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Attitudes toward Inflation and the Viability of Fixed Exchange Rates: Evidence from the EMS

Susan M. Collins and Francesco Giavazzi

An influential view of why the Bretton Woods system eventually collapsed points to the widening gap between European and American views on the desirable rate of inflation during the late 1960s. Reflecting on the tensions that characterized the economic relations between Europeans—Germans in particular—and Americans at that time, Harry Johnson (1973, 205) wrote, “so long as the United States maintained reasonable price stability, it suited the other major countries to live with the international financial dominance of the dollar, . . . [but] once the United States became a potent source of world inflation, the question naturally arose of establishing a basis for common action to resist imported inflation.” At the same time, Bundesbank president Otmar Emminger’s (1977, 53) description of the necessary conditions for the viability of a fixed exchange rate system vividly illustrated the thinking that led to the end of the Bretton Woods era: “a system of fixed . . . rates could only function so long as the key-currency country, by its domestic stability—i.e., monetary stability and economic stability in general—enables the other member countries to maintain fixed exchange rates without imposing undue strains on their own domestic stability.”

Similarly, behind the failure of the European attempts to create an area of

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exchange rate stability in the mid-1970s¹ lie divergent views on the role of inflation in helping the European economies steer through the rough waters of that decade. Commenting on the Italian exchange rate policy of 1976–78 (which would eventually lead to an inflation rate twice as high as the European average), the governor of the Bank of Italy wrote, “Though aware of its role in shaping the dynamics of prices, we guided the external value of the lira so as to permit a growth of exports setting the premises for a recovery of accumulation and of employment less conditioned by the external constraint” (Banca d’Italia, *Annual Report*, 1979)—a view to which even a German central banker during the time of the “locomotive experiment” would hardly have subscribed.

These experiences confirm that common attitudes toward inflation are a necessary condition for the viability of a fixed exchange rate system. Throughout the 1960s, Germany faced the choice between achieving its domestic inflation targets and behaving according to the rules of Bretton Woods. Eventually, the cost of an inflation rate that was constantly “too high” convinced Germans that a regime of flexible exchange rates was “the only one able to guarantee domestic price stability.”²

These experiences also suggest that the success of the European Monetary System (EMS) in creating an area of exchange rate stability in Europe—made possible by the convergence of inflation rates toward the German level—may be the result of an unprecedented convergence of attitudes toward inflation throughout the Continent. (Figure 12.1a shows that countries that had remained in the Snake³ maintained low inflation differentials relative to Germany from the end of the 1970s, while figure 12.1b shows that inflation rates in other European countries did not begin to converge toward German levels until the mid-1980s.) From this viewpoint, the various phases of the EMS experience could reflect the timing of such a shift in attitudes. The system was originally set up in March 1979 by seven countries, and it is commonly recognized that, until 1982–83, it effectively functioned like a crawling peg: each member maintained its own inflation rate, and realignments were the mechanism to correct the large swings in real exchange rates that the system generated regularly. But then, one after the other, the high-inflation members of the group changed policies, often going through dramatic U-turns: for example, Denmark in the fall of 1982; France in March 1983; and Italy at the time of

1. These initiatives never managed to extend the area of exchange rate stability beyond the group of small countries whose economies are closely linked to the German economy. For a reconstruction of that experience, see Triffin (1979) and *European Economy* (no. 12 [July 1982]).

2. Quote taken from a 1964 statement of the German Council of Economic Experts, reported in Giavazzi and Giovannini (1989, 23).

3. When the Snake was set up in spring 1972, ten countries participated: Germany, the Netherlands, Belgium, Luxembourg, Denmark, Norway, France, Italy, Great Britain, and Ireland. Denmark, Ireland, and Great Britain pulled out in June 1972, but Denmark rejoined in December 1972. Italy pulled out and Sweden joined in February 1973. France and Sweden left in January 1974 and August 1977, respectively. The EMS began operation in March 1979.

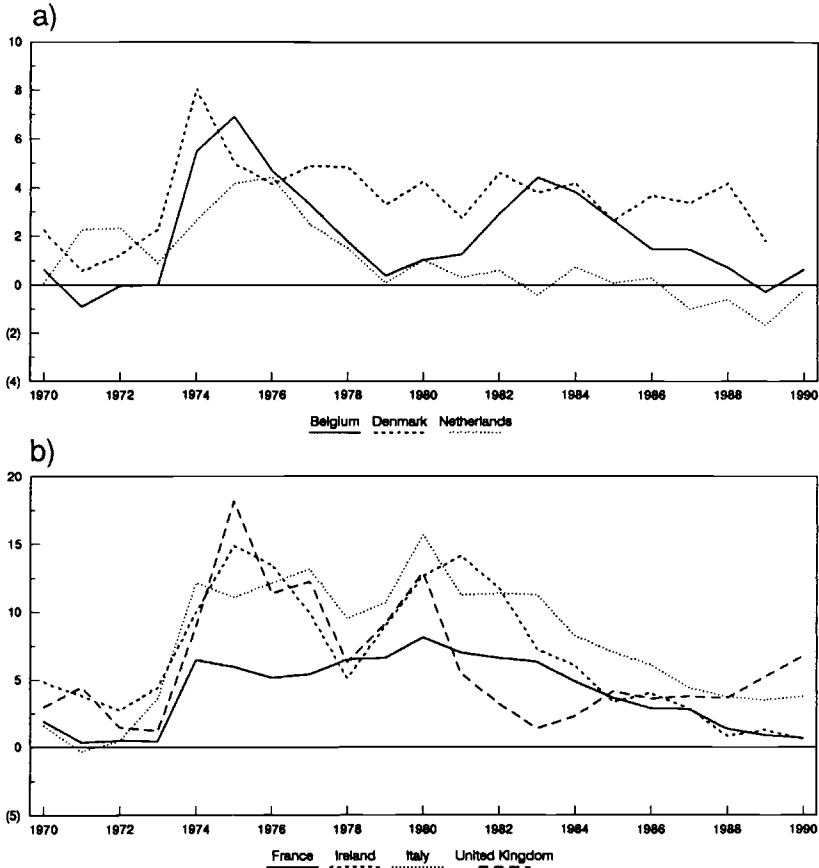


Fig. 12.1 Annual consumer price inflation rate, relative to Germany

Source: OECD, main economic indicators.

the 1984 referendum on the “scala mobile.” With the gradual convergence of inflation, realignments became less necessary and less frequent, until they were de facto abandoned in 1987.⁴ In the meantime, two more countries (Spain and the United Kingdom) joined the system, while Austria and Sweden—which are prevented from formal membership because they are not part of the European Community—follow an exchange rate policy consistent with full membership. By 1991, European monetary authorities—even the same central bank that in 1979 seemed to justify an inflation rate that was rising above 20 percent—are unanimously ready to sign on to a European system of central banks whose statutes declare price stability as the main objective of monetary policy.

