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Hysteresis and the European Unemployment Problem

After twenty years of negligible unemployment, most of Western Europe has since the early 1970s suffered a protracted period of high and rising unemployment. In the United Kingdom unemployment peaked at 3.3 percent over the period 1945–1970, but has risen almost continuously since 1970, and now stands at over 12 percent. For the Common Market nations as a whole, the unemployment rate more than doubled between 1970 and 1980 and has doubled again since then. Few forecasts call for a significant decline in unemployment over the next several years, and none call for its return to levels close to those that prevailed in the 1950s and 1960s.

These events are not easily accounted for by conventional classical or Keynesian macroeconomic theories. Rigidities associated with fixed-length contracts, or the costs of adjusting prices or quantities, are unlikely to be large enough to account for rising unemployment over periods of a decade or more. And intertemporal substitution in labor supply is surely not an important aspect of such a protracted downturn. The sustained upturn in European unemployment challenges the premise of most macroeconomic theories that there exists some "natural" or "non-accelerating inflation" rate of unemployment toward which the economy tends to gravitate and at which the level of inflation remains constant. The European experience compels consideration of alternative theories of "hysteresis" which contemplate the possibility that increases in unemployment have a direct impact on the "natural" rate of unemployment.

This article explores theoretically and empirically the idea of macroeconomic hysteresis—the substantial persistence of unemployment and the protracted effects of shocks on unemployment. We are particularly interested in the current European situation; we seek explanations for the pattern of high and rising unemployment that has prevailed in Eu-

rope for the past decade and for the very different performance of the labor markets in the United States and Europe, and we reach some tentative conclusions about the extent to which European unemployment problems can be solved by expansionary demand policies. The central hypothesis we put forward is that hysteresis resulting from membership considerations plays an important role in explaining the current European depression in particular and persistent high unemployment in general. The essential point is that there is a fundamental asymmetry in the wage-setting process between insiders who are employed and outsiders who want jobs. Outsiders are disenfranchised and wages are set with a view to ensuring the jobs of insiders. Shocks that lead to reduced employment change the number of insiders and thereby change the subsequent equilibrium wage rate, giving rise to hysteresis. Membership considerations can therefore explain the general tendency of the equilibrium unemployment rate to follow the actual unemployment rate. We adduce a number of types of empirical evidence consistent with our hypothesis. The paper is organized as follows:

Section 1 documents the dimensions of the current European depression. By looking at movements in unemployment in the United States and the United Kingdom over the past century, we show that high unemployment is in fact often quite persistent. We review and find lacking, standard explanations of the current European situation. We then consider a number of mechanisms through which a high persistence of unemployment could be generated.

Section 2 explores what we find the most promising of the possible mechanisms for generating hysteresis. It presents a formal model illustrating how temporary shocks can have a permanent effect on the level of employment in contexts where wages are set by employers who bargain with insiders. Persistence results in this setting because shocks change employment and membership in the group of insiders, thus influencing its subsequent bargaining strategy. We then discuss the role of unions and whether such effects can arise in nonunion settings.

Section 3 examines the behavior of postwar Europe in light of our theory of hysteresis. It presents direct evidence on the role of unions, on the behavior of wages and employment, and on the composition of unemployment. We find the European experience quite consistent with our model. Europe appears to have high hysteresis, much more so than the United States. High unemployment in Europe and low unemployment in the United States are well explained both by different sequences of shocks, especially in the 1980s, and by different propagation mechanisms, with Europe exhibiting more persistence than the United States.

Section 4 returns to an issue of fundamental importance for policy. Granting that Europe has more hysteresis than the United States, is it really due to unions or is hysteresis itself endogenous, being triggered by bad times? In an attempt to answer this question, we compare Europe now to Europe earlier when unemployment was low, and compare the current European depression to the U.S. Great Depression. The latter comparison is especially important, given the ability of the United States to decrease unemployment drastically in 1939 and 1940, mostly through aggregate demand. The conclusion summarizes our beliefs and doubts, and draws the implications of our analysis for policy.

1. *The Record of Persistent Unemployment*

We begin by documenting the dimensions of the current European depression, then demonstrate that Europe's current and persistently high unemployment is not historically unusual. Data for the past century suggest a surprisingly high degree of persistence in unemployment in both the United States and the United Kingdom. We argue that such persistence is not easily explained by standard natural rate theories and conclude that theories that allow for hysteresis—a very high dependence of current unemployment on past unemployment—[1] are required to explain such persistence.

1.1. THE EUROPEAN DEPRESSION

Table 1 presents some information on the evolution of unemployment in three major European countries as well as in the United States over the past twenty-five years. While European unemployment rates in the 1960s were substantially lower than in the United States, unemployment rates in Europe today are substantially greater than current U.S. rates. The unemployment rate in the United States has fluctuated considerably, rising from 4.8 to 8.3 percent in the 1973–1975 recession, then declining to 5.8 percent in 1979, rising to 9.7 percent in 1982 before declining to around 7.0 percent today. In contrast, unemployment in Europe has

1. Formally, a dynamic system is said to exhibit hysteresis if it has at least one eigenvalue equal to zero (unity, if specified in discrete time). In such a case, the steady state of the system will depend on the history of the shocks affecting the system. Thus, we should say that unemployment exhibits hysteresis when current unemployment depends on past values with coefficients summing to 1. We shall instead use "hysteresis" more loosely to refer to the case where the degree of dependence on the past is very high, where the sum of coefficients is close but not necessarily equal to 1.

risen seemingly inexorably since 1973. In France, the unemployment rate has increased in every single year since 1973, while it has declined only twice in Germany and the United Kingdom. The differences between the European countries and the United States are most pronounced after 1980. While the U.S. unemployment rate is at roughly its 1980 level, it has approximately doubled in the three European countries. The rapid decline in U.S. unemployment after 1982 contrasts sharply with the continuing increase in unemployment in Europe. The last line of table 1 gives European Commission forecasts of unemployment for 1986: they show little expected change. Longer-run forecasts are very similar: baseline projections by the European Commission put unemployment for the EEC as a whole at 10.4 percent in 1990, compared to 10.8 percent in 1985.

Differences in unemployment rates actually understate the differences in the performance of American and European labor markets over the past decade. Europe has suffered the concomitants of high unemployment—reduced labor force participation and involuntary reductions in hours—to a much greater extent than has the United States. Between 1975 and 1983, the labor force participation rate of men in the United States remained constant, while the corresponding rate in OECD Europe declined by 6 percent. Average annual hours worked declined by 2.7 percent in the United States between 1975 and 1982, compared with declines of 7.5 percent in France and 8.1 percent in the United Kingdom. Perhaps the most striking contrast of the labor market performances of Europe and the United States is the observation that between 1975 and 1985 em-

Table 1 EUROPEAN AND U.S. UNEMPLOYMENT, 1961–1986

	United States	*United Kingdom*	*France*	*West Germany*
1961–1970	4.7	1.9	.9	.8
1971–1975	6.1	2.8	2.6	1.8
1976–1980	6.7	5.2	5.3	3.7
1980	7.1	6.0	6.4	3.4
1981	7.6	9.2	7.7	4.8
1982	9.7	10.6	8.7	6.9
1983	9.6	11.6	8.8	8.4
1984	7.5	11.8	9.9	8.4
1985	7.3	12.0	10.7	8.4
1986*	7.2	11.7	10.9	8.0

Source. Annual Economic Review, Commission of the European Communities, 1986.
*Forecast.

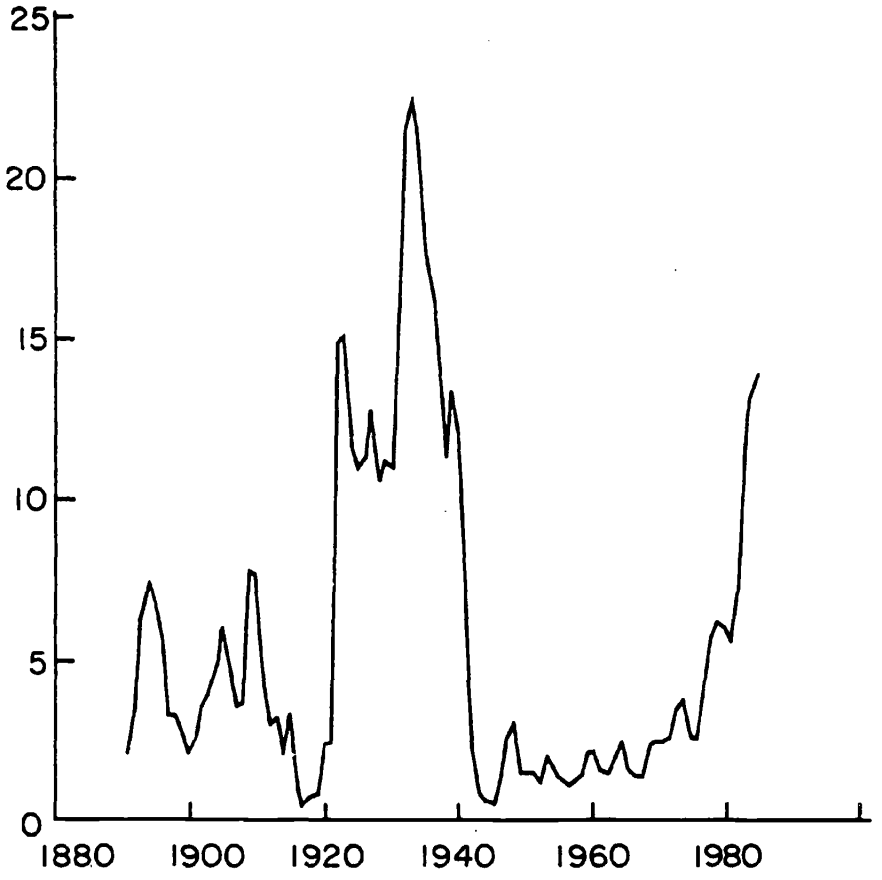
ployment increased by 25 percent, or about 25 million jobs, in the United States while declining in absolute terms in Europe.[2]

1.2. UNEMPLOYMENT RATES IN THE UNITED KINGDOM AND THE UNITED STATES OVER THE LAST CENTURY

European unemployment has increased steadily and, pending an unexpected change in policy, is expected to remain at this new higher level for the foreseeable future. How unusual is such high and persistent unemployment? To answer this question, we will now examine the behavior of

2. This difference reflects different demographic trends in the two countries as well as differences in labor market performance.

Figure 1 U.K. UNEMPLOYMENT RATE



unemployment over the last century in both the United Kingdom and the United States.

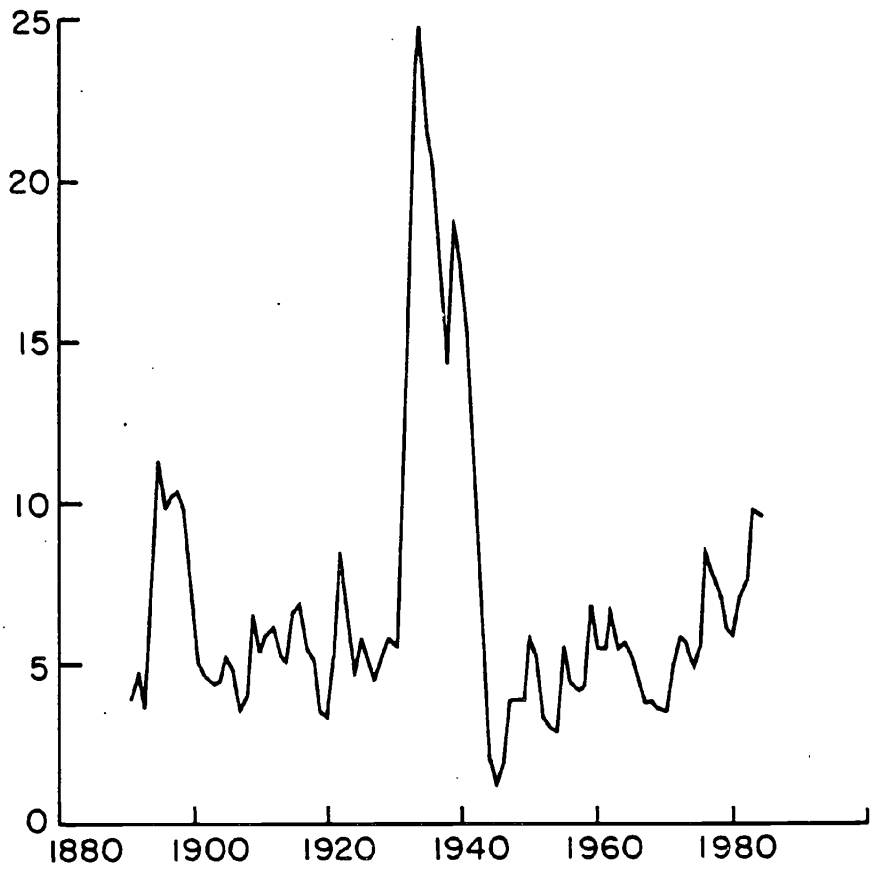
Figures 1 and 2 plot unemployment for each of the two countries, for the period 1890–1985 for the United Kingdom, and 1892–1985 for the United States.[3]

Estimation of an AR(1) process for the whole sample for each country gives:

$$\text{UK: } u = \underset{(.04)}{.93}\, u(-1) + e;\ \sigma_e = 2.1\%$$

3. For the United States we made use of the revised unemployment rates calculated by Romer (1986) for the 1890–1929 period.

Figure 2 U.S. UNEMPLOYMENT RATE



$$\text{US:} \quad u = \underset{(.04)}{.90}\, u(-1) + e;\ \sigma_e = 2.0\%$$

In both cases, the degree of first-order serial correlation is high. Unemployment is indeed surprisingly persistent. It exhibits at best a weak tendency to return to its mean.

Examination of the two figures—as well as statistical work—suggests that the evolution of the unemployment rate over the past century is not well captured by any simple linear autoregressive representation. The degree of persistence as captured by the degree of first-order serial correlation reported above arises largely from relatively infrequent changes in the level around which unemployment fluctuates. In the U.K., when unemployment goes up from 1920 to 1940, it shows little tendency during that period to return to its pre-1920 level; it then returns to a low level during World War II, to stay there until the 1960s. The current episode, both past and forecast, is a second instance in which unemployment, after having sharply increased, stabilizes at a new, high level. The United States experienced a sustained increase in unemployment from 1929 to 1939, only to see it drop sharply during and after the war to a new, much lower, level. When the degree of persistence in unemployment is estimated separately for periods of high and low average unemployment, there is some weak evidence of greater persistence within periods of high average unemployment.

Time series studied in isolation give little indication as to the cause of the changes in the mean level, which account for much of the persistence in unemployment. They could be exogenous or be triggered by unemployment itself, with a few years of high unemployment triggering an increase in the mean level of unemployment, a few years of low unemployment in turn triggering a decrease. Lacking a tight specification of how this triggering occurs we do not believe that the data can easily distinguish between these two possibilities, so we shall not attempt to do so.

Our finding that unemployment exhibits a very high degree of persistence over the past century parallels the findings of Nelson and Plosser (1982), Campbell and Mankiw (1986) and others that a variety of economic variables follow random walks or other nonstationary processes. In many cases such findings can be easily rationalized by recognizing that the level of technology is likely to be nonstationary and that other variables such as the level of output depend on productivity. But the failure of unemployment to display more of a mean-reverting tendency is troubling. It is unlikely that nonstationarity in productivity can account for the persistence of unemployment since the secular increase in pro-

ductivity has not been associated with any trend or upward drift in unemployment.

1.3. DIAGNOSING UNEMPLOYMENT PROBLEMS

What sort of theories can account for persistent high unemployment in general and the current European experience in particular? We highlight the general difficulties one encounters in explaining persistent unemployment by focusing on the problem of explaining the current European situation. The central puzzle it poses is its persistence. While it is easy to point to substantial adverse supply and demand shocks over the last fifteen years, we argue that our standard theories do not easily explain how they have had such enduring effects on the level of unemployment.[4]

Aggregate Demand There is little question that Europe has been affected by large adverse demand shocks, especially since 1980 (see, for example, Dornbusch et al. (1983)). In the 1980s, Europe has to a large extent matched tight U.S. monetary policy while at the same time engaging in a major and prolonged fiscal contraction (see Blanchard and Summers 1984 for the U.K., Germany and France; see Buiter 1985 for a more detailed study of U.K. fiscal policy).

But to the extent that aggregate demand shocks do not affect the equilibrium or natural rate of unemployment, one would expect sustained high unemployment to be associated with rapid declines in the rate of inflation. More generally, standard models of the effects of aggregate demand shocks would not predict that previous estimates of the relationship between inflation and unemployment would break down. There is, however, substantial evidence that this relation has broken down and that the decline in inflation has been much smaller than would have been predicted by past relationships. The relation between wage inflation and unemployment will be examined in detail later, but the basic point that previous relations have broken down is evidenced in table 2, which gives the rates of inflation and unemployment in 1984 and 1985 for the United Kingdom, France, and Germany. Despite the high rates of unemployment, there is no sign of disinflation, with the United Kingdom and Germany seeing a small increase in inflation and France a small decrease. Econometric estimates of the rate of unemployment consistent with stable inflation show rapid increases over the past decade. Layard et al.

4. This section relies heavily on the empirical work presented for individual European countries at the Chelwood Gate Conference on Unemployment, to be published in *Economica*, 1986. The reader is referred to individual country papers for further evidence.

