How Natural Is the Natural Rate of Unemployment in Europe?

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High unemployment has been the dominant economic policy issue in Europe over the last decade. The dispute centers on the nature and causes of unemployment in general. On the one hand, neoclassical economists argue that flexible prices clear markets, making all unemployment voluntary. In this view, traditional macroeconomic remedies would increase wages and prices, not decrease unemployment; only government policies that reduce the costs of labor to employers, like lower social security contributions or wage subsidies, would successfully increase employment. In contrast, Keynesian economists attribute high unemployment to a deficiency in the demand for labor. The solution, from this perspective, is to expand demand with conventional macroeconomic policies. Although each side in the debate possesses impressive theoretical models to support its view, ultimately the dispute must be settled empirically. This article reviews the most general and compelling empirical literature on the European problem. The initial work clearly recommends a neoclassical policy approach to increase employment. Yet evidence from the latter part of the decade is shown to contradict this dominant interpretation, suggesting that insufficient aggregate demand is the source of the European unemployment.
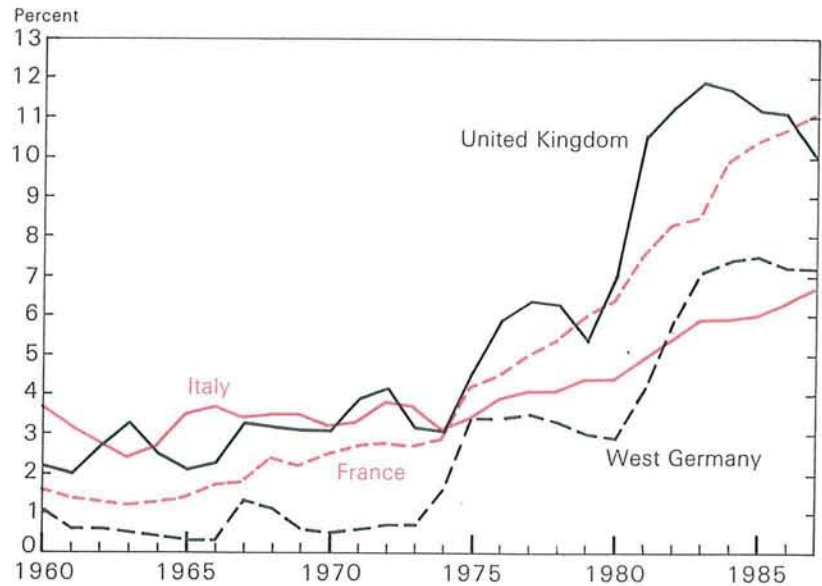
Chart 1 illustrates the unemployment problem in the four major European economies. In all of these countries the percentage of the work force unable to find a job has roughly doubled over the last ten years and doubled to quintupled since the first oil shock. In contrast, aside from cyclical swings, unemployment in the United States has remained roughly constant over the same time period. Furthermore, while cyclical variation has been large in the United States, chart 1 reveals the lasting duration of the European problem. The persistence of these unemployment rates over the last ten years must be explained in any complete analysis of the data. Such a study requires an examination of the factors that determine both labor demand and labor supply. It is necessary, therefore, to empirically identify these variables, examine

Chart 1

European Unemployment Rates, 1960-87

how they have changed, and test whether their movements have been sufficient to explain unemployment of the magnitude witnessed in Europe over the last nine years. Once the origin of the problem has been identified, the optimal direction of policy can be selected.

I. Characterizing Unemployment

To appreciate the policy debate, as well as the empirical research, requires an understanding of the theory. A simple labor supply–labor demand diagram can be used to illustrate each side of this dispute.

Classical Unemployment

In figure 1 labor demand, L_0^D, is a downward-sloping function of the real wage, represented by w. The position of this curve depends on the technology of the firm as growth in labor productivity, for example, shifts the schedule outward and increases the amount of labor demanded at each real wage. The supply of labor, on the other hand, is an upward sloping function of w; a rise in real hourly compensation increases the opportunity cost of leisure,

which induces people to work or to work longer. A shift up in the labor supply curve is the traditional neoclassical explanation for a decrease in employment.[1] In figure 1 the economy begins at full employment, L_{FE}, with the real wage equal to the full employment real wage, w_{FE}. A labor supply shift, from L_0^s to L_1^s, results in a rise in the real wage and a decline in employment. In broad terms, European government officials analyzed the decline in their employment growth precisely in this neoclassical context. As a result, the manipulation of traditional instruments of aggregate demand management was not perceived as a viable solution to their problem.

Although shifts in the labor supply curve could account for a decrease in employment, other aspects of the data cannot be explained by figure 1. At w', L_1 labor supply equals labor demand. This movement in labor supply does not produce an excess supply of labor; therefore, the unemployment rate in Europe should not increase. This conclusion is clearly contradicted by the evidence in chart 1. The above analysis also offers no explanation as to why labor supply suddenly and simultaneously decreased in every country in Europe, yet remained constant in the United States and Japan. Overlooking these two facts could seriously distort the policy selection. The exist-

ence of unemployment implies that government policy predicated on the belief that the labor supply had merely shifted would be inadequate; any policy that solely attempts to increase the supply of labor would be insufficient to attain full employment. Furthermore, even if the decline in employment were simply caused by movement in the labor supply curve, failing to understand the causes of that movement provides little information on how to reverse it, or whether it should be reversed at all. A policy of government inaction could not be defended using this simple analysis.

