
Mixed Signals: Central Bank Independence, Coordinated Wage Bargaining, and European Monetary Union

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The nations of the European Union (EU) are taking a major step toward greater economic and political integration by creating a monetary union to be administered by a European central bank that is formally independent of political control. There is broad consensus among the governing elites of Europe, informed by an extensive literature in economics, that the independence of the new central bank will confer important economic advantages on the new European Monetary Union (EMU).¹ As one influential financial publication concluded, “The argument for central bank independence . . . appears overwhelming.”²

Our purpose in this article is to question that consensus and to present a new perspective on the economic effects of the EMU.³ We focus on three issues. How should the effects of central bank actions on the economy be conceptualized? Do higher levels of central bank independence invariably result in better economic performance? Will establishing an EMU equipped with such a bank improve economic well-being in its member states? The analysis carries implications for what can be expected from currency unions more generally.

Our core contention is that many of the effects of central bank independence operate through a signaling process that takes place between the bank and economic

We began contemplating these issues independently in 1992–93. Since that time, too many intellectual debts related to this line of research have been incurred for us to name them all. We must, however, note our special gratitude to David Soskice and Torben Iversen, with whom we have separately and jointly discussed these issues on innumerable occasions. We also wish to thank Jeff Frieden and Barry Eichengreen and the participants at the 1996 Political Economy of European Integration meeting where an earlier version of this article was presented. The helpful comments of the anonymous reviewers are also gratefully acknowledged.

1. See European Commission 1990; Eichengreen 1990, 117–87; de la Dehesa et al. 1993; Gros and Thygesen 1992; Goodhart 1995, 448–506; Fratianni, von Hagen, and Waller 1992; and Fratianni and von Hagen 1992, 187–88. For a more general discussion of advantages and disadvantages of the EMU, see Eichengreen 1992; Eichengreen and Frieden 1997; and Goodhart 1995.

2. *The Financial Times*, 12 November 1992, 20.

3. Here we consider only those aspects of economic performance likely to be affected by the independence of the proposed European central bank. For a more general discussion of other factors bearing on the performance of the EMU, see Eichengreen 1992 and 1994.

actors. Most analyses assume an effective signaling process, but we suggest that this is unrealistic and that the effectiveness of the process more likely depends on a broader set of institutional conditions, including, most notably, the organization of wage bargaining. We argue that, where wage bargaining is more coordinated, this signaling process is likely to be more effective, so that increasing the independence of the central bank can lower the long-run rate of inflation at relatively low unemployment costs. Where bargaining is less coordinated, however, increases in central bank independence may lower the rate of inflation only at the cost of substantially higher levels of unemployment. The analysis carries substantial implications for the relative value the EMU will have for the nations that join it.

We proceed in three steps. First, we develop the theoretical underpinnings of the argument by examining existing theories about central bank independence.⁴ Second, we explore the applicability of the analysis to the Federal Republic of Germany, a crucial case often cited in support of plans for an independent European central bank.⁵ Third, we test the theoretical contentions developed here against those more commonly found in the literature through empirical analysis of the experience of the OECD nations.⁶

Our intent in this article is to bring the insights of international political economy to bear on an issue that is often treated in more narrow economic terms. It can be read as a critique of the central bank independence literature, as a reevaluation of the consequences of the EMU, and as an argument about the importance of institutional interaction within political economies.

Theories of Central Bank Independence

A standard neoclassical model underpins most of the literature on central bank independence. The model assumes that the rate of inflation is determined primarily by the rate of growth of the money supply, which is controlled by the central bank, while the rate of unemployment is affected by the level of real wages and unanticipated changes in policy.⁷ Within this framework, a variety of theories currently attribute advantages to central bank independence. Some analysts argue that an independent central bank can stimulate the economy more effectively because economic actors are less likely to anticipate monetary expansion from it than they would from a central bank more dependent on politicians.⁸ Others argue that central bank independence may reduce

4. Some of the basic theoretical literature is collected in Persson and Tabellini 1994; for the most extensive treatment, see Cukierman 1992.

5. See Fratianni, von Hagen, and Waller 1992; and Alesina and Grilli 1993.

6. For preceding analyses, see Alesina and Summers 1993; Grilli, Masciandaro, and Tabellini 1991; Cukierman 1992; and Eijffinger and De Haan 1996 for a review.

7. Although some of these postulates may be contentious, we do not take issue with them here because our own arguments hold under a variety of economic assumptions, including those of the standard neoclassical framework.

8. On this argument and a variety of others that go somewhat beyond this discussion, see Cukierman 1992.

the political business cycles that result from preelectoral manipulation of monetary policy or from postelectoral partisan shocks.⁹ However, the claim on which we focus here is the one most frequently cited in favor of central bank independence, namely, the claim that derives from the time-inconsistency problem associated with monetary policy in the context of nominal-wage contracting.

This theory specifies that, given nominal wages and/or prices that must be fixed for some duration before monetary policy is set, uncertainty about the future stance of monetary policy (and hence the rate of inflation) will lead contractors to agree on higher nominal wages and prices than they desire to guard against the possibility that future inflation will lower real wages and returns. As a result, wage–price settlements will be more inflationary than might otherwise be the case. Although the central bank can offer assurances that it will refrain from generating such inflation, the credibility of those assurances will be undermined to the degree the bank responds to politicians, who are known to be sensitive to electoral pressures that might incline them toward a more expansionary policy. Thus, rendering the central bank more independent of political control will increase the credibility of its assurances that monetary policy will remain tight, thereby allowing wage–price bargainers to lower their nominal contracts by reducing their fears about the real-wage and real-return losses that unanticipated inflation would generate. The result will be a lower rate of inflation without any adverse effects on the real economy.¹⁰

This theory is now one of the most widely accepted in economics. However, it has both strengths and weaknesses that can best be appreciated by seeing the central issues here as involving signaling and coordination. In short, this is a theory about the effectiveness of the process whereby signals transmitted from the central bank lead economic actors to coordinate on Pareto-superior forms of equilibrium behavior. The independence of the central bank matters primarily because it alters (1) the content of the signals that the bank sends about the course of monetary policy (a “conservatism effect”) and (2) the credibility of those signals (a “credibility effect”).¹¹ If credible signals are sent from the bank, and the relevant economic actors are able to coordinate their behavior in light of them, nominal wage–price settlements will be lower than they would otherwise be, and the bank can pursue the monetary policy it has announced without dampening the economy. On the other hand, if these signals do not inspire appropriate wage–price behavior, either because they lack credibility or because the relevant actors cannot coordinate on appropriate behavior, the monetary policy announced by the bank will occur in a context of relatively excessive nominal wages and prices, thereby dampening the economy and generating unemployment. Therefore, the conventional theory of central bank independence has the great merit of drawing our attention (1) to the importance of signal-

9. See Nordhaus 1975; Beck 1982; Alesina 1988; and, most recently, Clark, Lomas, and Parker 1998.

10. The classic source is Rogoff 1985, which builds on Barro and Gordon 1983, and Kydland and Prescott 1977. See also Lohmann 1992; and Cukierman 1992.

11. The general presumptions are that the more independent the central bank, the more restrictive its monetary policy and the more credible its commitment to a given policy announcement.

ing in central bank behavior, (2) to the importance of the credibility of those signals, and (3) to the significance of independence for such credibility.

However, the model of signaling and coordination underpinning this theory is deficient in some other important respects. In general, it portrays signaling as a highly diffuse process in which the central bank's announcement of a monetary rule will by itself lead a vast number of actors in the economy to modify their wage-price settlements. This is based on standard rational expectations assumptions that each actor will be able to predict the effects of an announced monetary policy on the economy, the behavior of all other relevant actors in the face of such an announcement, and the effects of that behavior. Under these conditions, rationality alone leads actors to coordinate their behavior on the optimal equilibrium. But such a model may not be appropriate for many of the cases it is meant to cover. It suffers from two problems. First, it assumes that the actors have unrealistically high levels of prescience and information. As Barry Eichengreen has observed in another context, the effects of monetary policy are often the subject of considerable disagreement even among experts.¹² When there are many wage and price bargainers in the economy, it is highly unlikely that they will all be able to predict the multiple effects of monetary policy with precision, let alone predict the behavior that will follow from the predictions made by other actors.¹³ Second, this approach neglects the collective action problems often present when the behavior of a large number of actors, facing some uncertainty about the behavior of others, must be coordinated. Such problems are well known to be endemic to wage bargaining in particular.¹⁴ In the circumstances of most industrial economies, we think it more realistic to posit actors (1) with bargaining power so that they must condition their wage and price settlements on expected settlements elsewhere, but (2) with less-than-complete information about the effects of monetary policy and/or others' reactions to it. This means that substantial collective-action problems will be associated with securing coordination on a Pareto-optimal equilibrium, which rationality alone will not address. In such circumstances, achieving an effective signaling and coordination process will depend more heavily on the presence of an appropriate set of institutional arrangements of the sort the "new political economy" draws to our attention, that is, institutions that provide the actors with a basis for making credible commitments, monitoring each other's behavior, and so on.¹⁵ From this perspective, the problem with most conventional analyses of central bank independence is that, by considering the characteristics of only one institution—

12. Eichengreen and Ghironi 1997.

13. Since prices can be defined as a markup on wages, any wage bargaining is by definition also bargaining over the price and profit rate. Henceforth, whenever we say "wage bargaining," we mean wage *cum* price bargaining. For simplicity, we will not continue to carry around both terms, but it is important to remember that it is restraint in wage *cum* price bargaining that is essential and that coordination of such bargaining can come as easily (or perhaps more easily) from the employer side as from the labor side.

14. For two of the most complete recent treatments, see Layard, Nickell, and Jackman 1991, esp. chap. 2; and Calmfors 1993.

15. See, for example, Milgrom and Roberts 1992; and Alt and Shepsle 1990.

that is, the central bank—they fail to appreciate the potential role of other institutions in the overall signaling and coordination process.

In this article we seek (1) to render the analysis of central bank independence more realistic by assuming that actors have less-than-complete information about the effects of monetary policy and the behavior of other actors; and (2) to broaden the analysis by including other institutions relevant to the signaling and coordination process. We focus, in particular, on the institutions associated with wage bargaining.¹⁶

The Role of Coordinated Wage Bargaining

Our choice of variables is not coincidental. A substantial literature in comparative political economy suggests that the institutional variables associated with wage bargaining can have large effects on economic performance.¹⁷ To date, scholars seeking institutional explanations for the rate of inflation have been confronted with two separate literatures that deserve to be integrated: one school emphasizes central bank independence and the other wage bargaining.