(1984), using crude time trends in a Phillips curve relation, find the unemployment rate consistent with steady inflation to have risen from 2.4 in 1967–70 to 9.2 in 1981–1983 in Britain, from 1.3 to 6.2 in Germany, and from 2.2 to 6.9 in France. Coe and Gagliardi (1985), also within the framework of the Phillips curve but using instead of a time trend a battery of potential determinants of equilibrium unemployment as right-hand side variables, obtain roughly similar results. Aggregate demand shocks have clearly played a role in explaining the increase in European unemployment, but they cannot be the whole story, given the increase in the rate of unemployment consistent with steady inflation.

Aggregate Supply Aggregate supply explanations appear more promising if the goal is to explain an increase in equilibrium unemployment. This is indeed the approach followed by much of the recent research. Sachs (1979; 1983) and Bruno and Sachs (1985) have argued that unemployment in Europe is largely the result of a combination of adverse supply shocks and real wage rigidity. The argument is that real wages do not adjust to clear the labor market so that adverse supply shocks that reduce the demand for labor at a given real wage create unemployment. This argument has two parts, real wage rigidity and the occurrence of adverse supply shocks. We start by reviewing the evidence on the second.

Table 3 presents some information on the behavior of various supply factors with a potential bearing on unemployment in the United Kingdom since 1960.[5]

A first candidate is *unemployment benefits*. Unemployment insurance may raise unemployment if it causes workers to search longer or less intensively for jobs, reducing the pressure that unemployment puts on

5. We focus on the United Kingdom because detailed data are easily available. Available data for France and Germany tell a very similar story.

Table 2 INFLATION AND UNEMPLOYMENT IN THE UNITED KINGDOM, FRANCE, AND GERMANY, 1984–1985

	United Kingdom		*France*		*Germany*	
	π	U	π	U	π	U
1984	4.4	11.8	7.0	9.9	1.9	8.4
1985	5.5	12.0	5.7	10.7	2.1	8.4

π = Rate of change of GDP deflator.
U = Unemployment.

Source: Annual Economic Review, Commission of the European Communities, 1986.

wages. The second column of table 3 gives the average replacement ratio, the average ratio of after-tax unemployment benefits to earnings for different categories of workers; it shows no clear movement over time. This is not necessarily conclusive evidence against a role for unemployment benefits: one can easily envision mechanisms through which increases in unemployment benefits lead to higher real wages and higher unemployment but little or no change in the replacement ratio. Indeed, another way of reading the column is that it shows an increase in real unemployment benefits of roughly 30 percent since 1970. Furthermore, it has been argued that the principal changes in unemployment insurance have occurred through changes in eligibility rules rather than benefit levels. Attempts to estimate the effect of unemployment benefits on unemployment have not been very successful (see Minford (1982) and Nickell (1984)) and one is led to conclude that the increase in unemployment benefits probably does not account for a large portion of the increase in unemployment.

A second candidate explanation is *structural change*. The argument is

Table 3 SUPPLY FACTORS AND U.K. UNEMPLOYMENT

Year	*Unemployment Rate (%)*[a]	*Replacement Rate (%)*[b]	*Mismatch Index (%)*[c]	*Productivity Growth (%)*[d]	*Change in Tax Wedge (%)*[e]
1960	2.3	42	—	1.9	.0
1965	2.3	48	41	2.8	1.0
1970	3.1	51	38	3.2	1.0
1975	4.7	49	43	2.7	.8
1976	6.0	50	38	1.5	2.8
1977	6.4	51	35	1.7	1.9
1978	6.1	50	35	1.4	−.9
1979	5.6	46	35	2.1	1.3
1980	6.9	45	37	1.5	1.3
1981	10.6	50	41	1.4	2.6
1982	12.8	54	37	1.1	1.0
1983	13.1	54	—	.5	−1.8

a. Standardized unemployment rate; source OECD.
b. Weighted average of replacement rates relevant to families of different sizes. Source: Layard and Nickell (1986).
c. Index consttructed as $\Sigma \mid u_i - v_i \mid$ where u_i and v_i are the proportions of unemployment and vacancies in occupation i respectively. Source: Layard, Nickell, and Jackman (1984).
d. Rate of change of total factor productivity growth, derived by assuming labor augmenting technical change. The first four numbers refer to the rate of change (at annual rate) over the previous five years. Source: Layard and Nickell (1986).
e. The tax wedge is the sum of the employment tax rate levied on employers and of direct and indirect tax rates levied on employees. The first four numbers refer to the rate of change (at annual rates) over the previous five years. Source: Layard and Nickell (1986).

that the need for large-scale reallocation of labor associated with structural change tends to increase unemployment. Often it is suggested that the energy shocks of the 1970s increased the rate of structural change and so led to higher unemployment. The adjustment to structural changes may be complicated by real wage rigidity. The third column of table 3 presents the index of "mismatch" developed by Layard, Nickell, and Jackman (1984). This index tries to represent the degree of structural change in the economy by examining the extent to which unemployment and vacancies occur in the same sectors. The results in the table look at occupational mismatch, but results are largely similar when industrial and regional measures are used.[6] There is little evidence of an increase in the rate of structural change since the 1960s, when the unemployment rate was consistently low.

Perhaps the most common supply-based explanations for persistent high unemployment involve factors that reduce labor productivity or drive a wedge between the cost of labor to firms and the wage workers receive. The fourth and fifth columns of the table give time series for *total factor productivity growth* and the change in the *tax wedge*.[7] It is clear from the table that there has been a substantial reduction in the rate of total factor productivity growth in the wake of the oil shocks. Over the years the total tax wedge has also risen substantially, by 30 percent since 1960, by 10 percent since 1970. While it is still true that the real after-tax wage consistent with full employment has risen fairly steadily, it has increased more slowly than it had in the first half of the postwar period.

The Problem with Aggregate Supply Explanations We have now documented the presence of adverse supply developments relative to what might have been expected in the early 1970s. But for these shocks to have a long-lasting effect on unemployment, there must be long-lasting real wage rigidity. If and when labor supply becomes inelastic, supply shocks are then reflected in real wages, not in unemployment. Surely, individual labor supply is inelastic in the long run. As with aggregate demand explanations, we face the problem of explaining the mechanism that causes shocks to have long-lived effects.

Recent models of union behavior (notably McDonald and Solow (1981)) have addressed this problem by showing that if wages are the result of bargaining between unions and firms, the result may be real wage

6. The mismatch index by industry goes up, however, in 1981 and 1982—the last two years for which it has been computed.
7. Let a be the rate of growth of productivity and θ be the change in the tax wedge. Then the rate of growth of the after-tax real wage consistent with a given capital/labor ratio is approximately given by $a - \theta$.

rigidity, with shocks affecting employment only. There is, however, a fundamental difficulty with this line of argument. To take the model developed by McDonald and Solow, if real wages were truly rigid at a rate determined by the interaction of union preferences and firms' production technology, employment would steadily increase and unemployment steadily decrease through time. Annual productivity improvements due to technical change are equivalent to favorable supply shocks. As long as productivity increments and capital accumulation lead to the demand curve for labor shifting outward faster than the population grows, unemployment would decline. This appears counterfactual.[8] Even over the last decade, the cumulative impact of productivity growth has almost certainly more than counterbalanced the adverse supply shocks that occurred.

To rescue this line of thought, it must be argued that real wages are rigid along some "norm," which may increase over time. But this has two implications. The first is that the dynamic effects of supply shocks on employment then depend on the way the norm adjusts to actual productivity—this is left unexplained. The second and more important here is that adverse supply shocks have an effect only as long as the norm has not adjusted to actual productivity. Thus, unless the norm never catches up with actual productivity, adverse supply shocks cannot affect unemployment permanently. It seems implausible that the current persistence of high unemployment can all be attributed to lags in learning about productivity. Both the United Kingdom and the United States have experienced enormous productivity gains without evident reduction in unemployment over the last century. High unemployment therefore cannot be blamed simply on poor productivity performance. It can only be attributed to *surprises* in productivity performance. But then it is hard to see how to explain protracted unemployment from lower productivity growth.

Where does this leave us? We have argued that there is plenty of evidence of adverse shocks, whether it be lower-than-expected productivity growth, increases in the price of oil or in the tax wedge in the 1970s or contractionary aggregate demand policies in the 1980s. But we have also argued that standard theories do not provide us with convincing explanations of how these shocks can have such a sustained effect on unemployment. Put differently, it is difficult to account for the apparent increase in the equilibrium rate of unemployment—or equivalently, in the unemployment rate consistent with stable inflation—by pointing to

8. When a time trend is added to the AR(1) specification of unemployment estimated above, its coefficient is both small and insignificant, for both countries.

these shocks. Borrowing from business cycle terminology, it is not difficult to find evidence of negative impulses—the difficulty is in explaining the propagation mechanism. This leads us to look for mechanisms that can explain the propagation of adverse supply or demand shocks over long periods of time. These include the possibility that current unemployment depends directly and strongly on past unemployment.[9] We now consider various channels through which this may happen.

1.4. THEORIES OF HYSTERESIS

Three types of explanation which, loosely speaking, might be referred to as the "physical capital," "human capital," and "insider-outsider" stories can be adduced to explain why shocks that cause unemployment in a single period might have long-term effects.

The physical capital story simply holds that reductions in the capital stock associated with the reduced employment that accompanies adverse shocks reduce the subsequent demand for labor and so cause protracted unemployment. This argument is frequently made in the current European context where it is emphasized that, despite the very substantial increase in the unemployment rate that has occurred, capacity utilization is at fairly normal levels. For the EEC as a whole, capacity utilization has shown no trend over the last decade. It currently stands at 81 percent, compared with 76 percent in 1975, 83 percent in 1979, and 76 percent in 1983. It is then argued that the existing capital stock is simply inadequate to employ the current labor force.

We are somewhat skeptical of the argument that capital accumulation effects can account for high unemployment, for two reasons. First, as long as there are some possibilities for substitution of labor for capital ex post, reductions in the capital stock affect the demand for labor just as adverse supply shocks do. As we have noted, it is unlikely that an anticipated supply shock would have an important effect on the unemployment rate. Second (see section 4), substantial disinvestment during the 1930s did not preclude the rapid recovery of employment associated with rearmament in a number of other countries. Nor did the very substantial reduction in the size of the civilian capital stock that occurred during the war prevent the attainment of full employment after the war in many countries.[10] The argument that reduced capital accumulation has an important effect on the level of unemployment is difficult to support with historical examples.

9. This is also the direction of research recently followed by Sachs (1985) to explain European unemployment.
10. Unemployment remained high—around 10 percent—in Italy until about 1960 but other factors are thought to have been at work in that case.

A second and perhaps more important mechanism works through "human capital," broadly defined. Persuasive statements of the potentially important effects of unemployment on human capital accumulation and subsequent labor supply may be found in Phelps (1972) and Hargraves-Heap (1980).[11] Some suggestive empirical evidence may be found in Clark and Summers (1982). Essentially, the human capital argument holds that workers who are unemployed lose the opportunity to maintain and update their skills by working. Particularly for the long-term unemployed, the atrophy of skills may combine with disaffection from the labor force associated with the inability to find a job to reduce the effective supply of labor. Early retirement may for example be a semi-irreversible decision. More generally, if for incentive or human capital reasons employers prefer workers with long horizons, it may be very difficult for middle-aged workers to find new jobs. A final point is that in a high-unemployment environment, it will be difficult for reliable and able workers to signal their quality by holding jobs and being promoted. The resulting inefficiencies in sorting workers may reduce the overall demand for labor.

Beyond the adverse effects on labor supply generated by high unemployment, the benefits of a high-pressure economy are foregone. Clark and Summers (1982) demonstrate that in the United States at least, World War II had a long-lasting effect in raising female labor force participation. Despite the baby boom, in 1950 the labor force participation of all female cohorts that were old enough to have worked during the war was significantly greater than would have been predicted on the basis of prewar trends. The causal role of participation during the war is evidenced by the fact that the participation of very young women who could not have worked during the war was actually lower than would have been predicted on the basis of earlier trends. Similarly, research by Ellwood (1981) suggests that teenage unemployment may leave some "permanent scars" on subsequent labor market performance. One channel through which this may occur is family composition. The superior labor market performance of married men with children has been noted many times. The effect of the Great Depression on fertility rates, both in the United States and in Europe has often been noted.

Gauging the quantitative importance of human capital mechanisms generating hysteresis is very difficult. Some of the arguments, early retirement for example, suggest that labor force participation should decline rather than that unemployment should increase in the aftermath of

11. Drazen (1979) constructs a related model, based on learning by doing, that also generates hysteresis. Hall (1976) explores the possibility that unemployment has long-lasting effects on productivity, and its implications for economic policy.

adverse shocks. Perhaps a more fundamental problem is that to the extent that there is some irreversibility associated with unemployment shocks, it becomes more difficult to explain why temporary shocks have such large short-run effects. If early retirement is forever, why should it be taken in response to a temporary downturn? Overall, while it seems likely that human capital mechanisms can explain some of the protracted response to shocks, it is doubtful that they are sufficient to account completely for the observed degree of persistence.

A third mechanism that can generate persistence and that we regard as the most promising relies on the distinction between "insider" and "outsider" workers, developed in a series of contributions by Lindbeck (see, for example, Lindbeck and Snower (1985)) and used in an important paper by Gregory (1985) to explain the behavior of the Australian economy. To take an extreme case, suppose that all wages are set by bargaining between employed workers—the "insiders"—and firms, with outsiders playing no role in the bargaining process. Insiders are concerned with maintaining their jobs, not insuring the employment of outsiders. This has two implications. First, in the absence of shocks, any level of employment of insiders is self-sustaining; insiders just set the wage so as to remain employed. Second, and more important, in the presence of shocks, employment follows a process akin to a random walk; after an adverse shock, for example, which reduces employment, some workers lose their insider status and the new smaller group of insiders sets the wage so as to maintain this new lower level of employment. Employment and unemployment show no tendency to return to their preshock value, but are instead determined by the history of shocks. This example is extreme but nevertheless suggestive. It suggests that, if wage bargaining is a prevalent feature of the labor market, the dynamic interactions between employment and the size of the group of insiders may generate substantial employment and unemployment persistence. This is the argument we explore in detail in the next section.

2. *A Theory of Unemployment Persistence*

Here we develop a theory of unemployment persistence based on the distinction between insiders and outsiders. As the example sketched at the end of section 1 makes clear, the key assumption of such a theory is that of the relation between employment status and insider status. We can think of this key assumption as an assumption about *membership rules*, the rules that govern the relation between employment status and membership in the group of insiders. The possibility of persistent fluctuations in employment arises because changes in employment may

change the group's membership and thereby alter its objective function.[12]

First, we develop a partial equilibrium model of bargaining between a group of insiders and a representative firm and characterize employment dynamics under alternative membership rules. (We use the term "group" rather than the more natural "union" to avoid prejudging the issue of whether the membership considerations we stress are important only in settings where formal unions are present.) Second, we extend the analysis to a general equilibrium setting and show how both nominal and real shocks can have permanent effects on unemployment. Third, we consider two issues: endogeneity of membership rules, and whether our analysis is indeed relevant only or mostly in explicit union settings.

2.1. A MODEL OF MEMBERSHIP RULES AND EMPLOYMENT DYNAMICS

To focus on the dynamic effects of membership rules on the decision of the group of insiders (the "group" for short), we formalize the firm as entirely passive, as presenting a labor demand on which the group chooses its preferred outcome.[13] We start by characterizing employment and wages in a one-period model. In a one-period model, initial membership is given and membership rules are obviously irrelevant. But it is a useful intermediate step, which will allow us to contrast our later results with traditional ones that treat membership as exogenous. Throughout, we make no attempt at generality and use convenient functional forms and some approximations to retain analytical simplicity.

The One-Period Model The group has initial membership n_0 (in logarithms, as are all variables in what follows, unless otherwise mentioned). It faces a labor demand function given by:

$$n = -cw + e \quad (2.1)$$

where n is employment, w is the real wage and e is a random technological shock, with mean Ee, uniformly distributed between $[Ee - a, Ee + a]$. The coefficient a captures the degree of uncertainty associated

12. The issue of membership and membership rules is clearly closely related to the issue of union size and union membership in the union literature. See Farber (1984, section 6) for a survey. This literature has not, however, focused on the dynamic implications of membership rules.

13. Formalizing the firm as passive allows us to concentrate on the effects of alternative membership rules on the decisions of the group of insiders. Allowing for wage bargaining between the firm and insiders as well as for some control of employment ex post by insiders introduces additional issues which we shall discuss later.

with labor demand. The group must decide on a wage w before it knows the realization of e. Given w and the realization of e, the firm then chooses labor according to the labor demand function. If n exceeds n_0, $n - n_0$ outsiders are hired. If n is less than n_0, $n_0 - n$ insiders are laid off. The probability of being laid off is the same for all insiders.

Before specifying the objective function of the group, we can derive, for given w and n_0, *the probability of being employed*. The probability of being employed for an insider is equal to 1 if $n > n_0$. For $n < n_0$, we approximate the probability (which is not in logarithms) of being employed for an insider by $1 - n_0 + n$. This approximation will be good as long as n is not too much smaller than n_0. Under these assumptions, the probability p of being employed is given by

$$\begin{aligned} p &= 1 - (1/(4a))(n_0 + cw - Ee + a)^2 && \text{for } n_0 + cw \geq Ee - a \\ &= 1 && \text{for } n_0 + cw \leq Ee - a \end{aligned} \tag{2.2}$$

(All derivations are in the Appendix.)

If even under the worst outcome —which is $e = Ee - a$ and thus $n = -cw + Ee - a$— n is larger than n_0, then the probability of employment is clearly equal to 1. Otherwise, the probability is an increasing function of expected productivity Ee, a decreasing function of initial membership n_0, and of the wage w. It is also a decreasing function of the degree of uncertainty a; the larger a is, the lower the probability of being employed in bad times, while the probability remains equal to 1 in good times.