Several recent theoretical papers have attempted to reconcile the neoclassical model with the European data.[2] They argue that the labor supply curve is not only unstable but depends on past employment. Specifically, their story goes, the oil price shocks of the middle and late 1970s decreased the demand for labor by reducing labor productivity. Along with the assumption of rigid real wages, this decline in labor demand produced short-run unemployment. As unemployment rose, union membership declined. Since it is assumed that unions do not care about their ex-members, this fall in union membership increases the real wage offered to the firm as the monopoly union need not worry about employing as many workers. In short, the real wage rose because union labor supply decreased. Even after real oil prices plummeted in the mid-1980s and increased labor demand to its previous level, the union maintained these high real wages to benefit its lower membership. As shown in figure 1, the decrease in union membership shifts the labor supply curve relevant to the firm, the supply of union labor, to L_1^s, increasing

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One strength of the insider theory is its ability to predict the different unemployment experiences in the United States and Europe.

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the real wage to w' and decreasing employment to L_1. Unemployment equal to $L^* - L_1$ results because the total labor supply in the economy, represented by L_0^s, includes both union and nonunion workers. Although the assumptions of the model are essen-

Figure 1
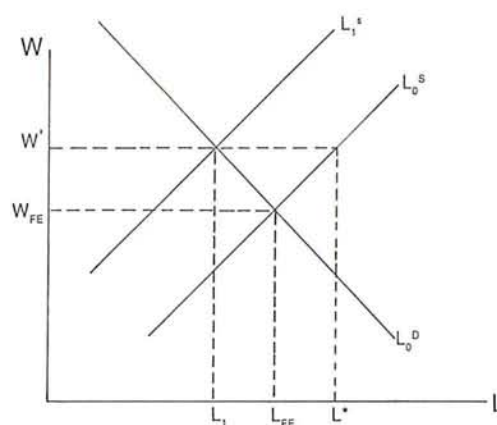
tially neoclassical, unemployment and its persistence are possible. The excess supply of labor does not drive down the wage as unions are both too powerful and too plentiful. Because this theory so vitally depends on the power of those workers currently "inside" the union, it will simply be referred to as the insider version of the neoclassical explanation.

The insider theory also offers an explanation for the divergent experiences of the United States and Europe. Union power can explain the persistence of high real wages as well as the different reactions of Europe and the United States to the oil shocks of the 1970s. Unionization rates are extremely high in Europe. Furthermore, European union and nonunion wages tend to move in unison. In this respect, the insider theory seems to fit the European data well. In the United States, on the other hand, much lower unionization rates prevent changes in membership size from significantly affecting the equilibrium wage, and the lack of a strong positive link between union and nonunion wages allows the nonunion sector to absorb any unemployed union members. One strength of the insider theory is its ability to predict the different unemployment experiences in the United States and Europe.
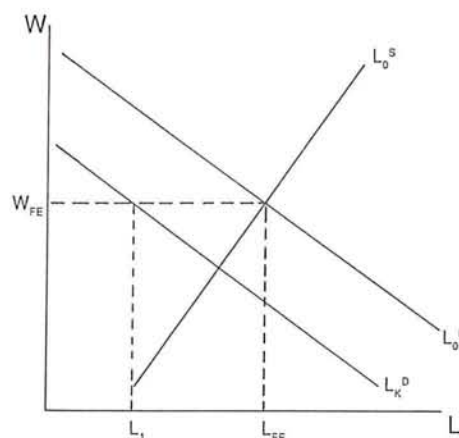
If the insider theory accurately describes the source of the unemployment in Europe, a fairly specific policy program can be adopted to alleviate the problem. As the decline in labor supply originates from union behavior, policy prescriptions aimed at

directly affecting union actions could be effective. Besides the direct subsidization of employment, one approach the government could take is to lessen union control over both the union and the nonunion wage. Encouraging management to stand firm against union demands would help reduce union power over its own wage. Alternatively, unions could be restricted in their ability to cut nonworking members from their membership rolls, which might temper real wage demands. Yet the success of such policies is not promising, as government control over these variables is tenuous. Even so, the Thatcher government has clearly attempted to decrease union power in Britain, enduring the endless strike by coal miners, for example, while the West German government seems content to tolerate whatever unemployment rate is necessary to bring the nonunion wage down.

Keynesian Unemployment

Keynesians, on the other hand, explain unemployment with shifts in labor demand, not labor supply. They argue that a reduction in aggregate demand reduces the demand for labor given the real wage. Many variations of the basic Keynesian model, assuming either perfect or imperfect competition and flexible or inflexible prices, can explain this decrease in labor demand.[3] For example, if it is assumed that the firm is constrained in the amount of output it can sell when aggregate demand is low, labor demand becomes a function of both the productivity of labor and the level of aggregate demand. Such an economy is portrayed in figure 2. As aggregate demand declines, the labor demand curve shifts down to L_K^D. At

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Different aggregate demand policies can explain the divergent United States and European unemployment experiences.

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the constant real wage equilibrium employment falls to L_1.[4] The new employment level is identical in figures 1 and 2, although the reasons for its decline are much different. As in the insider case, unemployment results, this time equal to $L_{FE} - L_1$, but the optimal policy to eliminate it changes.

