The Origins of Hysteresis, the Corridor, and the Political Economy of Full Employment in the OECD, 1955-1986

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HYSTERESIS, THE CORRIDOR, AND THE POLITICAL ECONOMY OF

UNEMPLOYMENT 1955-1986

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2

CONTENTS

ABSTRACT

The persistently high levels of unemployment found in many
industrial economies today are of a magnitude unseen since the Great
Depression of the 1930's. They pose a sharp challenge to prevailing
theories of business cycles. Persistent high unemployment is a clear
falsification of the natural rate approach. Moreover, the persistence
of unemployment shocks in the 1970's and 1980's and the apparent
lack of persistence of such shocks in prior decades suggests that
many economies underwent a substantial structural change sometime
in the 1970's.

Our investigation of high and persistent unemployment is
divided into two parts. First, we examine the time-series dimension
of the recent, primarily European, unemployment problem using as a
framework Axel Leijonhufvud's notion of the "corridor." We
tentatively assume that for economies close to full employment—and
thus "inside" the corridor—unemployment is mean reverting: the
invisible hand pushes the economy back to a natural rate equilibrium.
Outside the corridor the unemployment rate may well exhibit
"hysteresis": self-stabilizing forces may be extremely weak and the
persistence of shocks to unemployment may be quite high. We find
empirical support for the hypothesis of a significant break in the
serial correlation properties of many OECD economies in the 1970's.
We see this as consistent with the corridor-based interpretation. We
further argue that the interwar period can also be fruitfully

interpreted from a "corridor" viewpoint.

Second, we examine cross-country differences in unemployment performance. Economies that have either industrial relations systems characterized as "liberal" along with low unionization rates—like the United States—or "corporatist" industrial relations systems along with high unionization rates—like Norway and Sweden—tend to have lower unemployment rates today than do economies—like Britain and France—with intermediate degrees of unionization and industrial relations systems that appear to fall between the "liberal" and "corporatist" ideal types. These correlations suggest an interpretation in terms of the role that can be played by "encompassing" interest groups in rent-seeking societies: very large special interest groups may find that their own internal processes serve as an effective social allocation mechanism. It may well be that organized interest groups have the potential to create large-scale economic failure only if they are both large enough to block market mechanisms and yet insufficiently coordinated to serve as voice-based arenas for corporatist bargaining and policy-making.

HYSTERESIS, THE CORRIDOR, AND THE POLITICAL ECONOMY OF UNEMPLOYMENT 1955-1986

Introduction

For at least a generation macroeconomics has been built on the "natural rate" hypothesis. This underlying framework—common to both Keynesian and monetarist approaches to the business cycle—assumes that the long-run path of average output and unemployment can be taken as exogenous. They are the province of growth theory, the "trend." Business cycle theory proper analyzes deviations of actual output and unemployment from trend, the "cycle." Taking trend as given, macroeconomics aims to analyze, explain, and push for policies to control or minimize deviations of output and unemployment rates from their trend levels.

This decomposition of actual movements in output and unemployment has always been regarded as a first approximation. It is common knowledge that the long-run growth rate is not a fixed constant. Recessions cast shadows by reducing physical and human capital stocks. The rate of technical progres is itself stochastic. In fact, one of the traditional justifications for aiming at high employment—for a "high pressure economy"—has been to increase the long-run rate of economic growth by increasing investment. Nevertheless, macroeconomists have regarded the effect of "cycle" on "trend" as small enough to be neglected in analyzing the

performance of national economies.

The behavior of unemployment in Europe since 1973 has seriously undermined all forms of the natural rate view. European unemployment rates have increased during recessions. They have not decreased during booms. Figures 1-6 display unemployment behavior in 17 OECD nations, including 13 European countries, over 1955-1986. The increases in unemployment throughout Europe have been more than substantial. Moreover, it is likely that increases in officially-recorded unemployment rates considerably understate the amount of economic slack actually generated. Governments throughout Europe have taken more effective steps to close the unemployment gap by reducing labor supply than by expanding labor demand. Early retirement from and late entry into the labor force have been encouraged. Work-sharing has been encouraged with an eye both toward reducing the perceived dimensions of the unemployment problem and equalizing the distribution of apparently scarce employment opportunities. And the flow of net migration from southern to northern Europe has been effectively stopped.

Of these supply-restricting policies, the effective cessation of net international migration from low- to high-productivity nations is perhaps the one that will have the most serious long-term effects. The cessation of migration removes one of the principal causes of Europe's rapid post-World War II growth (Kindleberger (1965)) and thus permanently shifts potential aggregate supply downward. Two centuries' experience of large-scale international migration strongly suggests that the carriage of enterprising and risk-accepting people from market-poor and capital-scarce regions—whether rural Poland,

southern Italy, or China—to market-rich and capital-abundant regions—whether Cologne, New York, or Buenos Aires—is one of the most productive investments that can be made. The return of guestworkers to their countries of origin may well be the consequence of high European unemployment most damaging to economic progress in the long run.

Table 1 reports four different measures of the unemployment crisis in Europe: the change in the official OECD-basis unemployment rate from 1973-1986, the cumulative slowdown in the growth of the employment to population ratio from 1962-1973 to 1974-1986, the slowdown in net immigration from 1962-1973 to 1974-1986, and the change in "shadow" unemployment—defined as the change in official unemployment plus the cumulative net migration gap between 1973 and 1986. Northern Europe's unemployment performance looks worse, and southern Europe's looks better, when the shortfall in migration is added to the change in official unemployment. The rise of 3.75% in official recorded OECD-basis unemployment in Italy does not look as bad when one reflects that the Italian labor force was about 2.3% higher in 1986 than it would have been if pre-1973 migration patterns had continued.

The persistent increase in unemployment in OECD nations has led many economists to question the "cycle around trend" view.[1] Consider <u>inter alia</u> Robert Hall's (1986) announcement of the imminent death of the cycle around trend paradigm, and the

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[1]Which has also been under attack from other directions. Consider Nelson and Plosser's (1982) and Campbell and Mankiw's (1987) arguments that most shocks to US GNP represent permanent changes in supply and not transitory changes in demand.

interpretation of European unemployment as a process that exhibits "hysteresis" set forth by Blanchard and Summers (1986), Fitoussi and Phelps (1986), Gregory (1986), Lindbeck and Snower (1986), and others.[1]

Yet the shift away from the natural rate view raises an obvious question: If the hypothesis that the economy is characterized by cycles about a smoothly-growing trend is in fact false, why did no one notice the hypothesis' falsity before? One possible explanation that immediately suggests itself is that the genration of economists after World War II failed to reject the cycle around trend view because it was perfrectly adequate for the high employment and small business cycle times of the late 1950's and 1960's.[2] Perhaps macroeconomists did not talk about hysteresis until the 1980's because macroeconomic variables' equilibria were not path-dependent until the 1970's. Hysteresis may well be something new under the sun: the result of a significant structural shift in the behavior of industrial economies.

If the shift toward hysteresis in the minds of macroeconomists does reflect a real change in the structure of industrial economies, two major questions arise: What theoretical framework should be used to examine if and when economies enter hysteresis? And why do some countries enter hysteresis and others not? We suggest

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[1] "Hysteresis" first appears in reference to unemployment in Phelps (1972, pp. 77-80) who notes it as a theoretical possibility: "The live hand of history produces hysteresis effects: the time path to equilibrium shapes that equilibrium."

[2] The study of business cycles became regarded as an uninteresting topic in the 1960's. Witness the change of name from the Business Cycle Digest to the Business Conditions Digest and the title of Bronfenbrenner (1967).

tentative answers to these central questions.

Our answer to the first question makes use of Axel Leijonhufvud's notion of the "corridor." Leijonhufvud's central idea is that the dynamic behavior of the economy—whether there are forces pushing output and unemployment back to natural rate equilibrium levels—depends on the state of the system. Near equilibrium, the economy is self-adjusting and mean reverting. Far from equilibrium, the forces that would otherwise push output and unemployment back to equilibrium levels break down.

In section I, we discuss Leijonhufvud's idea of the "corridor" and argue that it is testable by estimating simple switching models for unemployment. In section II, we estimate corridor models of unemployment for seventeen OECD nations over the period 1955-1986. And in section III, we step back and look at the broader historical record, focussing on the possible emergence of analogous patterns of hysteresis in the 1930's. Our answers to the second question are laid out in section IV, and spring from the public choice perspective of Mancur Olson (1982, 1986ab). We conclude the paper by laying out what we think are the theoretically-live options open to someone wishing to explain present-day high European unemployment by using the concept of "hysteresis."

I. MODELLING THE CORRIDOR

The corridor approach

We start with Axel Leijonhufvud's (1973) thought-provoking essay. Leijonhufvud argued that one could reconcile the more-or-less

stable small fluctuations of the economy of the post-World War II period with the prolonged massive macroeconomic slack of the Great Depression by hypothesizing that the dynamic behavior of the economy—whether there were strong forces pushing output and unemployment rates back to equilibrium—depended on the state of the economy. As long as shocks were relatively small, they would displace the economy only a small distance from its ntural rate equilibrium. The economy would stay in a "corridor" where the self-adjusting mechanisms of the competitive market would have free play. When subject to small shocks, the economy would behave as Milton Friedman (1967) claimed: it would exhibit damped oscillations about an equilibrium position. In this Friedman-Phelps-Lucas framework, the natural rate of unemployment serves as the benchmark equilibrium towards which the economic system gravitates.

By contrast, large shocks to the economy might knock it out of the corridor altogether. Leijonhufvud argues that once the economy had been pushed sufficiently far from full-employment equilibrium the aggregate self-adjusting mechanisms of the market system would not longer necessarily be effective. Thus Leijonhufvud hoped to provide a conceptual scheme in which an economist could recognize both (a) that small disturbances did not appear to have large persistent effects, and (b) that deep, persistent depressions had happened and might happen again.

Leijonhufvud originally proposed the corridor as a way of conceptualizing financial market failures. He saw asset prices—the far forward-looking variables that drive current investment—as

adjusting rapidly back to equilibrium in most cases, but as open to the lage, persistent deviations from full-employment equilibrium levels discussed in Leijonhufvud (1968) in response to large shocks. The common judgment today is that, while financial market failures are important determinants of unemployment and output in some times and places, the rise of OECD unemployment since 1973 is more likely to be due to breakdowns of adjustment mechanisms in the labor market.[1]

Accordingly, we transfer Leijonhufvud's "corridor" hypothesis to the labor market. We hypothesize that if unemployment is relatively low the labor market will work relatively smoothly. A rise in unemployment sets in motion forces that rapidly (within a year or two) reduce the unemployment rate. But should any large shock send the unemployment rate "too far" from its natural rate equilibrium level—if unemployment becomes too high—then the labor market may break down, the self regulating forces of the market wither away, and the economy display high and persistent unemployment. Within the corridor unemployment will display mean reversion. Outside the corridor, unemployment may be very persistent.[2]

Consider a labor market with a substantial degree of entry and

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[1]Leijonhufvud (1973, p. 35) does remark in a footnote that "the possibility of persistent states of large-scale unemployment" is an issue that belongs to the class of effective demand failures that he considers. Thus, we feel that we do not stray too far from the world envisioned by him.

[2]Leijonhufvud's "corridor" concept has not been utilized in empirical studies of hysteresis. In fact, we have been unable to find it used as the foundation of empirical work although it has inspired theoretical work: inter alia Howitt (1978, 1986), Rustem and Velupillai (1980), and Fitoussi and Velupillai (1987). Leijonhufvud invites empirical applications of his concept, and we feel that we have answered his call by applying his idea in a novel way.

exit, of changing of jobs, and with low unemployment. Such a labor market might well smoothly coordinate economic activity by channeling the factor of production labor to uses that have a high social marginal product. Workers who become unemployed can quickly and easily become reemployed at wages that fall well within the range of their perception of their marginal values to the firm. Unemployment in such a labor market that is within the corridor is thus "frictional." It is likely to be mean reverting in response to shocks either to expectations, to technologies, or to nominal variables, and thus to be consistent with the weltanschauung of Friedman, Phelps, and Lucas.

Perhaps most important, the shadow value of having a job is low as long in such a labor market. As long as the economy is within the corridor, becoming unemployed at any given moment does not significantly reduce one's long term earnings prospects. The value of a worker's human capital is not significantly reduced if she fails to occupy one of the employee slots in the economy at any point in time. In such a low-unemployment, high-pressure labor market, the rewards to insider workers—those who possess jobs—from building and maintaining walls distinguishing themselves from outsider workers will be low.

Now consider the same labor market under conditions of high unemployment. With slack in the economy, it is probable that markets work less smoothly, uncertainty is larger, investment decisions are postponed, and changes of direction and activity are less easily reversed. The system "freezes up" as in Leijonhufvud (1973) and Howitt (1978, 1986). Most important for our purposes, in

a time of high unemployment—outside the corridor—the right to a particular job (if there is such a right) will be a very valuable commodity. To lose one's job may entail a large reduction in the value of one's human capital.

In such a high-unemployment world, rational individuals will thus devote considerable effort to transform implicit understandings and habitual practices of job continuity into the functional equivalent—it is of little consequence whether legal or customary, explicit or implicit, or supported by state or by worker sanctions—of private property. And the establishment of such "property rights" is likely to severely block the process of turnover, matching, and mixing that economists explicitly rely on when they argue that excess supply will register itself on the labor market and push the economy back to full employment.

The establishment of such formal or informal property rights in jobs may well have consequences for the average level of employment. Rights entail supporting duties: a worker's right to a job is also an employer's duty to hire. To the extent that rights to jobs are established, from the viewpoint of employers labor ceases to be a variable factor of production. Hiring a worker becomes closely akin to making an irreversible investment in an expensive capital good. In a temporarily uncertain and confused environment, such expenditures will be postponed until the resolution of uncertainty. And in a permanently uncertain an confused environment, the average level of such investments made will be reduced (see Bertola (1987) and Bentolila and Bertola (1988)).

We thus see the possibility that high unemployment creates a

cumulative process that tends to sustain high unemployment and create the characteristics of hysteresis. High unemployment creates incentives to take steps to reduce the liquidity of the labor market. And a frozen labor market is unlikely to function effectively as a self-adjusting equilibrium mechanism.

The relationship between worker-side market and political power and the ability of insiders to construct walls distinguishing themselves from outsiders is not monotonic. Over a range, increases in worker-side power may increase the degree to which the labor market freezes up in times of high unemployment. But for sufficiently strong and centralized working-class movements, there are too few potential outsiders for such building of distinguishing walls to be worthwhile.[1]

To sum up, we have verbally justified the corridor approach to hysteresis by appealing to the difference in the shadow price of a job between low- and high-unemployment economies. Within the corridor, markets are thick and liquid and trading patterns are well established. Strong exogenous shocks can temporarily raise the shadow price of occupying a job. Such shocks can thus set in motion processes to establish property rights in jobs and reduce the liquidity of the labor market. Coordination failures thus become widespread and long-lasting features of the economy.

A simple model of the corridor

We make the above verbal discussion more concrete by

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[1]We consider these issues further in section IV.

presenting a simple static model in which high unemployment becomes persistent by virtue of a labor market failure which is present only when the unemployment rate is itself high. Production is carried out using one factor of production, labor, according to:

$$(1) \qquad q_i = l_i$$

where l_i is the labor employed and q_i is the output produced by firm i. The model possesses two sectors, 1 and 2, each of which has its own representative monopolistically competitive firm. Each representative firm faces the individual demand curve:

$$(2) \qquad q_i = \left(\frac{p_i}{p^*}\right)^{-\lambda} d_i$$

where p^* is the price level (and is thus unaffected by the decisions of any single firm), λ is a common parameter, and d_i is a shift parameter that specifies the real demand curve for the product of firm i.

The price level is an average of the prices charged by the two representative firms:

$$(3) \qquad p^* = \frac{p_1 + p_2}{2}$$

And demands are a function of real spending and of a relative sectoral demand shock:

$$(4) \qquad d_1 = y + \psi$$

$$(5) \qquad d_2 = y - \psi$$

where the relative demand shock ψ has mean zero and variance $y^2\sigma^2$.

Labor is supplied inelastically in amount L^* and is paid a nominal wage w. The level of real demand is a function of the real money stock:

(6) $y = \dfrac{\alpha M}{p^*}$

where the nominal money stock M is taken to be exogenous.

The equilibrium of this version of the static model is easy to calculate. Whatever is the nominal wage w, the representative firms set:

(7) $p_i = \left(\dfrac{\lambda}{\lambda - 1}\right) w$

and so the price level and real wage are:

(8) $p^* = \left(\dfrac{\lambda}{\lambda - 1}\right) w$

(9) $\dfrac{w}{p^*} = \dfrac{\lambda - 1}{\lambda}$

At these prices and wages, the amount of unemployment is given by:

(10) $U = L^* - L = L^* - \dfrac{\alpha M}{p^*}$

Figure 7 plots unemployment against the price level. If we impose the requirement that supply and demand balance in the labor market then this version of the static model has a unique equilibrium at point A. If the economy were at some other point along (10) with a different nominal wage and price level, then unemployed workers would try to replace employed workers by bidding down wages. A firm that hired such wages would reduce its own prices. Supply and demand in the labor market balance only when w and p* have dropped enough to carry the economy to point A.