We focus here on the coordination of wage bargaining, a phrase that refers to the degree to which trade unions and employer organizations actively coordinate the determination of wage settlements across the economy. The degree of coordination, in turn, depends heavily on the organizational structures for wage bargaining, which vary from country to country. The institutional arrangements required for coordinated wage bargaining are complex because they must support cooperative outcomes in five nested sets of strategic interactions.¹⁸ The first set of interactions occurs within each dyad of bargainers between the organizations representing workers and those representing employers. A second set takes place between the leaders of bargaining organizations and the rank-and-file members whose support they must retain. We focus here on the third and fourth sets of interactions—those between the bargainers in each dyad and their counterparts in other dyads and those between wage bargainers as a group and the authorities controlling economic policy. A fifth set occurs between the authorities controlling monetary policy and those controlling fiscal policy.

With regard to these interactions, an early literature associated wage coordination entirely with highly centralized trade union movements bargaining at the peak level

16. See also Hall 1994. Franzese adds variation in the sectoral (structural) position of the actors to this sort of analysis; see Franzese 1994, and forthcoming. Iverson adds consideration of wage disparity and wage-equalization goals on the part of labor within a somewhat different framework; see Iverson 1994 and 1996; and Garrett and Way 1995a.

17. The classic early references are Bruno and Sachs 1984; and Cameron 1984. See also Calmfors 1993; Calmfors and Driffill 1988; Lange and Garrett 1985; Layard, Nickell, and Jackman 1991; and Soskice 1990. The other variable most often cited as important in this literature is the partisan composition of the government, which we also include in our regression models but, strictly speaking, is not an institutional feature of the political economy.

18. See Scharpf 1988, 1991; Thelen 1991; and Tsebelis 1990.

with employer confederations. In recent years, however, two important amendments have been made to this view. First, analysts have shown that employers' organizations can play an equally important role in the coordination of wage bargaining.¹⁹ Second, analysts have noted that effective coordination can take place within either of two organizational structures. In one structure, the principal locus of bargaining occurs at the economy-wide level, with negotiations taking place among highly centralized trade unions and employer confederations. In the other structure, wage negotiation occurs among trade unions and employer organizations that are highly concentrated at the sectoral level but equipped with sufficient economy-wide linkages to transmit across the economy the settlement reached in a leading sector.²⁰

To appreciate the impact of wage coordination on the economy, consider the case in which bargaining is not coordinated but conducted by many units acting separately. In this scenario, each bargaining unit, generally a dyad of employer and union, must reach a settlement in the context of considerable uncertainty about what the settlements reached by other bargaining units will be. This is conducive to three behavioral consequences.

First, the union in each dyad will be tempted to seek an extra "inflation increment" on top of the real wages it desires in order to protect itself from the real-wage losses it will incur if other settlements are more inflationary than its own. Because employers can expect such inflation to erode any nominal-wage concessions they make, they will also be more likely to accede to high settlements. Second, the actors in any one bargaining unit are unlikely to let considerations about the effects of their settlement on the overall economy influence their decision making, because any one bargaining unit is normally too small to have a noticeable impact of its own on the economy. This posture will be reinforced by the fact that other bargaining units can be expected to take a similar view such that, if one union moderates its nominal-wage settlement in the national economic interest, it may suffer real-wage losses from the failure of other units to do so.²¹ Third, when the economy-wide level of wage settlements proves inflationary, the fiscal or monetary authorities may respond with deflationary policies. In an uncoordinated setting, however, the actors in any one bargaining unit are unlikely to let the prospect of such a response influence their own settlement very much because they know that the monetary authority will be producing a policy, not in response to it, but to settlements that they cannot control across the economy as a whole. Thus, in uncoordinated settings, wage bargainers are unlikely to be highly responsive to threats from the fiscal or monetary authorities to respond to inflationary settlements with deflation.

Compare now the case in which wage bargaining is coordinated. In such settings, a central or lead bargain has great influence over the level of wage settlements in the

19. Thus, wage bargaining can be coordinated in Japan, where the unions are company-based, because bargaining is concentrated into a single "spring offensive," and employers can use their dense network of business associations to coordinate negotiations. See Soskice 1990; Swenson 1989; and Thelen 1994.

20. See Golden 1993; Iversen 1994.

21. This parallels the arguments in Olson 1965 and 1982.

economy as a whole. Several implications follow from this scenario. First, since the members of each bargaining unit, especially the lead unit, know what the level of subsequent wage settlements is likely to be once they have settled on their own, they need not build an increment for unanticipated inflation arising from other higher settlements into their own agreement. Second, because the lead bargaining unit knows that its settlement is likely to be generalized to the whole economy, the actors within it have a strong incentive during negotiations to consider the impact of their settlement on the economy. Thus, we can expect their concerns about levels of inflation, unemployment, and national competitiveness to influence wage settlements more strongly in coordinated systems of wage bargaining. An important empirical hypothesis follows from these observations: where wage bargaining is more coordinated, we should see lower rates of inflation, whether or not the central bank is independent.

Most central to our argument, however, is the way in which the system of wage bargaining interacts with the character of the central bank. Because, in a system of coordinated wage bargaining, the settlement of the lead bargaining unit is likely to be copied by other bargaining units, with direct effects for the entire economy, those negotiating the settlement know that the central bank is likely to respond directly to it. This renders the principal wage bargainers highly sensitive to signals from the central bank about the appropriateness of pending wage settlements and the likely stance of monetary policy in the face of them. In short, the signals sent from the central bank are more likely to affect the level of wage settlements in settings where wage bargaining is coordinated than in settings where it is not.

The important implication of this interaction is that, where wage bargaining is coordinated, the central bank may be able to influence the level of settlements and reduce inflation simply by signaling its policy intentions so that monetary policy does not raise the level of unemployment. Where wage bargaining is uncoordinated, however, such that small bargaining units have no reason to expect a direct response to their settlement and disincentives to exercise general moderation lest others fail to do so, the central bank may have to apply tight monetary policies that induce substantial increases in unemployment before wage and price contracts will respond.

In summary, we contend that (1) national levels of inflation and unemployment are affected significantly by the effectiveness of the signaling and coordination process that links the central bank and wage contractors, and (2) the character of the wage-bargaining system is critical to the effectiveness of this process. Through a combination of “conservatism” and “credibility” effects, increasing the independence of the central bank will most likely reduce the rate of inflation in all systems.²² However, this analysis suggests that credibility effects, which allow an increase in the independence of the central bank to reduce inflation without large increases in unemployment, are likely to dominate only where the signaling and coordination process is

22. The term *conservatism effects* refers to the tendency of more independent banks to be less tolerant of higher levels of inflation, and the term *credibility effects* refers to the impact of a more independent central bank committing to announced policy targets.

effective, namely, in systems where wage bargaining is coordinated. Where wage bargaining is less coordinated, an increase in the independence of the central bank is likely to reduce inflation only at the cost of corresponding increases in unemployment.

In the sections that follow, we use a cross-national empirical analysis to test the validity of these propositions. First, however, we examine their plausibility in a crucial national case, that of Germany.

The German Model Reconsidered

The Federal Republic of Germany has long been one of the most prominent cases adduced to support arguments for the economic effects of central bank independence. Its Bundesbank is considered one of the most independent central banks in the world, and for most of the postwar period, the German economy has been able to achieve low rates of inflation at relatively low rates of unemployment.²³ Thus, it is tempting to conclude, as many do, that the principal factor accounting for this outstanding economic record is the independence of the Bundesbank. This may have been one of the reasons why the European central bank is to be modeled on the Bundesbank.²⁴

A closer examination of the German case, however, suggests that the Bundesbank is not the only institutional feature of the German economy contributing to low inflation and unemployment.²⁵ In what follows, we argue that the institutional arrangements for wage bargaining have also greatly enhanced the capacity of the German economy to attain low rates of inflation at relatively low rates of unemployment.²⁶ Examining the German case allows us to explore in more detail the institutional arrangements for coordinated wage bargaining and how they operate in conjunction with monetary policy; these details will vary, of course, from nation to nation.

We begin by outlining the principal institutions that underpin wage bargaining. The German workforce is organized into seventeen large unions, often covering entire industries, that also belong to an overarching union confederation, the DGB (Deutscher Gewerkschaftsbund).²⁷ These unions bargain with employers associa-

23. From 1955 to 1990, the average rate of inflation in Germany was 3.7 percent compared with an average of 6.0 percent for the OECD nations examined here, and its average rate of unemployment was 3.1 percent versus 4.0 percent for the OECD. See Lohmann 1994.

24. See Alesina and Grilli 1993; and Eichengreen 1992, 38ff.

25. Although we focus in this analysis on the organization of the political economy, other factors may have contributed to Germany's good inflation record, including the strong growth of the economy and a more general cultural aversion to inflation born of the experience of hyperinflation in the 1920s. We are inclined to see the latter as a minor contributor to the outcome, but others accord it a more prominent role. See Hirsch and Goldthorpe 1978; and Lindberg and Maier 1985.

26. For analyses that explore the German case more fully than we can here, see Soskice 1990; Scharpf 1991; and Streeck 1984a,b. For an early formulation of similar arguments, see also Hall 1986, chap. 9.

27. Two smaller union confederations, the DAG (Deutsche Angestellten Gewerkschaft) and DBB (Deutscher Beamtenbund), are not in a position to have much influence on the overall outcomes, particularly the former, which is very small, whereas the DBB represents civil servants whose pay is set by legislation. On public-sector workers and wage bargaining, see Garrett and Way 1995b; on their interaction with central bank independence, see Franzese 1994 and forthcoming.

tions, also organized by industrial sector, representing 80 percent of German employers. Thus, collective bargaining is relatively centralized at the industry level. Both the unions and employers associations are strongly positioned vis-à-vis their rank and file through the control they exercise over a range of resources important to their members, such as skill certification, vocational-training schemes, and strike funds.

The system is supported by a legal framework that regulates many aspects of the bargaining process; specifies that only legally recognized unions can conclude collective wage agreements; and allows industry settlements to be extended to cover all companies in a sector by agreement between the union, the employers association, and the regional governments. At the plant level, a system of elected works councils, on which unions are generally represented, underpins the overall system. Works councils can negotiate local working conditions and, informally, local pay structures.²⁸

Equally central to the operation of the system is the less-formal arrangement whereby the settlements of most industries follow the precedent set by the bargain reached each year in a leading sector. For most of the postwar period, these lead bargains have been concluded between IG Metall, the massive metalworkers union that organizes a range of industries including automobiles, engineering, and steel, and the corresponding employers federation, Gesamtmetall.²⁹ A variety of factors converge to give IG Metall this role and to ensure that other industries follow its lead. Since it is the largest and one of the strongest German unions, others can follow its lead knowing they would be unlikely to improve on its settlement, and the powerful employers associations tend to resist increases beyond what it secures.³⁰

Clearly, these institutional arrangements constitute a system for highly coordinated wage bargaining and tend to promote low rates of inflation. Since the lead bargainers in metalworking know that their settlement is likely to be generalized to the whole economy, IG Metall need not seek an additional increment to guard against unanticipated levels of inflation that might follow from subsequent settlements. Both IG Metall and Gesamtmetall have strong incentives to take into account the overall economic impact of any potential settlement when determining it. Thus, the system of wage bargaining itself tends to reduce inflation.