Figure 2

Traditional macroeconomic instruments can effectively reduce Keynesian unemployment. More expansionary fiscal or monetary policy raises aggregate demand, shifts the labor demand curve back to its original level, and removes the excess supply of labor. This increase in employment does not aggravate inflation because the unemployed labor is willing to work at the going wage; firms need not raise wages to attract new workers. In fact, different aggregate demand policies can explain the divergent United States and European unemployment experiences. In the early 1980s, European and United States government officials reacted much differently to the worldwide recession. A huge fiscal expansion in the United States, powered by large tax cuts and a defense spending boom, along with a loosening of monetary policy after 1982 quickly moved the country toward full employment. The persistence of the European recession can be explained by government reluctance to increase aggregate demand sufficiently. The Keynesians can, therefore, explain the simultaneous increase in European unemployment and the divergent experiences of the United States and Europe; the explanation hinges on the proclivity of officials in each region to utilize the policy instruments that successfully alleviate unemployment.

Since both the insider and the Keynesian theories are consistent with at least a cursory examination of the data, the choice of the proper policy is unclear. An empirical test must be derived that can reveal

which theory explains the current European unemployment. Although unemployment occurs in both models, the two explanations can be distinguished by their different predictions about the real wage.[5] If the current real wage is greater than w_{FE}, as in the insider version of the neoclassical framework, the government should attempt to decrease whatever impediments exist to real wage flexibility; it should reduce

An empirical test must be derived that can distinguish which theory explains the current European unemployment.

union power and attempt to uncouple union and nonunion wages. If the real wage is currently at or near its full employment level, as in the Keynesian case, then the preferred policy would involve either expansionary fiscal or monetary action. Since the relationship of the current real wage to the full employment real wage signals the optimal policy, the empirical work in this area has exclusively examined European real wages.

II. The Methodology

The empirical approach taken in this article follows the efforts of several authors.[6] This paper's initial work updates the results, and parallels the methodology, of Bruno and Sachs (1985) and Bruno (1986), studies that most strongly support the insider explanation; thus, if the conclusions are at all biased, it is toward the neoclassical diagnosis. The essence of the empirical debate is illustrated in the previous two figures; whether unemployment is classical or Keynesian depends on whether the real wage that would produce full employment given perfect price flexibility, w_{FE}, is lower than the real wage actually occurring in these European countries, w'. The difference between the actual real wage and w_{FE} is defined as the real wage gap and is positive (negative) when actual real wages are above (below) their full employment level. If the real wage gap is greater than zero, then unemployment would be consistent with the insider theory. If no wage gap is present, however, only a Keynesian exegesis is possible. To

begin the empirical analysis, the value of w_{FE} must be established. Unfortunately w_{FE} cannot be directly observed so the value of the real wage gap is estimated. Once the wage gap has been produced, the sensitivity of employment to the real wage must be quantified in order to determine whether any increase in the real wage gap has been sufficient to explain employment movements of the order experienced in Europe over the last decade.

The full employment real wage depends on both labor demand and labor supply. The demand for labor derives from the firm's production process. In equation (1) labor, capital, and other inputs are used to manufacture output, Q.

(1) $Q = F(K, L, \ldots)$ where K = capital L = labor

In the short run, capital is assumed fixed. When firms maximize profits, they hire labor up to the point where the cost of the last hour of labor hired is equal to the return to the firm that results from that one hour increase in labor input. In perfect competition, this cost is the nominal hourly wage, W, and the return is the price of the output, P, times the number of units of output that hour of labor produces, the marginal product of labor or the MPL. This condition for firm profit maximization is given in equation (2), where $(\partial Q/\partial L)$ = MPL.

(2) $P*(\partial Q/\partial L) = W$ or $\partial Q/\partial L = W/P$

Alternatively, profit maximization requires firms to continue to hire labor until the MPL equals the real wage, as shown in the second part of (2).[7] This description of firm behavior is essential to the empirical derivation of the real wage gap, as the w_{FE} is now linked to a variable that is more readily available from the data. Substituting the labor supply at full employment into equation (2) and finding the full employment MPL, produces the full employment real wage.

(3) $$w_{FE} = (W/P)_{FE} = \frac{\partial Q(K, L_{FE} \ldots)}{\partial L}$$

Since this expression depends on the production function, a brief examination of the technology of the firm is needed to complete the derivation of w_{FE}.

Without knowing the exact production function of the firm, finding the full employment MPL would be impossible. However, for a broad classification of technologies, the average product of labor, the APL, is an appropriate surrogate for the marginal product.[8]

The APL is easily obtained from the data; one need only divide real output by total hours employed. Yet, the APL only measures the realized APL, regardless of the economy's position along the business cycle. Since peak years generally indicate full employment, however, it is assumed that the realized APL in those years coincides with the full employment APL. Thus, as shown in equation (3), the full employment real wage is defined as the full employment APL. To remain consistent with the previous literature, the peak years chosen are 1960, 1973, and 1979. The w_{FE} between these years is assumed to change at a constant rate; any technological innovations and labor force compositional effects embedded in this measure are smoothly and constantly incorporated into the w_{FE}. Note that by choosing three peak years, growth rates of the w_{FE} between the 1960–74, the 1975–79, and the 1980–87 periods are allowed to differ. This divergence is desirable as empirical work has conclusively shown a slowdown in labor productivity growth since 1974. Finally, since no European country has come close to a peak year in the 1980s, the w_{FE} after 1979 is constructed using a simple average of the previous two historical rates.