Now complicate the model. Suppose that "insiders" have the opportunity, by paying some cost C, to guarantee that they, at least, will be those first hired. Insiders will use the political and economic

bargaining system to "purchase" the rights to their jobs if the cost C of creating and maintaining this functional equivalent of a property right is less than the benefit they derive from certain employment, which is equal to the product of the (constant) real wage and the chance of being unemployed if insiders do not choose to freeze the labor market:

$$(11) \quad C < \left(\frac{w}{p^*}\right)\left(\frac{U}{L^*}\right)$$

If insiders choose to exercise their opportunity to make the labor market illiquid, then the normal channels of hiring and of wage competition no longer make supply equal to demand on the labor market. Instead, firms must precommit—before the value of the sectoral relative demand shock ψ is known—to how much labor l_i they will employ. Firms cannot, after the realization of the demand shock is observed, either fire or hire additional workers.[1] Given a nominal wage w, a level of real aggregate spending y, and action by insiders to establish property rights in their jobs and to build walls distinguishing insiders from outsiders, a profit-maximizing representative firm will set employment in order to maximize:

$$(12) \quad E\left\{p_i(q_i, d_i, p^*) - wl_i\right\}$$

Substituting in for p_i:

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[1] Why is additional hiring not allowed? Because then it is optimal for the firm to initially plan to employ no one. The presumption of continuity in jobs that underlies workers' abilities to achieve quasi-tenure does not fit naturally into this static model.

$$(13) \quad E\left\{ p*\left(\frac{d_i}{l_i}\right)^{\frac{1}{\lambda}} l_i - wl_i \right\}$$

This will be maximized when:

$$(14) \quad \frac{w}{p*} = \left(\frac{\lambda-1}{\lambda}\right)\left(\frac{y}{l_i}\right)^{\frac{1}{\lambda}} E\left\{ (1+\frac{\psi}{y})^{\frac{1}{\lambda}} \right\}$$

which is approximately:

$$(15) \quad \frac{w}{p*} = \left(\frac{\lambda-1}{\lambda}\right)\left(\frac{y}{l_i}\right)^{\frac{1}{\lambda}}\left\{ 1 - \frac{(\lambda-1)\sigma^2}{2\lambda^2} + \ldots \right\}$$

Therefore any nominal wage level w can support an equilibrium in which:

$$(16) \quad p* = w\left(\frac{\lambda}{\lambda-1}\right)\left\{ 1 + \frac{(\lambda-1)\sigma^2}{2\lambda^2} - \ldots \right\}$$

and:

$$(17) \quad y = \frac{\alpha M}{p*}$$

as long as the associated unemployment rate is sufficiently high to confirm insiders' decision that it would be worthwhile to try to freeze up the operation of the labor market:

$$(18) \quad C < \left(\frac{w}{p*}\right)\left\{ 1 - \frac{\alpha M}{L*p*} \right\}$$

In figure 7, the actual unemployment rates that will support a hysteresis equilibrium are those that lie above the line HH. The extended static model thus has two disconnected sets of equilibria:

the full employment equilibrium at point A, and the continuous set of all points that lie on the aggregate demand curve (10) and yet generate unemployment rates sufficiently high to make the increased shadow value of holding a job serve as sufficient incentive for the disruption of the liquidity of the labor market.

There are five additional facets of this simple static model that are worth noting. First, the model suggests that attempts to achieve disinflation by increasing unemployment are likely to succeed only at the cost of a much greater unemployment burden than would have previously been thought likely. There is a sense in which one can blame the exercise of worker-side labor market power for this high unemployment burden: if steps were not taken to make the labor market illiquid, then the unemployment burden would not be so high. But the large incentives accruing to successful action to freeze up the labor market would themselves be the product of disinflationary policies and high unemployment, so such a story would be incomplete.

Second, the real wage when the economy is in the hysteresis régime, above line HH, is lower than the real wage prevailing at full employment at point A. The inability of firms to adjust their labor forces at the margin under the hysteresis régime imposes a cost that shows itself as an increase in the average markup: the labor market failures that generate and support a high-unemployment equilibrium do not create a visible real wage gap in this static model. Third, the model suggests an obvious role for pump-priming policies. All that macroeconomic policy has to do is to reduce the unemployment rate below HH in figure 7, and thereafter the equilibrium-restoring forces of the market will take over. It will no longer be worth insiders'

while to maintain the barriers to mobility and labor market liquidity erected during times of high unemployment.

Fourth, it is plausible to imagine that in this static model orthodox demand expansion in times of high unemployment may generate little benefits in increased output. As labor becomes a quasi-fixed factor, it may make more sense for monopolistically competitive firms to raise prices than to increase output in response to a demand expansion of unknown duration. Fifth and last, there appears to be no compelling reason to believe that shocks to unemployment will not be permanent as long as the economy is in the hysteresis régime, and there is strong reason to believe that shocks to unemployment will be transitory as long as the economy is in the mean reverting full-employment régime. Thus estimates of the persistence of unemployment —and of the sacrifice ratios entailed by disinflationary policies—calculated using data from the mean reverting régime that rely on the constancy of the autocorrelations of unemployment might be expected to grossly underestimate the actual output costs of a shift to a seriously deflationary policy.

II. ESTIMATION

If the corridor approach sketched out in section I is correct, then we would expect to see striking changes in the serial correlation patterns of unemployment across various subperiods of the post-World War II period as economies shift into (and, we hope, in the future out of) the hysteresis régime. We search for such clear structural breaks in two steps. First, we split the period 1955-1986

for which we have reliable data at the year 1973 to investigate whether the mean-reversion and persistence propertiesof unemployment are different when one compares the first half of our post-World War II sample to the period as a whole. Next, we investigate the corridor view using a switching model in order to see how precisely we can identify critical dates demarcating structural shifts in unemployment behavior.

Our sample consists of those seventeen OECD nations for which consistent and meaningful annual[1] unemployment rate series can be taken from Main Economic Indicators for the period 1955-1986.[2] As mentioned above, the unemployment rates for the nations included are plotted in figures one through six. We have excluded seven OECD nations from the sample because various factors made us doubt our ability to construct a meaningful unemployment time series. For some nations consistent data were not available (Greece, New Zealand, Portugal, Turkey, and Yugoslavia), for some nations the economy was simply too small (Iceland and Luxembourg), and for Switzerland the role played by guestworkers has been so large as to make reportedunemployment rates practically meaningless.

Mean reversion over 1955-1973

Consider for each individual nation i separately the coefficients

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[1]We see no reason to add fineness of discrimination by moving to quarterly or monthly data. The added number of data points would be offset by the smaller identifying variance in each observation and the increased number of parameters that would have to be estimated. Moreover, our conclusions would be dependent on our correct handling of seasonal components in different nations.
[2]Our principal data source is Main Economic Indicators Historical Statistics 1959-1979, with subsequent and previous observations spliced onto this time series.

of a simple AR(1) process for the log of the unemployment rate
estimated for the period up to 1973:

$$(19) \qquad \ln(u_t^i) = \alpha^i + \beta^i \ln(u_{t-1}^i) + \varepsilon_t^i$$

where the AR(1) specification has been chosen for simplicity, and the
log specification has been chosen to minimize heteroscedasticity.
The results for the 1955-1973 period are reported in table 2. A null
hypothesis that the unemployment rate was not mean reverting in
country i—that β^i was equal to or greater than one—is rejected at high
levels of significance for a large majority of nations in the OECD
sample. The straightforward conclusion is that, as the data stood in
the mid-1970's, no one would think to advance the hypothesis that
unemployment rates, instead of being mean reverting, are
characterized by "hysteresis" understood as a value of β^i effectively
indistinguishable from one.

The evidence of all nations over 1955-1973 taken together
speaks strongly against the hypothesis that the unemployment rate is
in general not mean reverting. for eight nations, the null hypothesis
of a β^i equal to or greater than one can be rejected at the .05 level,
and the null hypothesis can be rejected at the .10 level for three
additional nations. In view of the short sample period, these
coefficients should strongly dispose us to believe that unemployment
rates did not exhibit "hysteresis." Before 1973, there is little doubt
that by and large national unemployment rates are subject to
transitory, not permanent shocks. Given the pre-1973 evidence a
surprise in crease of one percent in a country's unemployment rate in
any given year should have led one to revise upward by only a small

amount one's estimate of what unemployment would be five or ten
years into the future.

Persistence over 1955-1986

The strength of the evidence for mean reversion in
unemployment before 1973 makes the coefficients uncovered by
running the same regression over 1955-1986 astonishing. Including
the 1973-1986 period in the sample close to erases statistical
support for the claim that the null hypothesis of hysteresis is false.
The data for the whole period 1955-1986 do not speak at all against
the hypothesis that movements in unemployment rates are by and
large permanent either at the level of individual nations or at the
level of the pooled sample as a whole.

How can it be that the null hypothesis of hysteresis cannot be
rejected for the entire 1955-1986 period and yet can be rejected
strongly for the 1955-1973 period. The presence of mean reversion
in the 1955-1973 period is pronounced and is too large to be
attributed to sampling error. The reasonable conclusion is that for
many countries the serial correlation properties of unemployment
underwent a substantial change in the 1970's, and it is simply not the
case that annual unemployment rates in OECD nations have had
constant autocorrelations since the mid-1950's. It may therefore be
unwise to believe that coefficients uncovered by estimating
stationary processes are likely to convey information about the
properties of unemployment.

To sum up, the absence of any sign of hysteresis in
macroeconomic debate a decade ago is easily understood in view of

the substantial degree of mean reversion exhibited by the unemployment rate over 1955-1973. It was simply not the case that the canonical shock to unemployment was a permanent one. The facts that hysteresis is an active concept in macroeconomic debates today and that unemployment rates over 1955-1986 show little sign of tending to return to a given mean strongly suggests that we should estimate models in which the autocorrelations of unemployment are allowed to change over the sample.

Testing the corridor model

The models that the corridor approach to hysteresis suggest to us as interpretive devices to analyze the behavior of unemployment have a very simple structure. For each economy there is a critical switching date $t*^i$ (or a critical switching unemployment rate $u*^i$—the pattern of unemployment is sufficiently monotonic to make it impossible to distinguish between time- and state-dependent theories of the advent of hysteresis). After the economy has passed this critical switching point, the cumulative damage done to the equilibrating mechanisms of the labor market by high unemployment is enough to severely reduce the ability of the market to return to full employment equilibrium.

When an economy is within the corridor, its unemployment rate follows a simple mean reverting autoregressive process. But when the economy passes outside the corridor, the unemployment rate becomes for all practical purposes a random walk.

$$(20) \quad \ln(u_t^i) = \alpha_m^i + \beta^i \left\{ \ln(u_{t-1}^i) \right\} + \epsilon_t^i \qquad \beta^i < 1 \text{ if } u_{t-1}^i < u^{*i} \text{ or } t < t^{*i}$$

$$(21) \quad \ln(u_t^i) = \alpha_h^i + \left\{ \ln(u_{t-1}^i) \right\} + \epsilon_t^i \qquad \text{if } u_{t-1}^i \geq u^{*i} \text{ or } t \geq t^{*i}$$

Here we have defined "hysteresius" as implying that the coefficient on lagged unemployment is equal to one. A coefficient less than but close to one would indicate substantial persistence but not permanence of unemployment shocks. Often economists do not distinguish between "hysteresis" and "high persistence."[1] Here we see these two concepts as essentially interchangeable.

If there were more data available, we could allow for more complex stochastic structures both before and after the onset of hysteresis. The specifications that we have chosen are the simplest that capture the idea of the corridor. We do not think our specification passes muster as an adequate description of the time-series behavior of the processes generating unemployment; instead, we view our specification as tightly constrained in the hope of gaining sufficient power to address the issue of gross structural change in autocorrelations that is our central concern.

A final reason for estimating a simple model is that in the last analysis simple models are more convincing. It would not be surprising or striking that with sufficient care, complexity, and effort a model could be built for which the data do not clearly reject the hypothesis of the corridor set forth above. It would be noteworthy if the simplest possible framework establishes, as we show below, that for a large number of OECD nations there is a

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[1] On this point see Blanchard and Summers (1986) and Franz (1987).

reasonably precisely estimated structural break between a period in which unemployment was mean reverting and a period in which unemployment was highly persistent.

We therefore estimate (20) and (21) for each of the seventeen nations in our sample by maximum likelihood assuming that residuals are normally distributed and serially uncorrelated. Significance levels are calculated using likelihood ratio tests. For our small number of observations, the asymptotic distribution is not a reliable guide to the actual distribution of parameter values under the null, but preliminary Monte Carlo simulations suggest that our confidence intervals and significance levels are excessively generous to the null hypothesis.

Table 4 presents point estimates of the two parameters of greatest interest of the model and sorts countries by whether the data reject the two null hypotheses of (a) no structural change, and (b) a value of β^i equal to one before the moment of structural change. Figures 8-15 present Bayesian posterior distributions conditioned on an initial diffuse prior for the moment of the structural break t^{*i} for those nations that fall in the upper left box of table 4.

Table 4 and figures 8-15 support the notion of the corridor. A large number of nations do show a significant structural break, before which the unemployment rate is mean reverting. Different national economies appear to leave the corridor at different dates. It does not seem to be the case that the change in the serial correlation properties of unemployment can be traced to the breakdown of Bretton Woods in 1971-2 or the rise of OPEC in 1973-4. Two nations appear to leave the corridor in 1970. Four nations leave the corridor

in the 1974-75 recession. Two nations are only pushed out of the regime in which unemployment is mean reverting during the early stages of the Volcker deflation. Six nations appear never to have been clearly inside the corridor at all: unemployment rates in Australia, Ireland, the Netherlands, Norway, and Spain appear to have always been highly persistent. And in only three nations does there fail to be a date after which unemployment displays hysteresis.

If all nations had left the corridor at the same time, then one could advance the hypothesis that the principal cause of hysteresis was a single worldwide shift in monetary régime or the arrival of supply shocks. But such a conclusion does not seem to fit the divergence of national experiences. Table four supports the tentative conclusion that the advent of hysteresis is perhaps best thought of as due to analogous processes occurring in parallel in many nations.

We take three lessons away from our estimation of the corridor model. First, the experiences of different OECD nations in the post-World War II period are sufficiently diverse that attempts to construct a single "typical" experience are not likely to prove enlightening. Second, the shift in economists' thoughts toward models of hysteresis does indeed reflect a relatively sudden and sharp change in the unemployment behavior of a number of countries. For close to half of the sample, at some point between 1970 and 1980 the serial correlation properties of unemployment underwent a substantial change.

But for another third of the sample, ther is little evidence that the unemployment rate was ever strongly mean reverting. In these nations the unemployment rate appears to have possessed substantial

persistence throughout the post-World War II period. Unemployment appears to have been low and relatively unvolatile in these countries in the first half of the post-World War II period possibly because of an absence of adverse shocks, but there is little sign that the failure of unemployment to decline in the past decade for these nations is due to any change in the relative strength of equilibrium-restoring forces in the labor market.

Last, there are nations like Canada, Denmark, and the United States for which hysteresis does not appear to be an appropriate concept. These economies have not escaped unscathed from the macroeconomic upsets of the past two generations, but they nevertheless have appeared able to generate jobs and reduce the number of the unemployed during booms—an ability that the economies of many other OECD nations appear to have lost.

How do our results compare with those of other researchers? We have not found studies similar to ours that examine such long periods in search of changes in the time-series properties of unemployment for such a large number of countries.[1] As economists have turned only recently to the study of hysteresis and persistence in unemployment, the volume of empirical work to date is relatively small. Table 5 summarizes various studies in the field, accepting authors' interpretations of the possible distinction between "hysteresis" and "persistence." No clear picture emerges from this table. Some have concluded that there are significant differences

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[1]Calmfors (1987, p. 7) recommends as part of his agenda for future research on unemployment "more systematic, cross-country, empirical analysis" to reduce the risk of inferring too much from a few case studies of individual economies.

between the US and selected European countries (for example
Blanchard and Summers (1986, p. 53)). Others, like Gordon (1987),
find no significant structural differences between Europe and the
United States. To the extent that theories like those of Bruno and
Sachs (1985) and Blanchard and Summers (1986) suggest that real
wages and unemployment should vary together, the post-1980 rise in
unemployment coupled with a fall in estimated real wage gaps is
troubling.

Conclusions

The term "hysteresis" has commonly been applied to
characterize labor market performance in European nations in recent
decades. For many European nations we do indeed find that the time
series behavior of unemployment as summarized in the coefficients
estimated for our simple model does indeed show hysteresis in and
after the 1970's but not before. We read this as support for the idea
of the "corridor": there is a clear structural break, and before the
break the unemployment rate was mean reverting. We also find large
and significant differences in behavior across countries: for a
number of countries there is no sign that unemployment was ever
mean reverting, for some countries the structural break takes place
in 1980 as opposed to in the 1970's, and for some countries there is
little sign that unemployment ever ceased to be mean reverting. We
interpret the differences between nations as suggesting (a) that the
returns would be high to studies that closely examined national
differences in labor market structures and policies and (b) that there
is no single, OECD-wide shift in the international economy at the root

of hysteresis. Finally, we conclude that our results do not show any
support for any form of a "natural rate" theory of unemployment over
the entire period.

An important—and, within the limited time-series approach we
have taken in this section, unresolvable—question is whether
European economies can be returned to the corridor. In the long run
the answer must be yes: nations that had suffered from persistent
unemployment before World War II had little difficulty in
establishing full employment in the late 1950's and 1960's. We
therefore turn to the interwar experience with an eye toward seeing
what light a broader historical perspective can shed on the issues
surrounding the persistence of unemployment.