In addition, the German system also features a particular kind of interaction between wage bargainers and the central bank. The highly public conversation between the Bundesbank and the principal wage bargainers during the annual wage round in Germany is a prominent feature of German politics. The bank often issues pointed comments on the wage demands of the unions, accompanied by detailed commen-

28. On the importance of works councils in the overall system, see Thelen 1992; and Streeck 1984a. More generally, see Markovits 1986; Katzenstein 1987, chap. 3; and Berghahn and Karsten 1987.

29. The notable exception occurred in 1974 when the ÖTV, the public-sector union, took the lead in the negotiating round with less-than-ideal results. For a description of the events, see Goodman 1992, 71. See also Garrett and Way 1995b; and Franzese 1994 and forthcoming.

30. See Flanagan, Soskice, and Ulman 1983, chap. 5; Markovits 1986; and Thelen 1991.

tary on the state of the economy and warnings about the likely monetary policy consequences of overly inflationary wage settlements. Because bargaining is relatively centralized, the principal negotiators generally know whether the bank intends to respond to their particular settlement; and it is not uncommon for bargainers to issue counterstatements about the likely effect of their demands on the economy.³¹

In short, the coordination of wage bargaining in Germany helps to make the signaling process highly effective. The system does not work perfectly—occasionally, wage bargainers may defy the bank to test its resolve or to satisfy their rank and file—but, over the long run, they have paid careful attention to its pronouncements. As a result, the Bundesbank has often been able to use this signaling mechanism to induce more moderate wage settlements, thus limiting the extent to which it has had to rely on real monetary constriction.

Two other factors also enhance the effectiveness of the signaling process in Germany. First, the independence of the central bank increases the credibility of its pronouncements, which in turn helps to ensure that subsequent industry settlements do not exceed the lead bargain. This phenomenon suggests that there may be a reciprocal effect between central bank independence and wage coordination, whereby each augments the impact of the other, especially when bargaining is coordinated at the industry level.³² Second, the fact that a sector with high export concentration such as metalworking negotiates the lead bargain in most years may also enhance the effectiveness of the signaling mechanism. Wage bargainers in export sectors tend to favor lower settlements because they are concerned with maintaining unit labor costs at internationally competitive levels. However, they are also especially sensitive to signals from the central bank because the restrictive monetary policies that the bank wields tend not only to depress general economic activity but also to appreciate the exchange rate, thereby threatening the level of economic activity in export sectors especially severely.³³

In summary, the capacity of postwar Germany to secure low rates of inflation at low rates of unemployment cannot be attributed solely to the independence of the Bundesbank, but rather it derives from an effective signaling process that is based on a combination of central bank independence and coordinated wage bargaining.

A Cross-National Analysis

We turn now to a cross-national empirical investigation of the propositions advanced here. As noted earlier, one of the most important bases for contemporary enthusiasm

31. See, for example, Streeck 1984 and 1994; Scharpf 1988 and 1991, chap. 7; and Berghahn and Karsten 1987.

32. On this point, see also Iversen 1998 (although the rationale for this observation provided there differs to some extent from the one presented here).

33. See also Franzese 1994 and forthcoming.

about central bank independence is a set of simple yet influential empirical studies that conclude, using postwar-average cross-sections, that a nation can reduce its rate of inflation without any adverse real economic consequences simply by increasing the independence of its central bank. One such study concludes that "having an independent central bank is almost like having a free lunch; there are benefits but no apparent costs in terms of macroeconomic performance."³⁴

However, most of these studies suffer from a serious flaw. In keeping with neoclassical models that portray the economy as largely institutionally homogenous across nations, the only institutional variable they included is the degree of independence of the central bank.³⁵ Here, we propose including a further institutional variable: the degree to which wage bargaining is coordinated. Once this variable is brought into the analysis, two new possibilities arise. We may find that the independence of the central bank is only partially responsible for the effects hitherto attributed to it, and/or we may find that the precise impact of increasing the independence of the central bank depends on the configuration of other institutions in the political economy. The analysis presented in the preceding section suggests three specific hypotheses.

First, nothing in our account contradicts the proposition that an increase in the independence of the central bank will lower a nation's inflation rate. Thus, we expect to see a negative relationship between central bank independence and the rate of inflation in cross-national data.

Second, we expect the level of wage coordination to have an effect on the rate of inflation independent of the effects of central bank independence. This follows from the argument that, where wage bargaining is more coordinated, individual bargaining units will face more institutional incentives to avoid inflationary wage settlements.

Third, our theoretical perspective leads us to expect interaction effects between the level of central bank independence and the level of wage coordination with respect (especially) to the rate of unemployment. In nations where wage bargaining is coordinated, increasing the independence of the central bank may reduce the rate of inflation without adverse real economic consequences because the signaling system connecting the central bank to economic actors should be highly efficient. In nations where wage bargaining is less coordinated, however, we expect to find that increasing the independence of the central bank lowers the rate of inflation only at the cost of substantially higher rates of unemployment. This occurs because the signaling mechanisms are not efficient enough to allow the bank to reduce the rate of inflation without actually implementing restrictive real monetary policies that increase unemployment. Thus, we expect the unemployment cost of central bank independence to increase as the coordination of wage bargaining decreases. The corollary is that the

34. Grilli, Masciandaro, and Tabellini 1991, 375.

35. For notable exceptions, see Havrilesky and Granato 1993; Bleaney 1996; and Al-Marhubi and Willett 1994. For a survey including a review of previous empirical studies, see Eijffinger and De Haan 1996.

unemployment benefit of coordinated wage bargaining should increase with the independence of the central bank.³⁶

To test these hypotheses, we have assembled a data set covering all the OECD nations for which comparable data were available for the period 1955–90.³⁷ To measure central bank independence, we use an average of the five most commonly used indexes, which assess both the legal status of the central bank and its reputation for independence.³⁸ To measure the degree to which wage bargaining is coordinated across the economy, we construct an index based on one devised by David Soskice, extrapolated to a wider range of cases using the assessments made by Richard Layard, Stephen Nickell, and Richard Jackman of trade union and employer coordination and standard accounts of industrial-relations systems.³⁹ This index codes each nation at one of five points (0, 0.25, 0.50, 0.75, 1.0) based on the degree to which wage bargaining has been coordinated by trade unions and/or employers associations over the course of the 1955–90 period.

In the central bank independence literature, analysts have drawn their empirical support from cross-sectional analyses of the average postwar experience of the developed democracies. Accordingly, to ensure comparability with such analyses, we adopt the same approach in the first part of this investigation. Although this obviously limits the degrees of freedom, we think the argument underlying the approach—namely, that postwar-average cross sections are especially appropriate for assessing durable relationships between economic outcomes and structural variables that exhibit little or no variation over time—has considerable merit in this case.⁴⁰ The inde-

36. The reasoning behind the corollary is that, by being able to make more credible pronouncements, a more independent central bank can place greater pressure on the unions and firms in a *coordinated bargaining system* to exercise restraint, thereby enhancing the effectiveness of the system.

37. These eighteen cases represent all the major developed democracies from which Greece, Spain, and Portugal are excluded because they had undemocratic regimes for substantial portions of the period. Comparing a central bank's "independence" across authoritarian regimes and democratic regimes is difficult because the credibility of any nominal-legal degree of central bank independence ought to be discounted when the ruling regime is authoritarian, though by how much is unclear. Similar considerations plague the coding of wage-bargaining systems comparably across authoritarian and democratic regimes.

38. The five indexes are those most commonly employed in the literature: LVAU, an unweighted average of several legal characteristics, and QVAU, an unweighted average of survey results for CBI, from Cukierman 1992; EC, the rating of the economic independence of the central bank, and POL, the rating for political independence from Grilli, Masciandaro, and Tabellini 1991; and the original index from Bade and Parkin 1982.

39. See Soskice 1990, 55; Layard, Nickell, and Jackman 1991, 52; Flanagan, Soskice, and Ulman 1983; Ferner and Hyman 1992; Baglioni and Crouch 1990; and Crouch 1993. Some scholars prefer an index based on union organization, but this violates the important observation of Soskice 1990, Swenson 1989, and others that employer associations also contribute to wage coordination. A significant but unavoidable limitation of the data derived from Soskice and from Layard, Nickell, and Jackman is that they do not vary over time; see Soskice 1990; and Layard, Nickell, and Jackman 1991.

40. Alesina and Summers employ a similar approach and offer a similar defense; see Alesina and Summers 1993. Close inspection of such time-sensitive indexes of central bank independence and trade-union characteristics as do exist suggests that these variables did not shift substantially in the 1955–90 period. (The recent widespread movement toward more independent central banks occurred after our sample, which ends in 1990.) For example, 96.6 percent of the country-decade variance in Cukierman's LVAU index (the only time-variant index available) is solely cross-sectional (cross-country); see Cu-

TABLE 1. *Average rates of inflation and unemployment secured in OECD countries under alternative institutional arrangements, 1955–90*

	Inflation rate (%)			Unemployment rate (%)	
	Central bank independence			Central bank independence	
	Low	High		Low	High
<i>Coordinated wage bargaining</i>			<i>Coordinated wage bargaining</i>		
Low	7.5 (6) ^a	4.8 (2)	Low	4.7 (6)	6.1 (2)
High	6.2 (4)	4.8 (4)	High	2.3 (4)	2.8 (4)

Note: Cases were coded as follows: Coordinated wage bargaining, low = 0 and 0.25; high = 0.75 and 1. Central bank independence, low = <0.50, high = >0.50. Cases where coordinated wage bargaining = medium (0.5) are omitted here.

^aNumbers in parentheses indicate the number of countries in each category.

pendence of the central bank and the coordination of wage bargaining are clearly such variables. The premises are that the effects of such variables show up most clearly when assessed over a long period of time, and that greater confidence can be placed in any relationship if it persists over a wide variety of economic contexts—in this case extending from the years of postwar growth when inflation and unemployment were generally low, through the high-inflation period of the 1970s, to the high unemployment decade of the 1980s. Still, to the degree that cross-temporal variation that can be effectively measured and modeled exists, disaggregating the data may improve the empirical analysis. Accordingly, we extend previous inquiry by considering decade-frequency and annual data as well.⁴¹

We begin with some simple cross tabulations that display the broad patterns in the data. Table 1 reports the rates of gross domestic product (GDP)–deflator inflation and (internationally comparable) unemployment for nations that feature different levels of central bank independence and coordinated wage bargaining. Countries with more

kierman 1992. Since time-variant measures of coordination of wage and price bargaining do not exist, we can examine only proxies, such as Golden and Wallerstein's annual-level data for union confederation involvement in wage bargaining in six high-coordination countries; see Golden and Wallerstein forthcoming. Only 33 percent of the variation in this index is unique to country-year. Variation in the effective *coordination of wage bargaining* over this period is likely to be lower than variation in *union-confederal involvement* and far lower in low-coordination countries than in these six. Thus, 33 percent may serve as a very generous estimate of the upper limit of the share of total variation of coordination in wage and price bargaining that is country–time unique.