A rigorous examination of the forces shifting the labor supply curve would complicate this approach. Although attempts have been made to include this analysis, the methodology in this area is suspect.[9] Therefore, the real wage gap is obtained by subtracting the full employment average product in any one year from the real wage realized in that year while normalizing this series to zero over the relatively stable years of 1965 to 1969.[10] The actual real wage utilized in this analysis is the gross hourly labor compensation costs in manufacturing deflated by the product price. This study uses only manufacturing data because the assumption of perfect competition is more likely to hold in the more competitive traded goods sector, the marginal product is so clearly defined in manufacturing, and the data in this sector are readily available for all countries.

The results of this procedure for France, West Germany, Italy, the United Kingdom, and the United States are given in table 1. Not only are the first four countries the largest economies in Europe, but also they have suffered huge unemployment increases throughout the 1980s. The United States is included only for the sake of comparison, as our unemployment rate began falling after 1982. As previous research indicates, the above measure of the European real wage gap rose over the 1970s and early 1980s. In fact, every European country, except for Italy, had

Table 1
Real Wage Gaps for Selected Countries, 1965–87
Percent

Year	France	West Germany	United Kingdom	Italy	United States
1965	−1.5	−2.8	2.2	.33	.83
1969	.48	4.4	−1.2	2.5	.22
1973	3.1	10.1	8.3	10.6	3.3
1975	8.3	12.7	13.6	14.8	.10
1979	13.4	14.9	23.0	9.2	6.7
1981	12.7	14.3	26.1	−3.1	5.8
1982	13.7	9.0	26.3	−2.9	6.7
1985	1.6	2.1	22.9	−6.0	10.4
1986	−6.1	−5.5	23.9	−13.4	11.0
1987	−11.0	−9.4	26.0	−15.0	9.4

excessive real wages through the early 1980s. In contrast, through 1981 the real wage in the United States showed no comparable increase, which could explain that country's different economic performance. Based upon the data through 1982, European policymakers appeared to be correct in their assessment that the unemployment problem could not be helped by an increase in aggregate demand. The actual real wage was clearly greater than w_{FE}, signifying that European firms were too high on the full employment labor demand curve, not on a labor demand schedule that had shifted in. The evidence through 1982, therefore, seemed to reinforce the European policymakers' decision to refrain from expansive aggregate demand policy.

The most recent data, however, do not support that policy decision. Although this study exactly replicates the methodology in the major research that supports the insider view, the real wage gap in the later part of the decade has plummeted in three of the four European countries examined in this article. In Italy, France, and West Germany this decline has been well over 20 percent, more than reversing the original increase. If the insider version of the neoclassical analysis is correct, all things being equal, the unemployment problem in Europe should be significantly corrected by now. Charts 2 to 5 plot the co-movement of the real wage and the unemployment rate for each of the European countries studied. Before the 1980s the real wage gap tended to move with the unemployment

Unemployment Rate and Real Wage Gap

Chart 2

West Germany

Unemployment Rate (percent) — Real Wage Gap (log)

Real Wage Gap

Unemployment Rate

Year

Chart 3

France

Unemployment Rate (percent) — Real Wage Gap (log)

Real Wage Gap

Unemployment Rate

Year

Chart 4

United Kingdom

Unemployment Rate (percent) — Real Wage Gap (log)

Real Wage Gap

Unemployment Rate

Year

Chart 5

Italy

Unemployment Rate (percent) — Real Wage Gap (log)

Real Wage Gap

Unemployment Rate

Year
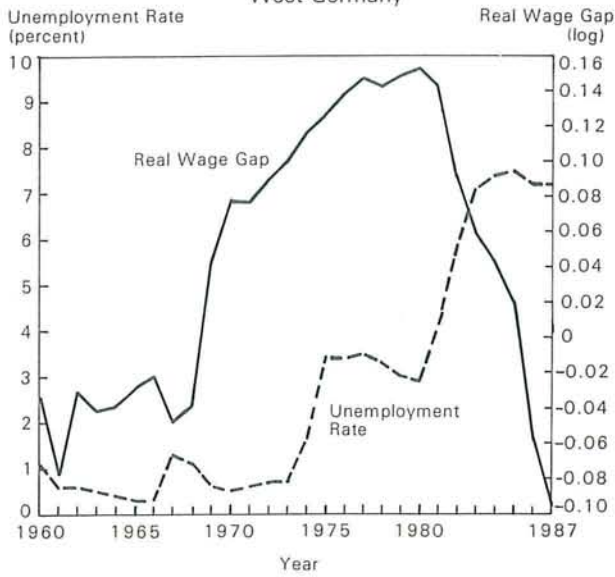
Table 2

Determinants of the Unemployment Rate, Selected Countries, 1962–87

Dependent Variable = Unemployment Rate (t-statistics in parentheses)