4. For discussions of the EMS experience prior to 1987, see Collins (1988) and Rogoff (1985a).

The aim of this paper is to provide new evidence about the hypothesis that the recent popularity of fixed exchange rates in Europe results from a convergence in attitudes toward inflation. So far, research on the European disinflation of the 1980s has concentrated on the extent to which membership in the EMS affected expectations and thus the unemployment cost of stabilizing prices (see, e.g., Giavazzi and Giovannini 1989; and Weber 1991). There has been less discussion of the reasons that led first to the decision to join the EMS and later (in most countries) to a change in policies that made the new exchange rate regime viable. Most existing work assumes that the turnaround was induced by “enlightened” policymakers whose unyielding commitment to price and exchange rate stability eventually produced a shift in private-sector expectations. An alternative view, explored in this paper, is that consumers’ perception of the trade-off between price and output stabilization changed first. Note that the second view raises an additional issue. Why did some countries pursue disinflation independently while others, by joining the EMS, seem to have attempted to replace their domestic central bankers with the Bundesbank? This issue is also discussed briefly.

The paper is organized as follows. Section 12.1 compares the Bretton Woods and the EMS experiences with inflation differentials and exchange rate adjustments. Section 12.2 discusses both the empirical methodology and the survey data of consumer expectations about the future economic performance on which the analysis is based. Section 12.3 presents empirical evidence for the hypothesis that attitudes toward inflation and unemployment have shifted within Europe. Section 12.4 develops a theoretical framework that illustrates how changes in private-sector attitudes across countries might lead to a convergence in inflation rates. The model, which follows recent work by Alesina and Grilli (1991), provides a useful context for thinking about our empirical findings. Finally, section 12.5 contains our concluding discussion.

12.1 Bretton Woods in Light of the EMS

As documented in figure 12.1*b*, there have been two distinct phases in the EMS in terms of the inflation experience of its members. For the first few years, membership in the exchange rate mechanism did not seem to have any effect on the high-inflation countries. The year after the system was inaugurated, the inflation differential relative to Germany increased in France, Ireland, and Italy. Convergence began only after 1982. This visual evidence is confirmed by empirical research on the effects of EMS membership. One common finding is that, to the extent that membership did affect expectations, the shift in expectations occurred with a lag: around 1983 in France, 1982 in Ireland and Denmark, and late 1984 in Italy (see Giavazzi and Giovannini 1989, chap. 5; and Webber 1991).

During this first stage of four to five years, the EMS had to accommodate countries with apparently very different attitudes toward inflation. In Italy, for

example, the inflation differential with Germany remained above 10 percent until 1984. Thus, the success of the system in its early years must be attributed in large part to its flexibility: that is, to the smooth working of realignments. Revisions of central parities happened frequently and were never delayed long enough to allow the buildup of large misalignments. However, they also required the agreement of all parties in the system, thus avoiding the risk of competitive devaluations.⁵ Moreover, capital controls allowed devaluations to occur without financial disruptions and allowed central banks to choose the timing of realignments, instead of being forced to realign by speculative attacks on reserves.

In the latter half of the 1980s, when European inflation rates and—more important, as we shall argue in this paper—European attitudes toward inflation converged, frequent realignments became unnecessary. Eventually, intra-EMS exchange rates became fixed. (There has been no change in central parities since January 1987.) As financial markets came to understand that realignments were no longer necessary, the need for capital controls also vanished. It therefore became possible to lift all administrative controls on intra-European financial transactions.

Despite some similarities, the EMS experience contrasts sharply with the Bretton Woods experience. As for Germany—the “center” in the EMS—U.S. inflation was lower than inflation in Europe, at least until the mid-1960s. On average, between 1960 and 1966, inflation (GDP deflators) was 2 percent per year lower in the United States than in France, 1.6 percent per year lower than in the United Kingdom, and 3 percent per year lower than in Italy. Even in Germany, inflation was higher than in the United States during this period, notwithstanding the German attempt to put downward pressure on domestic prices by revaluing the deutsche mark in 1961. Except for the deutsche mark episode, however, exchange rates remained fixed. When realignments happened, they were dramatic events, forced by the unsustainable external position of a member country. The U.K. experience provides a clear example of the resultant difficulties. By 1966, the United Kingdom had accumulated a loss of competitiveness vis-à-vis the United States of almost 20 percent (measured using unit labor costs). Sterling was devalued in November 1967, forced by a speculative attack large enough to burst the dam provided by British exchange controls (see Bordo, chap. 1 in this volume).

Table 12.1 compares the inflation performance and the role of exchange rates changes during Bretton Woods and the EMS. The first column of the

5. A clear example is France in March 1983. Jacques Delors, then finance minister, went to the realignment meeting asking for a devaluation of the franc that was viewed as “excessive” by his colleagues. The meeting was suspended, Delors returned to Paris, and the French government, facing exclusion from the exchange rate mechanism of the EMS, had to withdraw its request and change domestic policy accordingly. In the end, the devaluation of the franc was much smaller than the French had originally requested and was accompanied by devaluations of the Italian lira, the Belgian franc, and the Danish krone.

Table 12.1 Inflation Differentials and Realignments: Bretton Woods vs EMS

	Bretton Woods, Cumulative Position Relative to the U.S.		EMS, Cumulative Position Relative to Germany	
	1960-66	1967-71	1979-87	1988-91
Denmark:				
Unit labor cost	35.7	2.1	39.5	7.5
Exchange rate	.2	6.0	22.7	1.5
Italy:				
Unit labor cost	8.1	-12.0	81.2	10.4
Exchange rate	.6	-.9	53.2	-.9
Ireland:				
Unit labor cost	26.7	-6.2	49.2	1.1
Exchange rate	.6	12.1	39.5	.8
France:				
Unit labor cost	-3.4	-10.6	33.5	2.5
Exchange rate	.2	12.0	43.7	.0
Belgium:				
Unit labor cost	10.0	-14.3	12.3	2.7
Exchange rate	-.1	-2.2	29.1	.3
Spain:				
Unit labor cost	13.4	-14.2	44.1	19.2
Exchange rate	-.1	13.6	74.0	-4.2
Germany:				
Unit labor cost	12.4	-10.2		
Exchange rate	-4.1	-12.7		
United Kingdom:				
Unit labor cost	19.8	-8.5		
Exchange rate	.6	12.1		
Sweden:				
Unit labor cost	19.2	-11.0		
Exchange rate	.4	-1.0		
Japan:				
Unit labor cost	.5	-23.4		
Exchange rate	.7	-3.6		

Source: OECD, national income accounts. Unit labor costs are constructed using the index of labor cost per employee and the index of productivity. Both refer to the whole economy.

Note: The data for "unit labor cost" show the total change in the index of relative labor cost per unit of output between each country and either the United States or Germany, over the period indicated. "Exchange rate" is the total change in each country's exchange rate relative to the dollar or the deutsche mark over the period indicated—a positive sign indicates a cumulated depreciation.

table confirms that, until the mid-1960s, Bretton Woods central parities were rarely changed: our sample of countries reports only the 1961 deutsche mark revaluation. In the late 1960s, realignments became more frequent. However, there was no convergence of inflation rates. Instead, as U.S. inflation accelerated, the relative trend of unit labor costs reversed.