III. A HISTORICAL PERSPECTIVE ON HYSTERESIS AND THE CORRIDOR

In light of the rapid growth and low unemployment exhibited by
OECD economies in the 1950's and 1960's, the pattern of high
unemployment in the late 1970's and 1980's appears to be an
anomaly. But does this view arise from economists' shortness of
memory? Have there been other periods of hysteresis in the
historical experience of industrial nations? Is there evidence of a
"corridor" for other periods? To answer these questions we examine,
first, the possibility of hysteresis in United States output over the
very long run.[1] We then examine interwar unemployment rates for

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[1]Romer (1987) has recently revised U.S. output data over the very long run in order
to provide a consistent series on cyclical movements in output for over a century.

evidence of hysteresis for a selection of nations for which we have reliable data.

The corridor and US output, 1980-1986

This section considers whether long-run historical data support the notion of the "corridor." The interpretation of long time series of unemployment rates is difficult, for it is never clear whether a persistent change in unemployment is a sign of a hysteresis-like change in the level of production relative to the level of potential that would be achieved by an idealized benevolent and well informed central planner or merely a change in the unemployment measuring rod used to assess economic performance. In the case of Great Britain, for example, the availability of only union unemployment rates before World War I poses large obstacles to the use of unemployment rates to study hysteresis and the corridor. In the case of the United States, Romer's (1986) convincing demonstration that the standard unemployment rate series were excessively volatile effectively bars the way to considering movements in unemployment as independent evidence of the relationship between actual and any measure of trend output before World War I.[1] We therefore turn to the analysis of the path of output per capita in the United States using the output series of Romer (1987).

Long run data have been a soure of the belief that the typical

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We focus on the U.S. because it is the only nation for which such a recent, business cycle-sensitive revision of data has been performed.

[1]Romer (1986) does present a new pre-World War I unemployment series for the United States. It, however, is built on the shaky assumption that the relationship between the true unemployment rate and the unemployment rate calculated according to the methodology of Lebergott has remained unchanged over the past half century.

shock to the level of output is persistent and not transitory.[1] Yet to us the evidence suggests a different story. Some movements in output are indeed persistent: they are associated with autoregressive coefficients close to one and do indeed take many years to die away. But other movements are as transitory as any analyst of "cycles" could wish. The distinction is that those movements in output which appear very persistent are precisely those that we would argue involve exit from the corridor. The coefficients obtained by estimating any linear time series model are a weighted average of these two types of movement.

It is relatively easy to demonstrate that some movements in output really are transitory. Consider the simplest possible Dickey-Fuller test of the null hypothesis that U.S. output per capita is an autoregressive process with a unit root against the alternative that output per capita consists of AR(1) fluctuations around a linear deterministic trend and using as a sample the union of the pre-Depression (1890-1929) and post-World War II (1947-1986) periods.[2] This test regresses output per capita on its own lagged value and a time trend and finds:

$$(22) \quad y_t = \underset{(.00147)}{.00534(t)} + \underset{(.082)}{0.703(y_{t-1})} + \varepsilon_t \quad \sigma_\varepsilon^2 = .030$$

The t-statistic against the null hypothesis that the coefficient on lagged output is one is 3.6. This is sufficient to reject at the .05 level the null hypothesis that output per capita is a random walk

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[1] See Nelson and Plosser (1982).
[2] This analysis of the Depression draws heavily on De Long and Summers (forthcoming).

against the alternative that output per capita is made up of AR(1) fluctuations about a linear deterministic trend.

Now add to the sample the U.S. Great Depression. Over the sample 1890-1940 and 1947-1986, the same Dickey-Fuller test produces:

$$(23) \qquad y_t = \underset{(.00084)}{.00155(t)} + \underset{(.046)}{0.916(y_{t-1})} + \varepsilon_t \qquad \sigma^2_\varepsilon = .043$$

The value of the coefficient on lagged output is actually above its expected value if the random walk null hypothesis really were true. Simple linear models of output seem, when the Great Depression is included in the sample, to speak strongly for the position that the typical shock to output is permanent. Yet with the Great Depression excluded from the sample the same linear models seem to speak strongly for the position that the typical shock to output is quickly reversed.

How can this be? Our belief is that the coefficient produced by a linear model is actually an average of the coefficients produced by shocks that keep the economy inside and that push the economy outside the corridor weighted by the identifying variance associated with the different kinds of shocks. Since shocks that push the economy outside the corridor are the large ones, they possess by far the greatest amount of identifying variance. The large output shocks of the Great Depression did possess a substantial degree of persistence—but not absolute persistence: the economy had recovered nearly to its pre-1929 trend line before the beginning of World War II in December 1941—and this episode of persistence dominates the regression if the Great Depression is included in the sample.

A natural way to proceed in these circumstances is to estimate explicitly nonlinear models. We choose a nonlinear model simpler than but inspired by those of Stock (1987). Consider fluctuations around a linear deterministic trend as given by the following equations:

$$(24) \qquad y_t - T_t = \rho_t \left(y_{t-1} - T_{t-1} \right) + \varepsilon_t$$

$$(25) \qquad T_t = T_{t-1} + \alpha$$

$$(26) \qquad \rho_t = \frac{e^{\theta_t}}{1 + e^{\theta_t}}$$

$$(27) \qquad \theta_t = \gamma + \delta(y_{t-1} - T_{t-1})$$

Where T_t is the trend, $y_t - T_t$ the cyclical deviation from trend, α the rate of growth of trend, and the state-dependent autoregressive coefficient ρ_t is a logistic function of the difference between actual and trend output. The speed at which output returns to trend is thus allowed to be state dependent and is bounded between no tendency to return and complete return within a period.

This specification forces the autoregressive parameter ρ_t to remain between zero and one at all times. It allows the parameter to be nearly constant if the data do not display significant nonlinearities. It allows the autoregressive parameter to depend either positively or negatively on the level of output relative to trend. And it nests two hypotheses: the hypothesis H_0 that output is well described by a unit root, always exhibits hysteresis, and has a constant $\rho_t = 1$ always, and the hypothesis H_1 that $\delta = 0$ and thus that ρ_t is constant and output never exhibits hysteresis or significant

nonlinearities.

Table 6 reports likelihood ratios and key parameter values for this model estimated over the union of the samples 1890-1940 and 1947-1986. The inclusion of the Great Depression in the sample forces the estimate of p_t for H_1 to be close to one. More interesting is the far greater value of the likelihood obtained by the unrestricted model H_2. When p_t is allowed to depend on the state of the economy, the speed of mean reversion when the economy is close to trend is high and the steep slope $\partial p/\partial y$ indicates that as output falls far below trend the speed at which it reverts to trend becomes very slow. In deep depressions, the economy is indeed outside the corridor and does exhibit hysteresis. Figures 16 and 17 below show the cyclical component of output and the estimated autoregressive parameter p_t in each year. During the years of the Great Depression, the estimated autoregressive parameter is indistinguishable from one, suggesting a state of high persistence.

We see the long run growth path of output per capita in the United States as very strongly supportive of the notion that there is a "corridor." The self-restoring forces of the economy—as measured by the difference between p_t and one—appear to become weak as the economy lapses more than ten percent or so below trend.[1] Our analysis suggests that it is equally misleading to think of the economy as always being engaged in rapidly erased transitory

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[1]Estimating the same nested group of three models for the United Kingdom leads to similar conclusions if allowance is made for the productivity slowdown in British economic growth between 1900 and 1935. Whether this slowdown in the rate of trend growth was exogenous or a product of poor macroeconomic performance is a topic still open to debate.

fluctuations around a near-deterministic growth path or as always exhibiting "hysteresis" in output. Instead, "hysteresis" appears to be a product of bad times, a product of exit from the corridor and the associated breakdown of the normal regulating mechanisms of the macroeconomy.[1]

Our analysis suggests that the US experience during the Great Depression of the 1930's was at least superficially similar to the unemployment experience of many European nations in the 1970's and 1980's as reported in section II. We now turn to Europe during the interwar period, to see if signs of the processes at work in perpetuating high unemployment in the 1980's can be seen to be at work before World War II.

Hysteresis in unemployment, 1923-1938

As displayed in figures 18-21, unemployment was high and widespread in a number of nations between World Wars I and II. These figures report unemployment rates for eleven nations for which reasonably reliable data exist and can be found in Eichengreen and Hatton (1988) and Mitchell (1975). We examine unemployment rates over 1923-1938 using the same approach as in section II. We eliminate the years 1919-1922 from the sample because we believe they reflect primarily the adjustment process from war to peace.

First, we estimate equation (19) to examine mean reversion and persistence over the interwar period as a whole. Interestingly enough, for only two out of eleven nations can we reject the null

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[1]Blanchard and Summers (1986) also argue that there is some evidence that hysteresis is the result of "bad times."

hypothesis that β^i is equal to or greater than one at the five percent level, and for only one additional nation can we reject the null at the ten percent level. The shorter length of the sample implies that, even though estimated autoregressive coefficients are marginally higher over the 1955-1986 time period than over 1923-1938, it is not possible to reject the null that unemployment was very persistent during World War I with any confidence. By contrast, the 1923-1938 period does seem to exhibit more persistence than does the 1955-1973 period: the estimated autoregressive coefficient is less in the first half of the post-World War II period for eight out of eleven countries.

Turning to estimation of equations (20) and (21), we find that the pattern of results for the interwar period reported in table 8 is by and large similar to the pattern reported in table 4, although different countries are classified in different ways in the interwar and post-World War II periods. The hysteresis hypothesis—the belief that the time it takes for the effects of a shock to unemployment to die out is more like a decade than a year or two—appears reasonably well supported in the aggregate interwar data. The corridor hypothesis—the belief that the economy can have a full-employment régime in which unemployment is mean reverting and a high-unemployment régime in which unemployment is persistent—is not so well supported. The nations for which there is a clear sign of a structural break around the beginning of the Great Depression are relatively few, and are among the smaller economies.

There are three possible reasons for the relative weakness of support for the corridor hypothesis in the interwar period. The first

is simply lack of power: the interwar sample is only half as long as the post-World War II sample. The second is that perhaps our corridor hypothesis is badly framed. From the standpoint of most European nations, the interwar period saw two Great Depressions, one after of World War I, and a second after the US stock market crash. There thus was no period of low unemployment long enough to allow individuals to view the possibility of unemployment with relative unconcern and to restore liquidity to the lab or market.

The third possibility is that the unusual period as far as unemployment behavior is concerned is not the 1980's but the 1960's. Perhaps times of a high-pressure economy are the exception and not the rule. Perhaps the natural state of an advanced industrial economy is one of high unemployment and only weak equilibrium restoring forces in the labor market. From this perspective, it is interesting to note that at least four out of the last six peacetime decades—the 1920's, the 1930's, the 1970's, and the 1980's—have seen prolonged and persistent high unemployment among at least a substantial minority of OECD nations.

Anyone familiar with the economic policy debate in the 1970's and 1980's who goes back and reads the economic policy debate of the 1930's will experience déja vù. The same themes that have been used to argue against aggressive attempts to reduce unemployment in the 1980's were raised for the same purposes in the 1920's and 1930's. Franklin Roosevelt's initial campaign platform attacked the Hoover administration for running unbalanced budgets, which were thought likely to increase expectations of inflation, to increase the possibility of devaluation, and lead forward-looking investors to flee

with their capital to other countries and thus reduce domestic
investment in a process similar to what happened in France after the
Socialist election victory (Hawley (1967)).

The hostile contemporary reviews of Keynes' General Theory
(collected in Hazlitt (1961)) stressed that Keynesian policies would
achieve success only to the extent that they managed to reduce
workers' real wages. Critics pointed out that if one believed that
workers were unlikely to suffer real wage reductions through
inflation and thus that the economy possessed real wage rigidity,
then real public spending was likely to crowd out real private
spending one-for-one. Only if one thought that the labor market was
characterized by nominal rather than real wage rigidity could a case
for expansionary policies be made.

Last, Keynes (1937) himself was among those who argued that
it would be unrealistic to expect aggregate demand expansion to lead
to a reduction in the unemployment rate below eight percent or so.
Prolonged high unemployment had led to structural maladjustments
and capacity constraints that made a large share of the labor force
effectively unemployable. In such circumstances, Keynes argued that
as the unemployment rate dropped below eight percent "...we are
approaching, or have reached, the point where there is not much
advantage in applying a further general stimulus.... So long as surplus
resources were widely diffused between industries and locations it
was no great matter at what point in the economic structure the
impulse of an increased demand was applied. But... the economic
structure is unfortunately rigid.... It follows that the later stages of
recovery require a different technique.... We are in more need today of

a rightly distributed demand than of a greater aggregate demand."

In the heyday of Keynesianism such counsels of gloom did not attract much attention. But we suspect that many economists today would find the arguments raised against Keynesian policies in the 1920's and 1930's at least somewhat plausible. And we note that a number of economic historians are moving toward the conclusion that as little could have been done to rapidly reattain full employment in the 1930's as has been done to rapidly reattain full employment in the 1980's (see, for example, Aldcroft in Berend and Borchardt (1986)). To some degree this may represent a return to consistency: if Keynesian policies are not appropriate for the 1980's, it is difficult to see what differences in institutional structure would have made them successful in the 1930's had they been tried.[1]

IV. THE POLITICAL ECONOMY OF UNEMPLOYMENT 1955-1986

We have found considerable cross-country differences in unemployment patterns in the 1970's and 1980's. Some nations appear to have left the corridor, while others do not appear to display hysteresis over any subperiod at all. How is one to make sense of the diversity of national unemployment experiences? One approach is to take recent work in public choice as a key to assessing the consequences of labor market failure—which we proxy by the level of unemployment reached in 1986—as a product of the institutions and

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[1]Sachs and Eichengreen (1985) present substantial evidence that Keynesian—or at least monetarist—expansionary policies did meet with considerable success in the 1930's.

incentives determining labor market behavior. This suggests that we should examine the relationship between macroeconomic performance and variou industrial relations systems.

We thus seek a proxy for the susceptibility of the labor market to the breakdown of self-regulating forces. One such proxy might be the share of the labor market unionized in the early 1980's. The level of unionization before the rapid and persistent rise in unemployment is a legitimate predetermined variable. But this proxy is likely to be insufficient: susceptibility to labor market breakdown might depend not only on the level of unionization, but also on the degree to which economic and political power can be effectively utilized and on the role played by the industrial relations system in wage determination as well.

In the 1970's, political scientists attempted to account for the differential experience of OECD nations in containing inflation by classifying nations according to their systems of industrial relations. One such classification scheme is that of Crouch (1985), who argues that "within advanced capitalist economies, two broad types of industrial relations systems can be identified—neocorporatist systems in which a centrally coordinated union movement has developed within a political context responsive to labor demands, and liberal systems in which the labor movement lacks any significant centralized coordination." Crouch's classification, developed in the 1970's to understand inflation, is predetermined with respect to the great bulk of the rise in unemployment.

When the level of unemployment reached in 1986 is plotted against the proportion of the labor force unionized in the mid-1970's

no clear pattern emerges, as can be seen in figure 22. However, there
is a striking relationship between rates of unionization in the mid-
1970's and macroeconomic performance as captured by the OECD-
basis unemployment rate in 1986, but it is not monotonic. For those
nations that Crouch classifies as "liberal," there is a strong positive
relationship between levels of unionization and 1986 undemployment
rates: the higher the share of the labor force unionized, the higher is
unemployment. For those nations that Crouch classifies as
"corporatist," there is a strong negative relationship between mid-
1970's unionization and 1986 unemployment.

Table 9 reports robust rank regression coefficients for the
liberal and corporatist subsamples. Since it appears likely that Japan
is not well classified either as a liberal or a corporatist state, the
rank regression results are presented both including and excluding
Japan. For the entire sample as a whole, there is no relationship
between unionization rates and economic performance. But for both
the liberal and corporatist subsamples the relationship is much too
strong to be plausibly attributed to chance.[1]

An alternative way of illustrating empirically the central

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[1]Calmfors and Driffill (1988) argue that the concept of "corporatism" is a chimera
and that the right concept to use is simply the degree of centralization of wage
bargaining. They argue that there is a curvilinear relationship between worker-side
labor market oligopoly and macroeconomic performance using their own measures of
wage centralization. We are skeptical for three reasons. First, we do believe that
"corporatism" contains marginal explanatory power. Second, we suspect that
Calmfors and Driffill's arguments that their measure captures the relevant
dimension of variability are very sensitive to the classification of Japan, a
classification that we do not find obvious. And last, because their conclusions appear
to hinge on their judgment that a current account surplus is one of the principal goals
of economic policy. Barring pathological cases like the United States over 1984-
1988, we do not think that an excess of domestic investment over national saving is
necessarily an outcome to be avoided.

difference in unemployment performance between corporatist and liberal industrial relations systems is to model unemployment in 1986 as a quadratic function of the labor movement's organized, centralized strength in country i, denoted LS_i, where this strength is set equal to the percent of the labor force unionized in the mid-1970's plus a parameter δ times a dummy variable for whether the country's industrial relations system is classified as "corporatist" by Crouch:

$$(28) \quad UR_i^{1986} = \alpha(LS_i)^2 + \beta(LS_i) + \gamma$$

$$(29) \quad LS_i = UN_i + \delta(CORP_i)$$

Parameter estimates obtained by maximum likelihood are reported in table 10 for th3 estimation of (28) and (29) for those nations classified by Crouch. A test of the null hypothesis that parameter δ is equal to zero—that Crouch's mid-1970's classification of industrial relations systems has no predictive power for determining unemployment in 1986—leads to a $\chi^2(1)$ statistic of 7.08 which indicates rejection. Our specification does indeed fit the data relatively well: 1986 unemployment is low if the proxy for worker-side centralized power is either low or high.[1]

Economists can easily understand the upper lines of table 9 and the left-hand side of figure 23. The lower is worker-side labor market oligopoly, the less likely and less disruptive are the monopoly

[1] Our conclusion here is closely related to that of Freeman (1987), who finds that "...a dispersion of wages indicator of wage-setting institutions provides some support for the two claims that have dominated debate on the impact of institutions on outcomes: that 'flexible' decentralized labor markets... and that centralized corporatist-style markets produce better employment performance."

union-generated labor market failures that may lie behind the exit of many OECD economies from the "corridor" and the persistence of unemployment in the 1970's and 1980's. But the result for corporatist economies provides a puzzle for economists: why should an increase in the strength of centralized worker-side labor market organizations beyond a certain point lead to improved unemployment performance?