41. Time-variant indexes for the coordination of wage bargaining do not exist; central bank independence has been measured by “decade” (Cukierman's LVAU is measured for 1950–59, 1960–72, 1973–79, and 1980–89); the rest of our data can be measured annually. Although none of these levels of analysis is unambiguously dominant on statistical grounds, we view the decade-level analysis as the best compromise over degrees-of-freedom, data-limitations, and match-of-theory-to-empirical-specification considerations. Nonetheless, for comparison we report the results of all three levels of analysis.

independent central banks tend to have lower rates of inflation, as conventional analyses of central bank independence predict. In addition, as our second hypothesis predicts, increasing the level of coordination in the wage-bargaining system also seems to reduce the rate of inflation, albeit less substantially and only when central bank independence is low.

However, the unemployment effects of increasing the level of central bank independence vary according to the degree to which wage bargaining is coordinated. In nations where wage coordination is high, an increase in the independence of the central bank is associated with a very small increase in the rate of unemployment (0.5 percentage points). Where wage coordination is low, however, an increase in the independence of the central bank is associated with a substantial increase in the rate of unemployment (1.4 percentage points—or nearly three times as much). This is consistent with our third contention that increasing the coordination of wage bargaining improves the signaling and coordination mechanism between the central bank and wage bargainers, thereby making it possible for a nation to secure lower levels of inflation without as much cost in terms of higher levels of unemployment.⁴²

To provide more complete tests of our hypotheses we use regression analysis, which can assess the effects of the institutional variables (central bank independence, *CBI*; and coordinated wage bargaining, *CWB*) while controlling for a number of other economic and political variables that might be expected to influence the level of inflation or unemployment. In these regressions we control for (1) the economic openness of the economy, on the premise that more open economies may experience greater pressure to moderate the level of inflation and more (less) unemployment induced by adverse (favorable) fluctuations in the international economy; (2) the natural log of the level of real per capita GDP, on the premise that less-developed nations may be more tempted to rely on seignorage for revenue and more susceptible to high levels of unemployment; (3) the representation of left parties in the cabinet to reflect the widely accepted view that social-democratic governments are more likely to tolerate inflation and less likely to tolerate unemployment than their conservative counterparts; and (4) union density (percentage of the labor force unionized) on the premise that greater unionization (controlling for coordination) produces less wage restraint and, therefore, more inflation and unemployment.⁴³

42. Although tighter monetary policies normally raise unemployment only in the short run, through hysteresis, business confidence effects, and sustained deflation in an open economy, the result may be higher unemployment over long periods of time. Cf. Layard, Nickell, and Jackman 1991.

43. Economic openness is measured by exports plus imports as a percentage of GDP; terms of trade are measured by the export-price index divided by the import-price index (data from the International Monetary Fund International Financial Statistics, CD-ROM 6/96). The representation of the left in the cabinet is based on data from Lane, McKay, and Newton 1991; and Woldendorp, Keman, and Budge 1994. Classification of left parties is based on Swank 1989. Per capita GDP is from the Penn World Tables version 5.6. Unemployment and inflation are the internationally comparable figures compiled from OECD sources by Layard et al. 1991. Union density figures are from Golden and Wallerstein forthcoming, who worked from Visser 1992; here supplemented by Lane, McKay, and Newton 1991; Bean 1989; and Traxler 1994.

We use the following format for the regressions:

$$\pi = \alpha'_\pi \mathbf{C}_\pi + \beta_{cbi}^\pi CBI + \beta_{cwb}^\pi CWB + \beta_{cc}^\pi CBI \cdot CWB + \varepsilon^\pi$$

$$U = \alpha'_u \mathbf{C}_u + \beta_{cbi}^u CBI + \beta_{cwb}^u CWB + \beta_{cc}^u CBI \cdot CWB + \varepsilon^u$$

where π is inflation, U is unemployment, \mathbf{C} is a vector of controls (as mentioned earlier and including a constant), α is a vector of coefficients on those controls, and CWB and CBI are our measures of coordinated wage bargaining and central bank independence, respectively. We have three primary hypotheses and three ancillary hypotheses:

1. Central bank independence generally reduces inflation ($\beta_{cbi}^\pi + \beta_{cc}^\pi CWB < 0$);
2. Coordination of wage bargaining also generally decreases inflation ($\beta_{cwb}^\pi + \beta_{cc}^\pi CBI < 0$); and
3. Most centrally, coordination of wage bargaining reduces the unemployment cost of central bank independence ($\beta_{cc}^u < 0$).
4. We expect, not at all originally, that coordination of wage bargaining generally lowers unemployment ($\beta_{cwb}^u + \beta_{cc}^u CBI < 0$).
5. Because we have argued that central bank independence has unemployment costs when coordination of wage bargaining is low, this implies that, at least for low values of CWB , the unemployment costs of central bank independence ($\beta_{cbi}^u + \beta_{cc}^u CWB$) are positive, which in turn means that β_{cbi}^u must be sufficiently positive given that β_{cc}^u is expected to be negative.
6. Our analysis suggests that central bank independence and coordination of wage bargaining may interact in determining inflation as well as unemployment. Thus, β_{cc}^π may not be zero, but we do not have strong priors on its sign or magnitude.

The models we present are interactive, implying that the estimated effect of a unit increase in coordinated wage bargaining or in central bank independence is not given by the estimated coefficient on that variable alone but by $b_{cwb} + b_{cc}CBI$ and $b_{cbi} + b_{cc}CWB$, respectively. The estimated standard errors of these effects, in turn, depend on the standard error of both coefficients, their covariance, and the level of the other variable at which the standard error is being evaluated. Accordingly, a test of the effect of central bank independence on inflation, for example, cannot be read from the usual report of coefficient standard errors and t statistics but must be calculated separately (and produces a different significance level) at each level of the other variable. For example, our second hypothesis, that coordinated wage bargaining reduces inflation, leads us to expect that the estimated effect of coordinated wage bargaining on inflation, $b_{cwb}^\pi + b_{cc}^\pi CBI$, is significantly negative over all or most of the

sample range of central bank independence. Analogous considerations apply to our first, fourth, and fifth hypotheses.

In the data analysis that follows, we first report results from postwar-average data that regress the 1955–90 averages of inflation and unemployment each on a constant and the 1955–90 averages of the independent variables. The equation is estimated by ordinary least squares (OLS) with White’s heteroskedasticity-consistent variance-covariance matrices.

Next, we estimate regressions with decade-frequency data, which provides seventy-two observations. Dummy variables for each decade are included to allow for cross-nationally shared time trends and decade-specific supply shocks. To allow for the temporal dependence in the observations, we incorporate an AR(1) process in the residuals.⁴⁴ This temporal disaggregation now permits us to model the impact of international economic conditions on unemployment more accurately by controlling for the terms of trade ($ToT = [\text{export-price index}]/[\text{import-price index}]$) and terms of trade times trade openness ($ToT \cdot OPEN$).⁴⁵ The equations are estimated using weighted least squares (WLS) and White’s heteroskedasticity-consistent variance-covariance matrix.⁴⁶

Finally, although we consider the postwar average and decade-level analyses most appropriate given that our key institutional variables do not vary over time, we also report regressions employing annual-frequency data. This allows us to use the annual variation present in all but the institutional variables. Annual dummies are added to treat the data set as a pooling of cross sections rather than as a pooling of time series, increasing comparability of the estimates with those obtained from the other two

44. The first period is essentially immediately postwar, so we feel comfortable assuming that the residual from the previous decade does not have much lingering effect on the 1955–59 outcome. Accordingly, we begin the AR(1) process by allowing the 1955–59 residual to affect the 1960–72 outcome but being unaffected itself. This intuitively sensible procedure increases the sample size by a full 25 percent. A more orthodox (but less aggressive) Prais-Winston AR(1) process produces similar results. Both procedures assume a constant serial-correlation parameter that cannot be fully expected here because the adjacent data are averages of differing numbers of years. We have estimated decade-specific AR(1) parameters by Monte Carlo simulation using estimates from the annual data of the year-on-year correlation, but this makes no difference to our substantive conclusions, so we opt for the simpler and more familiar procedure.

45. We expect domestic unemployment to benefit (suffer) from positive (negative) terms-of-trade shocks to the degree the economy is open to foreign trade. The interaction captures this expectation; for example, it is an efficient and substantively meaningful way to control for oil booms in Norway and the United Kingdom. We omit terms of trade from the (domestic) inflation equations because terms-of-trade movements are essentially defined as movements in domestic inflation relative to foreign inflation.

46. Following standard practice to ease endogeneity concerns, each of the time-variant independent variables is measured in the year prior to the “decade” start. WLS is employed because the data for the dependent variables are averages over a different number of years (to accommodate the periodization of Cukierman’s LVAU index) and so should exhibit heteroskedasticity that is inversely proportional to the number of years in each decade. White’s matrix is then applied because the weights may not account for all the heteroskedasticity, although this does not substantively affect the results. (The Monte Carlo simulations mentioned in note 43 simulate the appropriate “decade” weights in the presence of annual serial correlation, producing similar results.)

levels of analysis. We estimate these equations by OLS as “pseudo-error-correction” models with Beck-Katz panel-corrected covariance (PCSE) matrices.⁴⁷

The results for all three sets of regressions, reported in Table 2, exhibit remarkable stability across the various units of temporal aggregation and, together, provide strong support for most of our hypotheses. In all models, both the level of central bank independence and the level of wage coordination have a negative and statistically significant relationship to the rate of inflation over the 1955–90 period (our first and second hypotheses).⁴⁸ For instance, taking the decade-level data as a base for estimates, if Belgium or the Netherlands ($CWB = 0.5$) had increased central bank independence by 0.3 points (an increase roughly equal to the distance between the independence of the Bank of England and the U.S. Federal Reserve), we estimate that they could have reduced their rate of inflation by about 1.16 percentage points. Conversely, if Denmark or Finland ($CBI \approx 0.5$) had increased coordinated wage bargaining by 0.25 points (to the level of Norway or Sweden), we estimate they could have reduced their inflation rate by about 0.44 points.

Similarly, our third, and most important, hypothesis—namely, that the unemployment costs of increasing central bank independence are not zero but rather depend (negatively) on the degree of wage coordination—receives very strong support here. The coefficients on the interaction term for $CBI \cdot CWB$ are negative, of substantial magnitude, and statistically significant in all three unemployment equations ($p \approx .0001$ in the “decade” equation, $p \approx .0025$ in the postwar-average equation, and $p \approx .047$ in the annual equation).⁴⁹

Although a less central hypothesis from this analysis, one further implication of these regressions is noteworthy. They suggest that increases in central bank independence tend to raise the level of unemployment in at least some settings. We interpret this as the “conservatism” effect noted earlier; that is, more independent central

47. On the interpretation of annual dummies as pooling cross-sections, see Smith 1995. On “pseudo-error-correction” and dynamic-model specification, see Beck 1991. On PCSEs, see Beck and Katz 1995 and 1996. Specifically, the “pseudo-error-correction” model here simply regresses (OLS) the change in the dependent variable on the lagged change and the lagged level of the dependent variable (this being revealed as the appropriate dynamics), changes in the independent variables (with the exception of the institutional variables, which do not change), and the first lag of the independent variables.