The third and fourth columns of 12.1 offer a comparison with the EMS. During the early 1980s, when inflation differentials relative to Germany were large, realignments avoided the buildup of large misalignments. Denmark provides a clear example of the difference. Between 1961 and 1966, the krone appreciated by 35.7 percent relative to the dollar, in real terms. Eventually, this was corrected in part when Denmark joined the sterling devaluation of 1967. A similar inflation divergence relative to Germany between 1979 and 1987, however, was accommodated by frequent devaluations, thus avoiding a significant real appreciation. Finally, the last column shows that, in the late 1980s, the move toward more fixed exchange rates was accompanied by a sharp convergence in inflation.

Thus, as seen from the perspective of the EMS experience, Bretton Woods failed on two accounts. First, the system lacked the necessary flexibility to accommodate countries with different inflation rates. Second, although this is not a fault that can be ascribed to the design of the system, the Bretton Woods years did not see the convergence of attitudes toward inflation that characterized Europe in the late 1980s and that we believe is a necessary condition for the survival of a fixed rate regime.

In the remainder of this paper, we first examine some new evidence that supports our view about the convergence of attitudes toward inflation. We then offer a theoretical framework that highlights the links between attitudes and the choice of an exchange rate regime.

12.2 Empirical Analysis

The empirical analysis examines two issues. First, is there any evidence of shifts in attitudes toward inflation versus unemployment within EMS member countries? Second, if so, when did any such shifts occur? In particular, we ask if there is any evidence of increased concern about inflation among countries that gave up some monetary sovereignty in following Germany's leadership of the multiple peg system. (Note that simply joining the EMS in 1979 need not have entailed any such change.) We would also like to know when any such shifts occurred. For example, if attitudes did change, did this occur before or after the EMS was instituted? Did it occur before or after changes in actual inflationary policy and performance that some countries experienced?

We assume that residents in each country have an expected loss function that depends on expectations about future inflation and unemployment. We use survey data from European households to provide information about how inflation and unemployment affect their assessments of general economic conditions, where the latter is interpreted as a measure of their "expected loss." We then use regression analysis to infer the implied weights on inflation and unemployment in this loss function and to look for changes in these weights over time. Following a description of the data and methodology in this section, the empirical results are presented and discussed in section 12.3.

12.2.1 The Data

To examine these issues, we use survey data on expectations about future economic performance from the European Community's survey of consumer opinion, reported in *European Economy*, supplements B and C.⁶ Surveys of households are taken three times a year (January, May, and October) in each of eight countries. The complete sample is available since 1974.⁷ These data can be interpreted as information about the average household in each country.

Three of the survey questions are relevant for our purposes. The first asks respondents their perceptions of prospects for the general economic situation in their country over the next twelve months, relative to the current situation in their own country. The second asks their expectations about the changes in the trend of the price level (inflation) over the next twelve months, and the third asks their expectations about changes in the unemployment rate over the next twelve months.⁸ Responses for these two questions are also relative to the current situation in the respondent's country. The published indicators are weighted sums of these responses. Each series ranges between -100 and $+100$, but the scale differs across questions. In particular, if respondents, on average, expected the inflation rate, the unemployment rate, and general economic conditions all to be the same over the next twelve months as they had been recently, then the indicators would be 50, 0, and 0 respectively (see n. 8 above).

Table 12.2 shows the means and standard deviations of each variable for the eight members of the European Community. Looking first at general economic prospects (*EP*), the table shows that, on average, respondents were pessimistic. The average response is less than zero for all eight countries, implying that, on average, economic conditions were expected to deteriorate. France, Belgium, and Ireland appear to be the most pessimistic, with Ger-

6. We look at the nine countries that were members of the European Community during the 1970s, with the exception of Luxembourg, for which these data are not available. In some cases, the reported figures average across months. We obtained the actual figure for the relevant months from the European Commission. However, these data were in each case identical to the published figures.

7. The survey is given to a random sample of twenty-five hundred adults, most of whom are household heads, in each country in January and May and to five thousand adults in October. (Note that we do not treat the October observations differently in the empirical analysis.) For additional discussion of the survey, see Papadia and Basano (1981).

8. The three questions and possible responses are as follows: (1) "General economic situation in your country, prospects over the next twelve months?" The possible responses are "a lot better" (coded as $+1$), "a little better" ($+\frac{1}{2}$), "the same" (0), "a little worse" ($-\frac{1}{2}$), "a lot worse" (-1), or "don't know." (2) "Price trends over the next twelve months?" The possible answers are "more rapid increase" ($+1$), "same increase" ($+\frac{1}{2}$), "slower increase" (0), "stability" ($-\frac{1}{2}$), "fall slightly" (-1), or "don't know." (3) "Unemployment level in your country in the next twelve months?" The possible responses are "increase sharply" ($+1$), "increase slightly" ($+\frac{1}{2}$), "remain the same" (0), "fall slightly" ($-\frac{1}{2}$), "fall sharply" (-1), or "don't know." For each variable, the "don't know" responses are redistributed between the other answer categories according to the latter's percentage distribution.

Table 12.2 Means and Standard Deviations: Household Expectations

	General Economic Prospects	Expected Price Trends	Expected Unemployment Trends
Germany	-9.08 (12.45)	32.06 (13.17)	16.90 (16.52)
France	-23.78 (11.59)	30.39 (14.07)	35.63 (14.73)
Italy	-16.10 (13.07)	48.37 (8.27)	45.98 (10.10)
Belgium	-25.14 (16.64)	33.10 (8.86)	40.47 (18.70)
Denmark	-14.90 (15.10)	19.39 (14.82)	19.78 (17.56)
Netherlands	-15.82 (10.14)	34.73 (18.97)	35.02 (28.39)
United Kingdom	-11.45 (14.18)	37.14 (12.56)	28.63 (18.54)
Ireland*	-25.09 (16.59)	40.19 (15.50)	35.68 (19.10)

Source: *European Economy*, Supplements B and C, various issues, May 1974–May 1990.

Note: Standard deviations are given in parentheses.

*January 1975–May 1990.

many and the United Kingdom the least pessimistic. But recall that respondents in each country are asked about their expectations relative to recent performance in their own country. Therefore, responses for different countries are not on comparable scales. Cross-country comparisons must be interpreted with caution.

Turning next to expected price changes (*PT*), table 12.2 shows that Italians on average expected inflation rates to be about the same as in the past. (The mean response is close to 50.) Respondents in other countries expected inflation to slow somewhat (responses between 0 and 50), with the greatest slowdown in inflation expected in Denmark. Italy and Belgium—not Germany—are the countries with the least variation in expectations about price trends. Finally, table 12.2 shows that all countries, on average, expected unemployment to rise. Italians expected the largest increase in unemployment, on average, and Germany the smallest.