The second step is to derive the choice of w. This requires specifying the utility function of the group. The group maximizes the utility function of the representative group member, which we specify as

$$U = p + bw$$

Utility is linear in the probability of employment and the wage. This specification is not the most natural but it is attractive, for two reasons. The first reason is that, as we will see, it implies, together with the specification of probabilities given above, that the group exhibits the stochastic equivalent of inelastic labor supply, that is, an increase in Ee is entirely reflected in an increase in real wages and leaves the probability of employment unchanged. We have argued previously that this is a desirable feature of any model of wage determination given the absence of major

trends in unemployment rates over long periods of time.[14] Note, however, that our assumption of stochastically inelastic labor supply is the opposite of that used by McDonald and Solow (1981). Where they postulate a rigid real wage so that the labor supply curve is perfectly elastic, we postulate perfectly inelastic labor supply. The second reason is that it is analytically convenient.

Replacing p by its value from equation (2.2) and solving for the optimal wage w gives:
$w^* = (1/c)(-n_0 + Ee + a(2(b/c) - 1))$
Replacing in labor demand gives
$n = n_0 - a(2(b/c) - 1) + (e - Ee)$
Replacing w^* in equation (2.2) and rearranging gives the optimal probability:
$p^* = 1 - a(b/c)^2$

Thus the wage depends negatively on initial membership. As, by definition, $E(e - Ee) = 0$, whether expected employment exceeds membership depends on the sign of $a(2(b/c) - 1)$, thus on whether b/c is less than ½ or not. The lower b is, the more importance workers attach to employment protection as opposed to the wage; the higher c is, the smaller the wage reduction required to increase expected employment. If b/c is less than ½, workers set a wage low enough to imply expected net hirings of outsiders by the firm. Note, as we have mentioned, that the optimal probability of being employed depends neither on the initial membership nor on expected productivity.[15]

Until now, the analysis has been rather conventional—given the initial membership, insiders choose a wage. This wage and the realization of a disturbance determine employment. But when we go from this one-period model to a dynamic one, there may well be a relation between employment in this period and membership in the next. This relation will depend on the form of membership rules. We now examine how this affects employment dynamics.

We first define *membership rules*. We can think of various membership rules as being indexed by m. Those workers who have been working in the firm for the last m periods belong to the group; they are insiders. Workers who have been laid off for more than m periods lose member-

14. The assumption of stochastically inelastic labor supply maintained here is not realistic for a single firm. It is best to think of the firm under consideration as a representative firm, facing the same shocks as other firms.

15. Because we use a log linear approximation to define p, p^* as defined can be negative. But the approximation is only acceptable for p close to 1, that is, for values of $a(b/c)^2$ not too large.

ship[16] and become outsiders. There are two extreme cases: the first is the case where m is equal to infinity, so that the initial membership never changes. The second is the case where $m = 1$ so that membership always coincides with current employment. The extreme cases highlight the effects of alternative membership rules; we consider them before turning to the more difficult intermediate case.

THE CASE OF A CONSTANT MEMBERSHIP (m = INFINITY) Let us denote by $\bar{n}_i$ beginning of period i membership, and by n_i realized employment in period i. In the present case, membership is equal to $\bar{n}_0$ forever. So, in each period, if n_i exceeds $\bar{n}_0$, all members work; if n_i is less than $\bar{n}_0$, the probability of being employed is given for each member by (approximately) $1 - \bar{n}_0 + n_i$. We assume that the one-period utility function of a worker is given, as above, by $(p_i + bw_i)$ and that the workers' discount factor is equal to θ. Thus the utility of a member at time zero is given by

$$U_0 = E_0 \sum_{i=0}^{\infty} \theta^i [p_i + bw_i] \text{ where } \theta \text{ is less than one.}$$

Assume for the moment that the shocks affecting labor demand are uncorrelated over time, or more precisely that e_i is independent and identically distributed, uniform on $[-a, +a]$. (We shall return to the case of serially correlated shocks.) Then by the previous analysis, the probability of being employed in period i, conditional on w_i is given by (using the fact that $Ee_i = 0$),

$$\begin{aligned} p_i &= 1 && \text{for } \bar{n}_0 + cw_i \leq -a \\ &= 1 - (1/4a)(\bar{n}_0 + cw_i + a)^2 && \text{for } \bar{n}_0 + cw_i \geq -a. \end{aligned}$$

Given that employment outcomes do not affect future membership, and given the assumption that shocks are white noise, the problem faced by members is the same in every period, and thus its solution is the same as that derived above:

$$\begin{aligned} w_i^* &= (1/c)(-\bar{n}_0 + a(2(b/c) - 1)) \quad \text{and} \\ n_i &= \bar{n}_0 - a(2(b/c) - 1) + e_i \quad (2.3) \end{aligned}$$

In response to white noise shocks, employment will also be white noise. Whether employment is on average larger or smaller than mem-

16. We may also think of asymmetric rules where it takes m_1 periods to acquire membership, and m_2 periods to lose it. We shall briefly return to their likely implications later.

bership depends on whether (b/c) is smaller or larger than ½. If the insiders want strong employment protection, they will choose a wage so that, on average, employment exceeds membership and the firm has a cushion of outsiders who are laid off first in case of adverse shocks.

It is easy to see that the result that employment is white noise will continue to hold regardless of the stochastic process followed by e. As shown above, our assumptions ensure that labor supply is stochastically inelastic. Changes in the expected value of e affect real wages but do not affect the level of employment. Only the deviation of e from its expected value affects the level of employment. By the properties of rational expectations, the unexpected component of e must be serially uncorrelated.

THE CASE WHERE MEMBERSHIP EQUALS EMPLOYMENT ($m = 1$) We now go to the opposite extreme, in which membership comes and goes with employment. In this case membership at time i is simply given by employment at time $i - 1$: $\bar{n}_i = n_{i-1}$. If the group kept the same decision rule as in equation (2.3) but applied it to $\bar{n}_i$ rather than to $\bar{n}_0$, equation (2.3) would become

$$\omega_i^* = (1/c)(-n_{i-1} + a(2(b/c) - 1))$$
$$n_i = n_{i-1} - a(2(b/c) - 1) + e_i. \quad (2.3)'$$

Thus, employment would follow a random walk, with drift. Optimal wage behavior under the assumption that membership equals beginning-of-period employment is, however, not given by equation (2.3'). Unlike the behavior implied by equation (2.3'), current members should recognize their inability to commit future memberships to wage policies. The subsequent policies of the group will depend on its then-current membership. This fundamentally changes the character of the maximization problem. The group membership, when taking wage decisions today, knows that wage decisions will be taken in the next period by a membership which will in general be different from that of today. This implies in particular that if an insider is laid off, he becomes an outsider and thus considerably decreases his chances of keeping employment with the firm; this presumably leads him to choose a lower wage than in the previous case, where being laid off in the present did not affect his chances of being hired in the future.[17]

17. There is another effect that works in the opposite direction. Choosing a high real wage leads to lower expected employment, thus lower membership and higher expected real wages in the future. This effect however turns out to be dominated by that emphasized in the text.

The formal solution to this problem is treated in the appendix. Even with the simplifying assumptions we have made so far, the problem is intractable unless we further simplify by linearizing the group's intertemporal objective function. Let w' be the wage around which the objective function is linearized and let the shocks to labor demand be white noise. The solution to the maximization problem is then

$$w_i^* = (1/c)\,(-n_{i-1} + a(2(b/c)\,(1/(1 + b\theta w')) - 1))$$
$$n_i = n_{i-1} - a(2(b/c)\,(1/(1 + b\theta w')) - 1) + e_i. \quad (2.4)$$

The probability of employment for a member is a constant and is given by

$$p_i^* = 1 - a[(b/c)\,(1/(1 + b\theta w'))]^2.$$

Thus, under this membership rule, employment follows a random walk with drift. For a given labor force, there is unemployment hysteresis. Uncorrelated shocks to labor demand affect current employment, and through employment, membership and future expected employment. The drift is positive if (b/c) is less than $(1 + b\theta w')/2$, if workers care sufficiently about the probability of employment as compared to the wage. In such a case, although they do not care about the unemployed, they will set the wage each period so as to have the firm hire, on average, new employees. For a given membership, the wage is always set lower than in the m = infinity case and thus the probability of employment is set higher; this is because being laid off implies a loss of membership and imposes a much larger cost than before.

This analysis can again easily be extended to the case where labor demand shocks are serially correlated. The results remain the same; employment continues to follow a random walk. This is a consequence of our maintained assumption that expected changes in labor demand have no effect on the level of employment.

The Intermediate Case (m between 1 and infinity) The intermediate case, where workers remain insiders for some time after losing their jobs and where newly hired workers eventually but not immediately become insiders, raises an additional conceptual problem. There will no longer be unanimity among insiders. Those who have already experienced some unemployment, or those who have been working in the firm for a short period of time, will be more apt to favor more cautious wage-setting policies than those who have not. A theory of behavior in the face of conflict

between members is beyond the scope of this article.[18] A plausible conjecture is that allowing for values of m between 1 and ∞ leads to wage-setting policies that are less cautious than in the $m = 1$ case but more cautious than in the $m = \infty$ case.

More important, rules corresponding to m between one and infinity are likely to generate unemployment behavior such as that shown in Figs 1 and 2, namely infrequent but sustained changes in the level of unemployment. Short sequences of unexpected shocks of the same sign have little effect on membership and thus on mean employment. In the case of adverse shocks, insiders are not laid off long enough to lose insider status; in the case of favorable shocks, outsiders do not stay long enough to acquire membership. But long—and infrequent—sequences of shocks of the same sign have large effects on membership and may lead to large effects on the mean level of employment. The length of the shock necessary to cause a permanent change in employment depends on the membership rules. In general, there is no reason for these rules to be symmetric. The length of time after which an unemployed worker becomes an outsider need not equal the length of time after which a new worker becomes an insider. Hence favorable and unfavorable shocks may persist to differing extents.

We have derived the results of this section under very specific assumptions: fixed membership rules; the firm is passive; outsiders play no role, direct or indirect, in the negotiation process. We must return to these assumptions. Before we do so, however, we must first show how the model of this section can be used to generate permanent effects on aggregate employment of both nominal and real shocks.

2.2. PERSISTENT EFFECTS OF NOMINAL AND REAL DISTURBANCES ON UNEMPLOYMENT

We now assume that there are many firms in the economy, each dealing with its own group of insider workers. We further assume that wages are set in nominal terms, so that nominal disturbances can affect employment. We then characterize the effects of nominal and real disturbances on employment and real wages.

THE DERIVED DEMAND FOR LABOR FACING EACH GROUP The economy is composed of many firms indexed by j, each selling a product which is an imperfect substitute for all others, but being otherwise identical. The demand facing firm j is given by

18. Farber (1984) reviews the research on union behavior when members have different seniority status, and thus conflicting interests.

$$y_j = -k(p_j - p) + (m - p), \quad k > 1.$$

All variables are in logarithms and all constants are ignored for notational simplicity. The variables y_j and p_j denote the output and the nominal price charged by firm j respectively; m and p denote nominal money and the price level. Demand for the firm's output depends on the relative price as well as on aggregate real money balances. The restriction on k is needed to obtain an interior maximum for profit maximization.

Each firm operates under constant returns to scale; the relation between output and employment is given by $y_j = n_j$. If w_j is the wage that firm j pays its workers, constant returns and constant elasticity of the demand for goods imply that prices are given by $p_j = w_j - e$, where e is a random technological shock, which is assumed common to all firms.[19]

Each firm j faces a group of insiders with the same objective function as above, which chooses a nominal wage and lets the firm determine employment. Given the relation between p_j and w_j, we can think of each group j as choosing w_j subject to the demand function

$$n_j = -k\,(w_j - e - p) + (m - p). \quad (2.5)$$

THE CHOICE OF THE WAGE AND EMPLOYMENT We now characterize the decisions of each group j at time zero (and for the moment we do not introduce the time index explicitly). We assume each group to operate under the membership rule $m = 1$, so that at time zero, membership in group j is given by $n_j(-1)$. The group now chooses a nominal rather than a real wage, based on its expectations of the price level, Ep, nominal money, Em, and the expected value of the technological shock, Ee, which all enter the derived demand for labor. As we have shown earlier, given such a demand function and its objective function, it chooses a wage so that the expected level of employment is equal to its membership plus a constant term. Again ignoring the constant, this implies

$$-k(w_j - Ee - Ep) + (Em - Ep) = n_j(-1) \quad (2.6)$$

which implicitly defines w_j as a function of $n_j(-1)$, Em, Ep and Ee.

19. Thus, we assume implicitly that the technological shock affects costs, but not the relation between output and employment. This is the case, for example, if output is produced with two inputs, labor and a nonlabor input, according to a Leontief technology, and the technological shock reflects changes in the relative price in the nonlabor input. A change in productivity growth would instead affect both the relation between output and employment, and between prices and wages. Allowing the technological shock to affect the relation between output and employment in the model is straightforward but introduces ambiguities in the effects of supply shocks on employment which are not central to our argument.

To solve for w_j, we must solve for the value of Ep. We do so under the assumption of rational expectations. As all firms and groups are the same, and are all affected by the same aggregate nominal shock, all groups have the same membership, $n_j(-1) = n(-1)$. Furthermore, all nominal prices are the same and equal to the price level, so that the first term in equation (2.6) is equal to zero. Thus, from equation (2.6)

$$Ep = Em - n(-1) \quad \text{and}$$
$$w_j = Ee + Em - n(-1)$$

The expected price level depends on expected nominal money and negatively on membership. The nominal wage in turn depends positively on expected nominal money and the expected technological shock, and negatively on membership. Replacing w_j and Ep by their values in equation (2.5) and aggregating over j gives the equation characterizing the dynamic behavior of aggregate employment

$$n = n(-1) + (m - Em) + (e - Ee)$$

or, if we reintroduce the time index i,

$$n_i = n_{i-1} + (m_i - Em_i) + (e_i - Ee_i). \quad (2.7)$$

SHOCKS, EMPLOYMENT AND WAGES From equation (2.7) only unexpected shocks affect employment. In the case of real shocks, this comes as before from the assumption of inelastic labor supply, which implies that each group sets wages so as to leave employment unaffected by anticipated real shocks. In the case of nominal shocks, the result is the same as in other nominal contract models (Fischer 1977) and the intuition is straightforward. Workers set a nominal wage which, in view of expected aggregate demand, will maintain last period's level of employment. Firms simply mark up over this nominal wage. Unexpectedly low aggregate demand leads to unexpected decreases in output and employment, with no changes in nominal wages (by assumption) and in prices (because of constant returns).[20]

These unexpected nominal and real shocks, unlike other contract models, have, however, permanent effects on employment. This is the result of our assumptions about membership rules. Once employment has decreased, it remains, in the absence of other shocks, permanently at

20. As in other contracting models, staggering of wage decisions across unions would lead to effects of even anticipated nominal shocks. See Taylor (1979).

the lower level. A sequence of unexpected contractions in aggregate demand increases equilibrium unemployment permanently. If we assumed that m, the length of membership parameter, was greater than 1, we would again obtain the result that while short sequences of adverse shocks have no effect on equilibrium unemployment, a long sequence of such shocks would increase equilibrium unemployment permanently.

While the implications for employment are straightforward, the model implies that there is no simple relation between employment and real wages. Consider in particular the effects of nominal shocks. By our assumption of constant returns to scale and constant elasticity of demand, they leave the markup of prices over wages unaffected. Equivalently, they leave the real wage unaffected. Thus, a sequence of adverse nominal disturbances will decrease employment, with no effect on the real wage. This lack of a simple relation between real wages and employment comes from our assumptions of monopolistic competition and constant returns, not from our assumptions about insiders and outsiders. As our focus is on the dynamic effects of membership rules, we will not further explore the relation between real wages and employment. But it is an important caveat to the line of research which has focused on the role of real wages in "explaining" high European unemployment. In the model constructed here, it is quite possible to have sustained high unemployment without high real wages. It is also possible for expansionary policies to raise employment without altering real wages.

2.3. THE ENDOGENEITY OF MEMBERSHIP RULES

We now return to the original model and examine various extensions. We first focus on the determination of the membership rules.

We have shown that the time-series evolution of employment depends critically on the nature of these rules. To the extent that insider status is closely linked with employment, substantial persistence is likely to result. If membership does not change or changes relatively little when employment changes, employment is likely to be much less persistent.

It is clear that at any given time the currently employed would find it optimal to commit the group to maximizing their interests indefinitely, while ignoring the welfare of those currently laid off. That is, they would like to apply the rule $m = 1$ this period and $m = \infty$ hereafter. But this means that if the currently employed are those who decide about membership, the only time-consistent rule is $m = 1$, which is always the best current-period rule for the currently employed. The issue is therefore whether the group can precommit itself, or, more accurately, whether the currently employed can commit the group to take care of their interest in the future whether or not they are still employed by the firm.

Achieving the $m = \infty$ solution is probably not feasible. But it seems plausible that the group will be able to commit itself at least to some extent. The factor limiting the commitment will be the degree of divergence between the original membership and the group of employed workers in some subsequent period. Where the divergence is too great, current employees will wrest control of the group from those controlling it in the interests of some group of past workers. The extent to which groups can commit themselves is probably greatest where demand shocks are small so that level and composition of employment change relatively little from period to period.

This suggests that m will depend on the distribution of the shocks. If shocks have large variance, m may have to be close to 1 to avoid large differences between membership and the employed. Or m may instead be a function of the realization of the shocks. A sequence of large positive or negative unexpected shocks may lead to the takeover of the group by the then-current employees. When a large fraction of an original labor force is on layoff, the incentive for the workers still employed to ignore them and thus not take the pay cut required to get them back may be strong. This is much less likely in the face of small shocks. Changes in the value of m associated with major shocks provide another possible explanation for the coincidence of persistent and high unemployment.