48. The effects of CBI and CWB on inflation are negative at statistically significant levels (.10 or better) over most or all (62.5–100 percent) of the sample range of the other variable in all three inflation equations. The effects of CBI (CWB) on unemployment are generally more significantly positive (negative) over more of the sample range of the other variable in all three unemployment equations (see Table 3).

49. We subjected these statistical estimates to a large number of sensitivity and robustness tests, including (1) searching for “influential points,” (2) considering alternative empirical measures, and (3) using alternative estimating procedures. Potential outliers were sought using DFbetas, Cook’s D, and leverage-to-squared-residual plots. “Robust” estimators that sequentially eliminate such outliers produce little substantive difference in our core findings. Substituting Cukierman’s LVAU for our averaged index of CBI or Soskice’s “economy-wide coordination” (ECW) and wage-pushfulness indexes for our CWB index produced similar findings, as did a variety of alternative estimating procedures (details available from the authors). In general, the results reported in Table 2 appear highly robust, with the possible exception of those regarding the ancillary hypothesis 6, the more marginal statistical support for which is also evident from the table.

TABLE 2. *Parameter estimates for models of inflation and unemployment in OECD countries, 1955–90*

<i>Independent variables</i>	<i>Dependent variables</i>					
	<i>Inflation rate (%)</i>			<i>Unemployment rate (%)</i>		
	<i>avg.</i>	<i>dec.</i>	<i>ann.</i>	<i>avg.</i>	<i>dec.</i>	<i>ann.</i>
Real GDP per capita (RGDPC) (in natural logs)	-2.1 (1.5) ¹⁹	-1.3 (0.8) ¹¹	-2.6 (1.1) ⁰²	-4.9 (1.4) ⁰¹	-3.5 (0.5) ⁰⁰	-3.1 (1.3) ⁰¹
Trade openness (OPEN) [(exports + imports)/GDP]	-1.8 (1.4) ²³	-2.1 (1.1) ⁰⁶	-1.2 (1.0) ²⁴	+2.0 (1.0) ⁰⁶	+19.5 (6.9)	+28.9 (13)
Terms of trade (ToT) (export prices/import prices)	—	—	—	—	+4.3 (2.1)	+8.0 (4.7)
Interaction term (ToT × OPEN)	—	—	—	—	-14.6 (6.4) ⁰³	-24.9 (12) ⁰⁴
Left cabinet participation (LCAB) (percentage of cabinet seats)	+1.87 (2.7) ⁵¹	-1.4 (0.7) ⁰⁵	+0.8 (0.8) ³⁰	+2.3 (1.4) ¹²	+1.4 (0.6) ⁰²	+1.0 (0.8) ²¹
Union density (UDEN) (percentage of labor force unionized)	+3.2 (2.8) ²⁸	+6.6 (1.8) ⁰⁰	+4.5 (2.0) ⁰²	+0.9 (3.1) ⁷⁹	+1.1 (1.8) ⁵⁴	+2.2 (2.2) ³¹
Degree of central bank independence (CBI)	-4.2 (1.7)	-6.2 (2.1)	-3.9 (2.8)	+11.5 (2.8)	+9.7 (1.9)	+8.3 (4.2)
Degree of coordinated wage bargaining (CWB)	-4.6 (2.3)	-4.1 (1.6)	-4.4 (2.6)	+1.0 (1.5)	-1.4 (1.5)	-1.6 (2.0)
Interaction term (CBI × CWB)	+3.2 (2.7) ²⁵	+4.7 (2.8) ¹⁰	+3.3 (3.8) ³⁹	-13.1 (3.3) ⁰⁰	-10.8 (2.5) ⁰⁰	-9.3 (4.7) ⁰⁵
<i>N</i> (degrees of freedom)	18 (10)	72 (60)	612 (566)	18 (10)	72 (58)	612 (562)
Adjusted <i>R</i> ²	0.55	0.73	0.31	0.81	0.86	0.40
SE	1.06	1.76	2.31	0.90	1.21	0.59
Durbin-Watson statistic	—	2.25	1.96	—	1.65	1.94

Note: Numbers in bold are estimated long-run coefficients; numbers in parentheses are their standard errors; superscript numbers are levels of significance from the two-sided *t*-tests of those long-run coefficients. *T*-tests of coefficients on individual variables are not informative in the usual manner when those variables are also involved in interaction terms in that regression (see text). Accordingly, the significance levels associated with those long-run coefficient estimates have been suppressed.

The long-run coefficients in the pseudo-error-correction models used for the annual data are given by $(b_0/|b_1|)$, where b_0 is the coefficient on the lagged level of the variable in question and $|b_1|$ is the absolute value of the coefficient on the lagged level of the dependent variable. The standard errors of these effects are then calculated as indicated in Greene 1997, 360–63.

Parameter estimates relating to the dynamics in the decade and annual models as well as the constants in all models have been suppressed to conserve space. Complete results are available from the authors.

banks may give more weight to securing low inflation over securing low unemployment than will more dependent banks. As Tables 2 and 3 suggest, however, these effects are likely to be more pronounced in settings where wage bargaining is relatively uncoordinated. Where it is highly coordinated, we have argued that an increase

TABLE 3. *The estimated impact of a unit increase in central bank independence at various degrees of coordination in the wage-bargaining system*

Level of wage-bargaining coordination	Impact on inflation rates (conditional parameter estimates)			Impact on unemployment rates (conditional parameter estimates)		
	avg.	dec.	ann.	avg.	dec.	ann.
	0.00 (U.S., U.K., Ireland)	-4.6 (2.3) ⁰⁷	-6.2 (2.1) ⁰⁰	-3.9 (2.8) ¹⁷	+12 (2.8) ⁰⁰	+9.7 (1.9) ⁰⁰
0.25 (France, Italy, New Zealand)	-3.8 (1.8) ⁰³	-5.0 (1.6) ⁰⁰	-3.1 (2.0) ⁰⁶	+8.3 (2.0) ⁰⁰	+7.0 (1.4) ⁰⁰	+6.0 (3.1) ⁰²
0.50 (Belgium, Netherlands)	-3.0 (1.5) ⁰⁴	-3.9 (1.3) ⁰⁰	-2.3 (1.4) ⁰⁵	+5.0 (1.4) ⁰⁰	+4.3 (1.0) ⁰⁰	+3.7 (2.1) ⁰⁴
0.75 (Japan, Germany, Denmark, Finland, Switzerland)	-2.2 (1.5) ⁰⁸	-2.7 (1.3) ⁰²	-1.5 (1.2) ¹²	+1.7 (1.2) ⁰⁸	+1.6 (0.9) ⁰⁵	+1.4 (1.5) ¹⁷
1.00 (Austria, Norway, Sweden)	-1.4 (1.7) ²¹	-1.5 (1.6) ¹⁸	-0.6 (1.7) ³⁵	-1.5 (1.4) ¹⁵	-1.2 (1.2) ¹⁸	+1.0 (1.6) ²⁷

Note: Numbers shown in bold are the estimated long-run effect of a unit increase in central bank independence at that level of coordinated wage bargaining. Numbers in parentheses are conditional standard errors at that level of coordinated wage bargaining. Superscript numbers are levels of significance based on a one-sided *t*-test at that point.

in central bank independence may actually help to lower unemployment by reinforcing the process of wage coordination, although the data provide only weak support for that contention. Table 3 reports the estimated long-run impact of a unit increase in central bank independence in settings that vary according to the level of wage coordination. As shown in the table, central bank independence tends to lower the rate of inflation in all settings but has the greatest impact where wage coordination is too low to affect inflation on its own. Conversely, central bank independence tends to increase the rate of unemployment, but this cost diminishes as coordination increases, perhaps even becoming a benefit at very high coordination.

Finally, the general patterns in these results can also be seen in Table 4, which reports the estimated rates of inflation and unemployment (according to the decade-level equations of Table 2) that can be expected to occur at different levels of central bank independence and wage coordination and at the sample means of the other variables. The first columns in the table indicate that, when wage bargaining is entirely uncoordinated, a 0.25 point increase in central bank independence (about the gap from the Danish to the U.S. bank or from the Austrian to the German bank) reduces the rate of inflation by about 1.5 points but at the cost of increasing the rate of unemployment by about 2.4 points. By contrast, where wage bargaining is more coordinated, as the last two columns indicate, a similar increase in the independence

TABLE 4. *Estimated inflation and unemployment rates at different levels of central bank independence and wage coordination (at means of other variables, using the “decade” equations)*

<i>Central bank independence</i>	<i>Level of coordinated wage bargaining</i>					
	<i>0.00</i>		<i>0.50</i>		<i>1.00</i>	
	<i>Inflation (%)</i>	<i>Unemployment (%)</i>	<i>Inflation (%)</i>	<i>Unemployment (%)</i>	<i>Inflation (%)</i>	<i>Unemployment (%)</i>
0.00	10.04	2.50	8.01	1.83	5.97	1.15
0.25	8.50	4.92	7.04	2.89	5.59	0.86
0.50	6.95	7.33	6.08	3.95	5.21	0.58
0.75	5.40	9.75	5.11	5.02	4.83	0.29
1.00	3.85	12.16	4.15	6.08	4.45	0.00

of the central bank brings smaller reductions in the inflation rate but without such large increases in the unemployment rate.

We interpret the findings reported in Tables 2–4 as follows. Starting from some level of central bank independence and some level of wage coordination, an increase in the coordination of wage bargaining improves the signaling process, thereby providing the central bank with the opportunity to get a lower unemployment rate at the same inflation rate or to secure a lower inflation rate at the same unemployment rate or to obtain some intermediate combination of these outcomes (and it appears that, in practice, the banks tend to take a little of both). In short, increases in the coordination of wage bargaining expand the “possibility frontier” in unemployment-inflation space for the better.

Similarly, when wage bargaining is highly coordinated, so that the bargainers have the incentive and capacity to respond effectively to signals from the central bank, an increase in the independence of the bank also expands the possibility frontier because, by rendering those signals more credible, the bank can reduce inflation without increasing unemployment. However, when wage bargaining is uncoordinated, increasing the independence of the central bank contracts the possibility frontier because, although it lowers the rate of inflation, it does so only at some unemployment cost. This occurs because, regardless of the credibility of the bank’s signals, the bargainers lack the incentive and capacity to respond to them effectively.

The Implications for Political Economy

These findings have important implications for our understanding of the political economy. First, they strongly support the contention that economic performance is

deeply affected by the institutional organization of the political economy and cannot be explained well without reference to variation in it.