12.2.2 Empirical Methodology

We interpret expected economic prospects as a measure of (minus) the expected loss function for residents in each country. We also assume that expected general economic conditions are a function of expected inflation (price trends) and expected unemployment: the greater the expected price increases

and the expected unemployment, the worse anticipated general economic conditions:⁹

$$(1) \quad -\mathcal{L}^i = EP^i = F(PT^i, UT^i),$$

where EP^i is expected general economic situation in country i , PT^i is expected price trends in country i , and UT^i is expected unemployment in country i .

Our next step is to take a linear approximation to the loss function $F(\cdot)$. This equation is used in the estimation. (Future work will consider other specifications, such as a quadratic function.) The weights on PT and UT in determining EP provide indicators about attitudes toward inflation and unemployment. As discussed above, these survey responses are not directly comparable across countries. However, a decrease in a given country's tolerance for unemployment relative to inflation should imply a fall in the weight (a smaller negative weight) on UT relative to PT in determining general economic prospects. Thus, changes in attitudes should imply structural shifts in equation (1).¹⁰ Note that we will estimate the actual weights that respondents placed on expected unemployment and expected price trends, not just the relative weight they placed on unemployment in the loss function (b in the model presented in sec. 12.4 below). This relative weight can be constructed from a ratio of parameters.

Suppose that we wished to examine whether a shift in attitudes occurred at a given date s . We could simply construct a dummy variable that was zero before s and unity afterward, enter it interactively with PT and UT , and test whether the coefficients on these interacted variables differ from zero, in the appropriate directions. However, we do not wish simply to test for a prespecified breakpoint; we wish to look at when any shifts in attitudes occurred. These breakpoints need not occur in all countries and need not occur at the same time for each country that experienced shifts. To look for the timing of any structural shifts, we estimated a series of equations for each country, allowing the breakpoint to range from January 1976 to May 1989.¹¹ Thus, we estimated the following equation for each country:

$$(2) \quad EP = C_0 + C_1 \cdot UT + C_2 \cdot PT + D \cdot (C_3 + C_4 \cdot UT + C_5 \cdot PT) + \varepsilon,$$

9. Ideally, we would analyze survey responses to questions about whether inflation or unemployment is considered a more serious problem. Such data are available for the United States and have been studied by Fischer and Huizinga (1982). However, these data are not available, in a time series, for European countries.

10. It is important to point out that there are alternative interpretations for changes in the coefficients in (2) below. One other possibility is that "general economic prospects" is really an indicator of expectations about future economic growth instead of an indicator of expected welfare. If so, changes in respondents' perceptions about the structural relations among inflation, unemployment, and growth would cause the coefficients to change. In general, it is very difficult to distinguish between these two interpretations.

11. This formulation assumes that any possible change in attitudes occurred all at once. It would also be interesting to look for gradual changes in attitudes, e.g., using a specification that allows for time-varying parameters.

where $D = 1$ after the breakpoint, 0 otherwise. In most cases, there was evidence of serial correlation. Our estimations correct for first-order autoregressive error terms.¹²

We compare the values of the likelihood function across possible dates for a breakpoint to see which specification best fits the data. A convenient indicator for these comparisons is the posterior odds ratio, $PR(s)$, for each possible breakpoint s . This ratio can be interpreted as the likelihood that the breakpoint occurred at time s relative to the likelihood that it occurred at s^* , where s^* is the breakpoint at which the value of the likelihood function is maximized.¹³ $PR(s)$ is equal to one for $s = s^*$ and is bounded between zero and one for all other dates, s . The ratio is useful for two reasons. First, it provides some information about how well the data can distinguish between alternative dates for the breakpoint. (For example, values close to one for many dates would suggest that it is difficult to pinpoint when the break occurred. Values close to zero at most dates, with a spike at one date, would suggest a clearly identifiable breakpoint. Multiple spikes would suggest more than one shift in attitudes within the sample period.) Second, since the ratio always ranges from zero to one, it facilitates cross-country comparison of the degree of confidence about the timing of shifts in attitudes about inflation and unemployment. For each country, we show a plot of the values of the posterior odds ratio across breakpoints and report the maximum likelihood parameter estimates and diagnostic statistics at breakpoint(s) corresponding to peaks in the value of the likelihood function.

Estimates for C_3 , C_4 , and C_5 provide information about shifts in attitudes. A negative (positive) estimate for C_3 can be interpreted as increased pessimism about overall economic prospects, given expectations about inflation and unemployment. Negative estimates for C_4 and C_5 can be interpreted as increases in the weights that respondents placed on expected unemployment and on expected inflation, respectively. And $(C_1 + C_4)/(C_2 + C_5) > C_1/C_2$ can be interpreted as a decrease in the relative weight placed on unemployment expectations or as an indication that respondents have become willing to tolerate more unemployment in return for lower inflations.¹⁴

12. The strong serial correlation suggests that there may be omitted variables in our equations to explain expectations about next year's economic conditions. We tried including actual levels of inflation and unemployment for each country and an index of real oil prices. However, this did not significantly reduce the serial correlation problem. Note that including these variables did not qualitatively change the results discussed in the text.

13. The posterior odds ratio for a breakpoint at date s is defined as $PR(s) = \exp[LF(s) - LF(s^*)]$, where $LF(s)$ is the value of the log likelihood function, given a breakpoint at date s , and $LF(s^*)$ is the value of the log likelihood function at the breakpoint s^* , where it is maximized. Thus, $PR(s^*) = 1$. Our procedure is similar to the one followed by Mankiw, Miron, and Weil (1987).

14. While we discuss changes in the estimated b —weight on unemployment relative to inflation—the estimated change in this ratio was statistically significant only in the cases of Belgium and Ireland.

12.3 Estimation Results

Is there any evidence of a shift in attitudes about inflation among EMS member countries? If so, when did it occur, and in which direction was the change? This section discusses the results from our empirical analysis for each country. A summary and interpretation of these results is given at the end of the section.

12.3.1 France

Figure 12.2a shows the values of the posterior odds ratios for alternative breakpoints for France. It shows that the likelihood function reaches a maximum when the breakpoint is October 1979. This suggests that there was a change in attitudes during the first year the EMS was in operation—not before it was instituted. There are also smaller peaks in the early 1980s. (The value of $\text{PR}[s = \text{May } 1983] = .43$, which can be interpreted as the likelihood that a shift occurred in May 1983 relative to the likelihood that it occurred in October 1979 is 43 percent. Similarly, $\text{PR}[s = \text{October } 1986] = .53$.) This suggests that there were additional shifts in attitudes during the early years of the exchange rate system. This result is quite interesting, in light of the fact that it was not until after 1983 that French monetary policy and inflation performance began to converge to policy and performance in Germany.