The rank correlations for corporatist economies in the lower half of table 9 and the right-hand side of figure 23 are no puzzle to political scientists who have often argued that organized corporatist societies are likely to adapt more quickly and more effectively to aggregate shocks than liberal societies. For political scientists, the puzzle is that below a certain point decreasing the degree to which interest groups are organized appears to improve performance.

Mancur Olson (1982, 1986ab) has given shape to the necessary argument required to bridge the intuitions of economists and political scientists. As long as an economy's interest groups are fragmented in such a way that each has a membership small relative to the population as a whole, the standard Buchanan and Tullock (1962) view of the economic costs imposed by rent-seeking pressure groups should hold. But if a dominant interest is itself organized in a corporatist fashion that admits coordination, it will face an incentive structure that reduces the returns to rent-seeking as the number of non-members from whom rents can be extracted falls. As interest groups become "encompassing" their individual special interest becomes the general interest, and they exert less drag on the economy than do small narrow interest groups: "The incentives

facing an encompassing... group are dramatically different....If an organization represents... a third of the income-producing capacity... its members will... obtain a third of the benefit from any effort to make the society more productive" (Olson (1982, p. 48)).

Consider Olson's argument as applied to the labor market failures involved in the creation of formal or informal property rights in jobs, in the freezing up of the labor market that may be behind the onset of hysteresis. As worker-side labor organizations become "encompassing," they internalize the macroeconomic effects of their own actions. An economy-wide strongly-centralized labor movement will be more inclined to trade real wage increases for employment, or job security for a high-pressure economy, than either a union which does not take account of the effects of its actions on a large group of nonmembers who might otherwise be employed in the unionized sector or a set of comprehensive but uncoordinated unions.

Alternatively, interest groups which have little effect on the aggregate liquidity of the labor market will not necessarily significantly degrade unemployment performance. The potential competition from a large ununionized sector will dominate macroeconomic outcomes and reduce the possibilities for the formation of hysteresis. Thus we would not expect to see high unemployment in economies either with low union membership or with strong encompassing centralized unions. And market structures between these two extremes might well exhibit higher unemployment rates.

Olson (1982) comes close to arguing that whether the behavior of an interest group is "encompassing" is largely a function of the

size of the interest group alone. Yet this surely cannot be correct:
any interest group that becomes as large as the entire economy
should itself succumb to the free-rider problem and be devoured by
rent-seeking behavior on the part of its different subgroups. After
all, the liberal democratic state is supposed to be the ultimate
"encompassing" interest group. Those elements of culture, history,
and institutions that allow the formation of what Olson calls
encompassing interest groups are, we suspect, what political
scientists attempt to understand through their dichotomy between
liberal and corporatist political institutions (see Dore (1987)).

The principal lesson we would draw from table 9 and figures 22
and 23 is that we can see in operation two substantially different
economic systems—two different structures of industrial relations—
each of which in its pure form works well in the sense of delivering
macroeconomic outcomes that have relatively little unemployment
attached. But each system appears vulnerable: a "liberal" system
appears vulnerable to over-mighty or over-influential interest
groups. A "neocorporatist" structure of industrial relations appears
vulnerable to insufficiently mighty centralized interest groups, for
what is the use of striking a corporatist bargain if the centralized
agent cannot enforce obedience to the terms of the bargain on the
part of its principals? Attempts to mix elements from the two
structures—a liberal system with a strong union movement, or a
"corporatist" system where the central bargainers do not have the
authority to bind workers and firms—appear likely to be

unsuccessful.[1]

We also wish to stress that the standard insider-outsider approach pioneered by Lindbeck and Snower, as applied to the labor market, paints unions with too black colors. Such a theory suggests that hysteresis should be a monotonically increasing function of the wall separating insiders from outsiders, and so has difficulty when confronted with the parabola we find in figure 23. We suspect that a more complete and balanced view would recognize that as far as the macroeconomy is concerned worker-side organization can have positive effects in enhancing "voice" alongside negative effects in retarding "exit," to use Albert Hirschman's (1974) dichotomy between what might be called political and economic ways of arriving at social decisions. Moreover, the persistence of unemployment in the 1930's suggests that reliance on explicit union-firm bargaining in building theories of hysteresis may be hasty. The institutional condominium of large firms and unions that has characterized European labor relations in the past decades was not present in such a developed form in the 1930's. And the decline in real wage gaps since 1980 (Bruno (1986)) makes one suspect that in a general equilibrium sense even workers employed in large firms have not benefitted from the institutional mechanisms supporting high unemployment.

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[1]The role of corporatism in a macroeconomic context has been the object of much study. For the origins of "corporatism" as a way of organizing the economy see Maier (1975). Olson's views on corporatism are amplified in the preface to the Swedish edition of his (1982) Rise and Decline of Nations. Crouch (1985) investigates the relationship between corporatism, unionization, and inflation in the 1970's. Bruno and Sachs (1985) argue that stagflation is best avoided by nations that possess either corporatist bargaining institutions or substantial degrees of labor market money illusion—nominal wage inertia.

V. ALTERNATIVE THEORIES OF HYSTERESIS

In this section we lay out what we believe are the live theoretical options open to economists who want to understand "hysteresis" in unemployment rates. Since Phelps (1972) first used "hysteresis" as a shorthand for describing a situation in which the path to equilibrium influenced the location of equilibrium, economists have used "hysteresis" as a synonym for "path dependency." Our view is that the phenomena that economists today place under the heading of hysteresis are critically important, and that a good theory of hysteresis must simultaneously explain why it is sometimes, as in the 1950's and 1960's, substantially absent.

Following Blanchard and Summers (1986), we can delineate three categories of models consistent with hysteresis: "human capital" models, "capital shortage" or "physical capital" models, and "wage bargaining" models. An earlier attempt to produce models with the same implications for the "equilibrium" path of unemployment was the original Keynesian project of developing models of unemployment equilibrium in order to understand both the emergence and the persistence of unemployment in the 1930's.

Human capital

This approach to hysteresis was first outlined in Phelps (1973), who discussed two cases. In the first hysteresis is the result of on-the-job training. When employment rises, perhaps because of increases in aggregate demand, more workers become trained. This

learning-by-doing increases the value of the human capital in the economy. Moreover, sustained employment of the additional workers may also lead to the introduction of new techniques and production methods. These two effects combined may contribute to a higher equilibrium level of employment and a lower natural rate of unemployment.

This process works in reverse. Prolonged unemployment reduces the skills of the labor force. A firm searching for new workers is likely to choose an individual who does not have a long experience with unemployment if prolonged unemployment is taken as a signal of low productivity.[1] Phelps' other case is a version of the wage-bargaining approach driven by the impact of labor unions. As employment grows, the membership of the union grows. When demand declines, a union that wishes to keep its members employed will have to accept a lower real wage.

Yet another human capital-based theory of hysteresis makes the ability of workers to search for employment a declining function of the length of time that workers have been unemployed. The excess supply of labor offered by the long-term unemployed would thus not register on the labor market.[2]

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[1]For this line of thought to meet contemporary standards of modelling consistency, it must either be that employers misperceive the relationship between skill and unemployment when unemployment is high or that some piece of the benefits from high employment are not privately appropriable.

[2]Hargreaves-Heap (1980), Sachs (1987), Cross (1987), Franz (1987), and others have presented models based on the human capital approach. Clark and Summers (1982) analyzed the U.S. labor market over 1951-1981 in order to uncover the roles of timing and persistence in cyclical fluctuations in labor supply. They conclude that persistence is more important than timing—that is, more important than voluntary labor-leisure substitution—but fail to reject the possibility that timing has significant effects. Franz (1987) analyzes unemployment in the Federal

Capital shortage

This approach builds on the view that a reduction in the capital stock due to adverse shocks may reduce the number of workers who can be profitably employed. Since capital and labor are complements the NAIRU drifts in the direction of the unemployment rate. When unemployment is high, the low rate of investment relative to trend tends to increase the natural rate of unemployment.

This explanation is supported by Modigliani et al. in Layard and Calmfors (1987) not so much as a cause of present-day high unemployment but as a factor that is likely to keep unemployment high in the future. Franz (1987) questions the extent to which capital shortage can explain the persistence of unemployment in West Germany. And Blanchard and Summers, impressed by the small effects that low US investment in the 1930's turned out to have on US productive capacity, argue that capital constraints play at most a very minor role in producing high unemployment.

Wage bargaining

The main center of theoretical focus on hysteresis has been in the area of wage bargaining. In its pure form it sharply distinguishes between employed insiders and unemployed outsiders. The real wage is set by bargaining between insiders and employers. Insiders'

Republic of Germany and concludes that increases in long-term unemployment have substantially contributed to rises in the NAIRU. He also argues that his study does not support the view that expansionary policy will only increase inflation. Heckman and Borjas (1980) analyze the time dependence of actual employment on future employment, and along the way discuss briefly the human capital approach.

concern for their own self-interest leads them to push and keep wages above full employment levels (Lindbeck and Snower (1985)). This insider-outsider argument complements the wage-gap argument of Bruno and Sachs (1985). It rationalizes the persistence of real wage gaps following their initial emergence in a time of recession or supply shocks.

If all wages are set by bargaining between insiders and firms, if insiders are not concerned with the employment of outsiders, if insiders cease to be insiders upon the moment of discharge, and if insiders do not wish to expand employment in order to insure themselves against the possibility that future adverse shocks will transform some of them into outsiders, then insiders will set the wage as high as they dare and any level of unemployment will be self-sustaining in the absence of shocks (Blanchard and Summers (1986)). Lindbeck and Snower (1985), Gottfries and Horn (1986), Blanchard and Summers (1986), and Drazen and Gottfries (1987) consider different special cases of more or less this same model. It is clear that, as Blanchard and Summers (1986) note, that wage-bargaining mechanisms can only create a channel to persistence. The initial rise in unemployment must be due to adverse shocks, some of them possibly originating from government action.[1] Moreover, to the

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[1]Hysteresis might also be rolled back through government action. Blanchard and Summers (1987) argued that a policy of deliberate expansionary tax reductions would be an efficient tool in order to raise employment. In the presence of nominal rigidities, a reduced tax rate increases both aggregate demand and aggregate supply. Unemployment would fall, the number of insiders would increase permanently, and at least in the long run a tax reduction should be close to self-financing. Symons (1987) skeptically rejects Blanchard and Summers' policy recommendations. He believes that outsiders do matter for wage determination and that the rise in the natural rate of unemployment may well be due to outbursts of union militancy.

extent that insiders foresee the emergence of hysteresis shocks will have only small effects on employment and will induce wage givebacks instead: in an insider-outsider model, insiders should be willing to pay a king's ransom to avoid being transformed into outsiders.

Keynesian unemployment equilibrium

In spite of the fact that the General Theory was written against the background of widespread persistent unemployment in the 1920's and 1930's, relatively few recent explanations of high unemployment in the 1980's have explicitly drawn on the Keynesian underemployment equilibrium tradition.[1] Yet the empirical regularities for which Keynes was trying to provide an explanation— the persistence of high rates of unemployment, the failure (except for the brief 1930-1933 period) of excess supply in the labor market to exert noticeable downward pressure on nominal wages, and the inability of entrepreneurs to find a way to profitably use both unemployed labor and unemployed capital—appear closely aligned with the empirical regularities of European unemployment in the 1980's.

Looking at the 1930's from the point of view of present-day explanations of persistent unemployment, we are inclined to conclude that none of the three approaches to hysteresis covered above

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Moreover, he believes that expansionary policies will have strong negative effects on financial markets, and that there is no way to reduce unemployment without raising inflationary expectations.

[1]We find this surprising in view of the fact that critics of expansionary policies (such as Symon (1987); see the note above) have drawn heavily on the the classical tradition of the 1930's against which Keynes saw himself as struggling.

represents a convincing explanation of the experience of the 1930's.
And we have a hunch that large dividends might be earned through
empirical work that explored further the similarities between mass
unemployment in the 1930's and mass unemployment in the 1980's.

Conclusions

In this section we have briefly reviewed three classes of
theories of hysteresis. We find human capital theories relatively
unattractive because we cannot believe that the long-term
unemployed in Europe really have become unemployable. We suspect
that most of the reduction in their rate of job search would disappear
in a high-pressure economy. Physical capital theories are thought
provoking, but they are undeveloped. Moreover, they are hard to
reconcile with rapid productivity growth in Europe in the past
decades, which is more suggestive of capital abundance than capital
shortage.[1]

Wage-bargaining theories appear as the most well elaborated of
the approaches to hysteresis, but the empirical support for the chain
of causation from insider bargaining power through high real wages
to unemployment appears scant in view of the apparent fall in wage
gaps since 1980. It should also be stressed that the strongest
insiders in corporatist economies display relatively low rates of
unemployment.

Unfortunately, the empirical evidence which could discriminate
between different potential explanations of hysteresis is difficult to

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[1]One could speculatively read European investment as the replacement of capital that
complements labor by capital that substitutes for labor.

obtain. Our own view of cross-country differences in unemployment performance through Olson's view of the logic of collective action points at the role of the incentive structure facing both unions and less formal bargaining coalitions in triggering good or bad labor market outcomes. We suspect that a sounder grasp of European unemployment could be gained by taking seriously the differences between the labor market structures generated by high-pressure (inside the corridor) and low-pressure (outside the corridor) economies on the one hand, and by liberal, mixed, and corporatist political systems on the other. And we suspect that within such a framework wage bargaining theories would play a central role.

VI. CONCLUSIONS

Our investigation of issues surrounding the persistence of unemployment in the 1970's and 1980's has led us to six conclusions. First, there is now "hysteresis" or strong elements of persistence in unemployment rates in almost all OECD nations. Changes in unemployment—at least upward changes—are likely to take a long time to reverse themselves. Second, this particular episode of hysteresis is of relatively recent origin. Different countries appear to leave the mean-reverting "corridor" at different dates, and we read this as suggesting that the place to look for an explanation of the changing persistence properties of unemployment is probably not in a single, world-wide shift in monetary régime.

Third, we see the cross-country evidence as supporting the idea that as long as an economy is close to full employment the

equilibrium-restoring mechanisms of the market tend to return it to full employment. For many OECD nations there appears to have been a corridor, a region over which changes in unemployment were not persistent. Many nations have since left the corridor: rapid rises in unemployment associated with the recessions of the 1970's and 1980's may have triggered shifts in labor market structure that made unemployment persistent. We see a plausible theoretical rationale for the existence of a relatively narrow corridor in the strong incentives to act to "freeze" the labor market once unemployment becomes high.

Fourth, our corridor interpretation casts doubt on natural rates of unemployment. As long as OECD nations were within the corridor, actual unemployment did indeed tend to gyrate around a natural rate. Outside the corridor, however, the natural rate disappears as a meaningful concept.

Fifth, when we analyze the pre-World War II period we find that hysteresis is not a completely new phenomenon. Pre-World War II persistence in unemployment was largely forgotten during the rapid growth generation that followed World War II, and this lapse of memory was assisted by the widespread belief that post-war governments did indeed know how to tame the business cycle. In fact, if one steps back, one notes that four out of the last six peacetime decades have seen high and persistent unemployment in at least a large minority of advanced industrial nations. One is led to wonder by what warrant economists dare consider the low unemployment and rapid growth of the 1950's and 1960's the "normal" state of an advanced industrial economy.

Last, we interpret the cross-country differences in unemployment performance of industrial natiosn in terms of Olson's theory of encompassing organizations. Those OECD nations that have done best with respect to unemployment in the past fifteen years appear to be those that had either weak or strong centralized labor movements. We interpret this as indicating that there are at least two different roads to full employment. Looking for the moment at employment performance alone, both appear reasonably effective in their pure forms. Those nations that have performed the worst appear to be those that have not decided which road they are on.