Second, they speak to the problem of securing coordination in the economy. Many neoclassical analyses assume that the behavior of economic actors will be coordinated almost exclusively by competitive market mechanisms and that nonmarket organizations should be seen primarily as factors that interfere with effective coordination. However, by focusing on the signaling mechanisms that link central banks to bargaining units and the latter to each other, we have argued that nonmarket organizations can significantly contribute to the effective coordination of economic behavior and thus to economic performance. Our analysis suggests that approaches to economic problems that posit highly competitive markets and assume they will generate cooperative outcomes are empirically fragile at best. Instead, more attention should be paid to the way in which diverse sets of institutional arrangements resolve the coordination problems of the economy and, in particular, to the kinds of interaction effects occurring among them.⁵⁰

More specifically, we challenge the influential claim that, by increasing the independence of its central bank, a nation can improve its rate of inflation without any other adverse economic effects. Once the character of the wage-bargaining system is incorporated into the analysis, we find that this proposition holds only for nations with coordinated wage-bargaining systems. Where wage bargaining is less coordinated, increasing the independence of the central bank lowers the rate of inflation only at the cost of significant increases in unemployment. We arrive at this conclusion by considering the signaling process between bank and economy more closely, and we support it with a close inspection of the critical German case and results from an analysis of cross-national data at three levels of temporal aggregation.

These findings have important implications for national policymakers. In particular, they suggest that enhancing the independence of the central bank may not be the economic panacea that many believe it to be. Independence of the bank may provide the full gains it promises only when it is combined with coordinated wage bargaining.⁵¹ But, unlike central bank independence, which can be legislated relatively easily, wage coordination is difficult to secure and substantially beyond the control of government policy. A nation's capacity for wage coordination depends on the character of a variety of societal organizations, such as trade unions and employer confederations, that have emerged out of a long historical process and may not be highly amenable to political engineering.⁵² Thus, many governments that enhance the independence of their central banks may find the results somewhat disappointing.

50. See, for example, Alvarez, Garrett, and Lange 1991; Beck et al. 1993; and Soskice 1991.

51. Conversely, our arguments and evidence also suggest that coordinated wage bargaining may work better in conjunction with an independent central bank.

52. See Levy 1993; and Regini 1984.

The Implications for the EMU

This analysis has especially interesting implications for the monetary union currently being contemplated in Europe. The EMU is to be built around a European central bank whose general structure and level of independence are modeled on the German Bundesbank. Many hope that, as a consequence, the new union will emulate the historic performance of the German system.

Our analysis suggests that such aspirations are unlikely to be realized, because the German system has depended on levels of wage coordination that the EU is unlikely ever to acquire. On the one hand, the leadership of the EU has yet to show any real interest in acquiring such institutions, as indicated by the halting nature of the steps toward developing a Social Charter.⁵³ On the other hand, even if they did show interest, such institutions would be difficult to secure. Wide disparities in the organization of workers and employers across the EU mean that wage bargaining could not be coordinated across the continent without large-scale reorganization; and the few efforts made by trade unions or employers to reorganize wage bargaining on a European level have been singularly unsuccessful.⁵⁴ As a result, to secure low rates of inflation, a European central bank may have to resort to relatively high levels of unemployment because it will lack the effective signaling process provided by a continentwide system of wage coordination.⁵⁵

Furthermore, the common view that all nations will gain from the EMU may be wrong.⁵⁶ Our analysis suggests that the move to monetary union may improve the economic performance of some nations but is likely to erode the economic performance of others. The precise effects experienced by each nation will be determined by the effectiveness of its existing institutions relative to those it acquires by joining the EMU.

Some sense of these effects can be gleaned from Table 5, which reports the average postwar performance of nations possessing different combinations of institutions. Although realized economic performance under monetary union will differ from these historical levels, the table does suggest how performance under the institutional conditions of the EMU will be likely to compare with performance under different institutional conditions found in its member states.⁵⁷ The EMU will create an economic unit characterized by a highly independent central bank and uncoordinated wage bargaining. That is the situation represented by quadrant II in Table 5,

53. See Lange 1993; Leibfried and Pierson 1995; Streeck and Schmitter 1991; and Streeck 1995.

54. See Streeck and Schmitter 1991; and George 1992.

55. This conclusion is reinforced by the finding that economies with more independent central banks tend to have higher sacrifice ratios. See, for example, Walsh 1995.

56. Compare Committee for the Study of Economic and Monetary Union 1989; and Gros 1996, esp. 26.

57. Since we focus here on the economic effects of institutional context, all else being equal, this analysis ignores other effects, both positive and negative, resulting from the move to monetary union, such as those from lower transaction costs or the need to adjust to asymmetrical demand and supply-side shocks. On these and other effects, see Eichengreen 1992; and Kenen 1995.

TABLE 5. *National economic well-being under different institutional arrangements assessed by inflation rate, unemployment rate, and Okun misery index, 1955–90*

		Level of central bank independence	
		Low	High
Degree of coordinated wage bargaining	Low	I. MI: 12.2 π : 7.5 UE: 4.7	II. MI: 10.9 π : 4.8 UE: 6.1
	High	III. MI: 8.9 π : 6.2 UE: 2.3	IV. MI: 7.6 π : 4.8 UE: 2.8

Note: MI = misery index, π = inflation rate (%), UE = unemployment rate (%). See note to Table 1 for coding of central bank independence and coordinated wage bargaining.

which displays the average historical performance of OECD nations with that mix of institutions. Whether a nation will gain or lose from the EMU over the long run will depend on the quadrant of the table from which it is moving, that is, on the institutional conditions prevailing before monetary union. Nations that have had relatively dependent central banks and uncoordinated bargaining systems, such as Britain, Ireland, and France (quadrant I), may gain slightly, at least in terms of the Okun misery index, by virtue of acquiring a more independent central bank. Greece, Portugal, and Spain probably also fall into this category, though they are not included in our empirical analysis. However, if these countries expect to replicate Germany's historic levels of performance, even they may be disappointed because they are moving to quadrant II rather than to quadrant IV.

By contrast, Table 5 suggests that virtually all other member states in the EU may experience a deterioration in economic performance as a result of the move to monetary union because they are shifting from the institutional conditions of quadrants III or IV to those of quadrant II. Ironically, one of the biggest losers from this perspective will be Germany, a prime mover behind the establishment of the EMU. Germany has long benefited from the smooth interaction between its independent central bank and its coordinated wage-bargaining system. But this interaction will be disrupted because the Bundesbank will be replaced by a European central bank that faces a wide range of organizationally disparate and uncoordinated wage-bargaining units; it cannot be expected to respond directly to German bargainiers any more than to French or Dutch bargainiers.⁵⁸ Indeed, most nations that once had a coordinated wage-

58. As Soskice points out, the absence of a central bank that responds directly to wage and price bargainiers is likely to enhance the power of German trade unions relative to employers, which may in turn produce a variety of further effects inside the German system. See Soskice 1997.

bargaining system will suffer because they will become part of a common currency area with a multiplicity of uncoordinated bargaining units. In the German case, Table 5 suggests a relative deterioration in economic performance equivalent to the movement from an Okun score of about 7 to one that is closer to 11. Thus, the move to monetary union may not be an unmitigated blessing: its effects on economic performance will be distributed unevenly across countries.

Besides such cross-national effects, the EMU may also have significant distributive consequences across social groups within each nation. Clearly, changes in rates of inflation and unemployment have more adverse effects on some groups than on others. Although identifying all such effects with precision is difficult, lower-skilled manual and clerical workers tend to suffer disproportionately from rising rates of unemployment.⁵⁹ In this context, even when the move to monetary union improves the aggregate economic performance of a nation as measured by the Okun index, it may shift the mixture of inflation and unemployment experienced there. Even those nations that should gain the most from entering the EMU (quadrant I of Table 5) can expect to experience higher levels of unemployment as a result. Indeed, from an institutional perspective, there is reason to expect the EMU to contribute to higher rates of unemployment than experienced historically by most of its member nations, either because the new European central bank will be more independent than their own has been (and thus more likely to target inflation over unemployment) or because it will seek rates of inflation commensurate with past experience but without the efficient signaling mechanism provided by systems of coordinated wage bargaining. This suggests that those at the margins of the labor market may bear the greatest costs associated with the creation of the EMU.

Of course, we emphasize that one must treat these inferences with caution. The EMU may have other economic effects not modeled here that could offset some of the aggregate or distributive consequences on which we focus; and, because the figures in Table 5 are based on historical levels of performance, the actual levels of economic performance realized in the EU may diverge from them for a variety of reasons. However, the theory and evidence provided here suggest that the EMU will have more uneven distributive effects within and across countries than are conventionally acknowledged.

To return finally to the German case, the better guide to what we can expect from EMU may not be the familiar image of *Modell Deutschland* but Germany's experience with unification in the years just after 1989. After all, the creation of an EMU is analogous in some respects to the process of German unification. High-wage and highly skilled economies will be joined to less-developed regions under a single monetary authority. That authority will have to cope with a greater variety of economic shocks than did its national predecessors. New modalities for wage bargaining and fiscal coordination across the disparate regions of the union will have to be developed; and the various kinds of economic integration that should follow from

59. On this point, there is considerable literature. See, for example, Hibbs 1977; and Wood 1994.

monetary integration may generate substantial economic dislocation, as they did in Germany, albeit to a lesser degree.

In this context, the lessons that follow from the example of German unification are not altogether encouraging. The German system itself experienced severe strain as a result of unification. Two sources of that strain deserve emphasis here. First, efforts to incorporate East Germany into the existing industrial-relations system proved highly taxing and only partly successful. One result was high levels of industrial conflict, notably in the spring of 1993 when employers challenged the extension of the wage-bargaining system to the former East Germany.⁶⁰ Second, unification also provoked conflict between the federal government and the Bundesbank, which customarily responds not only to wage bargains, as we have emphasized here, but also to the fiscal policies of the government. When the efforts of the latter to finance unification resulted in fiscal and monetary expansion, the Bundesbank responded with high interest rates to encourage fiscal restraint and dampen inflationary pressures. The consequences were far from ideal for the German or European economies.

The EMU will pose similar, if less severe, challenges. It will disrupt the processes of signaling and coordination long established between central banks and wage bargainers in some nations—an effect that may inspire broader changes in their industrial-relations systems. It will require the development of new relationships between the European central bank and the fiscal authorities of each nation, relationships that have already been the subject of considerable controversy.⁶¹ Moreover, in the context of continuing high unemployment, many member governments may seek more expansionary policies precisely when the new European central bank is seeking to establish its credibility with relatively rigorous monetary policies. One effect is likely to be higher levels of unemployment than many proponents of the EMU currently envisage.⁶² Another may be intensified pressure for further institution building to cope with the dilemmas of coordinating fiscal and monetary policy.