Our model thus suggests two alternative explanations for the empirical observation that unemployment remains at high levels for long periods of time. First, for a given fixed value of m greater than 1 but less than infinity, a sequence of adverse shocks will lead to a change in membership and therefore alter the level of employment permanently. Second, in bad times currently employed workers are more likely to take over and disenfranchise the unemployed, thus reducing the value of m and increasing persistence. The two differ in their implications for the process for unemployment at high levels. In the first, after the level change, the process for unemployment will have a higher mean but the same degree of persistence around the new mean as it had before. In the second case, unemployment will not only be higher but exhibit more persistence.

2.4. LIMITATIONS AND EXTENSIONS OF THE MODEL

In developing our analysis, we have made a number of simplifying assumptions regarding functional forms and the structure of bargaining between workers and firms. The question arises of how sensitive our results are to these assumptions. We have also carefully avoided using the term "union" to refer to the group of insiders. But it is clear that "union" would often have sounded more appropriate and the issue arises of

whether our analysis is actually relevant in nonunion contexts. We now discuss these issues informally.

OTHER BARGAINING STRUCTURES It is well known that even in a one-period model, it is in general inefficient to let the firm choose employment unilaterally, given the wage (see, for example, Oswald (1985)). In our multiperiod model the assumption that the firm chooses employment according to its short-run profit maximizing labor demand is even more questionable. Even if bargaining takes the form of the union setting a wage and allowing the firm to control the level of employment, firms will not choose to operate on their short-run labor demand curves. Through its employment decision, the firm can affect future membership (unless $m = \infty$). By employing more workers in this period, it can increase membership in the next period and thus lower the expected cost of labor. This will lead the firm to choose a level of employment higher than that implied by short-run profit maximization. We suspect that taking account of this consideration would not substantially alter our analysis of employment dynamics. Rather, it would simply shift each period's labor demand curve outward.

Another important possibility would be for the firm to introduce two-tier systems, where newly hired workers get lower wages than those hired previously. Under such systems, insiders should have no reluctance to let firms hire more workers, and employment should increase until new workers are paid their reservation wage. The general reluctance of unions to accept such arrangements, especially in Europe, suggests that a central issue is that of what happens over time to those hired at lower wages. Unions do not encourage two-tier arrangements at least partly because of the fear that second-tier workers will come to control the wage-setting process. Indeed, the rarity of two-tier arrangements is strong evidence for the relevance of the membership considerations stressed here. Without some such consideration, it is difficult to see why unions do not always favor such systems as a way of maximizing the rents that they can capture.

Going back to the setting of the wage, if we allow the wage not to be set unilaterally by the insiders but to be determined by bargaining between insiders and the firm, wages will depend both on the utility of insiders and on the present discounted value of profits to the firm. Profit is a decreasing function of the wage. Thus, the larger the weight of the firm in bargaining, the lower the wage, and thus the higher the average level of employment. The implications for employment persistence depend on the weight of the firm in bargaining when the wage is far from the reservation level of workers. If the firm is relatively more powerful

when the wage is much above the reservation wage, then the wage will tend to decrease when it is high, employment will tend to return to a higher level. Whether or not this happens depends on the structure of bargaining between insiders and the firm.

The specific utility function we have used for insiders is also important for our results. Its main implication, which we have argued is a desirable one, is that the probability of employment chosen by the group is invariant to the size of the group of insiders, or to the level of productivity. If instead an increase in membership, given productivity, led the group to choose both a lower wage and a lower probability of employment—which we can think of as the stochastic equivalent of elastic labor supply—employment would depend on both the anticipated and unanticipated components of productivity and may show less persistence. Even under the rule $m = 1$, an unanticipated increase in employment would, if the increase in productivity was temporary, lead to the choice of a lower wage and a lower probability of employment in the following period, implying an expected return to the initial level of employment over time. The same effects would also arise if, as unemployment became larger and being unemployed became more costly, the group chose a higher probability of employment, leading to an expected increase in employment over time.

Groups or Unions? Is our analysis still relevant when workers are not formally organized in unions, when, for example, wages are simply set unilaterally by the firm?

The work of Lindbeck and Snower (1985) suggests that even in the absence of formal unions current workers have some leverage vis á vis firms. And Slichter (1950) provides confirming empirical evidence suggesting that even before unions were economically important, wages tended to be high in industries with relatively inelastic labor demand.

In many nonunion settings, current incumbent workers and prospective workers cannot be regarded symmetrically. The requirement of cooperation among workers and the collective knowledge possessed by incumbent workers make their position very different from that of prospective new workers. This leads us to suspect that the membership considerations we have stressed are at least somewhat applicable even in nonunion contexts. The potential applicability of our analysis to nonunion settings may be argued informally as follows. Imagine a firm facing a collection of insider workers. The firm must choose a wage and an employment level. It cannot credibly threaten to lay off all its workers and replace them, except at very high cost, because of the specialized expertise of its labor force. On the other hand, the firm cannot credibly

threaten to replace workers individually with lower-wage workers because the remainder of the labor force will not tolerate the hiring of "scabs." Under these conditions, wages and expected employment will be set in some way so as to divide the surplus resulting from a continued relationship between workers and firms. Workers will in general be able to extract some surplus even when they are unorganized. If firms make an "inadequate" wage offer, the workers can refuse to work. As long as workers have specific capital, it will be preferable for management to make another higher offer rather than lay the worker off.

If agreements are renegotiated only periodically and firms are permitted to vary employment in the interim, shocks will in general influence the level of employment. Even without a formal model of the bargaining process between workers and firms, it seems reasonable to expect that a reduction in the number of incumbent workers will lead to the setting of a higher wage and a lower level of expected employment. Thus persistence in employment, though not necessarily as much as with unions, may result even in that case. This also may help explain what goes on in the nonunion sector of economies with large unions.

This argument is clearly tentative. But we conclude from it that, while the effects we have described are more likely to be present when there are explicit unions, they may also arise in settings in which insider-outsider considerations are important.

The Presence of a Nonunion Sector Finally, we consider how our conclusions must be modified if part of the labor market is neither unionized nor subject to insider-outsider considerations.

The simplest analysis of a setting with a competitive sector would hold that there was no involuntary unemployment. Wages in the nonunion sector would fall to the point where all those workers ejected from the union sector could find employment.[21] There are at least three reasons why even granting the existence of a competitive sector, this analysis is suspect. First, competitive firms may be reluctant to lower wages because of the fear of being unionized after they have alienated their current labor force. Second, unemployment benefits may be high enough so that the market-clearing wage in the nonunion sector is below some workers' reservation wage. In one sense their unemployment is voluntary since jobs are available. In another sense the unemployment is involuntary since the unemployed may envy workers with the same skill in the union sector. The general consideration is that when there are wage

21. There is some evidence that this has actually occurred in Britain. Despite the legal changes which have decreased the legal power of unions in the last decade, the size of the union wage differential appears to have risen sharply in recent years.

differentials across jobs, the concept of involuntary unemployment becomes elusive (see Bulow and Summers (1985) for an elaboration of that theme). Third, unemployment may occur even with a competitive sector if remaining unemployed is in some sense useful—or thought to be useful by workers—in getting a union job. This may occur if substantial search effort or queuing is required, or alternatively, if accepting a low-quality job sends a bad signal to employers. This unemployment is related to that of Harris and Todaro (1970) where workers must migrate to urban areas to have a chance at high-wage urban jobs.

There is a more fundamental point regarding the inability of a nonunion sector to prevent unemployment. As Weitzman (1982) persuasively argues, there are strong reasons to believe that most economic activity involves fixed costs and monopolistic competition. Imagine a monopolistically competitive economy with fixed costs of production and constant marginal costs where there is initially no involuntary unemployment. Suppose that an adverse demand shock reduces the demand for goods in this economy but that nominal wages remain constant in all existing firms. Then employment and output will fall as will the profitability of existing firms. Will it pay new firms to enter the market and hire the unemployed at low wages? It may not, because unlike incumbent firms, new firms must cover fixed as well as variable costs. Particularly in settings where labor costs do not represent a large fraction of sales, entry may not be able to ensure the employment of the unemployed.[22] These considerations may enhance the power of unions because they reduce the incentive to start up new nonunion firms.

3. *Empirical Evidence on Hysteresis Theories*

Having developed a formal theory of hysteresis, we now examine whether the model is consistent with the observed patterns of persistently increasing unemployment in Europe and whether it can illuminate the very different behavior of unemployment in Europe and the United States in the recent past. We start by giving direct, institutional evidence on the strength of unions in Europe. We then estimate wage and employment equations implied by our model, for both Europe and the United States. We finally examine patterns of labor market turnover, in the United Kingdom and the United States.

22. Consider a simple example. Suppose restaurant wages were rigid, and a big decline in the demand for restaurant meals took place so there were unemployed chefs. Would it pay to open a new restaurant with a low-paid chef? Probably not if fixed costs were high. These considerations may have something to do with why in bad times employment growth may be concentrated in small establishments.

3.1. THE ROLE OF UNIONS IN EUROPE

The Size of the Union Sector Our model suggests that, even if hysteresis may arise in nonunion contexts, it is probably the more likely to arise the stronger and the larger the union sector. Thus, we start by reviewing the role of unions in Europe. As before, we limit our investigation to the United Kingdom, France and Germany.[23]

Membership figures indicate a union density of approximately 45 percent for the United Kingdom, 20 percent in France, and 38 percent for Germany. But these figures give very limited information as to the strength of unions. A better indicator is union coverage, that is, the proportion of workers covered by some form of collective bargaining. For the United Kingdom, coverage is approximately 70 percent for manual workers, and 55 percent for nonmanual workers. For France and Germany, the proportion of all workers exceeds 80 percent. But even coverage numbers are misleading. To understand why, one must have some institutional background.

On the surface, the three countries appear to be very different. In France there are three main national unions. In Germany, there are only industry unions. In the United Kingdom, there is a maze of craft and industry unions. But the structure of bargaining is in fact quite similar and can be described as follows: in all three countries, most of the formal bargaining is done at the industry level. But in all three countries, wages are determined mostly at the company or plant level.

In the United Kingdom, industry bargaining sets rates, which are usually floors that have little effect on actual wages. Until the Employment Act of 1980, there was scope for extension, that is, for provisions to extend the terms of the agreement to the whole sector. These provisions were eliminated in 1980. In the last twenty years, there has been an increase in the amount of bargaining, both formal and informal, at the plant level, between shop stewards and employers. Given that plant/company bargaining is the really important level of bargaining, it is relevant to look at how many workers are covered by industry and/or plant/company level bargaining. In 1978, the number of workers covered by at least a company agreement was 33 percent for all industries and 47.7 percent for manufacturing. Given the importance of informal bargaining, these figures understate the importance of unions in setting wages.

In France, the "Conventions collectives," which are usually but not always at the industry level, form most of the formal bargaining. These

23. Given that this article is written primarily for an American audience, we do not review the role of unions in the United States in any detail. As will be clear from our description of Europe, unions in the United States play a much more limited role than they do in Europe.

agreements are signed between a "representative" union and a "representative" employer and apply even if not all unions sign it (which is frequently the case). Subject to some minor conditions, they can be extended to all firms in the industry, by decision of the Minister of Labor. As in the United Kingdom, however, the importance of industry agreements with respect to wages should not be exaggerated. They usually set floors, that do not appear, either directly or indirectly, to have a large effect on actual wages. As in the United Kingdom, a growing portion of the bargaining takes place at the company level, although often in haphazard fashion. Until 1982, wages were largely determined unilaterally by firms, or in response to complaints of union representatives in the plant, with little bargaining or even consultation; local strikes were a standard instrument used by unions to achieve a better deal. Since 1982, there has been a change in the law (Lois Auroux) which requires annual bargaining at the company level on pay and other matters. The result has been a drastic increase in the number of company-level agreements.

In Germany, most of the formal bargaining takes place at the industry level. Agreements can be extended—either to firms in the same industry or to nonunion workers in firms which sign the agreements—by the state or federal Minister of Labor if (1) half of the employees of the sector are employed by firms which have signed the agreement and (2) extension is approved by both unions and employers who have signed.[24] But as in the other two countries, bargaining is increasingly taking place at the company level and there is general agreement that pay is very largely determined at the company level.

To conclude, it is difficult to give an exact estimate of the "union sector" in these countries. To the extent that much bargaining over wages in fact takes place at the company level, union coverage numbers, which are based on both company and industry-level bargaining, probably overstate the number of workers for whom the wage is determined as a result of bargaining between unions and employers. Even with this adjustment, the size of the union sector still remains high, much higher than in the United States. Also, if we believe that the more disaggregated the level of bargaining the less likely it is to take into account the interests of the unemployed as a whole, then these countries are good candidates for hysteresis in the union sector.[25]

24. Actual extensions are rare but the threat of extension is considered to be very effective in making all firms respect the content of these agreements.

25. In future research, it would be valuable to study Japanese labor-market institutions with a view to evaluating the theories of persistent unemployment put forward here. There are a number of similarities between Japanese and European institutions, including the importance of company-level bargaining. There may however be important differences as well, particularly in the attitude of Japanese unions toward outsiders.

An alternative approach is to ask the question, can a firm be nonunion? can a firm become nonunion? In the United Kingdom, the answer is yes: a firm can be or can become nonunion. Nothing in the law prevents it. There are some well-known examples of nonunion firms, most often subsidiaries of U.S. companies. There are very few examples of firms going nonunion.[26] In France and Germany, extension agreements put some constraints on firms in a given sector. There are nonunion firms in both countries; in France, these are nearly exclusively small firms. In France, furthermore, various requirements are imposed on firms with more than 50 employees. In particular they must allow for the presence of *délégués du personnel* who are union representatives within the firm. All national unions have a right to be represented. Since 1978, firms must also allow for the presence of a *section syndicale d'entreprise*, for the presence of the union inside the firm. Together, these facts suggest that it is difficult to be or become nonunion in these countries.

Finally, there is the question of how different the nonunion sector is from the union sector. A study by Kaufman (1984) of the competitive sector in the United Kingdom finds relatively little difference in wage behavior across the two sectors. Together with the arguments given previously, this suggests that the size of the formal union sector may not be a major determinant of the extent of hysteresis. We shall return to this question in the next section.

Membership Rules Membership rules determining who the union represents at any particular time play an important role in our analysis. The empirical evidence on actual membership rules is fairly clear. Workers have the right to join unions if they want to. Workers who are laid off can remain in the union, although they often lose the right to vote; this may happen either because of formal restrictions, or because voting takes place inside the plant. But this tells us little about the question of in whose interest the union actually acts. A study of the unemployed and the unions in the United Kingdom (Barker et al. 1984) gives some information. It finds that, while laid-off workers are officially encouraged to remain in the union and have their union fees waived, they do not, for the most part, see reasons to stay in the union.[27] This provides support for the idea that the union cares mostly about the currently employed.

26. Two recent cases have been those of British Petroleum which has gone nonunion for some of its shipping operations, and that of Robert Murdoch who has in effect gone to a more accommodating union.
27. The reason unions encourage the unemployed to remain in the union appears to be due in part to their desire to increase membership figures, and through these, their role in the national union movement.

3.2. WAGE AND EMPLOYMENT EQUATIONS

Theory We now derive, and then estimate later, the wage and employment equations associated with an expanded version of the model of the previous section. There are two extensions. First we allow for a dynamic specification of labor demand; the reason for introducing it will be clear below. Second, we specify explicitly an alternative hypothesis to that of hysteresis.

We thus specify labor demand as[28]

$$n = s\,n_{-1} - (1 - s)b(w - p) + e. \quad (3.1)$$

Following the analysis of the previous section, we assume that the union acts to set expected employment according to the relation

$$En = (1 - a)n^* + an_{-1}. \quad (3.2)$$

The case where $a = 1$ corresponds to the case where $m = 1$ in the preceding section and there is hysteresis; the case where $a = 0$ corresponds to the case where the union's policy is independent of history and so there is no hysteresis. Clearly, intermediate outcomes are also possible.[29]

Finally, let the wage which satisfies equations (3.1) and (3.2) be denoted by w^*. We assume the actual wage to be given by

$$w = w^* + u,$$

where the disturbance term u is assumed to be white, uncorrelated with w^* and reflecting factors outside the model. Combining this assumption with equations (3.1) and (3.2) yields a wage and an employment equation:

$$w = Ep + (1/b(1 - s)) \times [-(1 - a)n^* + (s - a)n_{-1} + Ee] + u, \quad (3.3)$$

$$n = (1 - a)n^* + an_{-1} + [e - Ee + (1 - s)b(p - Ep - u)]. \quad (3.4)$$

28. Allowing labor demand to depend on current and expected real wages, as it should under costs of adjustment, would complicate our task here. John Kennan takes up this issue in his comments on our paper.

29. Note that a between 0 and 1 does not correspond exactly to m between 1 and infinity. As we have argued before, m between 1 and ∞ leads to a more complex, nonlinear specification.

The wage equation holds that the wage of the union is a decreasing function of n^*. When the union is larger, it is more cautious in setting wages. The impact of n_{-1} is ambiguous. A larger value of n_{-1} raises the size of the group in whose interest the union is maximizing wages but it also increases labor demand.