The first two columns of table 12.3 show parameter estimates for France assuming an October 1979 breakpoint. The equations fit quite well. They show that, on average in the 1970s, French respondents put about three times the weight on expected unemployment that they placed on expected inflation in forming their assessments of general economic prospects. (C_1/C_2 is about three.) The first column shows that, after October 1979, there is weak evidence that respondents became more pessimistic about general economic prospects ($C_3 < 0$) and that the weight they placed on price expectations increased ($C_5 < 0$). However, neither of these estimates is statistically significant.

It is possible that there are not enough data to distinguish between a change in attitudes toward inflation and an increase in pessimism more generally. In the second column, the latter change is ruled out (C_3 is constrained to equal zero). These estimates do show a statistically significant increase in the weight on inflation. They suggest that the weight on inflation relative to the weight on unemployment rose somewhat, from 0.28 before October 1979 to 0.39 afterward. Of course, this result raises the question of why French voters elected François Mitterand, and his very expansionary platform, in 1981.

The third column of table 12.3 provides estimates assuming a breakpoint in May 1983. Here, C_3 is significantly negative, suggesting that French respondents did anticipate less positive economic conditions in general as French macroeconomic policies under Mitterand became more restrictive. These results suggest that, before May 1983, the relative weight on unemployment

was 2.2 and provide weak evidence of a decrease after May 1983 to 1.4. These findings are consistent with the view that French households' concerns about inflation increased gradually during 1982–83.

12.3.2 Italy

Figure 12.2*b* shows the values of the posterior odds ratios for Italy across alternative breakpoints. Here, there is a clear, single spike of the likelihood function in October 1978. Interestingly, this is a few months before the EMS began operation. There is little evidence of additional shifts later on.

The last column of table 12.3 shows parameter estimates assuming an October 1978 breakpoint. Again, the overall fit of the equation is quite good. In contrast to respondents in France, Italian respondents became more optimistic on average about general economic performance during the EMS period. Like French respondents, Italians appear to have become less willing to tolerate inflation after October 1978. The weight on price trends rises, and the shift is statistically significant—even allowing for a change in the constant term. The weight on unemployment relative to inflation declined from 0.7 to 0.5 after the breakpoint.

12.3.3 Germany

Figure 12.2*c* plots the posterior odds ratio across alternative breakpoints for Germany. It shows that the likelihood function peaks for breakpoints during October 1988–October 1989. It also gives some evidence that attitudes were shifting in 1984–86. However, there are only six observations from October 1988 to the end of our sample, providing little information about such a recent shift in attitudes. We also wished to allow for a possible shift in attitudes following the collapse of the Berlin Wall in late 1989. Thus, in addition to looking at parameter estimates for breakpoints in October 1988 and January 1986, we also allow the coefficient on price trends to shift in October 1989, together with a general shift in attitudes in January 1986.

Table 12.4 presents the three sets of estimates. Those for an October 1988 breakpoint are in column 1. They point to results that we did not expect. German respondents' tolerance for inflation relative to unemployment appears to have *increased* sharply. Respondents also appear to have become more pessimistic about general economic prospects at the end of the 1980s. However, these results are somewhat strange in two respects. First, they suggest that Germany did not care at all about price trends after October 1988 ($C_2 + C_3$ is close to zero). Second, they suggest that, as German respondents expected unemployment to increase, they became more sanguine about general economic prospects ($C_1 + C_4 > 0$). Both may be an artifact of assuming that only one shift in attitudes occurred during the sample.

The second and third columns of table 12.4 assume an earlier breakpoint—January 1986. In the middle column, we allow for only one shift, while, in the last column, we allow for an additional shift—attitudes toward inflation

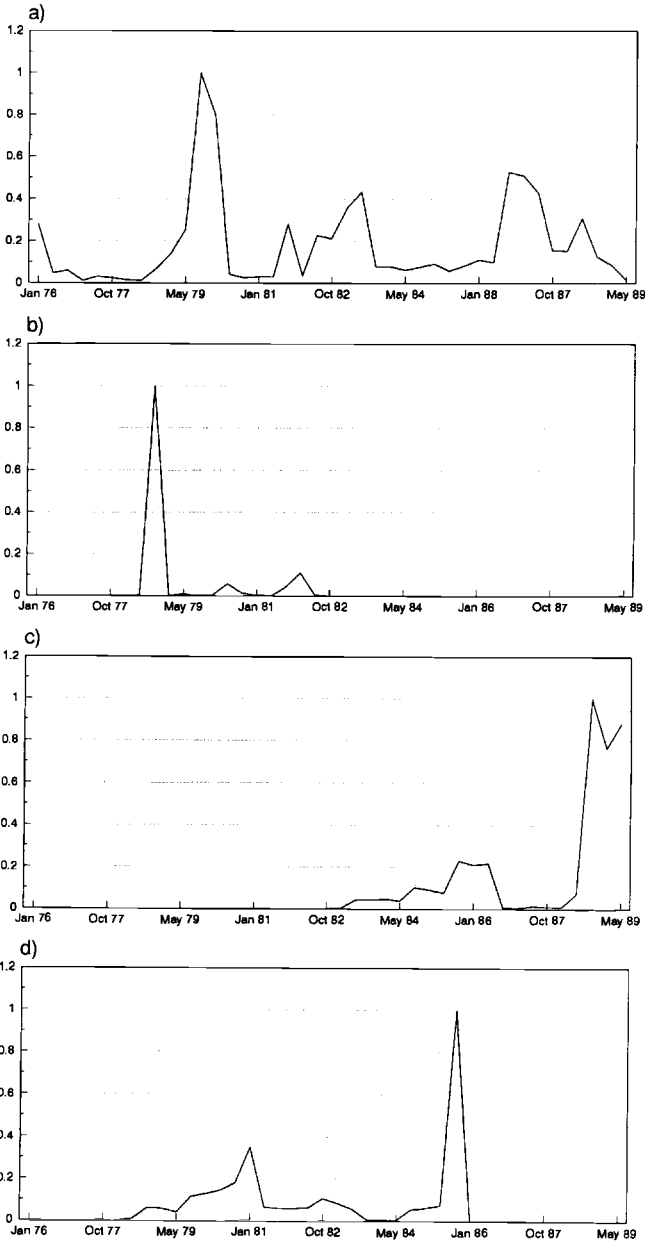


Fig. 12.2 Posterior odds ratio. *a*, France; *b*, Italy; *c*, Germany; *d*, Belgium; *e*, Netherlands; *f*, Ireland; *g*, Denmark; *h*, United Kingdom.