The larger point here is that creating a monetary union in Europe will generate a variety of new coordination problems that will not automatically be solved by the presence of a relatively independent central bank. Resolving such problems will depend on the development of a larger system of institutional arrangements. An independent central bank trying to impose its will on a reluctant government or recalcitrant workforce may be only a second-best solution to problems that could be tackled more effectively through a broader range of institutions. In this respect, creat-

60. See Webber 1994; Silvia 1994; and Locke and Jacoby 1995.

61. At least some national governments have supported monetary union in the hope that it will allow them to implement more expansionary policies than were possible under an EMS dominated by the Bundesbank, whereas others insist on greater fiscal and monetary strictness. See Fratianni and von Hagen 1992, chaps. 8, 9; Gros 1996, 88ff.; Frieden et al. forthcoming; and Eichengreen 1992.

62. The case of the United States in the early 1980s, when the government ran high deficits while the Federal Reserve Bank pursued a tight monetary policy, suggests that significant employment effects, lasting up to ten years, can follow from this combination. See Krugman 1989. On the political economy of U.S. monetary policy more generally, see Mayer 1990; and Wooley 1984. On potential fiscal-monetary conflict under the EMU, see Kenen 1995, chap. 4; and Gros and Thygesen 1992, chap. 8.

ing an EMU is likely to be only the first step in a more extensive process of institution building, bearing on both the coordination of monetary and fiscal policy at the European level and the character of collective bargaining within its member states.⁶³ The success of the EMU will ultimately depend on this wider process.

Appendix

We list here summary statistics for the data and all the data necessary to replicate the postwar-average results presented in the text. The data analysis was conducted in Econometric Views 2.0, Stata 5.0, and Gauss-386i v. 3.01. All of the data are available electronically from <http://www-personal.umich.edu/~franzese>.

TABLE A.1. *Postwar-average data and summary statistics for annual data*

<i>Country</i>	<i>MI</i>	<i>UE</i>	π	<i>CBI</i>	<i>CWB</i>	<i>GDP</i>	<i>OPEN</i>	<i>UDEN</i>	<i>LCAB</i>
United States	10.17	5.76	4.41	0.75	0.00	9.43	0.11	0.24	0.00
Japan	6.34	1.97	4.42	0.41	0.75	8.49	0.20	0.32	0.00
Germany	6.80	3.13	3.68	0.93	0.75	8.92	0.39	0.34	0.29
France	10.79	4.16	6.63	0.43	0.25	8.91	0.29	0.18	0.17
Italy	14.19	5.576	8.62	0.37	0.25	8.72	0.30	0.34	0.18
United Kingdom	12.25	4.88	7.37	0.42	0.00	8.95	0.37	0.43	0.33
Canada	11.49	6.43	5.06	0.61	0.00	9.25	0.39	0.30	0.00
Austria	6.57	2.18	4.39	0.65	1.00	8.71	0.46	0.55	0.65
Belgium	9.94	5.48	4.46	0.41	0.50	8.88	0.95	0.48	0.24
Denmark	11.51	4.85	6.65	0.53	0.75	8.94	0.52	0.67	0.64
Finland	10.75	3.10	7.66	0.49	0.75	8.78	0.43	0.54	0.39
Ireland	16.10	8.10	8.00	0.46	0.00	8.38	0.79	0.51	0.09
Netherlands	9.05	4.27	4.78	0.56	0.50	8.91	0.93	0.34	0.16
Norway	8.00	2.23	5.76	0.23	1.00	8.96	0.54	0.55	0.72
Sweden	8.46	1.73	6.73	0.30	1.00	9.03	0.45	0.73	0.85
Switzerland	5.00	0.89	4.11	0.84	0.75	9.32	0.53	0.32	0.23
Australia	10.56	3.95	6.61	0.47	0.25	9.10	0.28	0.46	0.22
New Zealand	9.22	1.34	7.88	0.15	0.25	8.97	0.43	0.58	0.27
Mean	9.96	4.01	5.96	0.50	0.49	9.15	0.46	0.44	0.31
Std. dev.	2.88	2.038	1.578	0.20	0.37	0.20	0.23	0.15	0.24
Maximum	16.5	8.46	8.62	0.93	1.00	9.51	0.95	0.73	0.83
Minimum	4.98	0.87	3.68	0.15	0.00	8.60	0.11	0.18	0.00

Note: *MI* = misery index, *UE* = unemployment, π = inflation, *CBI* = central bank independence, *CWB* = coordination of wage bargaining, *GDP* = natural log of real GDP per capita, *OPEN* = (exports + imports)/GDP, *UDEN* = fraction of labor force unionized, *LCAB* = fraction of cabinet seats held by left parties. See footnote 42 for sources.

63. Soskice 1997.

References

- Al-Marhubi, Farim, and Thomas D. Willett. 1994. The Anti-inflationary Influence of Corporatist Structures and Central Bank Independence: The Importance of the Hump-Shaped Hypothesis. Unpublished manuscript, Claremont McKenna College, Claremont, Calif.
- Alesina, Alberto. 1988. Macroeconomics and Politics. In *NBER Macroeconomics Annual*, vol. 3, 13–52. Cambridge, Mass.: NBER and MIT Press.
- Alesina, Alberto, and Vittorio Grilli. 1993. The European Central Bank: Reshaping Monetary Politics in Europe. In *Establishing a Central Bank: Issues in Europe and Issues for the U.S.*, edited by Matthew Canzoneri, Vittorio Grilli, and Paul Masson, 43–77. New York: Cambridge University Press.
- Alesina, Alberto, and Lawrence Summers. 1993. Central Bank Independence and Macroeconomic Performance. *Journal of Money, Credit, and Banking* 25 (May):151–62.
- Alt, James, and Kenneth Shepsle, eds. 1990. *Perspectives on Positive Political Economy*. New York: Cambridge University Press.
- Alvarez, R. Michael, Geoffrey Garrett, and Peter Lange. 1991. Government Partisanship, Labor Organization, and Macroeconomic Performance. *American Political Science Review* 85 (2):539–56.
- Bade, Robin, and Michael Parkin. 1982. Central Bank Laws and Monetary Policy. Unpublished manuscript, University of Western Ontario, London, Ontario.
- Baglioni, Guido, and Colin Crouch, eds. 1990. *European Industrial Relations: The Challenge of Flexibility*. London: Sage.
- Barro, Robert, and David Gordon. 1983. Rules, Discretion, and Reputation in a Model of Monetary Policy. *Journal of Monetary Economics* 12:102–22.
- Bean, R., ed. 1989. *International Labour Statistics: A Handbook, Guide, and Recent Trends*. London: Routledge.
- Beck, Nathaniel. 1982. Presidential Influence on the Federal Reserve in the 1970s. *American Journal of Political Science* 26 (August):415–45.
- . 1991. Comparing Dynamic Specifications: The Case of Presidential Approval. *Political Analysis* 3:51–89.
- Beck, Nathaniel, and Jonathan Katz. 1995. What to Do (and Not to Do) with Time-Series-Cross-Section Data in Comparative Politics. *American Political Science Review* 89 (3):634–47.
- . 1996. Nuisance Versus Substance: Specifying and Estimating Time-Series-Cross-Section Models. *Political Analysis* 6:1–36.
- Beck, Nathaniel, Jonathan Katz, R. Michael Alvarez, Geoffrey Garrett, and Peter Lange. 1993. Government Partisanship, Labor Organization, and Macroeconomic Performance: A Corrigendum. *American Political Science Review* 87(4):945–48.
- Berghahn, Volker, and Detlev Karsten. 1987. *Industrial Relations in West Germany*. Oxford: Berg.
- Bleaney, Michael. 1996. Central Bank Independence, Wage-Bargaining Structure, and Macroeconomic Performance in OECD Countries. *Oxford Economic Papers* 48:20–38.
- Bruno, Michael, and Jeffrey Sachs. 1985. *Economics of Worldwide Stagflation*. Cambridge, Mass.: Harvard University Press.
- Calmfors, Lars. 1993. Centralization of Wage Bargaining and Economic Performance—A Survey. Seminar Paper 536. Stockholm: Institute for International Economic Studies.
- Calmfors, Lars, and John Driffill. 1988. Centralization of Wage Bargaining. *Economic Policy* 6 (April): 13–61.
- Cameron, David. 1984. Social Democracy, Corporatism, Labor Quiescence, and the Representation of Economic Interest in Advanced Capitalist Society. In *Order and Conflict in Contemporary Capitalism*, edited by John H. Goldthorpe, 143–78. New York: Oxford University Press.
- Clark, William Roberts, Usha Nair Reichert, Sandra Lynn Lomas, and Kevin L. Parker. 1998. International and Domestic Constraints on Political Business Cycles in OECD Economies. *International Organization* 52(1):87–120.

- Committee for the Study of Economic and Monetary Union. 1989. *Report on Economic and Monetary Union in the European Community*. Brussels: European Community.
- Crouch, Colin. 1993. *Industrial Relations and European State Traditions*. Oxford: Clarendon.
- Cukierman, Alex. 1992. *Central Bank Strategy, Credibility, and Independence: Theory and Evidence*. Cambridge, Mass: The MIT Press.
- de la Dehesa, Guillermo, Alberto Giovannini, Manuel Guitian, and Richard Portes, eds. 1993. *The Monetary Future of Europe*. London: Centre for Economic Policy Research.
- Eichengreen, Barry. 1990. One Money for Europe? Lessons from the U.S. Currency and Customs Union. *Economic Policy* 10:117–87.
- . 1992. Should the Maastricht Treaty Be Saved? *Princeton Studies in International Finance* 74: 38ff.
- . 1994. *International Monetary Arrangements for the 21st Century*. Washington, D.C.: Brookings Institution.
- Eichengreen, Barry, and Fabio Ghironi. 1997. European Monetary Unification and International Monetary Cooperation. Working Paper. Berkeley, Calif.: Center for International and Developmental Economics Research, University of California.
- Eichengreen, Barry, and Jeffrey Frieden, eds. 1997. *The Political Economy of European Integration*. Ann Arbor: University of Michigan Press.
- Eijffinger, S. C. W., and J. De Haan. 1996. The Political Economy of Central Bank Independence. Special Papers in International Economics 19. Princeton, N.J.: Economics Department, Princeton University.
- European Commission. 1990. One Market, One Money. *European Economy* 44 (October).
- Ferner, Anthony, and Richard Hyman, eds. 1992. *Industrial Relations in the New Europe*. Oxford: Blackwell.
- Flanagan, Robert J., David W. Soskice, and Lloyd Ulman. 1983. *Unionism, Economic Stabilization, and Incomes Policies*. Washington, D.C.: Brookings Institution.
- Franzese, Robert J., Jr. 1994. Central Bank Independence, Sectoral Interest, and the Wage Bargain. Working Paper 56. Cambridge, Mass.: Center for European Studies, Harvard University.
- . 1996. The Political Economy of Over-Commitment: A Comparative Study of Democratic Management of the Keynesian Welfare State, chap. 4. Ph.D. diss., Harvard University, Cambridge, Mass.
- . Forthcoming. Monetary Policy and Wage/Price Bargaining: Macro-Institutional Interactions in the Traded, Public, and Sheltered Sectors. In *Varieties of Capitalism: The Challenges Facing Contemporary Capitalist Democracies*, edited by Peter Hall and David Soskice.
- Fratianni, Michele, and Jürgen von Hagen. 1992. *The European Monetary System and the European Monetary Union*. Boulder, Colo.: Westview Press.
- Fratianni, Michele, Jürgen von Hagen, and Christopher Waller. 1992. The Maastricht Way to EMU. *Princeton Essays in International Finance* (June):187.
- Frieden, Jeffrey, Daniel Gros, and Erik Jones. Forthcoming. *The New Political Economy of EMU*. New York: Rowman and Littlefield.
- Garrett, Geoffrey, and Christopher Way. 1995a. Labor Market Institutions and the Economic Consequences of Central Bank Independence. Paper presented at the 91st Annual Meeting of the American Political Science Association, August, Chicago.
- . 1995b. The Rise of the Public-Sector Unions and the Decline of Corporatism. Paper presented at the 53rd Annual Meeting of the Midwest Political Science Association, Chicago.
- George, Michael. 1992. Euro-Corporatism After 1992. Paper presented to the 88th Annual Meeting of the American Political Science Association.
- Golden, Miriam. 1993. The Dynamics of Trade Unionism and National Economic Performance. *American Political Science Review* 87 (June):439–54.
- Golden, Miriam, and Michael Wallerstein. Forthcoming. Trade Union Organization and Industrial Relations in the Postwar Era in 12 Countries. In *Change and Continuity in Contemporary Capitalism*, edited by Herbert Kitschelt, Gary Marks, Peter Lange, and John Stephens. Cambridge: Cambridge University Press.