TABLES

TABLE 1: MEASURES OF TOTAL LABOR MARKET SLACK, 1973-1986

Nation	Change in Unemployment 1973-1986	Cumulative Decline in Emp/Pop Growth, 1962-1973 to 1974-1986	Cumulative LF Reduction from Migration Slowdown	Change in Shadow Unemployment 1973-1986
Canada	4.9%	3.2%	1.3%	6.2%
U.S.	2.3	-.3	-.6	1.7
Japan	1.3	-3.9	-.1	1.2
Australia	5.9	12.0	3.8	9.7
New Zealand	3.9	5.6	4.5	8.4
Austria	3.1	3.9	2.6	5.7
Belgium	9.7	14.8	1.3	11.0
Denmark	6.4	7.7	0.8	7.2
Finland	2.5	-14.4	-3.1	-.5
France	7.4	10.8	2.3	9.7
Germany	7.3	9.4	5.7	13.0
Greece	5.8	-7.0	-7.2	-1.4
Iceland	-.1	-3.1	-.5	-.6
Ireland	11.7	8.5	-2.3	9.4
Italy	3.7	-10.9	-2.4	1.3
Luxembourg	1.1	9.6	3.1	4.2
netherlands	10.6	-.6	-.7	-8.9
Netherlands	10.6	-.6	-.7	8.9
Norway	1.0	-10.6	-.8	.2
Portugal	6.5	16.5	-19.5	-13.0
Spain	19.0	30.9	-1.9	17.1
Sweden	0.3	-6.8	1.0	1.2
Switzerland	0.9	4.7	3.0	3.9
Turkey	3.7	4.6	NA	NA
United Kingdom	9.3	9.0	-.5	8.8
Continent N of Alps	7.2	8.8	3.3	10.5
+ UK, Ireland, Italy	7.8	8.9	1.4	9.2
All Europe	7.5	6.2	0.2	7.7
OECD	4.5	2.3	0.0	4.5

TABLE 2: AR(1) REGRESSIONS FOR 1955-1973

Nation	β_i	Standard Error of β_i	Natural Rate of Unemployment
Australia	.53**	.19	2.16
Austria	1.00	.07	--
Belgium	.77*	.14	3.47
Canada	.67**	.18	5.36
Denmark	.67**	.16	3.76
Finland	.64**	.19	1.80
France	1.04	.11	--
Germany	.73**	.14	1.22
Ireland	.79	.16	6.76
Italy	.85*	.10	5.08
Japan	.66**	.19	1.20
Netherlands	.86	.18	1.74
Norway	.89	.19	.94
Spain	.79	.21	1.61
Sweden	.50**	.22	1.99
United Kingdom	.75*	.13	2.30
United States	.60**	.19	5.02
Pooled	.81*	.12	

**Significantly less than one at .05 level.   * Significantly less than one at .10 level.

TABLE 3: AR(1) REGRESSIONS FOR 1955-1986

Nation	β_i	Standard Error of β_i
Australia	.92	.07
Austria	.88*	.07
Belgium	1.00	.05
Canada	.88*	.09
Denmark	.84*	.10
Finland	.93	.09
France	1.02	.03
Germany	.95	.07
Ireland	1.06	.09
Italy	.91	.08
Japan	.99	.07
Netherlands	1.00	.05
Norway	.79*	.12
Spain	1.03	.03
Sweden	.69**	.14
United Kingdom	.98	.05
United States	.78*	.11
Pooled	1.02	..05

**Significantly less than one at .05 level.   * Significantly less than one at .10 level.

TABLE 4: SWITCHING REGRESSION RESULTS FOR THE CORRIDOR MODEL, 1955-1986

Reject Null Hypothesis of No Structural Change

		Yes			No		
			β^i	$t*^i$		β^i	$t*^i$
Reject Null Hypothesis of β^i Always Equal to One	Yes	Austria	.86	1982	Canada	.66	1975
		Belgium	.77	1974	Denmark	.82	1974
		Finland	.58	1975	US	.76	1986
		Germany	.73	1970			
		Italy	.84	1974			
		Japan	.65	1970			
		Sweden	.51	1981			
		UK	.75	1975			
	No	France	.91	1976	Australia	1.10	1973
					Ireland	.86	1972
					Netherlands	1.00	1984
					Norway	1.00	1984
					Spain	1.16	1984

TABLE 5: EVIDENCE ON HYSTERESIS-PERSISTENCE

Researcher	Countries	"Hysteresis"	"Persistence"
Heckman-Borjas (1980)	U.S.	n.a.	no
Clark-Summers (1982)	U.S.	n.a.	yes
Coe-Gagliardi (1985)	Australia	no	yes
	9 OECD nations	no	no
Blanchard-Summers (1986)	UK, Germany	yes	yes
	France, US	yes	yes
Sachs-Wyplosz (1985)	France	no	no
Franz (1987)	Germany	no	yes
Gordon[1] (1987)	Austria, Belgium Sweden, Switzerland	yes	
	9 OECD nations	no	

Due to differences in time periods covered, data used, estimation techniques applied, and specification, the results from individual studies can only be compared with great caution.

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[1]Gordon (1987) finds weak support for hysteresis in a set of wage and reduced form price equations. However, he also concludes by giving stronger support to the hysteresis view "in the broader sense that the best estimate of the natural unemployment rate is whatever the natural unemployment rate happens to be" (Gordon (1987, p. 45)).

TABLE 6: NONLINEAR MODELS OF US OUTPUT PER CAPITA

Model	Likelihood	Null and Alternative	Likelihood Ratio Statistic	Distribution
H_0: ρ_t=constant=1.0	288.63	H_0:H_1	4.45	$\chi^2(2)$
H_1: ρ_t=constant ρ estimated at 0.92	290.86	H_1:H_2	18.04	$\chi^2(1)$
H_2: ρ_t=free $\rho(y_t=T_t)$ estimated at .27 $d\rho/dy(y_t=T_t)$ estimated at 4.70	299.88	H_0:H_2	22.50	$\chi^2(3)$

TABLE 7: PERSISTENCE IN UNEMPLOYMENT 1923-1938

Nation	α^i	β^i	Standard Error of β^i
Austria	.42	.84	.14
Belgium	.31	.91	.10
Canada	.42	.85	.14
Denmark	1.20	.60**	.20
France	.75	.61**	.20
Germany	.21	.88	.28
Netherlands	.19	.95	.11
Norway	1.03	.67*	.17
Sweden	.51	.80	.17
UK	.59	.78	.17
US	.55	.83	.13

**Significantly different from one at .05.   *Significantly different from one at .10.

TABLE 8: SWITCHING REGRESSION RESULTS FOR THE CORRIDOR MODEL, 1923-1938

Reject Null Hypothesis of No Structural Change

		Yes		No	
		β^i	$t*^i$	β^i	$t*^i$
Reject Null Hypothesis of β^i Always Equal to One	Yes	France .07** 1931		Denmark .60** 1938 Norway .67* 1938	
	No	Sweden 1.27 1932		Austria 1.03 1932 Belgium .91 1938 Canada .85 1938 Germany .88 1938 Netherl. .95 1938 UK .94 1932 US .83 1938	

TABLE 9: RANK REGRESSIONS OF 1986 UNEMPLOYMENT ON MID-1970'S UNIONIZATION RATES

Sample	Rank Slope	Rank Standard Error
"Liberal" economies	.80	.16
"Liberal" economies (excluding Japan)	.79	.18
"Corporatist" economies	-.90	.18
Total sample	-.17	.25

TABLE 10: 1986 UNEMPLOYMENT AS A FUNCTION OF CENTRALIZED LABOR-SIDE POWER

$$(28) \quad UR_i^{1986} = \alpha(LS_i)^2 + \beta(LS_i) + \gamma$$

$$(29) \quad LS_i = UN_i + \delta(CORP_i)$$

Coefficient	Estimate	Asymptotic Standard Error
δ	30.4%	8.1%
γ	8.4	2.2%
β	.20	.08
α	−.004	.001

66
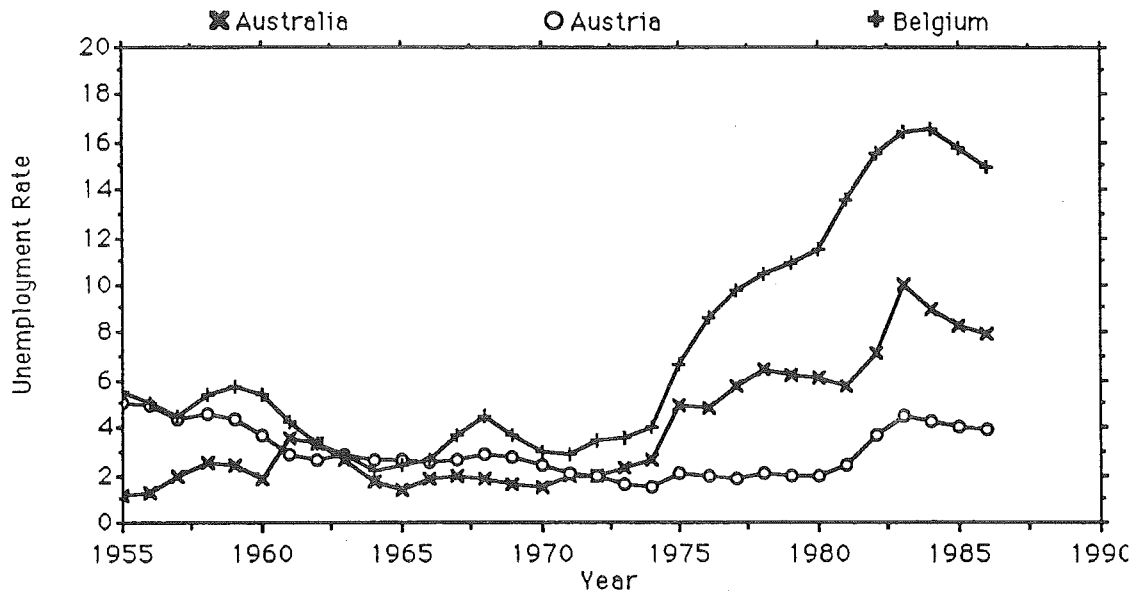
FIGURES

FIGURE 1

FIGURE 2
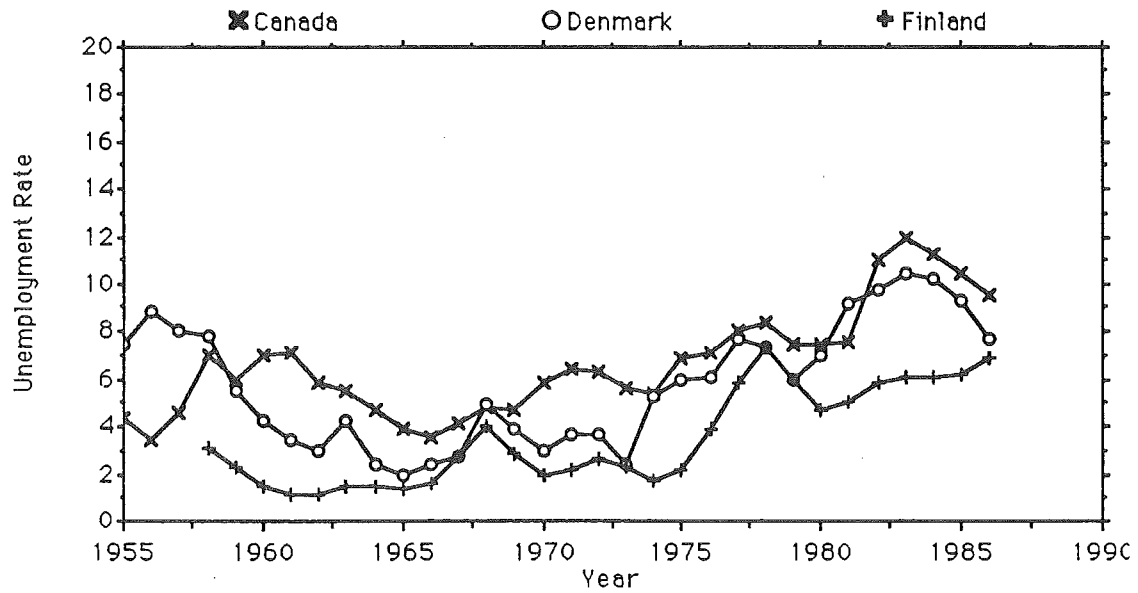
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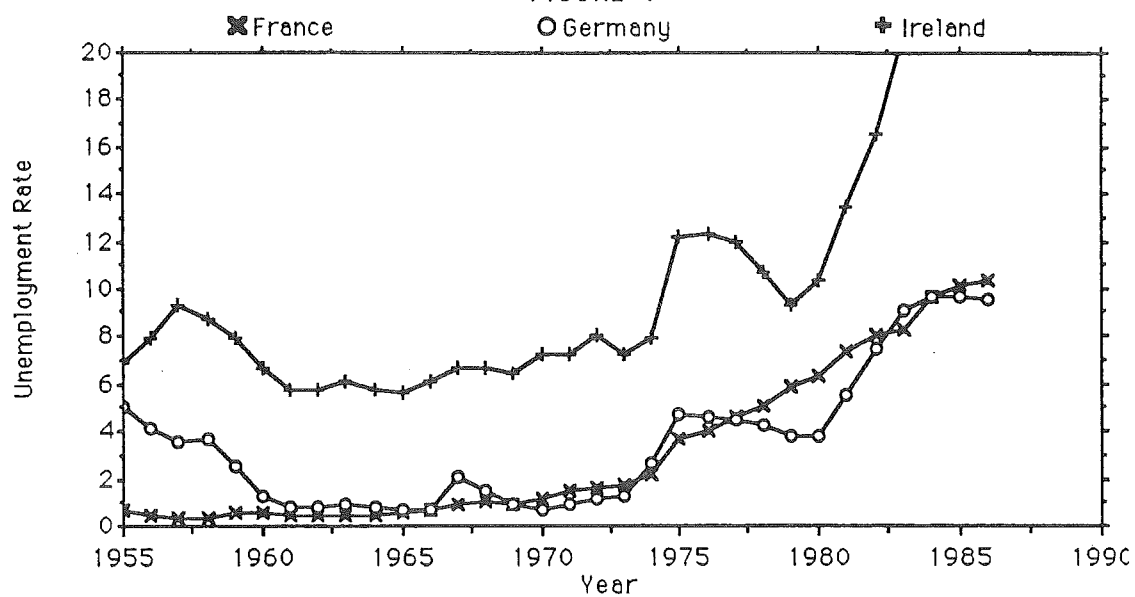
FIGURE 4
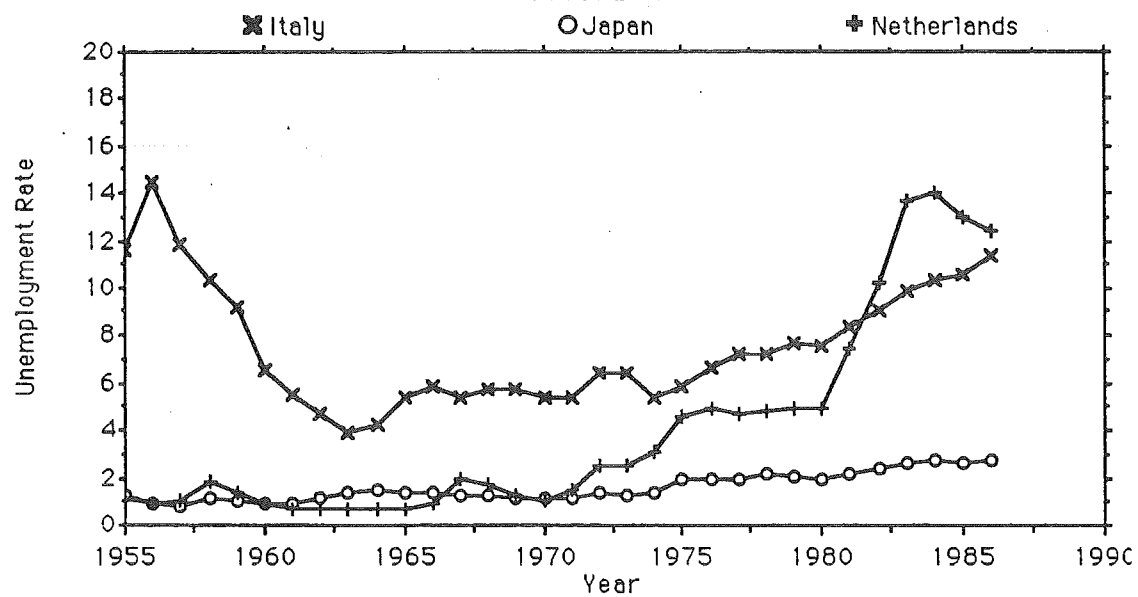
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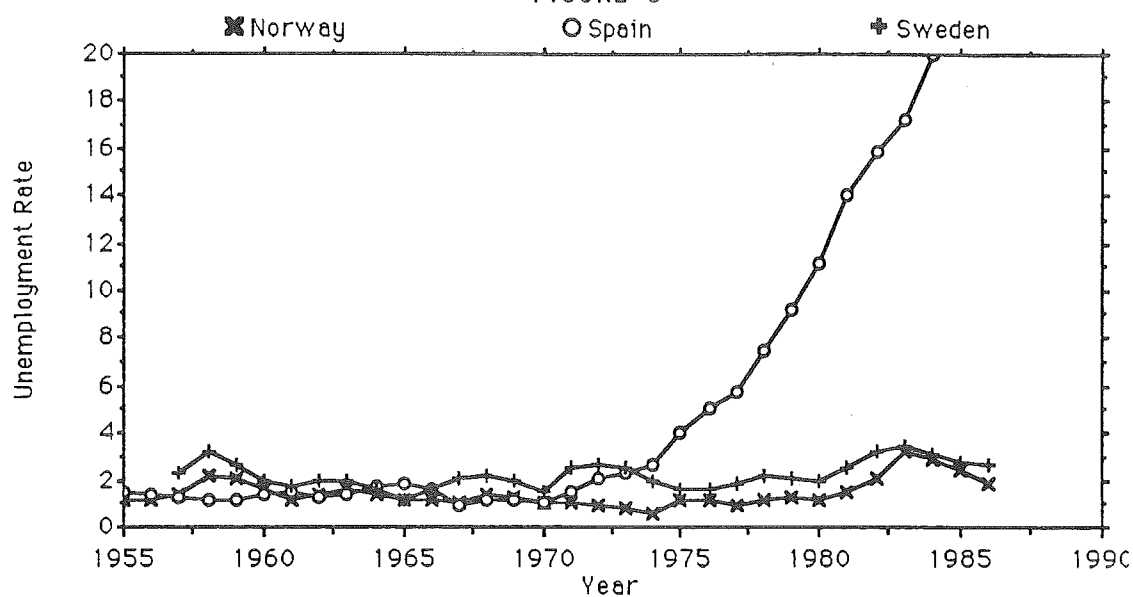
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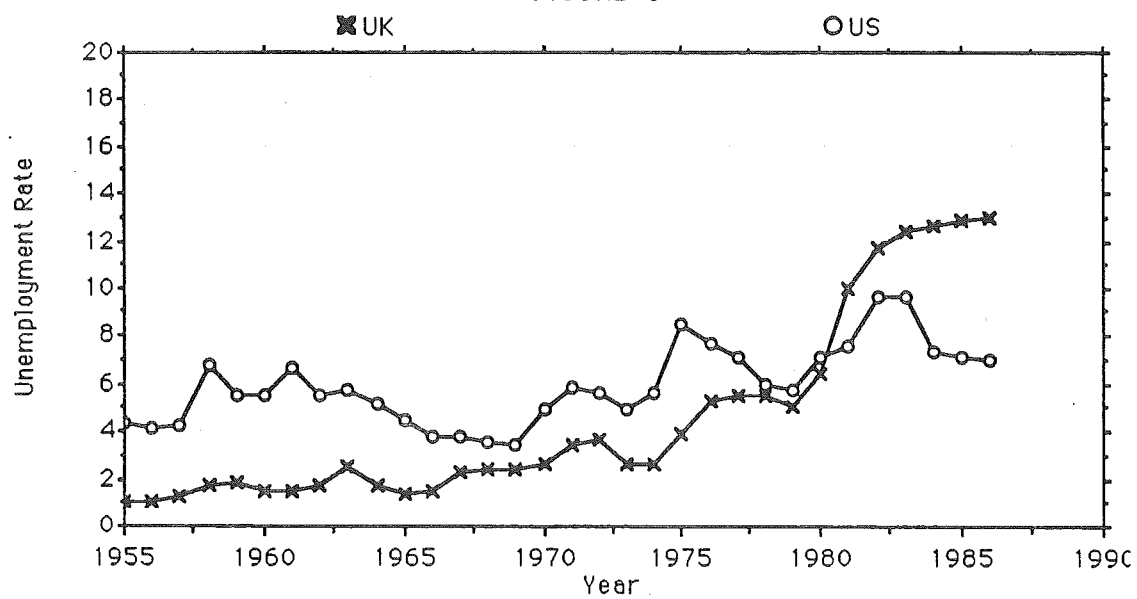
FIGURE 7: UNEMPLOYMENT AND THE PRICE LEVEL