The employment equation, on the other hand, implies that employment follows a first-order process. The degree of persistence depends only on a, not at all on s. Unexpected movements in employment are due to price and productivity surprises, and deviations of wages from target. Equation (3.4) can be estimated by ordinary least-squares (OLS). This is, however, not the case for equation (3.3): expected productivity is likely to be correlated with past productivity and thus with past employment. Therefore we now derive the reduced-form wage equation. To do so requires an assumption about the process followed by e: we assume that e follows a random walk.[30] Lagging equation (3.1) and substituting it in equation (3.4) yields

$$w - w_{-1} = k + (Ep - p_{-1}) + (1/b(1 - s)) \times [(1 + s - a)n_{-1} - s\,n_{-2}] + u, \quad (3.5)$$

where $k \equiv -(1/b(1 - s))(1 - a)n^*$.

This equation can be estimated by OLS. It gives the rate of wage inflation as a function of expected price inflation, and employment lagged once and twice. It is worth examining further.

Consider first the case where there are no costs of adjustment in labor demand. In this case the equation gives a relation between expected real-wage growth and lagged employment only. If $a = 1$, then expected wage growth does not depend on employment but if $a < 1$, it does. After an unexpected decline in productivity, which leads to lower employment, the remaining workers accept a cut in real wages only to the extent that they care about the workers who have been laid off.

If there are costs of adjustment to employment, then expected real-wage growth depends on employment lagged both once and twice. If $a = 0$, then the ratio of employment lagged twice to employment lagged

30. This is a plausible and convenient assumption. Suppose we assumed instead that productivity was the sum of a linear function of observable variables and a stationary or borderline stationary process, say an AR(1) process with coefficient ρ. The wage equation would then differ from that in the text in several ways. One would be the presence of lagged real wages, with coefficient $\rho - 1$. Another would be the presence of the ρ first differences of the observable variables affecting productivity. We have explored these more general specifications empirically for the United Kingdom and found our simple wage equation not to be misleading.

Table 4a WAGE EQUATIONS, 1953–1984

Country	π_{t-1}	$logE_t$	$logE_{t-1}$	$logE_{t-2}$	Time × 100	θ	DW	R^2	Z
Germany									
(1)	.6*	—	.92	−.80		.07	1.99	.54	.87
			(4.0)	(−4.2)		(.3)			
(2)	.6*	—	.71	−.57	−.12	.04	2.03	.59	.80
			(2.4)	(−2.2)	(1.5)	(.2)			
(3)	.6*	1.12	−.89			−.10	2.00	.74	.79
		(9.6)	(−8.9)			(−.5)			
(4)	.6*	.96	−.74		−.07	−.13	2.01	.76	.77
		(6.2)	(−5.1)		(−1.5)	(−.7)			
United Kingdom									
(5)	.75*	—	.67	−.76	—	.25	2.01	.23	1.13
			(2.6)	(−2.5)		(1.5)			
(6)	.75*	—	.86	−.84	.19	.09	1.97	.31	.98
			(3.2)	(−2.8)	(1.9)	(.5)			
(7)	.75*	.13	−.08	—	—	.21	1.83	.07	.62
		(.4)	(−.2)			(1.0)			
(8)	.75*	.34	−.19	—	.20	.16	1.84	.15	.56
		(1.0)	(−.5)		(1.5)	(.7)			

France									
(9)	.8*	—	.58	−.39	—	—	2.03	.12	.67
			(1.5)	(−.9)					
(10)	.8*	—	.61	−.42	.00	−.05	1.92	.13	.69
			(1.2)	(−.7)	(.0)	(−.2)			
(11)	.8*	.97	−.74	—	—	—	2.04	.29	.76
		(2.9)	(−2.1)						
(12)	.8*	1.28	−1.16	—	.12	—	2.09	.33	.91
		(3.1)	(−2.1)		(1.2)				
United States									
(13)	.7*	—	−.07	.00		.54	2.03	.26	.00
			(−.8)	(.0)		(2.2)			
(14)	.7*	—	−.07	.00	.00	.54	2.02	.26	.00
			(−.8)	(.0)	(.0)	(2.2)			
(15)	.7*	.24	−.25	—	—	.48	1.98	.49	1.04
		(4.6)	(−4.8)			(2.5)			
(16)	.7*	.28	−.16	—	−.13	.34	1.99	.63	.57
		(5.9)	(−3.3)		(−3.9)	(1.7)			

$\dot{w}$: rate of change of average hourly earnings in manufacturing.
π: rate of change of the consumer price index.
E: manufacturing employment.
t-statistics in parentheses.
All equations for Europe are run with a first order autocorrelation correction (θ = AR1 coefficient).
All equations for the U.S. are run with a first order moving average correction (θ = MA1 coefficient).
Z is the absolute value of the ratio of the coefficient on Log E_{t-1} to the coefficient on log E_t (or of the coefficient on log E_{t-2} to the coefficient on log E_{t-1} as the case may be).

Source: OECD data bank, extended back to 1950 by D. Grubb. See Grubb (1984).

once cannot exceed ½ (in absolute value). But as a increases, the ratio tends to 1. If $a = 1$, the ratio equals unity, that is, expected real-wage growth depends on the change rather than on the level of employment.

Note that we cannot identify a and s separately from estimation of the wage equation. But a must be positive if we find the ratio described above to be larger than ½. Furthermore, a can be directly obtained from the employment equation.

While we have derived the wage equation (3.5) from a rather specific theory of union behavior, it can be motivated in other ways. Following the logic of the monopolistic competitive model (see the preceding section) just as we have followed the logic of the competitive model, gives rise to an equation for wage inflation paralleling equation (3.5). Much more generally, equation (3.5) is very close to a standard Phillips curve which allows for a rate-of-change effect, a la Lipsey. The only real difference is the presence of employment rather than unemployment on the right-hand side. We now turn to estimation of the wage and employment equations.

Results The results of estimation of the wage equations for the United Kingdom, France, Germany, and the United States, for the period 1953 to 1984 are reported in tables 4 and 5.

In table 4a, four alternative specifications of the wage equation are estimated for each country. Because the appropriate timing is unclear with annual data, we estimate the equations using alternatively contemporaneous and once-lagged employment, and once- and twice-lagged employment.[31] We also estimate each equation with and without a time

31. Because our wage data refer to manufacturing wages, we use manufacturing employment as the employment variable in the results reported here. Very similar results were obtained using total employment.

Table 4b WAGE EQUATION RESIDUALS, 1953–1984

Year	*Germany*	*United Kingdom*	*France*	*United States*
1980	−1.91	1.7	1.6	−1.2
1981	−.32	−4.1	1.4	−.8
1982	−.75	3.9	−.0	−.1
1983	.57	−2.7	.1	−.9
1984	−.44	1.1	−1.5	.3
	$\sigma = 1.87$	$\sigma = 3.2$	$\sigma = 3.9$	$\sigma = 1.5$

Residuals from equations 3, 5, 11 and 15 in table 4a.

trend. Many researchers have captured the shift of the Phillips curve by a time trend, that is, by an increase over time unrelated to the history of unemployment and it is interesting to see what happens to our specification when a time trend is allowed. This gives us the four alternative specifications. Finally, we use for expected inflation the forecast of inflation obtained from estimation of an AR(1) process for inflation over the sample period and constrain the coefficient on expected inflation (which is therefore equal to a constant plus a scalar times lagged inflation) to equal unity.

In table 5, we perform the same set of estimations, but using unemployment rather than employment as a right-hand-side variable. We do this because unemployment is the variable used in standard Phillips curve specifications. Some theories of hysteresis such as the idea that the long-term unemployed exert less pressure on wages than those recently laid off also suggest that unemployment is more appropriate than employment in the Phillips curve.

Tables 6 and 7 give the results of estimation of the employment and unemployment processes for each country for the period 1953 to 1984. Here again, while our theory has implications only for employment, we think it is useful to report results for unemployment as well.

The results are fairly clear-cut and indicate that there are substantial differences between the European countries and the United States. Starting with the wage equations, one can draw the following conclusions:

1. Virtually all specifications for Germany, France, and the United Kingdom in tables 4 and 5 suggest a substantial degree of hysteresis.

Let us denote by Z the absolute value of the ratio of the coefficient on lagged employment/unemployment to the coefficient on contemporaneous employment/unemployment (or of the coefficient on employment/unemployment lagged twice to the coefficient on employment/unemployment lagged once as the case may be). As we have seen, under strict hysteresis ($a = 1$) this ratio should be equal to unity. Z is indeed close to unity for nearly all specifications; it is not affected by the inclusion of a time trend, or by the use of employment versus unemployment. There is little difference across countries: Z is higher in the United Kingdom, sometimes exceeding unity. It is closer on average to 0.85 for Germany and France.[32]

32. All these findings are quite robust. The value of z is substantively the same if, following the argument of footnote 30, the lagged real wage, current and lagged values of the capital-labor ratio, the price of oil, and a proxy for productivity growth (when available) are added to the regressions. The results are also robust to changes in the coefficient on lagged inflation, say within 0.2 of the values used in the table.

Table 5 WAGE EQUATIONS, 1953–1984

Country	π_{t-1}	U_t	U_{t-1}	U_{t-2}	*Time* × *100*	ρ	*DW*	R^2	Z
Germany									
(1)	.6*	—	−2.86	2.62	—	.30	1.97	.57	.92
			(−4.3)	(3.8)		(1.6)			
(2)	.6*	—	−2.41	2.12	−.08	.27	1.94	.59	.88
			(−3.0)	(2.6)	(−1.1)	(1.4)			
(3)	.6*	−2.39	1.68	—	—	.06	1.99	.50	.70
		(−4.0)	(2.6)			(.3)			
(4)	.6*	−1.60	.95	—	−.10	.08	2.00	.54	.59
		(−2.1)	(1.2)		(−1.5)	(.4)			
United Kingdom									
(5)	.75*	—	−2.31	2.58	—	.04	2.02	.33	1.17
			(−3.6)	(3.4)		(.2)			
(6)	.75*	—	−2.57	2.46	.14	(−.03)	2.02	.37	.96
			(−4.0)	(3.3)	(1.4)	−.2			
(7)	.75*	−.96	.78	—	—	.22	1.83	.12	.81
		(−1.0)	(.7)			(1.0)			
(8)	.75*	−1.43	.62	—	.28	.13	1.85	.25	.43
		(−2.0)	(.8)		(2.4)	(.6)			

France									
(9)	.8*	—	−1.42	1.35	—	.07	1.93	.03	.95
			(−.7)	(.6)		(.4)			
(10)	.8*	—	−3.01	2.10	.25	−.10	1.86	.15	.70
			(−1.3)	(.9)	(2.1)	(−.5)			
(11)	.8*	−3.57	3.78	—	—	.13	1.99	.14	1.06
		(−1.97)	(1.8)			(.7)			
(12)	.8*	−4.97	4.12	—	.33	−.10	1.91	.33	.83
		(−2.9)	(2.2)		(3.0)	(.5)			
United States									
(13)	.7*	—	−.07	−.06	—	.40	1.99	.21	.86
			(−.2)	(−.1)		(1.3)			
(14)	.7*	—	.11	.07	−.07	.47	2.01	.24	.64
			(.3)	(.2)	(−1.7)	(1.6)			
(15)	.7*	−1.02	.47	—	—	.41	1.99	.62	.46
		(−6.0)	(2.9)			(2.2)			
(16)	.7*	−1.05	.43	—	—	.42	1.99	.63	.41
		(−5.8)	(2.4)		.02	(2.2)			
					(.6)				

See Table 4.
U: standardized unemployment rate.
Z is the absolute value of the ratio of the coefficient on U_{t-1} to the coefficient on U_t (or of the coefficient on U_{t-2} to the coefficient on U_{t-1} as the case may be).

Source: OECD (1984) and Grubb (1984).

In most cases, the time trend contributes little. If the increase in unemployment was an autonomous increase in the natural rate over time, the coefficient on the time trend should be positive. It is in most cases insignificant and often negative. There are, however, two exceptions, for France and the United Kingdom when unemployment—rather than employment—is used as the right-hand-side variable. In both cases, the time trend is positive and significant and explains a large portion of the increase in nominal wages at given inflation and unemployment rates; in both cases, however, even when the time trend is allowed for, lagged unemployment still enters positively and the hysteresis ratio remains high.

Another way in which an autonomous but stochastic shift could manifest itself would be by the presence of high serial correlation in the estimated Phillips curve. Estimated serial correlation is, however, low in all cases.

A final piece of evidence is given in table 4b which reports the residuals associated with the best-fitting equations from table 4a, not in-

Table 6 EMPLOYMENT PROCESSES, 1953–1984

Country	ρ	θ	$\alpha \times 100$	R^2
Germany				
	.76	1.00	—	.96
	(22.3)	(5.3)	—	
	.86	.78	-1.9×10^{-2}	.97
	(26.7)	(3.9)	(.0)	
United Kingdom				
	1.07	.54	—	.96
	(23.3)	(2.6)	—	
	.95	.41	−.20	.94
	(16.3)	(2.0)	(−3.8)	
France				
	.94	.81	—	.94
	(19.5)	(3.0)	—	
	1.08	.48	−.13	.94
	(19.5)	(2.5)	(−4.0)	
United States				
	.82	.07	—	.72
	(7.5)	(.3)	—	
	.34	.46	.40	.77
	(1.5)	(1.6)	(2.5)	

Results of estimation of :
$\log E = \rho \log E(-1) + \alpha(\text{TIME}) + \varepsilon + \theta\varepsilon(-1)$
E : manufacturing employment.

cluding a time trend, for each country, for 1980 to 1984. There is little evidence of significant prediction errors in recent years. This is in sharp contrast to the performance of wage equations which do not allow lagged employment to enter.

2. In contrast to the results for Europe, the results for the United States provide evidence of much less hysteresis. There is evidence of a significant effect of either lagged employment or lagged unemployment. But, with the exception of one specification using employment, the value of z for the United States is smaller than for Europe, being in most cases around 0.5. There is also no evidence in favor of a time trend in the wage equation.

3. A comparison of the results of estimation in tables 4 and 5 does not give a clear answer as to whether employment or unemployment belongs in the wage equation. Using R^2's gives a draw, with employment doing better for France, unemployment doing better for the United Kingdom. Regressions, including current and lagged values of both unemploy-

Table 7 UNEMPLOYMENT PROCESSES, 1953–1984

Country	ρ	θ	$\alpha \times 100$	R^2
Germany				
	.92	.65	—	.91
	(14.8)	(3.4)	—	
	.94	.39	.06	.93
	(17.5)	(1.9)	(5.0)	
United Kingdom				
	1.02	.77	—	.95
	(20.9)	(3.9)	—	
	.81	.82	.09	.96
	(9.9)	(3.9)	(3.5)	
France				
	1.12	−.06	—	.97
	(32.7)	(−.3)	—	
	1.04	−.22	.02	.97
	(18.2)	(−1.1)	(1.4)	
United States				
	.72	.06	—	.58
	(4.5)	(.2)	—	
	.36	.31	.07	.63
	(1.4)	(.9)	(1.9)	

Results of estimation of :
$U = \rho U(-1) + \alpha(\text{TIME}) + \varepsilon + \theta\varepsilon(-1)$
U : standardized unemployment

ment and employment (or equivalently, employment and the labor force) give the same ambiguous answer, with the labor force being significant in the United Kingdom, but not in France or Germany. We see the U.K. results, however, as presenting a problem for our model.

The employment and unemployment equations reported in tables 6 and 7 confirm to a large extent the conclusions from the wage equations. Both unemployment and employment are more persistent in Europe than in the United States. In particular, the process generating unemployment appears nonstationary in all three European countries, whether or not a time trend is included in the regressions. The U.S. process is stationary. The data, however, strongly suggest that an ARMA(1,1), rather than the AR(1) process implied by our theory, is needed to fit the employment and unemployment processes of all four countries. This may reflect a difference between the length of a period in the model and the annual frequency of observation used in the estimation.

3.3. PATTERNS OF LABOR MARKET TURNOVER

A central element in our theory of hysteresis is the lack of concern of employed workers for the unemployed. It is the fear of job loss for current workers and not the outstanding labor-market pool that restrains wage demands. Indeed the formal model explains why firms hire at all only by assuming that wages which are set low enough to insure the jobs of current workers will sometimes make it profitable for firms to hire new workers. While this is clearly an oversimplification, the point remains that insider-outsider or union models of the type we have considered are really theories of why the unemployed are not hired, not theories of why layoffs take place. This suggests the utility of looking at data on labor-market turnover. A finding of high turnover with many workers having short spells of unemployment and then being rehired would tend to cast doubt on the relevance of insider-outsider formulations, while a finding that the rate of flow into and out of employment was relatively low but that the unemployed remained out of work for a very long time would tend to support these theories.

Table 8 presents some evidence on the rate of flow into unemployment in the United States and the United Kingdom over the past decade. The flow is measured as the number of persons becoming unemployed over a three-month period. For the United States, this is estimated as the number of unemployed reporting durations of less than fourteen weeks. For Britain it is the number of unemployment registrants over a three-month period.

Two conclusions emerge clearly. First, despite the much higher rate of unemployment in the United Kingdom than in the United States,

the rate of flow into unemployment is actually lower in the United Kingdom. The implication is that the unemployment problem is not one of an excessive rate of job loss but of an insufficient rate of hiring of the unemployed. The second striking feature is that the rate of flow into unemployment in Britain has increased surprisingly little as unemployment has soared. Between 1970 and 1984 when the rate of unemployment in Britain rose more than 300 percent, the rate of flow into unemployment has risen by only about 75 percent. This pattern of rising unemployment with only a modest increase in the rate of inflow appears more pronounced in British than in American labor markets. In the United States, the inflow rate has accounted for a significant part of the increase in unemployment during recession periods. For example, between 1979 and 1982, unemployment increased by 67 percent and the inflow rate rose by 44 percent.