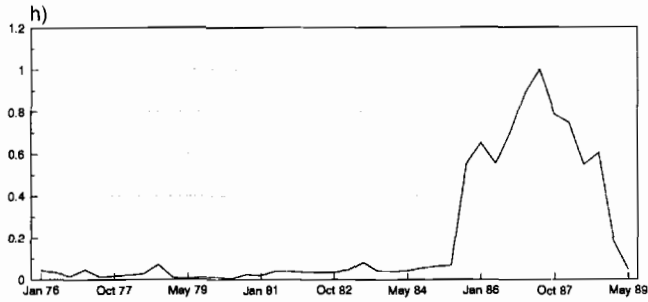
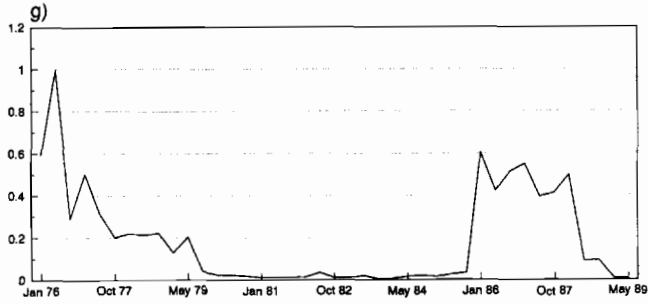
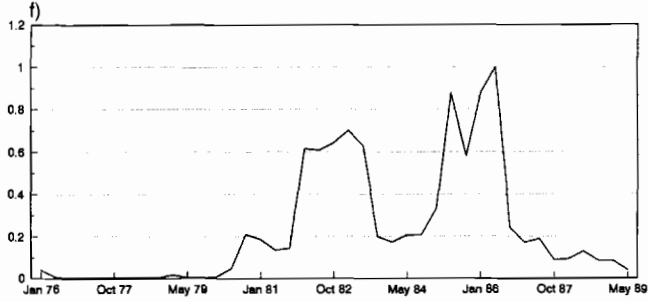
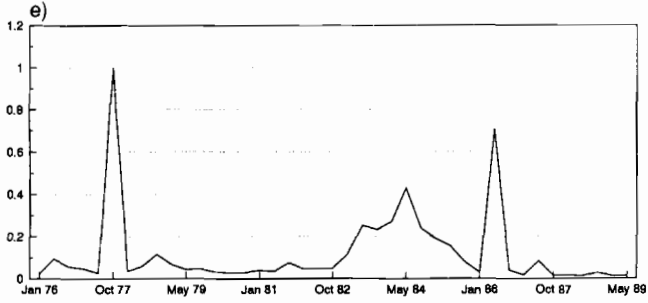


Table 12.3

$$\text{Estimation Results: France and Italy}$$

$$EP = C_0 + C_1 \cdot UT + C_2 \cdot PT + D \{C_3 + C_4 \cdot UT + C_5 \cdot PT\}$$

Breakpoint	France			Italy,
	Oct. 1979	Oct. 1979	May 1983	Oct. 1978
C_0	6.334 (1.376)	3.255 (1.388)	8.406 (2.132)	25.678 (3.345)
C_1	-.563 (7.256)	-.532 (-7.759)	-.600 (-8.738)	-.434 (-4.731)
C_2	-.196 (-2.015)	-.148 (-1.969)	-.270 (-3.324)	-.656 (-4.333)
C_3	-4.213 (- .781)	. . .	-9.680 (-1.795)	35.208 (3.791)
C_4	.041 (.404)	-.010 (-.124)	.146 (1.379)	-.083 (-.621)
C_5	-.118 (-1.040)	-.172 (-1.955)	-.049 (-.421)	-.364 (-1.922)
Rho	.511 (4.015)	.485 (3.765)	.623 (5.403)	.449 (3.325)
$\ln L$	-129.90	-130.23	-130.736	-129.027
\bar{R}^{2a}	.814	.800	.765	.856
No. of obs.	49	49	49	49
C_1/C_2	2.9	3.6	2.2	.7
$(C_1 + C_4)/(C_2 + C_5)$	1.9	2.6	1.4	.5

Note: The table shows maximum likelihood estimates, correcting for the first-order autocorrelation. "Rho" is the first-order autocorrelation coefficient. The sample is from May 1974 to May 1990. *t*-statistics are given in parentheses. *D* is a dummy equal to zero before the breakpoint and one from then on.

^aBased on transformed data, using autocorrelation coefficient, rho.

are allowed to shift again in October 1989 in response to developments in the former East Germany. We focus on the latter, which suggests three conclusions. First, German respondents do appear to have become more pessimistic, on average, about their economy in the mid-1980s. Second, the weight that Germans placed on expected price trends declined significantly in the mid-1980s. In fact, $C_2 + C_3$ is close to zero. (There was no change in their weight on unemployment.) Increased German tolerance of inflation may help resolve the puzzle of why Germany has been willing to stay in an EMS that leads to higher German inflation. Finally, there appears to have been a further reduction in the weight that German respondents placed on price movements after October 1989. This is consistent with West Germans expecting German unification to increase inflation but, at the same time, feeling more positive about the likely performance of their economy. Unfortunately, there are too few observations after October 1989 to distinguish between a general shift in optimism and a shift in attitudes toward inflation.

Table 12.4 Estimation Results: Germany

$$EP = C_0 + C_1 \cdot UT + C_2 \cdot PT + D\{C_3 + C_4 \cdot UT + C_5 \cdot PT\} + D_2 \cdot C_4 \cdot PT$$

Breakpoint	Oct. 1988	Jan. 1986	Jan. 1986,
			Oct. 1989 (PT only)
C_0	7.049 (3.153)	12.440 (3.121)	12.528 (3.921)
C_1	-.576 (-11.760)	-.553 (-9.505)	-.583 (-12.551)
C_2	-.229 (-3.267)	-.378 (-3.268)	-.367 (-4.023)
C_3	-12.058 (-1.374)	-10.612 (-2.155)	-9.448 (-2.360)
C_4	.750 (2.632)	.082 (.517)	.052 (.375)
C_5	.237 (.851)	.491 (2.636)	.334 (2.046)
C_6	...	...	.309 (3.061)
Rho	.381 (2.741)	.444 (3.211)	.239 (1.604)
lnL	-133.375	-134.933	-130.848
\bar{R}^{2a}	.834	.811	.872
No. of obs.	49	49	49
C_1/C_2	2.52	1.46	1.59
$(C_1 + C_4)/(C_2 + C_5)$	21.75	-4.17	16.1

Note: The table shows maximum likelihood estimates, correcting for first-order autocorrelation. "Rho" is the first-order autocorrelation coefficient. The sample is from May 1974 to May 1990. *t*-statistics are given in parentheses. D is a dummy equal to zero before the breakpoint and one from then on. D_2 is a dummy equal to zero before October 1989 and one from then on.

^aBased on transformed data, using autocorrelation coefficient, rho.

12.3.4 Belgium and the Netherlands

These two countries did not pull out of the Snake in the 1970s (see n. 3 above) but chose to follow German leadership. They also resemble Germany here in that parameter estimates in each imply a rise in relative tolerance for inflation. Looking first at Belgium, the plot of the posterior odds ratio in figure 12.2*d* shows an initial peak in January 1981, with some evidence that attitudes had been shifting during the previous two years, and then a much larger peak in October 1985. The parameter estimates presented in table 12.5 show a significant increase in the weight on expected unemployment after January 1981. After October 1985, there is evidence that the weight on inflation declined (the point estimate is close to zero).