U

$$U=L^*-\alpha(M/p^*) \quad AD$$

HH

p*

A
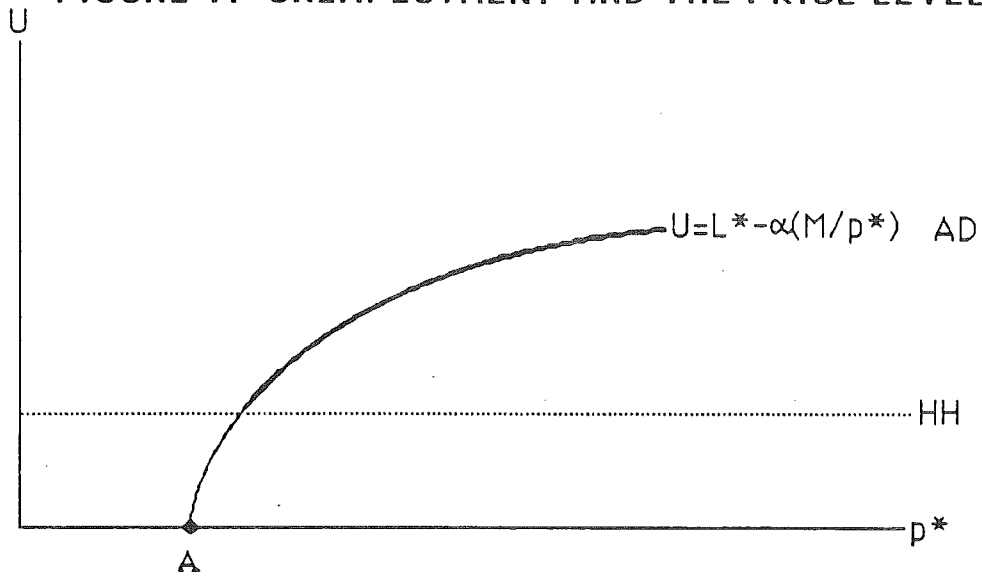
FIGURE 8: POSTERIOR DISTRIBUTION OF AUSTRIAN STRUCTURAL BREAK
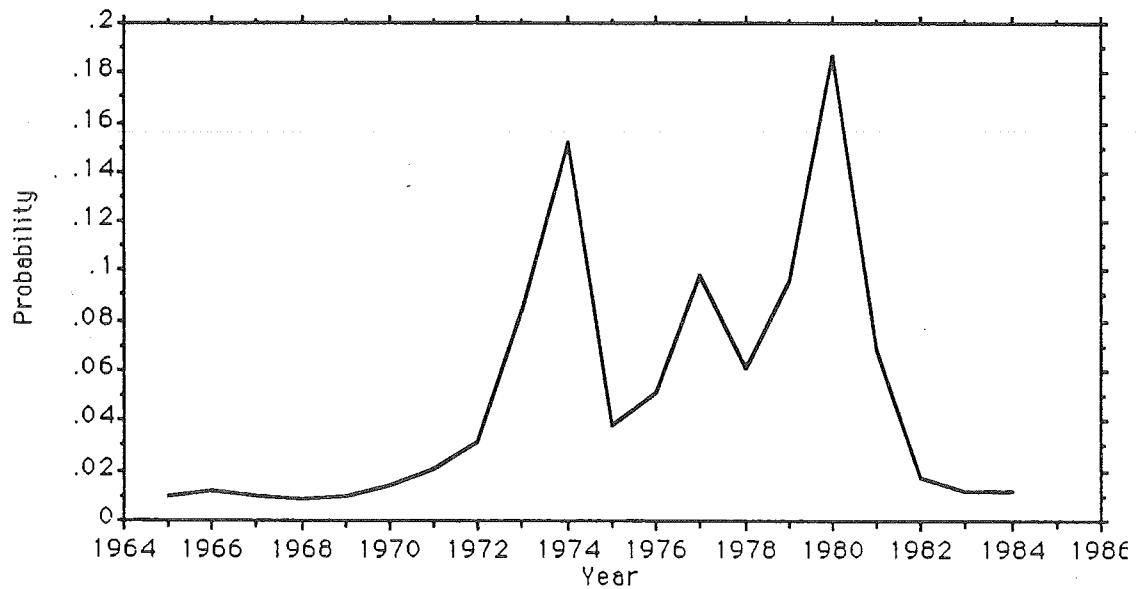
FIGURE 9: POSTERIOR DISTRIBUTION OF BELGIAN STRUCTURAL BREAK
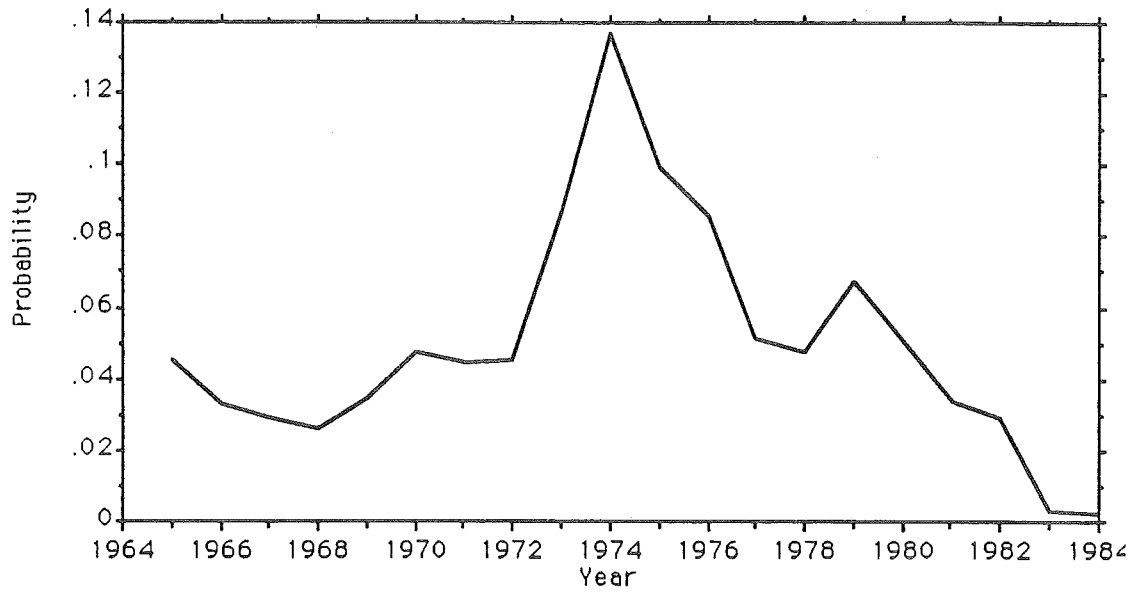
FIGURE 10: POSTERIOR DISTRIBUTION OF FINNISH STRUCTURAL BREAK
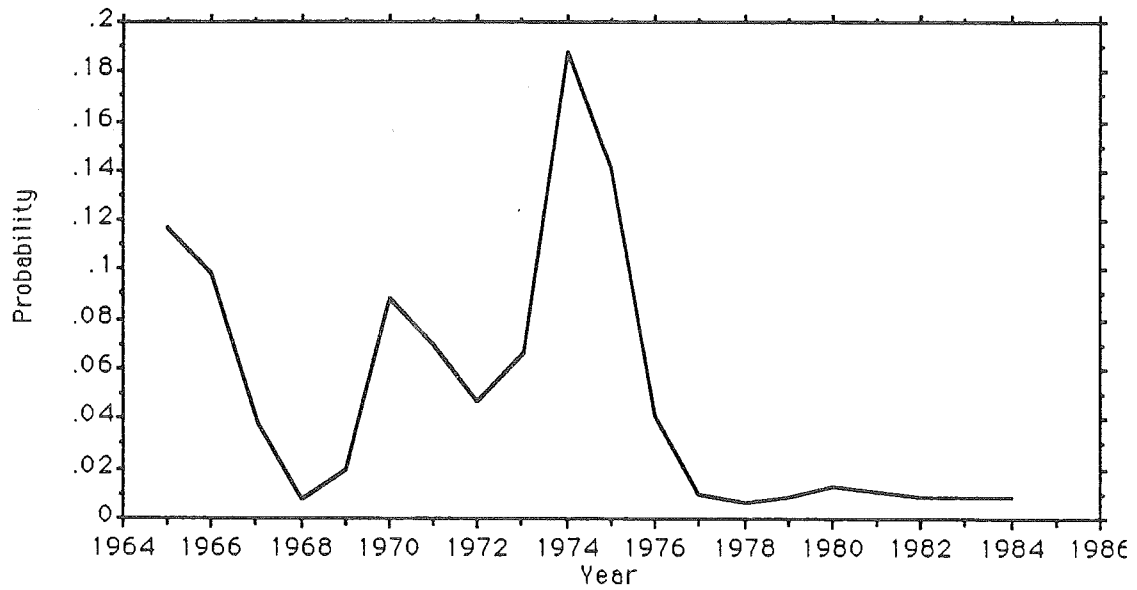
FIGURE 11: POSTERIOR DISTRIBUTION OF GERMAN STRUCTURAL BREAK
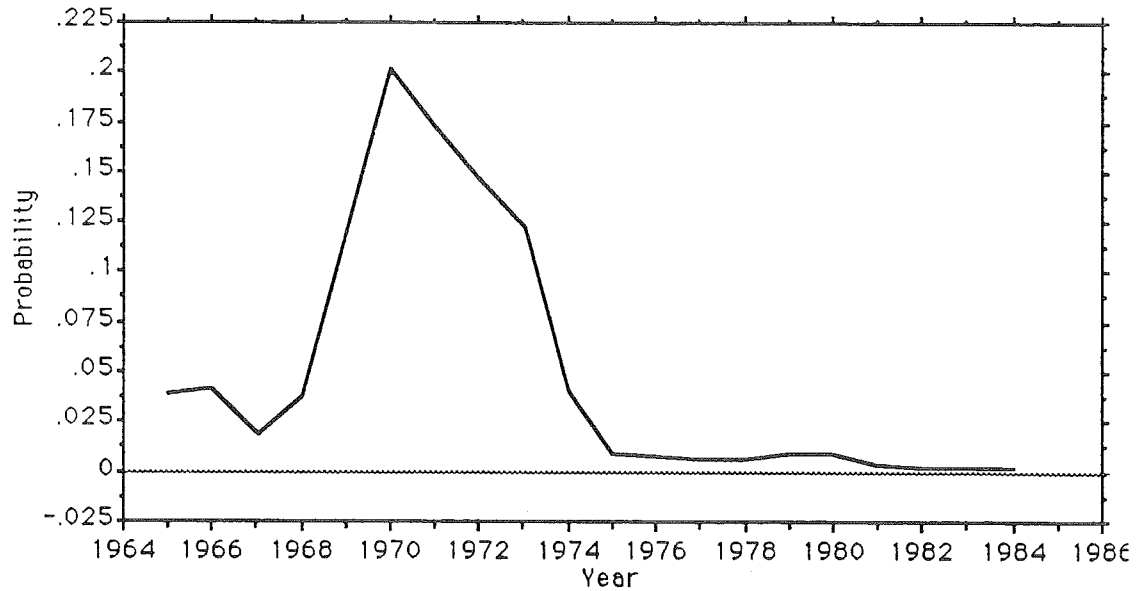
FIGURE 12: POSTERIOR DISTRIBUTION OF ITALIAN STRUCTURAL BREAK
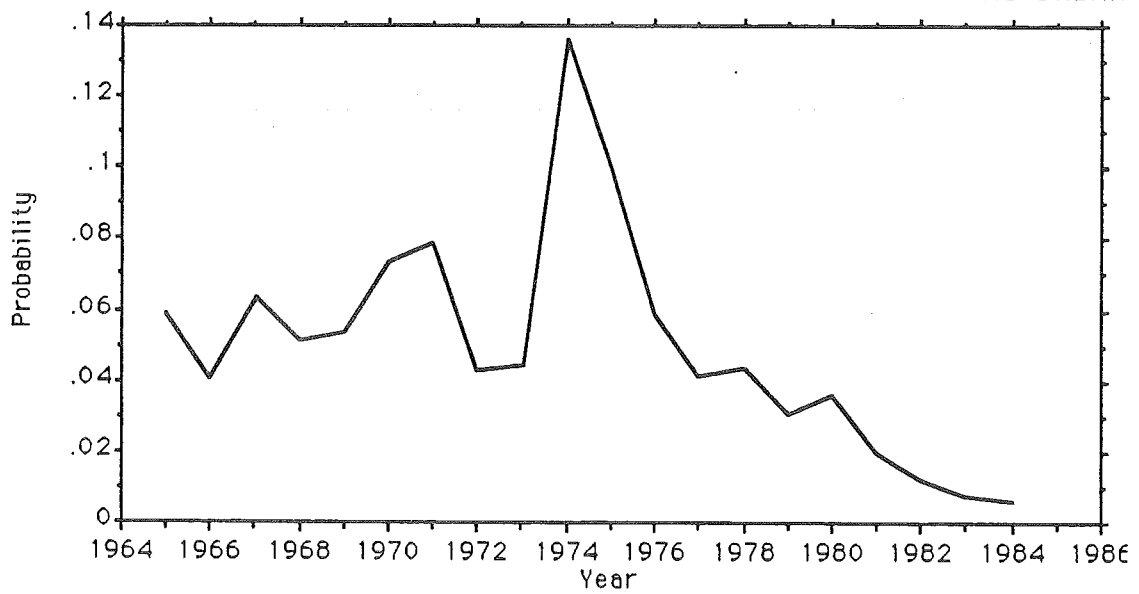