The OECD (1985) summarizes the fragmentary information available on labor market turnover for other European nations. The data in general parallel our findings for the United Kingdom—suggesting relatively modest increases in the rate of flow into unemployment starting from a very low base. They do, however, suggest that the composition of the

Table 8 PATTERNS OF INFLOW TO UNEMPLOYMENT

	United States	*Great Britain*
Year	Number unemployed less than 14 weeks as percent of employment	Quarterly inflow as percent of employment*
1970	4.4	3.3
1971	4.8	3.6
1972	4.5	3.6
1973	4.2	2.9
1974	4.8	3.2
1975	6.3	4.2
1976	5.7	4.9
1977	5.5	4.7
1978	5.0	4.5
1979	5.0	4.2
1980	5.8	4.9
1981	6.0	5.2
1982	7.2	5.5
1983	6.5	5.6
1984	5.5	

* Average of quarterly values.

newly unemployed has changed over time as the unemployment rate has increased. Lay-off rates have increased while quit rates have declined.

Given the magnitude of the increases in European unemployment rates and the relatively small increases in flow rates, it is inevitable that unemployment durations have increased substantially. Table 9 presents some information on the increasing importance of long-term unemployment in Europe. Along with information on the average duration of unemployment, it presents estimates of the fraction of all unemployment due to persons whose total length of unemployment exceeds various threshold lengths.[33] The data demonstrate that at the same level of unemployment, long-term unemployment is much more important in Europe than in the United States. In 1980, when the American unemployment rate was 7.2 percent, only an estimated 15 percent of all unemployment was due to persons out of work for more than a year. The corresponding percentages were 74 percent, 59 percent and 75 percent in the United Kingdom, Germany, and France even though the unemployment rates were lower. The data also show that long-term unemployment has increased in importance as overall unemployment rates have risen in Europe. Indeed, the increase in duration of unemployment is almost proportional to the increase in unemployment.

Summary We have shown that unions play an important role in Europe and that the behavior of European unemployment is consistent with our hypothesis about hysteresis. It is obviously tempting to conclude that unions are at the root of the European problem; but the temptation must be strongly resisted. First, even if unions create hysteresis, they only create a channel for persistence, which implies that both favorable and adverse shocks will both have long-lasting effects. The sequence of unfavorable shocks, at least some of which are the consequence of policy, may equally well be said to be the cause of persistent high unemployment. Second, it is yet unclear whether the cause of hysteresis in Europe is unions or the sequence of adverse shocks which has caused high unemployment.

4. *Is Eurosclerosis Really the Problem?*

We have seen that our model of persistent unemployment may explain important aspects of the current European depression and the very dif-

33. The motivation for calculations of this type is laid out in Clark and Summers (1979). In performing the calculations, we have assumed that the exit rate from unemployment is not duration-dependent. If, more realistically, we allowed for it to decline, the estimated concentration of unemployment in long spells would show up even more clearly.

Table 9 THE IMPORTANCE OF LONG TERM UNEMPLOYMENT

	United States		*United Kingdom*		*Federal Republic of Germany*		*France*	
	1980	1984	1980	1984	1980	1984	1980	1984
Unemployment rate	7.2	7.5	6.5	12.7	3.4	8.1	6.6	10.0
Average duration of unemployment for adult men currently unemployed	3.6	5.8	12.2	19.4	8.6	12.6	12.6	14.4
Percent contribution to adult male unemployment of those unemployed at least:								
6 months	50	72	91	96	85	92	92	93
12 months	15	39	74	87	59	75	75	80
18 months	4	18	57	76	38	58	58	64
24 months	1	8	41	65	23	43	43	56

Source: Based on authors' calculation.

ferent behavior of European and American labor markets. The evidence presented so far leaves open a crucial question, however. Is the presence of hysteresis in European unemployment a consequence of the heavily regulated and unionized character of European labor markets? Alternatively, is hysteresis the result of a sequence of adverse shocks to employment? The case that major structural reforms are needed if full employment in Europe is to be restored depends on an affirmative answer to the first question, while the case for expansionary macroeconomic policies is more compelling if the second question can be given a positive answer.

Deciding whether the source of hysteresis lies ultimately in European institutions or in the sequence of adverse shocks that have buffeted European economies requires comparisons of the current situation with situations where only one of these elements is present. Comparison with the United States at present cannot resolve the issue because the American economy lacks institutions like those in Europe and has not suffered a sequence of contractionary aggregate demand shocks like those experienced by Europe in the 1980s. But we are able to make two comparisons that can shed some light on the sources of hysteresis. The first is a comparison of the behavior of European labor markets in the recent period with their behavior over the 1953–1968 period. Broadly speaking, labor market institutions were similar in the two periods but the pattern of shocks was very different.[34] The second comparison is between the current European depression and the U.S. Great Depression of the 1930s. At the time of the U.S. Depression, unions were weak and social programs and labor-market regulations were a small factor. The U.S. Depression may also shed light on the role of expansionary policies in alleviating persistent high unemployment. We consider these comparisons in turn.

4.1. EUROPEAN LABOR MARKETS BEFORE THE CURRENT DEPRESSION

We have examined the persistence of unemployment and the behavior of wages in Europe over the past thirty-five years. This long interval contains the current depression period and the period of unparalleled growth of the 1950s and 1960s. We now examine the extent to which hysteresis is a product of bad times by considering labor-market behavior separately over each of the two periods. Table 10 presents estimates of the stochastic process followed by unemployment separately for the

34. Some of the institutional rigidities of European labor markets date, however, from social policies introduced in the 1960s and 1970s.

1952–1968 and 1969–1984 periods.[35] The degree of persistence in unemployment in Europe is much higher in the latter period. Similar but somewhat less dramatic results are obtained using employment rather than unemployment figures. For the earlier period, unemployment appeared to have been more persistent in the United States than in the United Kingdom or France. These results tend to suggest that hysteresis is a feature of bad times rather than a consequence of the structure of European labor markets.

Table 11 presents estimates of wage-change equations paralleling those reported in table 5, but using annual data for the 1953–1967 period. Taken together, the results suggest somewhat less hysteresis in the 1953–1967 period than over the whole sample period, with the difference being pronounced in the United Kingdom where the ratio Z, which

35. It is clear that with such short samples, and such a drastic increase in unemployment in the second subsample, estimation cannot be very precise.

Table 10 THE PERSISTENCE OF UNEMPLOYMENT IN GOOD AND BAD TIMES

Country	ρ	θ	*SE regression*
France			
1952–1968	.41	.81	.3
	(1.1)	(1.8)	
1968–1984	1.11	−.48	.4
	(5.0)	(1.4)	
Germany			
1952–1968	.86	.22	.5
	(12.3)	(.9)	
1968–1984	1.07	.51	.8
	(5.1)	(1.4)	
United Kingdom			
1952–1968	.01	.97	.5
	(.0)	(2.5)	
1968–1984	1.0	.99	.9
	(27.6)	(3.8)	
United States			
1952–1968	.75	−.37	1.0
	(1.6)	(−.7)	
1968–1984	.59	.50	1.1
	(1.7)	(1.1)	

The results represent estimates of an ARMA (1,1) process for the unemployment rate.

Table 11 WAGE EQUATIONS, 1953–1967

Country	π_{t-1}	U_{t-1}	U_{t-2}	Time × 100	ρ	DW	R^2	Z
Germany								
(1)	.6*	−6.48	5.86	—	−.14	1.91	.55	.90
		(−3.7)	(3.7)		(−.4)			
(2)	.6*	−6.25	4.53	−.60	−.14	2.07	.60	.72
		(−3.6)	(2.2)	(−1.1)	(−.4)			
United Kingdom								
(3)	.75*	−2.91	1.89	—	−.00	1.71	.50	.65
		(−3.2)	(2.0)		(.0)			
(4)	.75*	−3.49	1.74	.16	−.17	1.71	.57	.50
		(−3.8)	(1.9)	(1.4)	(−.5)			
France								
(5)	.9*	−6.11	4.53	—	−.47	2.18	.61	.74
		(−3.8)	(2.8)		(−1.8)			
(6)	.9*	−6.25	4.12	−.06	−.50	2.19	.62	.66
		(−3.8)	(2.3)	(−.5)	(−1.9)			
United States								
(7)	.7*	−1.23	.37	—	.73	2.05	.66	.30
		(−5.2)	(1.7)					
(8)	.7*	−1.25	.57	−.17	−.04	1.90	.86	.46
		(−7.0)	(3.2)	(−4.2)	(−.1)			

See Table 4a and Table 5.

was close to 1 for the full sample is now close to 0.5. However, the results for the 1953–1967 period, like those for the entire period, suggest a greater degree of hysteresis in Europe than in the United States. The fact that persistence is present in the earlier period in Europe to a greater degree than in the United States but becomes increasingly important as the unemployment rate increases makes it difficult to draw any firm conclusion about its causes.

On balance, evidence on the changing behavior of European labor markets suggests that bad times as well as unions account for findings of hysteresis. But this evidence is not sufficiently powerful to permit a judgment about their relative importance.

4.2. A TALE OF TWO DEPRESSIONS

Salient features of many discussions of the current European depression include pessimistic forecasts that unemployment will never return to earlier levels, concern that reduced investment and lower capital stocks have made it impossible to employ the entire labor force, and fears that expansionary policies will lead directly into inflation with little or no favorable impact on output or employment. These pessimistic views are premised on the conviction that structural problems are central to high unemployment in Europe, and that the causes of persistent high unemployment go beyond a sequence of adverse shocks. Yet the American depression of the 1930s was ended by the expansion in aggregate demand associated with rearmament. Unemployment recovered to pre-Depression levels. Recovery was not inhibited by an insufficient capital stock or by the overly rapid adjustment of wages and prices. Are this experience and the current European experience sufficiently comparable to permit the inference that hysteresis arises from a sequence of adverse shocks rather than from structural problems in the labor market? Or do major differences in the character of the American and European depressions render the American experience irrelevant for thinking about current European problems?

We begin by briefly reviewing the record of the American economy over the 1925–1945 period. A number of basic economic statistics are presented in table 12. The outstanding feature of the period is, of course, the dramatic upsurge in unemployment that began in 1929. Unemployment rose from levels comparable to those in Europe in the late 1960s and early 1970s to 25 percent in 1933 and remained above 14 percent until 1940. As in Europe today, employment actually declined over a ten-year period. Beginning in late 1939 with the declaration of war in Europe, unemployment began to decline rapidly as rearmament stimulated the economy. The benefits of increased defense spending spilled over into

the rest of the economy. While there were only 822,000 men in the army in November 1940 and 2.1 million a year later, nonagricultural employment increased by 16 percent (6 million persons) between 1939 and 1941. Production of a variety of nondefense goods increased rapidly. Mitchell (1947) reports that between 1939 and 1941 sales of automobiles rose by 35 percent, refrigerators by 69 percent and washing machines by 63 percent. Overall industrial production rose by 20 percent.

These rapid improvements in economic performance were unexpected. Indeed, in the wake of the 1937 recession many observers had despaired of any eventual return to full employment. Paul Samuelson noted in 1944 that "in the years just prior to 1939 there were noticeable signs of dwindling interest in the problem of unemployment which took the form of ostrich-like attempts to think away the very fact of unemployment by recourse to bad arithmetic and doubtful statistical techniques. And even among economists there was increased emphasis on the recovery of production and income to 1929 levels." Such pessimism was pervasive even among those charged with alleviating the situation. Harry Hopkins, a

Table 12 THE AMERICAN ECONOMY, 1925–1945

Year	*U*	*w (all workers)*	*p (CPI)*	*Index of productivity*	*Nonresidential capital (1958$)*
1925	3.2	.9	4.0	92.6	211.0
1926	1.8	1.5	0.0	95.0	218.7
1927	3.3	3.2	−6.0	95.4	223.9
1928	4.2	.3	−1.0	96.1	229.3
1929	3.2	3.5	−1.0	100.0	236.6
1930	8.9	−0.6	−3.0	97.0	238.8
1931	16.3	−5.0	−8.3	98.5	233.5
1932	24.1	−8.9	−9.0	95.4	222.8
1933	25.2	−5.8	−5.0	93.2	212.2
1934	22.0	12.0	2.6	103.3	203.9
1935	20.3	2.3	2.6	106.7	198.3
1936	17.0	1.9	1.2	111.3	197.0
1937	14.3	5.9	3.7	110.4	198.4
1938	19.1	1.8	−2.4	113.5	194.5
1939	17.2	1.2	−1.2	117.6	192.2
1940	14.6	2.4	1.2	122.2	193.6
1941	9.9	9.7	4.9	124.2	198.3
1942	4.7	26.9	10.5	123.3	193.5
1943	1.9	10.6	6.3	124.6	186.5
1944	1.2	7.8	2.0	134.4	183.0
1945	1.9	9.0	1.9	142.0	185.5

Source: Bailey (1983) and *Historical Statistics of the United States.*

liberal confidante of Franklin Roosevelt, wrote in 1937 that "it is reasonable to expect a probable minimum of 4 to 5 million unemployed even in future prosperity periods" (Leuchtenberg (1963) p. 263). Similar sentiments were echoed by others, including New York Mayor Fiorello LaGuardia who concluded that the situation had passed from being an emergency to being the new norm.

Similar pessimism is often expressed in Europe today. The pessimism reflects the view that unlike the U.S. Great Depression's persistent unemployment, persistent unemployment in Europe is caused by structural problems which are not merely the residue of adverse shocks. H. Giersch has coined and popularized the word "eurosclerosis" to denote these structural problems. Is there some important difference between the two situations that suggests that rapid expansionary policies would fail in Europe today even where they succeeded so spectacularly in the United States in 1940? There are surprisingly many similarities between the two experiences. The failure of inflation and real wages to recede more rapidly is an often-noticed aspect of the current European experience. Indeed, it is this observation that leads to conclusions that problems are structural and that the equilibrium rate of unemployment has increased. In the latter half of the depression, a similar pattern appeared in the United States. Between 1936 and 1940 unemployment fluctuated around a very high mean but there was essentially no deceleration in inflation and real wages rose by about 10 percent, close to the normal rate of productivity growth. Before the 1930s, periods of steady inflation had had much lower average unemployment rates.

Just as unemployment in Europe is highly persistent today, it appeared highly persistent during the American depression. The autocorrelation of unemployment was 0.87 in the United States over the 1919–1941 period. In table 13, we examine further the issue of hysteresis during the depression and present some estimated wage equations for the 1920–1941 period. The war years are omitted because of the influence of controls. The results dramatically suggest hysteresis paralleling that found in Europe today. When only contemporaneous employment or unemployment is entered into the equation, it is insignificant, but the change in employment or unemployment is strongly associated with changes in the rate of wage inflation.[36] These results are robust to a variety of ways of treating expected inflation. While paralleling our results

36. A similar finding is emphasized by Gordon and Wilcox (1981) who also provide evidence that it holds for Europe during the depression period. Gordon (1983) emphasizes the importance of the rate of change effect in the Phillips curve during the depression period in both the United States and the United Kingdom but finds the level effect to be dominant outside of this interval.

Table 13 WAGE EQUATIONS, 1920–41 AND THE AMERICAN DEPRESSION

	U_t	U_{t-1}	$logE_t$	$logE_{t-1}$	π_{t-1}	R^2	DW	Z
(1)	−.06	—	—	—	.22	0.0	1.71	—
	(.2)				(.8)			
(2)	−1.13	1.26	—	—	.50	.29	2.13	1.12
	(2.9)	(3.2)			(2.1)			
(3)	—	—	.67	—	.24	.03	1.75	—
			(.50)		(.9)			
(4)	—	—	2.71	−2.72	.38	.36	1.99	1.00
			(.74)	(3.2)	(1.7)			

The dependent variable is the rate of wage inflation. Data drawn from *Historical Statistics of the United States*.

for present-day Europe, these results differ from our results using American data for the postwar period. This may be taken as evidence that hysteresis is a phenomenon associated with bad times rather than with particular labor market institutions.

In considering contemporary European labor markets, we laid considerable stress on the importance of long-term unemployment, emphasizing that turnover rates were, if anything, lower in Europe than in the United States. Table 14 (from Woytinsky (1942)) presents some of the limited evidence available on patterns of labor-market turnover during the American depression. Again, the results parallel Europe today. There is little evidence of an increase in the flow rate into unemployment, though quits decline and layoffs increase. As in Europe today the duration of unemployment appears to have increased substantially. Woytinsky reported evidence from a 1937 Philadelphia survey that found that 61.7 percent of unemployed adult men had been out of work for more than a year. More generally, he concluded that the depression era saw the emergence of a new group of hard-core unemployed. Patterns in labor-market turnover do not appear to provide a basis for distinguishing European labor markets and American labor markets during the depression.

Hysteresis appears to be an important feature of American depression. Earlier, we suggested three possible sources of hysteresis. Of these, physical capital accumulation appears an unlikely culprit. As table 12 demonstrates, the real value of the nonresidential capital stock actually declined between 1929 and 1939. This reduction did not represent an important bar to full employment during or after the war when demand for goods was strong. This makes us somewhat skeptical of claims that insufficient capital is preventing a European recovery. However, it should be noted that Mitchell (1947) claims that capacity utilization rates were very low before the 1939 expansion. This is not true in Europe today. There is some evidence of human capital hysteresis in labor force participation. The U.S. labor force participation rate of men over 65 dropped from 54 to 42 percent between the 1930 and 1940 censuses.[37] This is considerably more rapid than its trend rate of decline. Between 1920 and 1930, it fell by only 1 percent, and it remained essentially constant between 1940 and 1950. It seems unlikely however that this could have had much effect on unemployment. Indeed, to the extent that marginal workers were induced to drop out of the labor force, bad times might have reduced subsequent unemployment.