Independent Variables	West Germany (I)	West Germany (II)	France (I)	France (II)	United Kingdom (I)	United Kingdom (II)	Italy (I)	Italy (II)	United States (I)	United States (II)
REAL WAGE GAP(−1) (logs)	−.36 (−.161)	−1.48 (−.707)	−3.21 (−1.34)	−5.87 (−2.38)	3.10 (.549)	3.45 (.648)	−2.63 (−1.57)	−1.82 (−1.23)	−3.74 (−.415)	−6.36 (−.698)
REAL WAGE GAP(−2) (logs)	5.70 (2.77)	3.03 (1.44)	2.05 (.770)	.05 (−.018)	12.18 (2.01)	15.53 (3.10)	1.74 (.980)	1.35 (.925)	−2.55 (−.260)	−12.30 (−1.33)
REAL MONEY BAL-ANCES (−1) (logs)	−9.44 (−5.90)	−9.62 (−7.15)	−.32 (−.213)	−.95 (−.618)	−5.15 (−2.48)	−5.31 (−2.60)	−1.73 (−1.27)	−2.19 (−1.98)	−12.78 (−2.77)	−18.33 (−4.10)
REAL MONEY BAL-ANCES (−2) (logs)	−4.70 (−2.96)	−6.35 (−3.56)	−.77 (−.583)	−3.54 (−2.47)	1.21 (.531)	.76 (.336)	.521 (.470)	.207 (.202)	−7.85 (−1.65)	2.29 (.583)
WORLD TRADE	−2.07 (−1.20)		−4.94 (−2.62)		−5.15 (−1.04)		1.13 (.539)		−1.31 (−.296)	
WORLD TRADE(−1)	−2.57 (−1.56)		−3.12 (−1.83)		−.57 (−.128)		−2.43 (−1.13)		10.93 (2.66)	
Standard Error of Regression	.22	.25	.25	.34	.71	.73	.24	.23	.54	.60

rate in all of these countries. Since the turn of the decade, however, this relationship has broken down; in France, West Germany, and Italy the unemployment rate has not followed the plunge in the real wage gap.[11] Clearly, a complete description of European unemployment using only real wage gaps is suspect at best. To investigate this suspicion, the next section statistically analyzes the relationship between European unemployment, real wages, and other potential explanatory variables.

III. Real Wage Gaps and Unemployment: The Results

If real wage gaps are to be used to explain high European unemployment, then a more rigorous statistical investigation of their relationship is required. For the sake of comparison this study follows Bruno (1986), examining the relationship between unemployment rates and a variety of independent variables.[12] Specifically, each country's unemployment rate is related to its real wage gap and various measures of its aggregate demand. In the short run, aggregate demand can affect the demand for labor if wages are slow to adjust, while a long-run story

would require a Keynesian explanation similar to that in section I. Initially, this study will parallel Bruno (1986) as closely as possible in order to analyze why this insider theory has failed over the past five years. To begin the examination, unemployment is regressed on time, lags of the logarithm of the real money stock, a dummy variable to pick up the post-1975 labor productivity slowdown, various lags on the real wage gap, and a world trade variable. The time parameter attempts to account for any trend movement in the unemployment rate over the sample period while the world trade variable seeks to proxy for world aggregate demand. Various government deficit variables were tested to account for fiscal policy but are not reported here since they were insignificant for all countries.[13] Finally, all regressions are corrected for the first-order serial correlation normally found when regressing time series variables.

Table 2 contains the results of the regressions fit to the 1962–87 period for the five countries. Looking at equation I, the money stock variable is significant and correctly signed for three of the five countries. Increases in the real money supply decrease the unemployment rate in West Germany, the United Kingdom, and the United States. Contrary to the

insider explanation of unemployment, however, the real wage gap measures are correctly signed and statistically significant in only two of the countries. The United Kingdom and West Germany stand alone as economies where real wages seem to account for unemployment movements. In fact, the real wage gap coefficients in the remaining countries are generally incorrectly signed, implying that a rise in real labor costs, all else held constant, decreases the unemployment rate. Furthermore, what is striking about even the correctly signed real wage-unemployment relationships is their instability. Excluding the insignificant world trade variables from the regressions, as is done in the second equation in table 2, produces statistically unimportant real wage gap coefficients for West Germany.[14] Without strong prior beliefs that the world trade variable belongs in the regression, its low statistical significance recommends its removal; when this variable is excluded, only the United Kingdom has a positive and significant real wage coefficient over the entire 1960–87 sample.

In short, current unemployment in Europe cannot be classified in this insider version of the neoclassical framework even when applying the same criterion as in the original studies. Not only did these measures of the real wage gap fall throughout the 1980s while unemployment rates remained roughly constant, but the relationship between these two variables became much less statistically significant as the sample was updated. This result tends to dispute the most persuasive empirical work supporting the insider explanation of European unemployment. In fact, except for the United Kingdom, European unemployment far more favors a Keynesian interpretation, where a lower level of employment with a constant real wage indicates insufficient labor demand. Before any firm conclusions can be drawn, however, two issues must be explored: (1) Are the insignificant real wage gap coefficients due to incorrectly modeled aggregate demand variables? and (2) What has caused the collapse of the relationship between real wages and the unemployment rate, which apparently has occurred since the completion of the previous research?

IV. The Breakdown of the Classical Relationship

One problem with the regressions in table 2 could be their failure to choose the correct indepen-

dent variables to represent aggregate demand. Although the lags of the real money supply are often significant and correctly signed, theory suggests several measures that might better indicate the expansionary or contractionary direction of monetary policy. In fact, central banks traditionally affect investment and consumption through the interest rate. Replacing the log of the real money stock with the real interest rate could alter the real wage gap results.

The evidence clearly supports the conclusion that the relationship between the real wage gap and the unemployment rate broke down in the 1980s.

Another possible measure of central bank intentions is the term structure of the interest rates. Generally, monetary authorities directly affect short-term rates; thus, expansionary monetary policy would produce a decline in short-term interest rates relative to their long-term counterparts. However, replacing the real money supply variable with either of these alternatives does not improve the performance of the coefficients on the real wage gap. These results are excluded from the tables as the parameters for the term structure and the real interest rate are rarely significant. In short, using a variety of measures of aggregate demand does not change the basic findings of the previous section.[15] The evidence clearly supports the conclusion that the relationship between the real wage gap and the unemployment rate broke down in the 1980s.