FIGURE 13:   POSTERIOR DISTRIBUTION OF JAPANESE STRUCTURAL BREAI
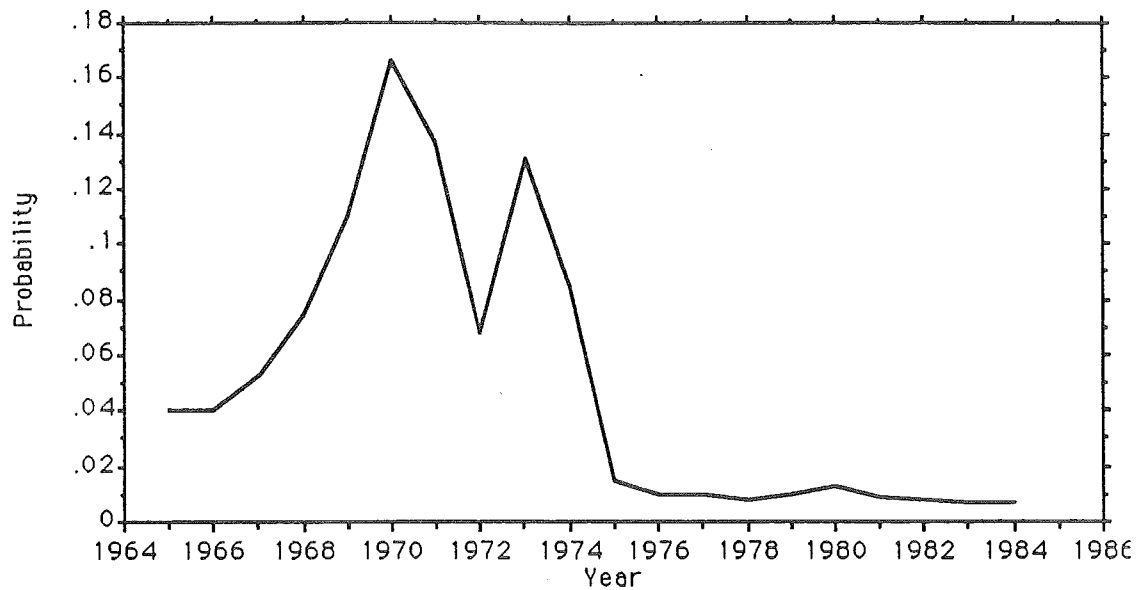
FIGURE 14:   POSTERIOR DISTRIBUTION OF SWEDISH STRUCTURAL BREAK
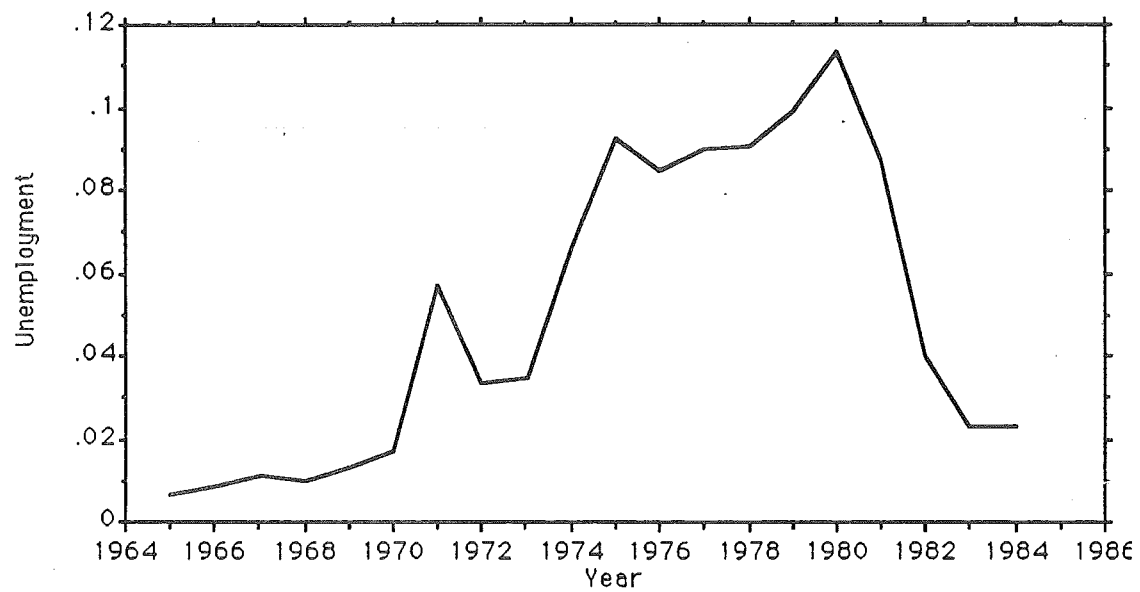
FIGURE 15: POSTERIOR DISTRIBUTION OF BRITISH STRUCTURAL BREAK
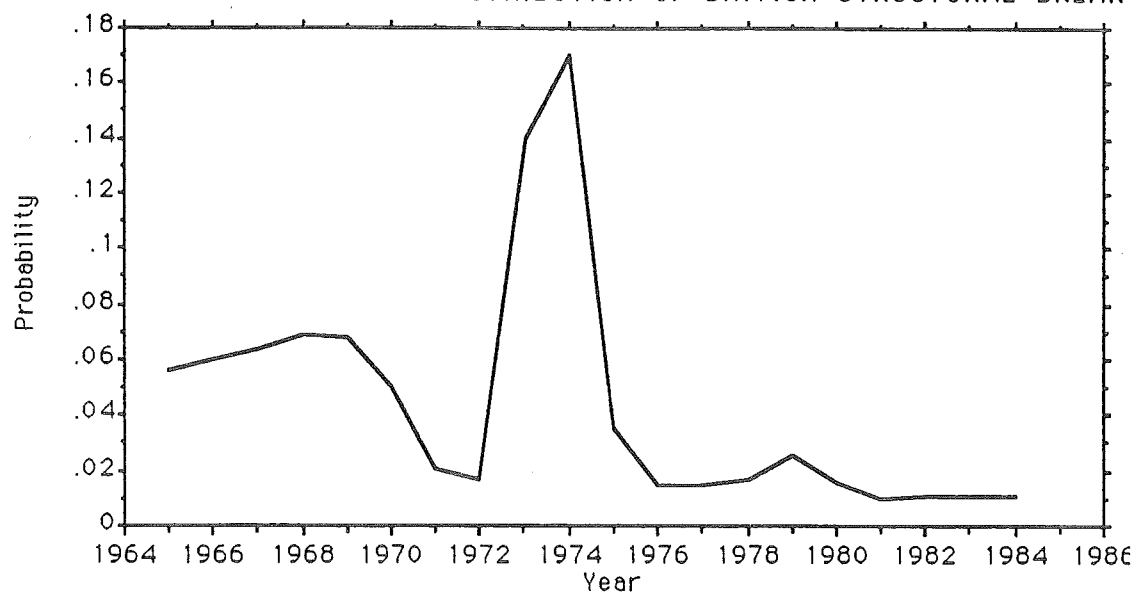
FIGURE 16: DETRENDED US OUTPUT
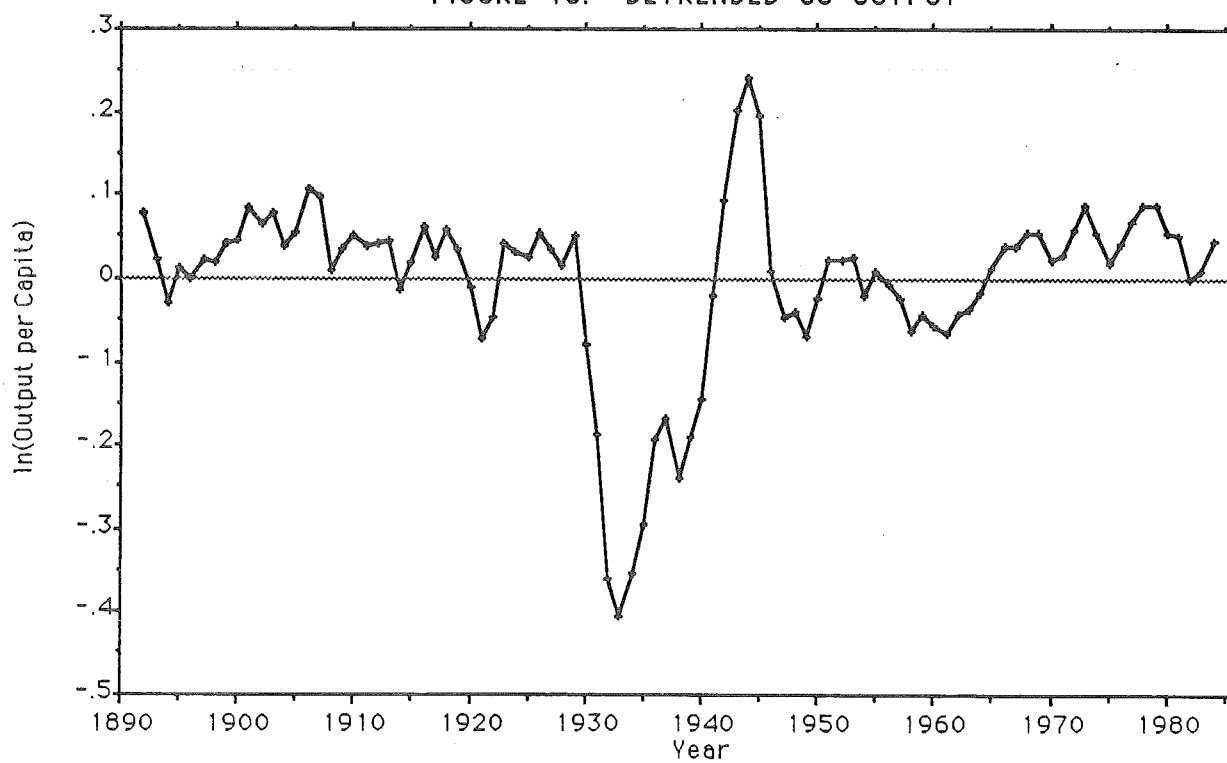
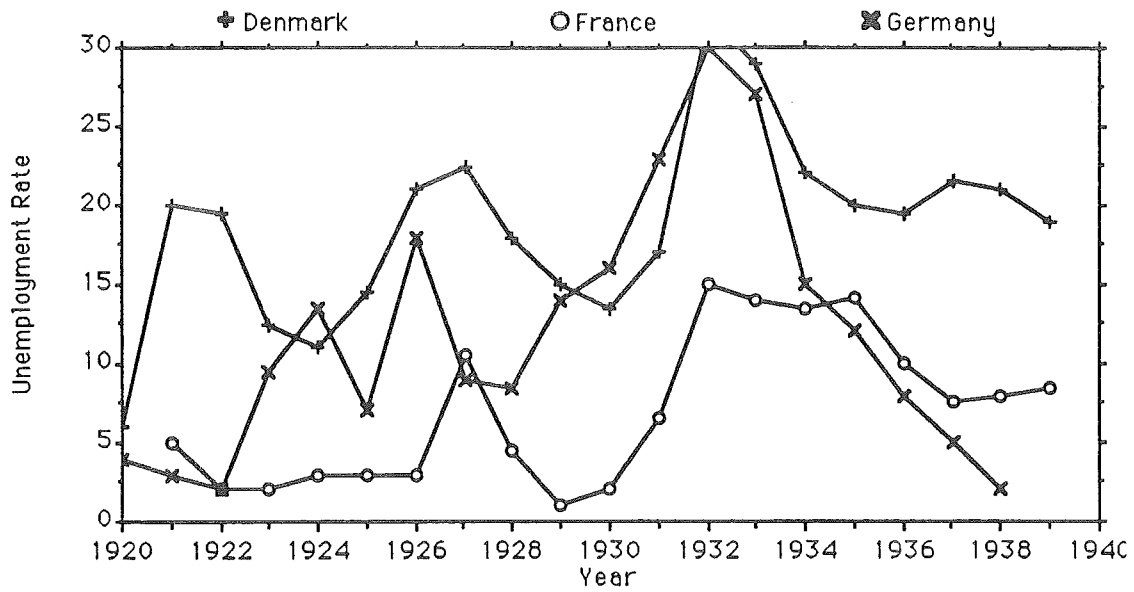FIGURE 17:   US STATE-DEPENDENT AUTOREGRESSIVE PARAMETER
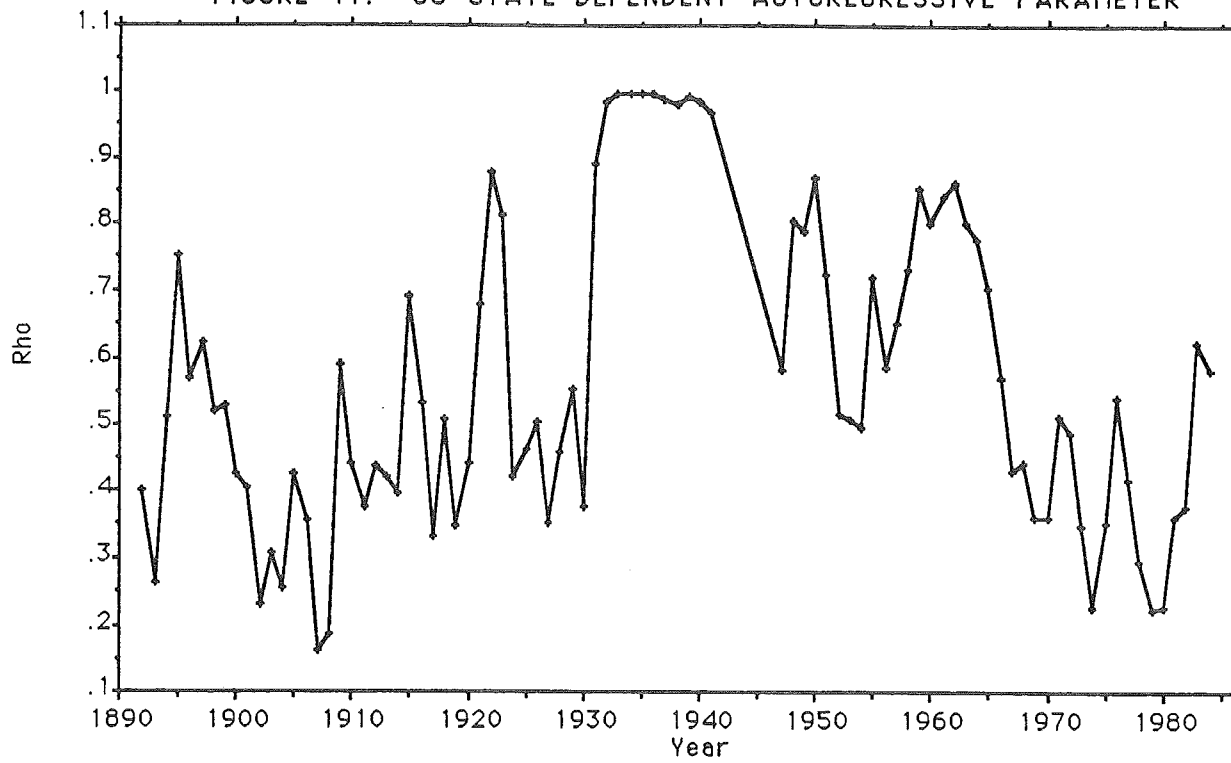
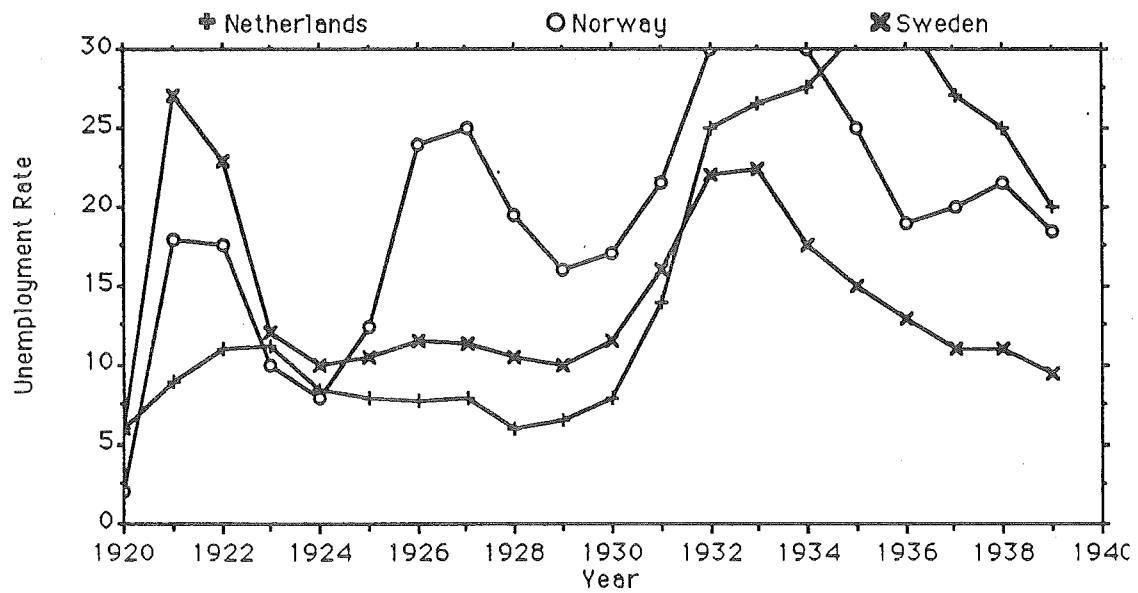FIGURE 18
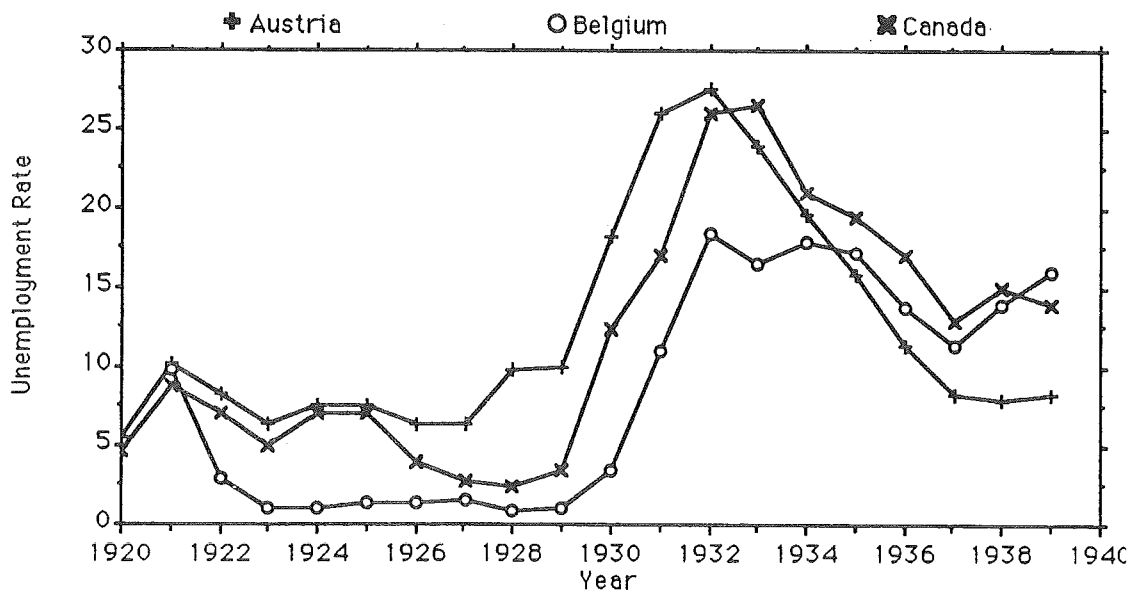
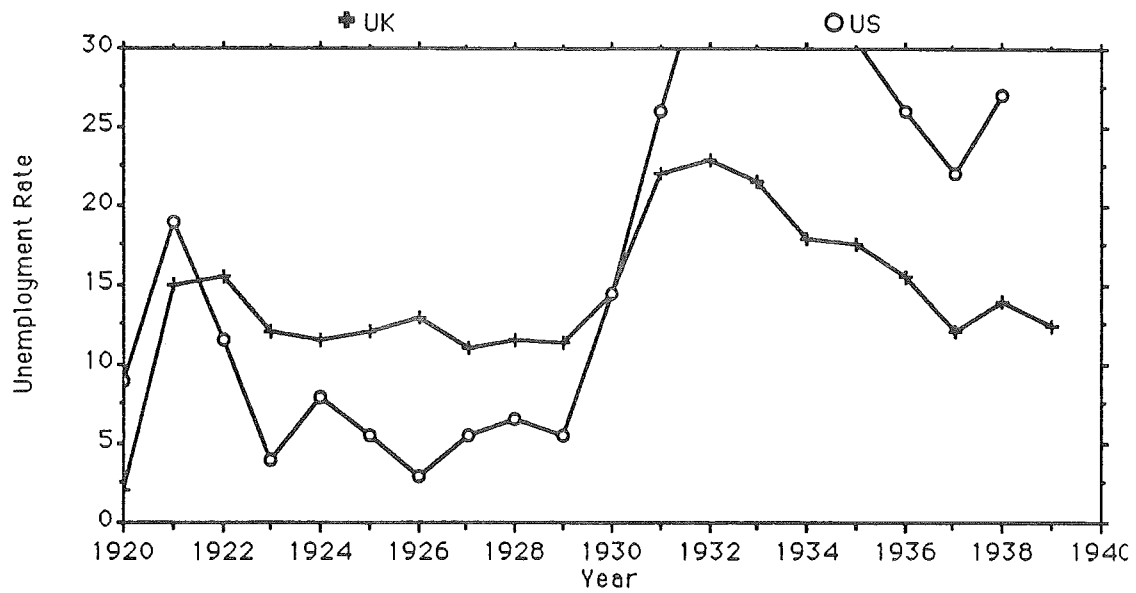FIGURE 19