37. This drop-off may to some extent reflect the effects of the introduction of Social Security. The program was sufficiently small in 1940 that this is unlikely to be the whole story. Moreover, the timing of its introduction surely had something to do with the fact of the depression.

Table 14 LABOR MARKET TURNOVER AND THE AMERICAN DEPRESSION

EXTENT OF LABOR TURNOVER FROM 1919 TO 1929
(Median monthly rates per 100 workers)

		Separations			
Year	*Accessions*	Total	Quits	Discharges	Layoffs
1919	10.1	7.5	5.8	1.1	0.6
1920	10.1	10.3	8.4	1.1	0.8
1921	2.7	4.4	2.2	0.4	1.8
1922	8.0	5.3	4.2	0.7	0.4
1923	9.0	7.5	6.2	1.0	0.3
1924	3.3	3.8	2.7	0.5	0.6
1925	5.2	4.0	3.1	0.5	0.4
1926	4.6	3.9	2.9	0.5	0.5
1927	3.3	3.3	2.1	0.5	0.7
1928	3.7	3.1	2.2	0.4	0.5
1929	4.4	3.8	2.7	0.5	0.6

Source: Monthly Labor Review, July 1929, pp. 64, 65; February 1931, p. 105.

EXTENT OF LABOR TURNOVER FROM 1930 TO 1940, BY YEARS
(Average monthly rates per 100 workers)

		Separations			
Year	*Accessions*	Total	Quits[a]	Discharges	Layoffs
		Median rates			
1929	4.4	3.8	2.7	0.5	0.6
1930	1.6	2.4	1.1	0.2	1.2
		Weighted average rates			
1930	3.1	5.0	1.6	0.4	3.0
1931	3.1	4.1	1.0	0.2	2.9
1932	3.4	4.3	0.7	0.2	3.4
1933	5.4	3.8	0.9	0.2	2.7
1934	4.7	4.1	0.9	0.2	3.0
1935	4.2	3.6	0.9	0.2	2.5
1936	4.3	3.4	1.1	0.2	2.1
1937	3.5	4.4	1.2	0.2	3.0
1938	3.8	4.1	0.6	0.1	3.4
1939	4.1	3.1	0.8	0.1	2.2
1940	4.4	3.35	1.0	0.15	2.2

a. Including miscellaneous separations because of death, retirement on pension, etc., reported separately since January 1940.
Source: Monthly Labor Review, 1930 to 1941. For a summary of labor turnover from 1931 to 1939, see *ibid.*, September 1940, pp. 696–704.

Source: Woytinsky (1942).

Our insider-outsider story of wage setting still remains. Beyond documenting the importance of hysteresis, and confirming its implications for wage equations, it is difficult to test the story directly. But the judgment of Leuchtenberg (1963) is perhaps revealing. "By Roosevelt's second term, as it seemed the country might never wholly recover, the burden of the unemployed had become too exhausting a moral and economic weight to carry. Those who drew income from other sources could hardly help but feel that the Depression had been a judgement which divided the saved from the unsaved. Increasingly, the jobless seemed not merely worthless mendicants but a menacing Lumpenproletariat." While Leuchtenberg is referring primarily to public attitudes toward the unemployed, similar private attitudes are the driving force behind the hysteresis mechanism we have stressed.

The finding of so many parallels between the current European depression and the American depression suggests to us that hysteresis in Europe may be more the result of a long sequence of adverse shocks than the result of structural problems. Perhaps most telling is the observation that the apparent natural rate of unemployment drifted upward following the actual unemployment rate during the American depression just as it has in Europe. Given the absence of structural explanations for this drift, the inference that it resulted from high past unemployment seems compelling. So too, the high apparent European natural rate of unemployment may be the result of hysteresis arising in the aftermath of a sequence of adverse shocks. This implies that expansionary macroeconomic policies may well work in reducing unemployment in Europe.

5. *Conclusions*

Periods of persistently high unemployment are not uncommon events in broad historical context, yet standard macroeconomic theories have a difficult time accounting for them. We have argued that they can only be understood in terms of theories of hysteresis that make long-run equilibrium depend on history. We have also argued that membership effects may well be important sources of hysteresis. Such effects appear to be an important source of persistence in unemployment in Europe today.

High unemployment is not, however, always persistent. Identifying the circumstances under which persistence is likely to arise is crucial. The main issue is whether hysteresis is the result of specific labor-market structures, of the presence of unions in particular, or whether it is itself the result of adverse shocks, which by increasing unemployment, trigger the insider-outsider dynamics we have discussed here. Our tentative conclusion, from the historical record, is that membership effects be-

come important in bad times and are not crucially dependent on the presence of unions. We have not, however, provided a fully satisfactory theory of membership effects in nonunion settings.

Our theory permits a broad-brush account of the increase in unemployment in Europe over the past fifteen years. In the 1970s, European economies were hit with surprises in the form of rising oil prices, a productivity slowdown, and rapid increases in tax rates. With wages rigid in the short run, each of these types of shocks created unemployment. Because of the membership considerations stressed here, the decrease in employment was validated by higher wage demands. As a result, by the end of the 1970s the equilibrium level of unemployment had increased substantially. In the 1980s, the European economies, unlike the U.S. economy, experienced a series of adverse aggregate demand shocks as European monetary policies followed U.S. policies, but fiscal policies turned contractionary. This led to further unemployment which was then validated by wage demands by those who remained employed. At this point, unemployment will remain high even if there are no more adverse shocks, because of the power of insider workers to set wages.

Our argument is that Europe has experienced a sequence of adverse shocks during the past fifteen years, each of which had a fairly permanent effect on the level of employment. Current high unemployment can be blamed equally on a propagation mechanism that leads the adverse shocks of the past to have a lasting impact, or on the shocks themselves. Unlike simple Keynesian explanations for the European depression which stress only aggregate demand, our theory explains increases in the apparent natural rate of unemployment. Unlike some classical explanations for European unemployment which deny any role for demand management policies, our theory explains how aggregate demand can have protracted effects even in the absence of any long-lasting nominal rigidities.

This view of the European unemployment problem has a number of fairly direct policy implications. A first policy implication of our analysis is the desirability of using measures to "enfranchise" as many workers as possible. If work-sharing programs cause more workers to be employed and therefore represented in wage-setting decisions, they may lead to reduced wage demands and increased employment. Profit-sharing plans such as those proposed by Weitzman (1984) may also raise employment by making it possible for employers to reduce the cost of labor by increasing hiring. On the other hand, they would increase unions' resistance to hiring new workers and might thereby increase membership problems. An obvious alternative policy is to enact measures to reduce the power of unions and thereby allow outsider workers to have a larger

impact on wage bargains. Our findings regarding the U.S. Depression where unions were probably not of great importance lead us to be somewhat skeptical of the efficacy of such measures. Certainly it does not yet appear that efforts to reduce the power of unions in the United Kingdom have borne (macroeconomic) fruit.

Our model suggests that shocks, positive or negative, are in a sense self-validating. If employment changes, wage-setting practices adapt to the new level of employment. This means that positive shocks contrived through demand management policies can reduce unemployment regardless of the source of the shocks that caused it. Even if unemployment initially originated from adverse productivity shocks, expansionary policies, if they succeed in raising the level of employment, will yield permanent benefits. Symmetrically, even if most of the increase in unemployment in the 1980s is due to demand, the large decrease in the price of oil may well decrease it permanently. At the same time the model suggests that only policies or shocks that are in some sense surprises will be efficacious. This means that it may be difficult to increase employment a great deal with expansionary policies. The crucial question becomes the length of time over which expansionary policies can "surprise" wage setters. To whatever extent they can, very long-lasting benefits will be derived.

Do the many parallels between the American and European depressions imply that a major expansion in aggregate demand would create the same miracles in Europe as it did in the United States? Unfortunately comparison of the two depressions cannot lead to a very definite answer. While it does dispose of the idea that the apparent increase in the natural rate of unemployment means that demand expansion cannot possibly succeed, and the idea that real wage growth must be restrained if expansion is to take place, an important problem remains. The likelihood of achieving a surprise for a protracted period through inflationary policies may well have been much greater in the United States after a decade including a major deflation than it is in Europe today after a decade of stagflation. On the other hand, the very political infeasibility of expansion in Europe suggests its possible efficacy. Certainly the protracted high unemployment caused by the deflationary policies of the recent past stands as a testament to the potent effects of macroeconomic policies.

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APPENDIX TO SECTION 2

1. Derivation of the probability of being employed.

For a given realization of e, thus for a given $n = -cw + e$, the probability of employment is given by

If $n \geq n_0$, or equivalently for $e \geq n_0 + cw$, then $p = 1$

If $n \leq n_0$, or equivalently for $e \leq n_0 + cw$, then $p = N/N_0 \div 1 - n_0 + n$.

This implies that, for an arbitrary distribution of e, with density function $f(e)$, and support $[e^-, e^+]$, the probability is given by

$$p = \int_{e^-}^{n_0 + cw} (1 - n_0 - cw + e) f(e) de + \int_{n_0 + cw}^{e^+} 1 \, f(e) de.$$

If, as assumed in the text, e is uniform on $[Ee - a, Ee + a]$, p becomes

$$p = (\tfrac{1}{2}a) \{[(1 - n_0 - cw + e/2)e]_{Ee - a}^{n_0 + cw} + (Ee + a - n_0 - cw)\}$$

$$= 1 \qquad \text{for } n_0 + cw \leq Ee - a$$

$$= 1 - (\tfrac{1}{4}a)(n_0 + cw - Ee + a)^2 \quad \text{for } n_0 + cw \geq Ee - a.$$

2. Derivation of the solution in the case when $m = 1$.

We first derive the objective function maximized by the union at any given time.

We assume that, if laid off, the probability of being rehired by the firm is equal to zero. As in the text, we assume that the utility of being unemployed is equal to zero. Let p_i be, as in the text, the probability of being employed at time i for a member of the union at time i. Then, given the membership rule that membership depends on employment in the previous period, the probability for a union member at time zero to still be a union member in period i is given by $E_0(p_0 p_1 \ldots p_{i-1})$. Thus, the utility of the union member as of period 0 is given by

$$U_0 = E_0((p_0 + bw_0) + \theta p_0(p_1 + bw_1) + \theta^2 p_0 p_1(p_2 + bw_2) + \ldots),$$

or, in recursive form, by

$$U_0 = p_0 + bw_0 + p_0E_0(\theta U_1).$$

Even under the assumption that the shocks are independently distributed through time, the random variables within the expectation operator above are not in general independent, making the maximization problem intractable. Thus, we solve instead the problem associated with the objective function linearized around some p', w'. This linearized objective function is given by the following recursion:

$$V_0 = (A + dp_0 + bw_0) + \theta p'E_0V_1,$$

$$\text{where } A \equiv -\theta p'(p' + bw')/(1 - \theta p') \text{ and}$$
$$d \equiv 1 + \theta(p' + bw')(1 + \theta p' + \theta^2 p'^2 + \ldots)$$
$$= (1 + b\theta w')/(1 - \theta p').$$

The weight put on the probability of being employed, p_0, is now higher than in the previous case. This is because p_0 affects not only today's outcome but the probability of union membership and employment in the future.

We now derive the solution to the maximization using the linearized objective function. Under the assumption that shocks to labor demand are independent and uniformly distributed on $[-a, +a]$, the solution to the linearized maximization problem is derived as follows:

We first guess that the maximized value V_0 is of the form

$$V_0 = \alpha - \beta n_{-1} \tag{a1}$$

with coefficients α and β to be determined. We then solve for optimal p_0 and w_0 given α and β, and finally solve for α and β.

If $V_0 = \alpha - \beta n_{-1}$, then $E_0V_1 = \alpha - \beta E_0 n_0 = \alpha + \beta c w_0$. Replacing in the recursive form which characterizes V_0 gives

$$V_0 = (A + \theta p'\alpha) + (b + \theta p'\beta c)w_0 + dp_0 \tag{a2}$$

The probability p_0 is given by

$$p_0 = 1 - (1/4a)(\bar{n}_0 + cw_0 + a)^2$$

Replacing p_0 in equation (a2) and solving for optimal w_0 gives

$$w_0 = (1/c)[-\bar{n}_0 - a + 2a(b + \theta p'\beta c)/dc]. \tag{a3}$$

This in turn gives

$$p_0 = 1 - a((b + \theta p'\beta c)/dc)^2. \quad \text{(a4)}$$

This gives us w_0 and p_0 as functions of structural parameters and of α and β. We now solve for the values of α and β. Replacing w_0 and p_0 in equation (a2) and comparing equations (a2) and (a1) gives the values of α and β. The value of α is of no interest here. The value of β is given by

$$\beta = (b/c)/(1 - \theta p').$$

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Comment

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This is a thought-provoking paper on an important topic. The main theoretical idea is that persistence in the level of unemployment may be traced to the influence of currently employed workers ("insiders") on wage rates. Wages are set so that the insiders have a high probability of continued employment in the face of random shifts in the labor demand function. When demand is realized employment may increase or decrease, and the new set of insiders then acts so as to perpetuate itself. In particular, a run of negative demand shocks will produce a shrunken group of insiders who will be able to maintain high wage rates without seriously jeopardizing their own employment prospects.

The basic model presented in section 2.1 of the paper uses a quadratic approximation for the probability of employment p, and a utility function which is linear in p and the log-wage w. This tends to obscure the results, which are actually fairly general. For example, if the utility function were literally linear in p then utility would be unbounded, since p could be set at zero and the wage could be set arbitrarily high. The main results can apparently be derived in a slightly different way, however.

Suppose that the union maximizes the expected value of a log-linear function of the number of members employed and the wage rate:

$$\max_w E\, b\, w + n.$$

If there is no uncertainty and $b = 1$ this reduces to the standard (Dunlop) model in which the union maximizes the total income of its mem-

bers. Union employment is limited by the membership n_0 (measured in logs) and by the stochastic log-linear demand curve, so that

$$n = \min (n_0, e - cw)$$

where e is a random variable with distribution function F. Thus the union acts so as to maximize the function $V(w)$, which is defined as

$$\begin{aligned} V(w) &= b\,w + E \min (n_0, e - cw) \\ &= b\,w - cw + E \min (n_0 + cw, e). \end{aligned}$$

The derivative of this function is

$$\begin{aligned} V'(w) &= b - c + c[1 - F(n_0 + cw)] \\ &= c\,[b/c - F(n_0 + cw)]. \end{aligned}$$

Evidently, if $c < b$ then $V'(w)$ is always positive (since $F \leq 1$). In this case the union would maximize utility by setting an extremely high wage, implying that virtually no one would be employed (that is, the union would act as a monopolist facing inelastic demand). Assume then that labor demand is relatively elastic, so that $c > b$. Then if there were no uncertainty about the position of the labor demand curve, the union would set a wage just low enough so that all of its members would be employed. More generally, the union chooses a wage w^* so that

$$F(n_0 + cw^*) = b/c.$$

To see whether employment will exceed the union membership, write the labor demand function as

$$n - n_0 = e - cw - n_0.$$

Then when the union sets the optimal wage w^* the result will be

$$n - n_0 = e - F^{-1}(b/c).$$

For example, the expected value of nonunion employment is

$$En - n_0 = Ee - F^{-1}(b/c).$$

If the median of e is equal to its mean (as in the case of the uniform distribution assumed in the article) then $Ee = F^{-1}(\frac{1}{2})$. Since F is an increas-

ing function, this implies that expected employment will exceed union membership if b/c is less than ½.

Thus the static results presented in section 2.1 remain valid for a reasonable reinterpretation of the union's utility function. In addition, the results hold for more general specifications of the distribution of labor demand shocks. The most important substantive assumption seems to be that the elasticity of labor demand must be quite high (roughly speaking, if the union maximizes expected income, c must be above 2). Equation (2.4) indicates that this assumption can be weakened considerably in the dynamic case.

If the labor demand elasticity is sufficiently high, then the dynamic model sketched by Blanchard and Summers gives a plausible qualitative description of recent movements in European unemployment rates. The model suggests that wages are set so that the current group of insiders can expect to preserve their jobs, given an average realization of the labor demand shock, with perhaps a small expected cushion of nonunion employment. When there is a run of large unfavorable labor demand shocks (such as oil price increases) many insiders lose their jobs and thereby lose a good deal of their influence on how wages should be set. The new smaller group of insiders then sets wages so that employment can be expected to drift slowly back up toward the full-employment level.

Of course this model is still subject to the standard criticism that unemployment is inefficient. It is not clear why the union must set wages before the demand shock is realized, nor why the union cannot negotiate a Pareto optimal contract. In the absence of a convincing explanation of this inefficiency, policy recommendations based on this model are on shaky ground.

Additional Unemployment Data

In discussing "the European unemployment problem" it seems appropriate to summarize the unemployment data for as many European countries as possible. This is done in table 1a; for comparison, unemployment data for several non-European countries are also included. Evidently, the recent experience of Britain, France, and Germany, which Blanchard and Summers take to be representative, is not the whole story. Although there are undoubtedly serious questions about the comparability of data across countries, any convincing explanation of the persistently high unemployment recently experienced by Britain, France, and Germany must account for the low unemployment rates in Switzerland, Sweden, Norway, and Austria.

Blanchard and Summers emphasize the contrast between movements in European and U.S. unemployment rates, particularly after 1980. Table 1a indicates that a similar contrast exists between Canada and the United States. Ashenfelter and Card (1986) recently considered the list of obvious suspects here, and concluded that there was insufficient evidence to warrant any indictments. It is true, however, that unions are now much more important in Canada than in the United States. According to Ashenfelter and Card, union membership rose from about 33 percent of employed workers in 1970 to about 40 percent in 1984, while union membership in the United States fell from 27 percent to about 20 percent over the same period. These data might be used to support the Blanchard-Summers thesis that a higher degree of unionization is associated with more sluggish adjustment to labor demand shocks.