The Relationship over Time

Exactly when this collapse occurred is uncertain. Given Bruno's more positive real wage results, it might be assumed that the breakdown began after Bruno's sample ended, in 1982. If the regressions fit to Bruno's time frame show strong positive real wage gap coefficients, then a post-1982 change in this relationship is suggested.[16] The real wage gap coefficients for equation I fitted to the 1960–82 sample are given in table 3. The parameters on the real money stock variables were roughly similar to those in the

Table 3

Determinants of the Unemployment Rate, Selected Countries, 1962–82

Dependent Variable = Unemployment Rate (t-statistics in parentheses)

Independent Variables	West Germany (I))	France (I)	United Kingdom (I)	Italy (I)	United States (I)
REAL WAGE GAP(−1) (logs)	−1.21	−.81	−3.08	−2.15	−3.03
	(−.466)	(−.438)	(−.403)	(−.974)	(−.494)
REAL WAGE GAP(−2) (logs)	8.03	.23	11.80	2.24	15.66
	(3.72)	(.133)	(1.60)	(1.14)	(1.64)

full sample and are not included in the table. The link between unemployment and the real wage gap does, in fact, strengthen slightly. The negative coefficient for France moves toward zero and becomes less significant, while the German real wage coefficients become more positive and more significant. Both the U.S. and the Italian net real wage coefficients become correctly signed and move toward statistical relevance. For the United Kingdom, however, the shorter sample actually worsens the relationship as the coefficients remain roughly constant between the entire sample and the sub-sample, but their statistical relationship becomes less certain. Though these parameters on the gap as a whole perform better than the 1962–87 coefficients, these results do not impressively support the insider neoclassical explanation, as only West Germany has a correctly signed and statistically significant coefficient. Certainly, 1982 does not seem to be a turning point in this relationship.

One possible explanation for the breakdown in the real wage–unemployment relationship involves the formation in 1979 of the European Monetary System.

Perhaps a more valuable test for the turning point in these regressions would include a hypothesis concerning its cause. One possible explanation for the breakdown in the real wage–unemployment relationship involves the formation in 1979 of the European Monetary System, the EMS. The EMS is a system of exchange rate controls. Although its exact mechanism is not without debate, it can be compared to the old Bretton Woods regime, with the West German mark taking on the role of the U.S. dollar. The agreement calls for all member countries to fix their exchange rate to the mark. This commitment allows West Germany to set monetary policy throughout Europe, since central bankers in the remainder of Europe lose control of their money supplies when required to maintain a fixed deutsche mark exchange rate. As an illustration, assume West Germany is running very tight monetary policy. Any attempt by the French to decrease their interest rates below West Germany's by increasing the supply of francs is completely frustrated. With a fixed exchange rate, the French central bank is forced to buy back all the newly issued francs as they flee to West Germany to take advantage of the mark's higher return. As the French support the franc, the French money supply and interest rate return to their original levels. In fact, exporting West Germany's monetary discipline is one of the major arguments for the mark as the base currency in the EMS.

With the formation of the EMS, these other countries, with vastly diverse institutions and inflationary histories, suddenly began to import the West German inflation rate. This change not only shocked any already preset wage contracts, but also profoundly altered the variables that had historically affected each country's domestic inflation. For example, how relevant is Italian unemployment to Italian monetary policy? The answer can be radically different if the West German Bundesbank, rather than the Italian central bank, fixes the Italian interest rate. Note that this movement from Italian to West German control over the Italian interest rate does not merely represent a change in the value of the interest

Table 4

Determinants of the Unemployment Rate, Selected Countries, 1962–78

Dependent Variable = Unemployment Rate (t-statistics in parentheses)

Independent Variables	West Germany (I))	France (I)	United Kingdom (I)	Italy (I)	United States (I)
REAL WAGE GAP(−1) (logs)	−2.87 (−1.00)	5.58 (3.00)	−.59 (−.150)	−21.15 (−6.00)	8.00 (.951)
REAL WAGE GAP(−2) (logs)	6.58 (2.88)	−.62 (−.36)	19.41 (3.68)	20.12 (6.27)	12.95 (1.40)
REAL MONEY BALANCES(−1) (logs)	−10.30 (−4.74)	−3.17 (−3.80)	−10.00 (−5.18)	5.89 (3.18)	−13.44 (−3.01)
REAL MONEY BALANCES(−2) (logs)	1.87 (.710)	2.70 (4.19)	2.85 (.992)	−3.91 (−2.75)	−7.60 (−2.39)
Standard error of regression	.19	.10	.36	.17	.35

rate, but embodies a change in the variables that determine that rate. Any event that alters such relationships is referred to as a regime shock. Thus, a regime shock caused by the institution of the EMS could be the source of the original unemployment in Europe. After 1979, the fixed exchange rates and the continued tight policy of the Bundesbank prevented the European central banks from loosening policy in reaction to the rise in unemployment. If, in fact, difficulties do arise in wringing unemployment out of the system, this process is one possible Keynesian explanation of the European unemployment. The remainder of this article takes a variety of tacks to examine the validity of this hypothesis.

Unemployment and the EMS

A policy regime shock that results in Keynesian unemployment would have several empirical implications. The formation of the EMS would manifest itself in the full sample regression as a collapse in the relationship between the real wage gap and unemployment. Before the shock, while on the full employment labor demand curve, this relationship would be stable. Once the labor demand curve shifted down, however, the constant in the unemployment regression would increase over the post-shock sample, while the shift would break down the relationship between real wage gaps and unemployment over the entire period. Furthermore, the traditional aggregate demand variables would not capture

the effects of the formation of the EMS as the relationship of these variables to unemployment would have changed, not just their levels.