Turning next to the Netherlands, figure 12.2*e* shows that there appear to be a number of candidates for a breakpoint. In fact, all show attitudes shifting in

Table 12.5 Estimation Results: Belgium, Netherlands, Ireland
 $EP = C_0 + C_1 \cdot UT + C_2 \cdot PT + D\{C_3 + C_4 \cdot UT + C_5 \cdot PT\}$

Breakpoint	Belgium		The Netherlands		
	Jan. 1981	Oct. 1985	Oct. 1977	May 1986	Ireland, Jan. 1986
C_0	4.531 (1.182)	6.441 (1.992)	39.284 (1.943)	21.381 (3.855)	21.613 (6.694)
C_1	-.489 (-8.462)	-.569 (-10.976)	-.378 (-2.606)	-.536 (-8.181)	-.608 (-15.235)
C_2	-.391 (-3.733)	-.349 (-3.870)	-.762 (-1.663)	-.417 (-3.105)	-.616 (10.564)
C_3	13.612 (2.398)	.016 (.002)	-29.265 (1.426)	-16.931 (-2.767)	.656 (.112)
C_4	-.349 (-4.212)	-.058 (.415)	-.145 (-.974)	-.071 (-.460)	-.275 (-.074)
C_5	.138 (.811)	.315 (1.427)	.482 (1.022)	.274 (1.224)	.296 (1.680)
Rho	.527 (4.169)	.360 (2.574)	.687 (6.526)	.639 (5.554)	.109 (.684)
$\ln L$	-127.991	-126.936	-152.006	-152.352	-130.707
\bar{R}^{2a}	.893	.922	.733	.745	.926
No. of obs.	49	49	49	49	49
C_1/C_2	1.25	1.63	.50	1.29	.99
$(C_1 + C_4)/(C_2 + C_3)$	3.31	15.03	1.87	3.44	2.76

Note: The table shows maximum likelihood estimates, correcting for first-order autocorrelation. "Rho" is the first-order autocorrelation coefficient. The sample is from May 1974 to May 1990. *t*-statistics are given in parentheses. *D* is a dummy equal to zero before the breakpoint and one from then on.

^aBased on transformed data, using autocorrelation coefficient, rho.

the same direction: increasing tolerance for inflation and/or decreasing tolerance for unemployment. Table 12.5 shows estimation results assuming breakpoints in October 1977 and in May 1986. For the earlier breakpoint, none of the changes in coefficients are statistically significant. (Constraining the constant term to be the same across subperiods did not alter this result.) However, the estimates suggest that the weight that Dutch respondents placed on unemployment relative to inflation rose from 0.5 to 2.0. The estimates for the later breakpoint show a further shift, to a relative weight on unemployment of 5.0 after May 1986.

12.3.5 Ireland

Ireland also seems to have experienced a decrease in tolerance for unemployment. The likelihood function exhibits a series of peaks from late 1982 through 1986 (see fig. 12.2*f*). The last column of table 12.5 gives the parameter estimates assuming that the breakpoint was January 1986. These show

that the weight on price trends declined in the second subperiod while the weight on unemployment rose. Both coefficient estimates differ significantly from their estimated values in the earlier subperiod. The weight that Irish respondents placed on unemployment relative to inflation rose from slightly less than 1.0 before January 1986 to 2.8 afterward.

12.3.6 Denmark

As shown in figure 12.2*g*, there appear to be two breakpoints for Denmark—an early one in 1976 and one a decade later. Table 12.6 presents parameter estimates for each. The early breakpoint suggests that, in the mid-1970s, Danish respondents placed little weight on inflation in their general economic assessments—the relative weight on unemployment was 11.1. This changed dramatically, as the relative weight on unemployment fell to just 0.5 after May 1976. (However, we have only a few observations in the earlier subperiod.) The second set of estimates, with a January 1986 breakpoint, is quite different. They point to a rise in Danish tolerance for inflation and a decline in tolerance for unemployment. (This shift resembles the ones discussed above for Germany, Belgium, the Netherlands, and Ireland.) Perhaps the relatively low explanatory power of the regressions for Denmark is due to the assumption of a single shift in attitudes.

Without additional information about the early 1970s, it is difficult to test for multiple breakpoints. Instead, we allow the coefficient on PT to change only in January 1976, assuming a general breakpoint in January 1986. These results are reported in the third column of table 12.6. They imply that, prior to 1976, Danish respondents placed about the same weight on inflation and unemployment. During 1976–86, their concern about inflation increased significantly ($C_6 < 0$). After 1986, they became significantly more pessimistic about their economy overall. There is also weak evidence that the relative weight placed on unemployment rose somewhat.

12.3.7 United Kingdom

Finally, we look at the United Kingdom, the only country in our sample that was not a member of the exchange rate mechanism of the EMS. Figure 12.2*h* shows that the value of the likelihood function peaks for a breakpoint in May 1987.¹⁵ Estimates for this shift date are given in the last column of table 12.6. These estimates suggest that British respondents became more optimistic about their economy overall after 1987 but that there was a large and significant increase in their tolerance for unemployment relative to inflation. (The relative weight on unemployment falls from 1.2 before 1987 to 0.3 more recently.)

15. Interestingly, the 1987 breakpoint coincides with the abandonment of the United Kingdom's medium-term financial strategy.

Table 12.6 Estimation Results: Denmark and the United Kingdom
 $EP = C_0 + C_1 \cdot UT + C_2 \cdot PT + D\{C_3 + C_4 \cdot UT + C_5 \cdot PT\} + D_2 \cdot C_6 \cdot PT$

Breakpoint	Denmark			
	May 1976	Jan. 1986	Jan. 1986, Jan. 1976 (PT only)	United Kingdom, May 1987
C_0	-5.977 (- .679)	-10.883 (2.861)	11.157 (2.315)	24.999 (6.631)
C_1	-.522 (-3.532)	-.351 (-4.349)	-.379 (-5.110)	-.585 (-6.576)
C_2	-.047 (- .229)	-.733 (-6.572)	-.361 (-2.692)	-.480 (-4.753)
C_3	10.908 (1.313)	-11.228 (-2.121)	-13.360 (-2.537)	38.482 (2.257)
C_4	.120 (.722)	-.225 (-1.236)	-.219 (-1.260)	.141 (.544)
C_5	-.731 (-3.022)	.191 (.351)	.287 (.565)	-1.059 (-2.762)
C_6	...	...	-.471 (-3.346)	...
Rho	.843 (10.990)	.629 (5.497)	.812 (8.908)	.134 (.844)
$\ln L$	-151.240	-151.750	-147.020	-160.492
\bar{R}^{2a}	.644	.665	.695	.741
No. of obs.	49	49	49	49
C_1/C_2	11.11	.48	1.05	1.22
$(C_1 + C_2)/(C_2 + C_3)$	.52	1.06	8.08	.29

Note: The table shows maximum likelihood estimates, correcting for first-order autocorrelation. "Rho" is the first-order autocorrelation coefficient. The sample is from May 1974 to May 1990. *t*-statistics are given in parentheses. D is a dummy equal to zero before the breakpoint and one from then on. D_2 is a dummy variable equal to one before 1976 and zero from then on.