Employment and Real Wage Equations

In section 3.2, Blanchard and Summers present estimates of wage and employment equations which apparently provide some empirical sup-

Table 1a UNEMPLOYMENT RATES, 1960–1985

	1960–64	*1965–69*	*1970–74*	*1975–79*	*1980–83*	*1984*	*1985*
Ireland	6.0	6.3	7.5	11.3	16.5	23.1	—
Spain	1.8	1.2	1.9	6.4	16.2	20.6	21.9
Belgium	3.6	3.4	3.4	9.3	15.9	18.6	18.8
Holland	—	—	2.7	5.1	12.4	17.6	—
Britain	1.8	2.0	3.0	5.2	10.9	12.6	13.0
Canada	6.1	4.2	5.8	7.6	9.9	11.3	11.2
Denmark	—	—	1.6	6.7	9.4	10.5	11.0
Italy	4.7	5.6	5.8	6.9	9.1	10.4	10.5
France	—	—	2.6	4.9	7.9	9.7	10.1
Germany	0.9	1.2	1.3	4.4	7.1	9.1	9.6
Australia	1.4	2.2	2.2	5.9	7.6	9.0	8.7
U.S.	5.7	3.8	5.4	7.0	8.3	7.5	7.5
Finland	—	2.6	2.2	5.1	5.6	6.2	6.8
Austria	3.0	2.7	1.9	2.0	3.4	4.5	5.0
Norway	1.4	1.2	0.9	1.1	2.2	3.3	—
Sweden	1.6	1.8	2.2	1.9	2.8	3.1	2.8
Japan	1.4	1.2	1.3	2.0	2.4	2.7	2.7
Switzerland	—	—	—	0.4	0.6	1.1	1.1

The countries are sorted according to the 1984 unemployment rate. Unemployment is stated as a percentage of the (total or civilian) labor force, except for Ireland and Belgium, where it is a percentage of the insured labor force. The 1985 figures generally refer to the first six months of 1985.

Source: OECD Main Economic Indicators.

port for their "hysteresis" theory. Equations of this sort are generally open to several alternative interpretations. For example, similar equations can be derived from the equilibrium labor market model discussed by Sargent (1979, chapter 16). Allowing for the influence of expected future real wages (as suggested in footnote 28 of the article), the labor demand function may be written as

$$n(t) = s\,n(t-1) - (1-s)\,b \sum_{i=0}^{\infty} \beta^i E_t W(t+i) + e(t), \quad (3.1)$$

where W is the real wage, β is the discount factor, and constant terms are ignored. When utility is intertemporally nonseparable in leisure the labor supply function can be written symmetrically as

$$n(t) = a\,n(t-1) + (1-a)\,d \sum_{i=0}^{\infty} \beta^i E_t W(t+i) + f(t), \quad (3.2)$$

where d is a parameter representing the elasticity of labor supply, and $f(t)$ is a preference shock. When d is set to zero this equation can instead be interpreted as the union's rule for setting expected employment, as in the article.

Assume that both e and f follow AR(1) processes:

$$(1 - \sigma L)\,e(t) = u(t)$$
$$(1 - \tau L)\,f(t) = v(t).$$

Then, as is shown by Kennan (1985) the reduced form is a VAR(2):

$$\begin{bmatrix} n(t) \\ W(t) \end{bmatrix} = \begin{bmatrix} A_{nn} & A_{nW} \\ A_{Wn} & A_{WW} \end{bmatrix} \begin{bmatrix} n(t-1) \\ W(t-1) \end{bmatrix} + \begin{bmatrix} B_{nn} \\ B_{Wn} \end{bmatrix} n(t-2) + \begin{bmatrix} E_n(t) \\ E_W(t) \end{bmatrix},$$

where the coefficients labeled A and B are complicated functions of the basic structural parameters. The vertical supply curve assumption ($d = 0$) used in the article implies $A_{nW} = 0$, $A_{nn} = a + \tau$, $A_{WW} = \sigma$, $B_{nn} = -a\tau$ and

$$A_{Wn} = \frac{[s - a + \sigma - \tau][1 - a\beta s\tau] - a\beta s[a - \sigma][s - a]}{b[1 - s][1 - \beta s]}$$

$$B_{Wn} = -\frac{[\sigma s - \tau a - \beta a s \tau(\sigma - \tau + s - a)]}{b[1 - s][1 - \beta s]}.$$

The case analyzed in the article corresponds to assuming $\beta = 0, \tau = 0$ and $\sigma = 1$. Then

$$A_{Wn} = \frac{[s - a + 1]}{b[1 - s]}$$

$$B_{Wn} = \frac{-s}{b[1 - s]}.$$

In particular, if there is "strict hysteresis" ($a = 1$) then the employment coefficients in the wage equation sum to zero. This is hardly a solid foundation for a test of hysteresis, however, since it depends crucially on assuming $\tau = 0$ and $\sigma = 1$. For example, if there is no hysteresis ($a = 0$) the employment coefficients will still sum to zero if $\tau = \sigma + s(1 - \sigma)$.

Even if the employment and real wage equations are open to alternative structural interpretations it is useful to compare the reduced-form estimates across countries, as is done in tables 4–7 in the article. Some variations on this theme are shown in table 2a, using monthly data sampled annually, for eight countries. It is by no means clear that the data-generating process is similar for the five European countries in this table. Any unified theory of unemployment movements in the various European countries seems likely to have trouble dealing with the diversity shown in table 2a, particularly if the theory is built around the relationship between employment and real wages, as in the Blanchard and Summers article.

A Policy Experiment

Finally, it seems appropriate to mention a conventional alternative to the Blanchard-Summers hysteresis theory, namely that there is a connection between high unemployment and the notoriously high rates of income taxation in Europe. A simple policy experiment could pay rich dividends here. Suppose it is announced now that next year's income tax liability for each worker will be capped at the (real) amount paid by this worker last year plus (say) 10 percent. This would mean a zero marginal tax rate for (all of) next year, provided that the worker expects to reach the cap. If high marginal tax rates are important in depressing the level of economic activity, this experiment should produce a surge in employment, as the net wage received by workers rises, while the gross wage paid by employers falls. If marginal tax rates are not important, the experiment will not have much effect on real activity, or on the government's tax revenue.

Table 2a EMPLOYMENT AND REAL WAGE EQUATIONS

	Employment (n)				*Real Wage (W)*				
	$n\ (t-1)$	$n\ (t-2)$	$W\ (t-1)$	Trend	$n\ (t-1)$	$n\ (t-2)$	$W\ (t-1)$	Trend	*W/n*
Canada	.83	−.62	.24	.02	.28	.26	.93	−.02	.18
1962–84	(4.5)	(2.5)	(2.9)	(2.7)	(1.1)	(0.8)	(8.1)	(1.9)	
Italy	.81	−.07	.01	.00	−.30	−.15	.75	.01	.45
1962–84	(4.0)	(0.3)	(0.1)	(0.3)	(0.5)	(0.2)	(4.3)	(1.3)	
France	.71	.14	.18	−.01	−.19	.58	.91	.00	.04
1962–84	(3.0)	(0.6)	(2.2)	(2.6)	(0.5)	(1.6)	(6.9)	(0.5)	
U.S.	.67	−.46	.08	.02	−.64	−.11	.82	.02	.03
1962–84	(2.8)	(1.6)	(0.7)	(3.3)	(1.9)	(0.3)	(5.1)	(2.4)	
Austria	1.38	−.72	.21	−.01	.26	.19	.64	.01	.05
1962–84	(7.7)	(3.5)	(1.6)	(1.6)	(1.1)	(0.7)	(3.7)	(1.8)	
Japan	.48	.23	−.05	.005	−.19	1.7	.90	−.01	.002
1962–84	(2.2)	(1.1)	(1.6)	(2.4)	(0.4)	(3.4)	(12.5)	(2.5)	
Britain	1.03	−.01	.14	−.005	.47	−.35	.43	.01	.19
1955–83	(5.1)	(0.0)	(1.1)	(1.8)	(1.6)	(1.1)	(2.3)	(3.0)	
Germany	1.08	−.76	.44	−.02	.38	−.28	1.03	−.00	.02
1963–83	(5.3)	(3.2)	(2.3)	(2.5)	(3.2)	(2.1)	(9.0)	(0.6)	

Explanation: These are VAR(2) estimates (*t*-statistics in parentheses). The variables *n(t)* and *W(t)* refer to employment and real wages in April of year *t*. The column "*W/n*" gives the significance level of the F-statistic for the hypothesis that employment does not cause the real wage. The employment variable covers the whole economy except for Austria (mining and manufacturing), Germany (manufacturing) and Britain (manufacturing). The real wage is hourly earnings in manufacturing deflated by the consumer price index, except for Japan, where the real wage is monthly earnings in manufacturing, deflated by the CPI. The wage for Germany is obtained from quarterly data.

In other words, this experiment will yield large returns in case marginal tax rates are important, and will not cost much in any case.

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Comment

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Macroeconomics is undergoing a painful adjustment to the growing realization that the evidence does not support conventional theories about macro fluctuations. By and large, when output suffers a shock, the effects of that shock are permanent. Theories of gradual wage-price adjustment, by contrast, teach us that the economy gradually adjusts to demand shocks, so the shocks have no lasting effect on output or employment. In those theories, output follows a cycle around a full-employment trend path.

The first evidence against the cycle-around-trend view was presented by Charles Nelson and Charles Plosser (1982). Recent results obtained by John Campbell and N. Gregory Mankiw (1986) strongly support Nelson and Plosser's findings. Real GNP does not follow a cycle around a stable growth trend. Instead, each random deviation lasts more or less forever. In fact, a simple random walk with drift is not a bad approximation to the stochastic character of real GNP in the United States. Preliminary work of my own suggests that the same conclusion holds even more strongly in all of the major OECD economies.

Blanchard and Summers look at the same issue with respect to unemployment. As they note, unemployment is the least likely macro variable to deviate from the cycle-around-trend type of stochastic behavior. If unemployment measures the gap between labor supply and demand, then events which make output and employment change permanently—such

as random technological innovations—should change unemployment only temporarily. They show that unemployment has tended to revert to a "natural rate" in postwar U.S. experience, but they also show how atypical that experience has been. In earlier U.S. history, and in all recorded European history, unemployment has been highly persistent. Again, a random walk is not a bad stochastic model for unemployment.

Macro theorists have gone in two very different directions in creating models where output does not have cycles around a stable trend. Nelson and Plosser interpret their findings as strongly supporting the real business cycle models where markets always clear and output fluctuates because of random shifts in tastes and technology. Certainly that type of model is alive and well today, as the article by Martin Eichenbaum and Kenneth Singleton (in this volume) shows. But an interesting new literature is also developing which deals with models where markets never clear, thanks to sound microeconomic reasons having to do with noncompetitive markets. Papers by Oliver Hart (1982) and many others make the point that a full-employment equilibrium is a special feature of competition.

The theoretical work to date generally rests on standard models of market imperfections. For example, Hart relies on Cournot behavior in the product market on the part of a finite number of sellers, and similar behavior in the labor market on the part of a finite number of labor unions. The existing models explain why the economy does not drive to its full-employment point, but they do not explain why stochastic fluctuations in output should have a random-walk character. Blanchard and Summers have opened a new avenue of research which deals explicitly with the random-walk issue.

In the Blanchard-Summers model, the monopoly power of a labor union or other group of incumbent workers depends on the past history of demand shocks. A positive demand shock dilutes the strength of the union because it adds new workers to the union, and the new workers have voting power equal to that of the established workers. Hence employment remains high virtually forever after a positive shock. A negative demand shock pushes some workers out of employment and soon thereafter out of the union. With fewer workers, the union chooses to jack up the wage and keep employment lower, again virtually forever.

An essential adjunct of the theory is that displaced workers cannot find jobs in new firms or in other sectors. Blanchard and Summers argue, with some persuasive power, that fixed costs deter entry at times of low demand in some sectors. Even if a competitive sector exists, they say, when it is crowded with displaced workers, the competitive wage

will fall to the point where many workers will be unemployed because they are queued up for jobs in the union sector.

To my mind, the only serious weakness in Blanchard and Summers's model is the willingness of the incumbent workers to allow a favorable demand surprise to dilute their effective shareholder interest in the firm. Why don't they impose a rule against hiring, so that every demand surprise can be translated into further wage increases? The all-powerful union in the model slips in only one respect, but it is a terribly important respect. The sensible union would pursue a policy described by Lloyd Ulman as the "Cheshire Cat" theory of unionism—union membership gradually declines through retirement and attrition, and wages rise along the demand curve for labor. Ultimately all that is left is the smile of the last member, who is paid an astronomical wage.

Obviously there are many blanks to fill in to make this new explanation of unemployment persistence credible. The article as it stands has only a tiny section on how European unions actually operate, yet this is crucial to empirical support for the theory. Moreover, as Blanchard and Summers note, a random-walk model well describes U.S. unemployment in eras when unionization was extremely low. The theory then requires that the incumbent workers have some of the power of a union, but we do not yet know how they achieve or exercise that power without a formal union.

To my mind, the strongest empirical backing for the basic idea of the article is the evidence of the extreme persistence of unemployment in most countries in most eras. In addition to presenting this evidence, Blanchard and Summers devote quite a bit of space to the study of a companion type of evidence, the relation between wage adjustment and unemployment (or employment). Under a Phillips curve, where wage inflation is increasingly negative whenever the unemployment rate exceeds the natural rate, unemployment cannot evolve as a random walk. Consequently, the wage adjustment equation that governs an economy with fully persistent unemployment has the rate of change of unemployment (or employment) on the right-hand side, rather than the level of change. Blanchard and Summers devote considerable effort to showing that this prediction is fulfilled. I do not disagree with what they do, but I think it is important to point out that their case does not depend on the wage-change equations. The finding of strong persistence in unemployment makes their case on its own, and is much less subject to econometric criticism than their wage-change regressions.

My general conclusion is that the absence of cycle-around-trend behavior in most economies most of the time is an established fact, and one

that will have an important role in shaping the macro theories of the future. The labor-market membership model developed by Blanchard and Summers has some merit as an explanation, but I do not find it compelling as a unitary explanation. Until I find out why unions stand idly by when their incumbent interests are diluted, I will remain unconvinced that a positive demand shock can raise output. Instead, I will continue to examine carefully alternative explanations of the failure of market-clearing forces, grounded in the microeconomics of product markets.

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Discussion

Rudiger Dornbusch pointed out the difference between employment trends in manufacturing and in services in Europe. The negative trend of employment is strong in the manufacturing sector, but not in services. He suggested that European unions are reluctant to cut wages because they doubt employment will increase unless large-scale investment takes place. He argued that the Blanchard-Summers analysis favored more fundamental policy changes than they imply, for instance the wage tribunals suggested by James Meade or Martin Weitzman's profit-sharing scheme.

Arnold Kling commented that Europe is not the only place with high unemployment. The "fresh water belt" of the United States, such as Michigan, has the same problem. One reason unemployment persistence has been less of a problem in the United States may be the fortunate presence of a prosperous "salt water belt."

Martin Weitzman criticized Blanchard and Summers's reluctance to draw the conclusions their analysis implies. The paper implies that labor unions are the prime suspect in the crime of high unemployment in Europe, but Blanchard and Summers shrink from that conclusion. They do not, for instance, discuss the relative merits of a two-tier wage system versus profit sharing in the labor market. In addition, the paper is am-

biguous about the merits of Keynesian demand expansion. The paper implies that since the old-style Phillips curve has broken down, demand expansion would lead to inflation. He saw no alternative to microeconomic measures to attack the unemployment problem in Europe.

In response, Lawrence Summers stressed the parallels he and Blanchard found between the United States in the 1930s, when unions were weak, and Europe currently. Those similarities made them hesitant to blame Europe's difficulties on the unions.

The authors' failure to close the model worried James Hamilton, who agreed with John Kennan's statement that the labor contracts considered by Blanchard and Summers are inefficient. He suspected that a complete model might produce a constant level of employment.

Paul Romer cited Ashenfelter and Card's comparison between United States and Canadian unemployment, suggesting that this may give a clue as to whether unionization as opposed to the insider-outsider distinction mattered. The different attitudes to unionization in the two countries were exemplified by the frequency and government tolerance of Canadian mail strikes compared with the firing of the air traffic controllers in the United States.

Stephen Zeldes thought the Blanchard-Summers model had more to say about the persistence of unemployment than its average level. In a full model, it was quite possible that equilibrium would show a higher average level of unemployment in competitive labor markets than in the type of market examined by Blanchard and Summers, but that persistence would be lower in a competitive labor market.

Differences in unemployment rates across industries might give a clue as to the importance of unions, James Poterba suggested. It was also possible that characteristics of the employer as well as the employees determined wage and employment characteristics. Japanese firms in Britain have not gotten rid of British workers, but of British managers.

Olivier Blanchard agreed with Kennan's doubts about the optimality of Blanchard and Summers's labor contract, but speculated that the result from a more complete model would not be very different. He commented that he and Summers estimated and discussed the Phillips curve because their Phillips curve has policy implications very different from the most-used alternative, a standard Phillips curve with a time trend. With a time trend, high unemployment reflects a high natural unemployment rate, and there is no room for aggregate demand policy to affect unemployment. Answering Martin Weitzman, he agreed that expansion now would lead to high inflation unless some incomes policy is introduced, but he stressed that high inflation may have to be accepted for some time as a trade-off for lower unemployment.