FIGURE 20

FIGURE 21

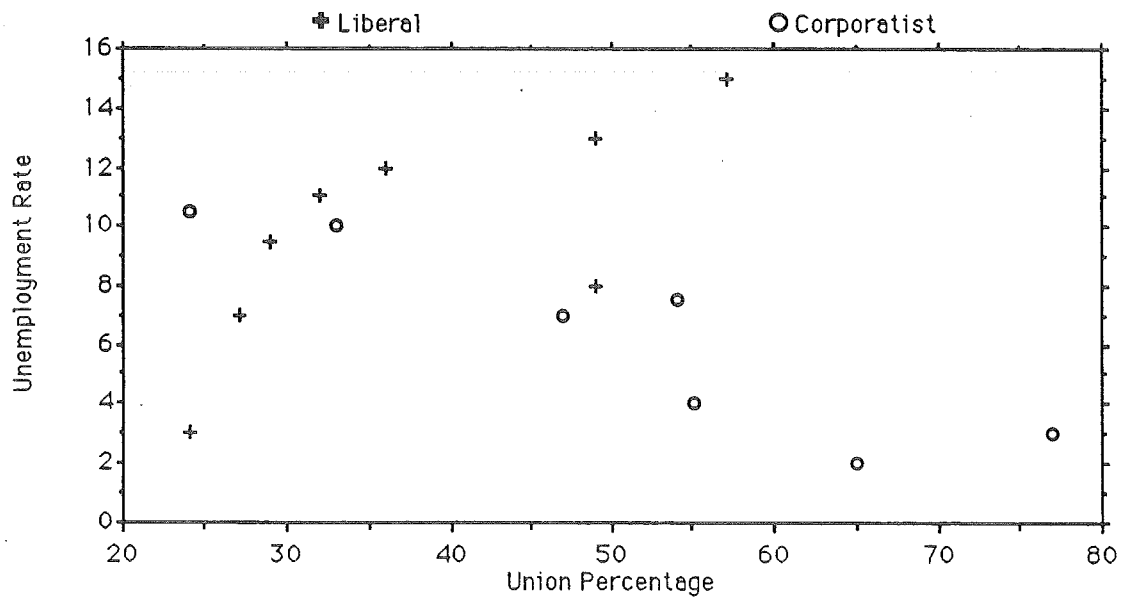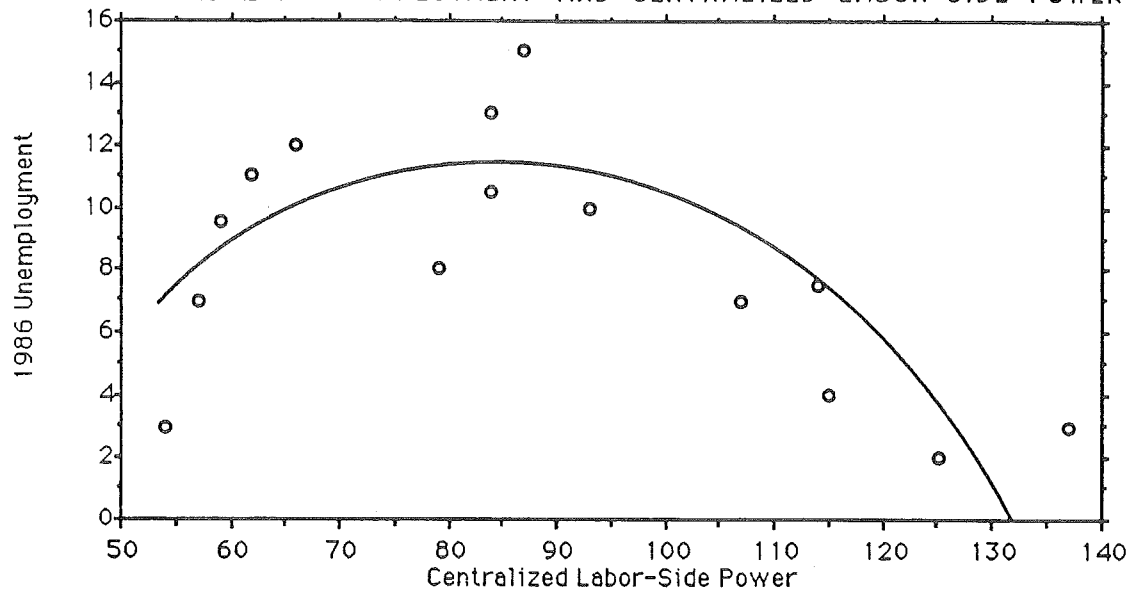FIGURE 22: UNIONIZATION AND UNEMPLOYMENT

FIGURE 23:   UNEMPLOYMENT AND CENTRALIZED LABOR-SIDE POWER

REFERENCES

Bentolila, S., and G. Bertola (1987), "Firing Costs and Labor Demand: How Bad Is Eurosclerosis?" (Cambridge, MA: MIT mimeo).

Berend, I. and K. Borchardt, eds. (1986), The Impact of the Great Depression of the 1930s and Its Relevance for the Contemporary World (Budapest: Karl Marx University of Economics).

Bertola, G. (1987), "Irreversible Investment" (Cambridge, MA: MIT mimeo).

Blanchard, O. and L. Summers (1986), "Hysteresis and the European Unemployment Problem," pp. 15-89 in S. Fischer, ed., NBER Macroeconomics Annual 1986 (Cambridge: MIT).

Blanchard, O. and L. Summers (1987), "Fiscal Increasing Returns, Hysteresis, Real Wages, and Unemployment," European Economic Review 31: 543-66.

Bronfenbrenner, M., ed. (1969), Is the Business Cycle Obsolete? (New York: Wiley).

Buchanan, J., and G. Tullock (1962), The Calculus of Consent: Economic Foundations of Constitutional Democracy (Ann Arbor: University of Michigan).

Bruno, M. and J. Sachs (1985), Economics of Worldwide Stagflation (Oxford: Basil Blackwell).

Bruno, M. (1986), "Aggregate Supply and Demand Factors in OECD Unemployment: An Update, in C. Bean, R. Layard, and S. Nickell, eds., The Rise in Unemployment (Oxford: Basil Blackwell).

Calmfors, L. and L. Driffill (1987), "Centralization of Wage Bargaining and Macroeconomic Performance" (Stockholm: Institute for International Economic Studies mimeo).

Campbell, J.Y. and N.G. Mankiw (1988), "Are Output Fluctuations Transitory?" Quarterly Journal of Economics.

Campbell, J.Y. and N.G. Mankiw (1987), "Permanent and Transitory Components in Macroeconomic Fluctuations" (Cambridge, MA: NBER mimeo).

Clark, K. and L. Summers (1982), "Labour Force Participation: Timing and Persistence," Review of Economic Studies 49: 825-44.

Coe, D.T. and F. Gagliardi (1985), "Nominal Wage Determination in Ten OECD Economies" (OECD mimeo).

Cross, R.B. (1987), "Hysteresis and the Instability of the Natural Rate of Unemployment," Scandinavian Journal of Economics 89: 71-89.

Crouch, C. (1985), "Conditions for Trade Union Restraint," in L. Lindberg and C. Maier, eds., The Politics of Inflation and Economic Stagnation (Washington: Brookings).

De Long, J.B. and L. Summers (1988), "Assessing Macroeconomic Performance: An Output Gap Approach" (forthcoming).

Dore, Ronald (1987), Taking Japan Seriously: A Confucian Perspective on Leading Economic Issues (Stanford: Stanford).

Drazen, A. and N. Gottfries (1987), "Seniority Rules and the Persistence of Unemployment in a Dynamic Optimizing Model" (Stockholm: Institute for International Economic Studies mimeo).

Eichengreen, B. and T. Hatton (1988), "Interwar Unemployment in International Perspective," forthcoming in B. Eichengreen and T. Hatton, Interwar Unemployment in International Perspective.

Fitoussi, J.P. and E.S. Phelps (1986), "Causes of the 1980's Slump in Europe," Brookings Papers on Economic Activity 1986, 2: 487-513.

Fitoussi, J.P. and K. Velupillai, "Growth Cycles in Distributive Shares, Output, and Unemployment," forthcoming in Observations et Diagnostics Economiques, Revue de l'OFCE.

Franz, W. (1987), "Hysteresis, Persistence, and the NAIRU: An Empirical Analysis for the Federal Republic of Germany," in R. Layard and L. Calmfors, eds., The Fight Against Unemployment (Cambridge, MA: MIT).

Freeman, Richard (1987), "The Impact of Labor Market Institutions and Constraints on Economic Performance" (Cambridge, MA: Harvard University mimeo).

Friedman, Milton (1968), "The Role of Monetary Policy," American Economic Review 58: 1-17.

Gordon, R. (1987), "Wage Gaps v. Output Gaps: Is There a Common Story for All of Europe?" (Cambridge, MA; NBER mimeo).

Gottfries, N. and H. Horn (1986), "Wage Formation and the Persistence of Unemployment" (Stockholm: Institute for International Economic Studies mimeo).

Gregory, R. (1986), "Wages Policy and Unemployment in Australia," in C. Bean, R. Layard, and S. Nickell, eds., The Rise in Unemployment (Oxford: Basil Blackwell).

Hall, R. (1986), "Comment on Blanchard and Summers," in S. Fischer, ed., NBER Macroeconomics Annual 1986 (Cambridge: MIT).

Hargreaves-Heap, S.P. (1980), "Choosing the Wrong 'Natural' Rate: Accelerating Inflation or Decelerating Employment and Growth?" Economic Journal 47: 247-83.

Hawley, E. (1967), The New Deal and the Problem of Monopoly (Princeton: Princeton).

Hazlitt, H., ed. (1961), The Critics of Keynesian Economics (New York).

Hirschman, A. (1974), Exit, Voice, and Loyalty (Cambridge, MA: Harvard).

Howitt, P. (1986), "The Keynesian Recovery," Canadian Journal of Economics 19: 625-41.

Keynes, J. M. (1937), "Avoiding a Slump," The Times (12 January 1937).

Kindleberger, Charles P. (1965), Europe's Postwar Growth (Cambridge, MA: Harvard).

Layard, R., and L. Calmfors, eds. (1987), The Fight Against

Unemployment (Cambridge, MA: MIT).

Leijonhufvud, A. (1968), On Keynesian Economics and the Economics of Keynes (Cambridge, UK: Cambridge).

Leijonhufvud, A. (1973), "Effective Demand Failures," Scandinavian Journal of Economics 75,1: 27-48.

Lindbeck, A. (1985), "What Is Wrong with the West European Economies?" The World Economy 8: 153-70.

Lindbeck, A. and D. Snower (1986), "Wage Setting, Unemployment, and Insider-Outsider Relations," American Economic Review 76:.

Lindbeck, A. and D. Snower (1987), "Union Activity, Unemployment Persistence, and Wage-Employment Ratchets," European Economic Review 31:.

Lucas, R. (1976), "Econometric Policy Evaluation: A Critique," in K. Brunner and A. Meltzer, eds., The Phillips Curve and Labor Markets, Carnegie-Rochester Conference series 1: 19-46.

Maier, C. (1976), Recasting Bourgeois Europe (Princeton: Princeton).

Mitchell, B.R. (1975), European Historical Statistics (London: Macmillan).

Modigliani, Franco et al. (1987), "Capital Constraints on European Growth," in Richard Layard and Lars Calmfors, eds., The Fight Against Unemployment (London: CEPS).

Nelson, R. and C. Plosser (1982), "Trends and Random Walks in Economic Time Series: Some Evidence and Implications," Journal of Monetary Economics 10: 139-62.

Olson, M. (1982), The Rise and Decline of Nations (New Haven: Yale).

Olson, M. (1986a), "Maintaining a Healthy Business Climate: A broader Perspective on the Rates of Economic Growth and Unemployment in the Southern and Southwestern States," Federal Reserve Bank of Dallas Review.

Olson, M. (1986b), "A Theory of the Incentives Facing Political

Organizations: Neo-Corporatism and the Hegemonic State,"
International Political Science Review 7: 165-89.

Phelps, E.S. (1972), Inflation Policy and Unemployment Theory
(London: Macmillan).

Romanis, C. (1967), "Cost Inflation and Incomes Policy in Industrial
Countries," IMF Staff Papers 14: 169-209.

Romer, C. (1986), "Spurious Volatility in Historical Unemployment
Data," Journal of Political Economy 94: 1-37.

Romer, C. (1987), "New Estimates of Real GNP, 1869-1913"
(Cambridge, MA: NBER xerox).

Rustem, B. and K. Velupillai (1980), "On the Definition and Detection
of Structural Change," in M. Hoffman, ed., Stochastic Differential
Equations and Optimal Control Theory (Springer-Verlag).

Sachs, J. (1987), "High Unemployment in Europe: Diagnosis and Policy
Implications," in C-H Siven, ed., Unemployment in Europe: Analysis
and Policy Issues (Stockholm: Timbro).

Sachs, J. and B. Eichengreen (1985), "Exchange Rates and Economic
Recovery in the 1930s,"Journal of Economic History.

Sachs, J. and C. Wyplosz (1985), "The Economic Consequences of
President Mitterand," Economic Policy 2: 262-322.

Stock, J. (1987), "Measuring Business Cycle Time," Journal of
Political Economy 95: 1240-61.

Symons, J.S.V. (1987), "Comments on Blanchard and Summers,"
European Economic Review 31: 560-4.

Watson, M. (1986), "Univariate Detrending Methods with Stochastic
Trends," Journal of Monetary Economics 18: 1-27.

Yoshitomi, M. (1987), "Comments on Blanchard and Summers,"
European Economic Review 31: 564-6.