To test whether, indeed, a strong correlation existed between the real wage gap and the unemployment rate before the formation of the EMS, the same regression is fitted over the 1962–78 sub-sample. The results in table 4 reveal a much stronger unemployment–real wage relationship over this pre-EMS period, than over the full sample or the 1962–82 sub-sample. One of the two Italian coefficients is now correctly signed and statistically significant. The French estimates are positive and significant, which completely reverses the perverse French results found over the previous two sample periods. The West German and U.K. coefficients remain positive and statistically important. Further, the relationship between unemployment rates and the aggregate demand variables improves. Over the 1962–78 sub-sample, each country has at least one correctly signed and statistically relevant money stock coefficient. Although not reported here, even the real interest rate coefficients improve over this shorter sample. These general results strongly suggest that some shock shattered the connection between European real wages and unemployment in 1979.

In fact, a statistical test can be performed to measure the stability over the 1962–78 and 1979–87 sub-periods of the relationship between unemployment and the independent variables on the right-hand side of the equation. To enhance the degrees of

Table 5
Chow Statistic for Regression II,
Determinants of the Unemployment Rate,
1962–1978

	REGRESSION II CHOW STATISTIC
West Germany	6.43
France	31.71
United Kingdom	16.14
Italy	1.74
United States	2.73

freedom, this test was performed for the equations without the world trade variable. This measure is given in table 5 as the Chow statistic. The larger the value, the less likely the structural relationship is constant over time.[17] At a value of 3.87, one is 99 percent sure that the two regressions represent two separate structural relationships, and that a regime shock occurred in 1979. The actual values range from a low of 1.74 for Italy to a high of 31.71 for France. It comes as no surprise that the countries whose real wage parameters are most affected by the change in sub-samples, France, West Germany, and the United Kingdom, have the three largest values. Thus, statistical support for the hypothesis that a regime change adversely affected the unemployment regressions seems fairly strong. Certainly something occurred in 1979 to affect this relationship, although conclusive proof that the source of the change was the formation of the EMS is difficult to provide.

Further attempts, however, were made to specify the cause of the structural shift. As previously mentioned, a surprise monetary policy shift caused by a change in the exchange rate system could cause a permanent shift in unemployment, as the labor demand curve moves to a lower level; thus, tests of whether the post–EMS constant term had increased were performed. A variety of different dummy variables covering the EMS years were tested. The results were mixed. For example, if the world trade variable is excluded, then the EMS dummy is positive and significant for France and West Germany; yet when the trade variable is included, the dummy is significant in only West Germany. The real price of oil was also included in these regressions in an attempt to control for OPEC price shocks, yet it had no effect on the

results. Another statistical approach for this test is to pool the regressions in order to compensate for a small sample size. The problem with this procedure is its assumption that the coefficients for each variable are identical for every country, which strongly contradicts the findings so far in this paper. Regardless, the parameters on the real wage gap and the EMS dummy are significant and correctly signed in these pooled regressions. These tests tend to rule out other possible causes of the structural shift, like oil price changes, while further suggesting the EMS as the source.

More general analysis also supports the EMS hypothesis. For example, if the EMS produced the collapse in the real wage–unemployment relationship, one would expect West Germany and the United Kingdom to be the least affected by this change. The EMS regime shock should have little effect on the West German equations since their labor markets are accustomed to the Bundesbank's policies. Furthermore, the United Kingdom should not be greatly affected by the formation of the EMS as it is the only European country that has yet to commit itself to the fixed exchange rates dictated by the European union. Table 3, in fact, reveals that Britain and Germany are the only two countries in the study with significant real wage gap variables over the entire sample. Furthermore, the Chow statistic measuring the stability of the regressions over time shows the United States to be more consistent than any other country in the sample but Italy. Even though the United States could easily have been shocked in 1979,

Statistical support for the hypothesis that a regime change adversely affected the unemployment regressions seems fairly strong.

for example by the institution of reserve targeting by the Federal Reserve, the only non-European country in the group had one of the lowest Chow statistics. Taken as a whole, the evidence clearly indicates an event in 1979 that disrupted what had been a relatively stable relationship between the real wage gap and unemployment. One possible explanation for this collapse would be the most significant event to affect Europe at that time, the formation of the EMS.

V. Conclusion

The results in this paper suggest that the unemployment problem in Europe is not due to excessive real wages. The Bruno and Sachs (1985) and Bruno (1986) studies are the major works that found significant real wage gaps in the early 1980s; thus, by using their methodology this paper gives the recent insider-based neoclassical explanation its best chance to perform. Yet incorporating the recent data into their framework clearly rejects this analysis of European unemployment along with its policy prescriptions. The real wage gaps are shown to increase throughout the late 1970s and the early 1980s, but they decline abruptly since the end of those studies. As unemployment declines have not followed the fall in the real wage gap, a more Keynesian source of unemployment in Europe is suggested. The origin of this involuntary unemployment could have been the institution of the European Monetary System, which produced a serious monetary shock and monetary regime change in Europe. Although some single-country studies have suggested the need for policies to increase labor supply, this paper indicates the need for expansionary aggregate demand policy also. Further, the complaint of many European government officials that increases in aggregate demand would only increase inflation is without foundation if, as this paper implies, these European countries are off their full employment labor demand curves. In fact, recent experience in Germany, although not in the United Kingdom, has clearly shown unemployment to be falling without any pressure on the rate of inflation.