- Goodhart, Charles A. E. 1995. The Political Economy of Monetary Union. In *Understanding Interdependence*, edited by Peter B. Kenen, 448–506. Princeton, N.J.: Princeton University Press.
- Goodman, John. 1992. *Monetary Sovereignty: The Politics of Central Banking in Western Europe*. Ithaca, N.Y.: Cornell University Press.
- Grilli, Vittorio, Donato Masciandaro, and Guido Tabellini. 1991. Political and Monetary Institutions and Public Finance Policies in the Industrial Countries. *Economic Policy* 13:341–92
- Gros, Daniel. 1996. *Towards Economic and Monetary Union: Problems and Prospects*. Brussels: Center for European Policy Studies.
- Gros, Daniel, and Neils Thygesen. 1992. *European Monetary Integration*. New York: St. Martin's.
- Hall, Peter A. 1986. *Governing the Economy*. New York: Oxford University Press.
- . 1994. Central Bank Independence and Coordinated Wage Bargaining: Their Interaction in Germany and Europe. *German Politics and Society* (autumn):1–23.
- Havrilesky, Thomas, and James Granato. 1993. Determinants of Inflationary Performance: Corporatist Structures Versus Central Bank Autonomy. *Public Choice* 76:249–61.
- Hibbs, Douglas. 1977. Political Parties and Macroeconomic Policy. *American Political Science Review* 71:1467–87.
- Hirsch, Fred, and John Goldthorpe, eds. 1978. *The Political Economy of Inflation*. London: Martin Robertson.
- Iversen, Torben. 1994. Wage Bargaining, Monetary Regimes, and Economic Performance in Organized Market Economies: Theory and Evidence. Working Paper 59. Cambridge, Mass.: Center for European Studies, Harvard University.
- . 1998. Wage Bargaining, Central Bank Independence, and the Real Effects of Money. *International Organization* 53(2):469–504.
- Katzenstein, Peter. 1987. *Policy and Politics in West Germany*. Philadelphia, Penn.: Temple University Press.
- Kenen, Peter B. 1995. *Economic and Monetary Union in Europe*. New York: Cambridge University Press.
- Krugman, Paul. 1989. *Exchange-Rate Instability*. Cambridge, Mass.: The MIT Press.
- Kydland, Finn, and Edward Prescott. 1977. Rules Rather Than Discretion: The Inconsistency of Optimal Plans. *Journal of Political Economy* 85:473–86.
- Lange, Peter. 1993. Maastricht and the Social Protocol: Why Did They Do It? *Politics and Society* 21 (1):5–36.
- Lange, Peter, and Geoffrey Garrett. 1985. The Politics of Growth: Strategic Interaction and Economic Performance in the Advanced Industrial Democracies, 1974–1980. *Journal of Politics* 47:792–827.
- Lane, Jan-Eric, David McKay, and Kenneth Newton. 1991. *Political Data Handbook: OECD Countries*. New York: Oxford University Press.
- Layard, Richard, Stephen Nickell, and Richard Jackman. 1991. *Unemployment: Macroeconomic Performance and the Labour Market*. Oxford: Oxford University Press.
- Levy, Jonah. 1993. Tocqueville's Revenge: Dilemmas of Institutional Reform in Postwar France. Ph.D. diss., MIT, Cambridge, Mass.
- Leibfried, Stephan, and Paul Pierson, eds. 1995. *European Social Policy : Between Fragmentation and Integration*. Washington, D.C.: Brookings Institution.
- Lindberg, Leon, and Charles Maier, eds. 1985. *The Politics of Inflation and Economic Stagnation*. Washington, D.C.: Brookings Institution.
- Locke, Richard M., and Wade Jacoby. 1995. The Dilemmas of Diffusion: Institutional Transfer and the Remaking of Vocational Training Practices in Eastern Germany. Unpublished manuscript, MIT, Cambridge, Mass.
- Lohmann, Susanne. 1992. Optimal Commitment in Monetary Policy. *American Economic Review* 82: 273–86.
- . 1994. Federalism and Central Bank Autonomy: The Politics of German Monetary Policy, 1957–1992. Unpublished manuscript, University of California, Los Angeles.
- Markovits, Andrei S. 1986. *The Politics of the West German Trade Unions*. New York: Cambridge University Press.

- Mayer, Thomas, ed. 1990. *The Political Economy of American Monetary Policy*. New York: Cambridge University Press.
- Milgrom, Paul, and John Roberts. 1992. *Economics, Organization, and Management*. New York: Prentice-Hall.
- Nordhaus, William. 1975. The Political Business Cycle. *Review of Economic Studies* 42:169–90.
- Olson, Mancur. 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, Mass.: Harvard University Press.
- . 1982. *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities*. New Haven, Conn.: Yale University Press.
- Persson, Torsten, and Guido Tabellini, eds. 1994. *Monetary and Fiscal Policy*. Cambridge, Mass.: The MIT Press.
- Regini, Marino. 1984. The Conditions for Political Exchange: How Concertation Emerged and Collapsed in Italy and Great Britain. In *Order and Conflict in Contemporary Capitalism*, edited by John A. Goldthorpe, 124–42. New York: Oxford University Press.
- Rogoff, Kenneth. 1985. The Optimal Degree of Commitment to an Intermediate Monetary Target. *Quarterly Journal of Economics* 11:1169–90.
- Scharpf, Fritz. 1988. Game Theoretical Interpretations of Inflation and Unemployment in Western Europe. *Journal of Public Policy* 7 (1):227–57.
- . 1991. *Crisis and Choice in European Social Democracy*. Ithaca, N.Y.: Cornell University Press.
- Silvia, Stephen J. 1994. A House Divided: German Employers' Associations After Unification. Paper presented to the Industrial Relations Research Seminar, MIT, Cambridge, Mass.
- Smith, Mark. 1995. Time-Serial Designs and Cross-Sectional Designs: Uncovering the Structural Logic of Pooled Analyses. Paper presented at the 91st Annual Meeting of the American Political Science Association, August, Chicago.
- Soskice, David. 1990. Wage Determination: The Changing Role of Institutions in Advanced Industrialized Countries. *Oxford Review of Economic Policy* 6 (4):36–61.
- . 1991. The Institutional Infrastructure for International Competitiveness: A Comparative Analysis of the UK and Germany. In *The Economics of the New Europe*, edited by A. B. Atkinson and R. Brunetta, 45–66. London: Macmillan.
- . 1997. The Future Political Economy of EMU: Rethinking the Effects of Monetary Integration on Europe. Unpublished manuscript, Wissenschaftszentrum Berlin, Berlin.
- Streeck, Wolfgang. 1984. *Industrial Relations in West Germany*. London: Heinemann.
- . 1994. Pay Restraint Without Incomes Policy: Institutionalized Monetarism and Industrial Unionism in Germany. In *The Return of Incomes Policy*, edited by Ronald Dore, Robert Boyer, and Zoe Marn, 118–140. London: Pinter.
- . 1995. From Market-Making to State-Building: Reflections on the Political Economy of European Social Policy. In *European Social Policy*, edited by Stephan Leibfried and Paul Pierson, 389–431. Washington, D.C.: Brookings Institution.
- Streeck, Wolfgang, and Philippe Schmitter. 1991. From National Corporatism to Transnational Pluralism. *Politics and Society* (June):133–64.
- Swank, Duane. 1989. Partisan Policy: Political Parties, Economic Interest Representation, and Fiscal Policies in the Capitalist Democracies, 1970–85. Unpublished manuscript, Marquette University, Milwaukee, Wis.
- Swenson, Peter. 1989. *Fair Shares*. Ithaca, N.Y.: Cornell University Press.
- Thelen, Kathleen. 1991. *Union of Parts: Labor Politics in Postwar Germany*. Ithaca, N.Y.: Cornell University Press.
- . 1992. Union Structure and Strategic Choice: The Politics of Flexibility in the German Metalworking Industries. In *Bargaining for Change: Union Politics in Comparative Perspective*, edited by Miriam Golden and Jonas Pontusson, 215–46. Ithaca, N.Y.: Cornell University Press.
- . 1994. Beyond Corporatism: Toward a New Framework for the Study of Labor in Advanced Capitalism. *Comparative Politics* 27:107–24.
- Tsebelis, George. 1990. *Nested Games*. Berkeley: University of California Press.

- Traxler, F. 1994. Collective Bargaining: Levels and Coverage. *OECD Employment Outlook* (July): 167–94.
- Visser, Jelle. 1992. Trade Union Membership Data Base. Amsterdam: University of Amsterdam, Department of Sociology.
- Walsh, Carl E. 1995. Central Bank Independence and the Short-run Output-Inflation Trade-off in the European Community. In *Monetary and Fiscal Policy in an Integrated Europe*, edited by Barry Eichengreen, Jeffrey Frieden, and Jürgen von Hagen, 12–37. Berlin: Springer Verlag.
- Webber, Douglas. 1994. The End of Solidarity: The German Solidarity Pact. *West European Politics* 17(1):1–27.
- Woldendorp, J., H. Keman, and I. Budge. 1994. Party Government in 20 Democracies. *European Journal of Political Research* 24 (1):1–107. Special issue.
- Wood, Adrian. 1994. *North-South Trade, Employment, and Inequality*. Oxford: Clarendon Press.
- Wooley, John. 1984. *Monetary Politics: The Federal Reserve and the Politics of Monetary Policy*. New York: Cambridge University Press.