This debate has been cast not just in terms of policy but in a theoretical context because the issue is much more general than the current European experience. Unemployment has dropped out of the policy debate in the United States because of our sustained expansion of the last seven years. Neoclassical models of unemployment dominate American labor market analysis. Yet, the battle between the neoclassical and the Keynesian theorists still rages in Europe. The recent European experience emphasizes that this debate is not simply some arcane academic exercise.

Recent European experience emphasizes that the debate between the neoclassical and the Keynesian theorists is not simply some arcane academic exercise.

Thus, this paper is not merely an examination of the currently optimal European policy, but a reminder that if any shock resulted in unemployment of that magnitude in the United States, policymakers should not reflexively assume that perfectly flexible prices necessitates a labor supply explanation. They did that very thing sixty years ago and to some extent are doing it in Europe now, at a tremendous cost in wasted resources.

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[1] The most recent version of neoclassical business cycle theory postulates shifts in both labor supply and labor demand curves. What drives these models, however, are short-run shocks to technology. Thus, the decline in employment that is produced in these paradigms should be of brief duration, not the long-run problem experienced in Europe this decade. If the technological disturbance were a long-run phenomenon, it would be accounted for in this empirical study.

[2] See, for example, Sachs (1986) and Blanchard and Summers (1986a,b).

[3] Coen and Hickman (1987) examine both perfect and imperfect competition. Solow (1986) assumes imperfect competition. The usual approach under perfect competition follows Barro and Grossman (1971) and Muellbauer and Portes (1978), who assume some sort of price or wage rigidity. Yet, Clower (1965) discusses Keynesian theory in a perfectly flexible world.

[4] Neo-Keynesian theory is rather agnostic about what actually happens to the real wage. It could fall, equating supply with the new level of demand, or it could rise, depending, as Clower (1965) points out, on the dynamics of nominal wages and prices out of equilibrium. It is drawn as a constant here for ease of exposition.

[5] Excessive real wages are necessary but not sufficient for insider unemployment. As mentioned in footnote 4, Keynesian unemployment can co-exist with high real wages. The economy could be both on a lower labor demand curve and at a higher real

wage than that which would sustain full employment. Yet since high real wages are a necessary condition for the insider theory, this test can rule out insider unemployment.

[6] Essential for the technique used in this paper are Bruno and Sachs (1985) and Bruno (1986). Other works which approached this problem somewhat differently are Artus (1984) and Coen and Hickman (1987).

[7] It is assumed that the more labor hired given the levels of other inputs, the less productive is that last hour of labor. This diminishing marginal productivity of labor explains the downward slope of the labor demand curve in figure 1. The slope of the labor demand curve ensures that the equilibrium condition in equation (2) is attainable.

[8] Specifically, if Cobb-Douglas technology is assumed, the logarithm of the average product of labor is merely a constant away from the logarithm of its marginal product. This constant may be ignored as it is the change in this variable that is important, not its level.

[9] Artus (1984) and Coen and Hickman (1987) attempt to incorporate labor supply variables. Forecasting full employment from demographic data on labor force participation rates is, however, notoriously inaccurate. Furthermore, empirical estimates of the labor supply curve reveal it to be relatively stable and very inelastic with respect to the real wage. It therefore seems highly doubtful that shifts in the labor supply curve have caused much of the problem. If the labor supply curve is not extremely variable, then Bruno and Sachs's method cannot be attacked for ineffectively including labor supply movements.

[10] This normalization is used as it is generally assumed that Europe was at full employment during this period so any deviation of wages away from that level would represent excess real wages.

[11] It should be pointed out that Bruno and Sachs (1985) and Bruno (1986) also constructed an alternative measurement of the real wage gap. Its purpose was to account for cyclical movement along the labor demand curve and short-run episodes off the curve due to adjustment costs. Replicating this measure produced results that generally conformed with those for the method discussed in the body of this paper. They are not reported here since the unemployment regressions that follow are similar to those in Bruno (1986), and Bruno only reports these results using the first measure of the real wage gap.

[12] These equations are informal reduced form regressions used in an attempt to control for the simultaneity problems in this type of study. Although a complete structural model is not constructed, it is possible and commonplace to get reduced forms of this type out of more rigorously specified paradigms.

[13] For the United States the Federal Reserve estimate of the real, full-employment, government deficit was used. Unfortunately this variable was impossible to find for the European countries; thus the real deficit in each country was run in its place. None of these variables were statistically significant in the regressions, and therefore, they are not reported in this paper. These results conform to those of Bruno (1986), except for the United States.

[14] A recent paper by John Pencavel (1989) makes essentially this same point.

[15] These results are also robust to the addition of other types of explanatory variables. Different dummies were included in an attempt to capture the effects of different disturbances, such as oil shocks. In fact, even the real price of oil was included in these regressions. None of these variables affected the results.

[16] Bruno and I actually get slightly different results for these regressions. Primarily this is due to the updating of the base year that the U.S. Bureau of Labor Statistics used for the calculation of the real value added in manufacturing. Since the weights changed, some of our results will differ. I also updated his deviations from trade trend, although regressions using his trend years fared no better. Essentially, however, his results were not all that much more conclusive for the real wage gap explanation in these countries.

[17] This test is essentially an F-test performed on the null hypothesis of sub-sample stability.

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