^aBased on transformed data, using autocorrelation coefficient, rho.

12.3.8 Summary and Discussion

These empirical results provide surprisingly strong support for the hypotheses advanced at the beginning of this paper. Shifts in attitudes about unemployment relative to inflation can help explain the "success" of the EMS—increased convergence of monetary policies and inflationary performance among members. To summarize, Italians became more tolerant of unemployment relative to inflation shortly before the EMS came into operation. Unemployment tolerance also increased in France, but the shift appears to have begun somewhat later, with most of the change occurring after the EMS was already in operation. (In both countries, the shift comes after the failure of the Snake.) In contrast—and surprisingly—Germany seems to have experienced a rise in relative tolerance for inflation in the mid-1980s, in the sense that

expected inflation became a less important determinant of overall assessments of the future economic situation. This was reinforced at the end of the decade, perhaps by German unification. Belgium and the Netherlands—both members of the Snake and perhaps “closer” to Germany—as well as Ireland seem to have had a similar rise in their tolerance for inflation. However, their shifts appear to have occurred earlier than the shifts in Germany. Denmark experienced both a decline in tolerance for inflation in the mid-1970s and a subsequent reversal in the mid-1980s. Last but not least, the United Kingdom has experienced a fall in tolerance for inflation at the end of the 1980s, consistent with its late entry into the exchange rate mechanism of the EMS.

12.4 Attitudes toward Inflation and the Choice of an Optimal Central Banker

The previous section has presented evidence of shifts in attitudes toward inflation and unemployment in Europe since the late 1970s. In particular, there appears to have been some convergence in attitudes, in the sense that initially high-inflation countries (such as France and Italy) have become less tolerant of inflation relative to unemployment while attitudes in traditionally low-inflation countries (such as Germany) have shifted in the opposite direction.

This section develops a theoretical framework to illustrate how such shifts in private-sector attitudes might make fixed exchange rates more likely. The model is based on the new theories of economic policy that suggest that societies concerned about the stability of both prices and output may solve the dilemma between the lack of credibility of an “activist” central banker and the cost of giving up monetary policy as a stabilization tool by delegating the conduct of monetary policy to an independent central banker whose preferences for output and price stability are slightly more “conservative” than society’s.¹⁶

More specifically, we follow recent work by Alesina and Grilli (1991) that assumes that citizens elect central bankers by majority rule. They have shown that, if citizens were to vote on which type of central banker to appoint, they would choose one who values price stability more than the median voter.¹⁷ Next we study the consequences of a shift in consumers’ attitudes toward inflation. We ask the following question. Assume that, after the shift in preferences, the first-best outcome (the election of a new central banker) is ruled out. Then there are two options: (1) keep the current central banker, who is no longer optimal since tastes have changed, or (2) force the domestic central

16. For an early statement of this view, see Rogoff (1985b). Empirical evidence can be found in Grilli, Masciandaro, and Tabellini (1991).

17. The original work by Rogoff (1985b) was not cast in the framework of a voting equilibrium: he simply showed that society’s welfare can be improved by appointing a central banker whose preferences differ from those of society.

banker to relinquish domestic monetary sovereignty, for example, through a commitment to peg the exchange rate.

12.4.1 Voters' Preferences and the Optimal Central Banker

The starting point is the time-consistency problem illustrated by Kydland and Prescott (1977) and Calvo (1978). Following Barro and Gordon (1983), we assume that the time-consistency problem arises from the central banker's attempt to steer the economy toward higher output growth. The preferences of the central banker are described by the loss function:

$$(3) \quad L = E[p^2 + b(x - k)^2],$$

where $E(\cdot)$ is the expectation operator, p the inflation rate, and $(x - k)$ the deviation of the level of output from the central banker's target k . The parameter b measures the weight that the central banker attaches to output fluctuations, relative to fluctuations in the level of inflation. Output is determined by an expectational Phillips curve:

$$(4) \quad x = (p - Ep) + e,$$

where the "natural" rate of output has been assumed to be equal to zero, the elasticity of output with respect to unexpected inflation has been assumed to be equal to one, and e is an i.i.d. real shock with mean zero and variance σ_e^2 . Expectations are formed—and wages are negotiated—before the central banker sets the inflation rate; the realization of the random shock e is known to the central banker when monetary policy is set but not to wage setters when contracts are signed. It is well known that, in this setup, the time-consistent levels of inflation and output are

$$(5) \quad p = b \cdot k - \frac{b}{1 + b}e,$$

$$(6) \quad x = \frac{1}{1 + b}e.$$

Equations (5) and (6) illustrate the time-consistency problem. If the central banker attempts to steer output away from the natural rate, the average rate of inflation is positive (its optimal level in [3] is zero), with no gains in terms of output stabilization. The trade-off between average inflation and the variance of output, $\sigma_x^2 = \sigma_e^2/(1 + b)^2$, depends on the value of the parameter b . The lower is b in the central banker's objective function, the lower is inflation (on average), but the higher is the variance of output. If b were equal to zero, (average) inflation would be eliminated, but monetary policy would lose any ability to stabilize output.

Suppose now that voters were able to elect a central banker who, during her term of office, could freely pursue her preferred monetary policy—that is, once elected, the central banker cannot be recalled until the end of her term. Voters differ with respect to the relative weight that they attach to inflation and to output stabilization. Voter i 's preferences are described by a loss function

identical to (3) but with a relative weight b_i on the two objectives. Under majority rule, the central banker elected will be the one preferred by the median voter, that is, by the voter characterized by the median value of b_i : b_m . As shown by Alesina and Grilli (1991), the first-order condition that determines the type of central banker chosen by the median voter is

$$(7) \quad b^* \cdot k^2 - \left[\frac{\sigma_\epsilon^2}{(1 + b^*)^3} \right] \cdot (b_m - b^*) = 0.$$

The parameter b^* , which characterizes the preferences of the “optimal” central banker from the viewpoint of the median voter (and thus of the central banker who will be elected by majority rule), is a function of the preferences of the median voter, b_m , and of the variance of real shocks. Equation (7) shows that, for $\sigma_\epsilon^2 > 0$, b^* is always positive but smaller than b_m : as originally shown by Rogoff (1985b), the median voter has an incentive to appoint a central banker who is more “conservative” than she herself is—that is, a central banker who values fighting inflation more than the median voter does.¹⁸

12.4.2 The Choice to Relinquish Monetary Sovereignty

Consider now the effects of a change in voters’ preferences. Let us assume that the distribution of preferences across voters shifts so as to result in a lower value of b_m : the median voter becomes relatively more concerned about inflation.¹⁹ As b_m falls, so does b^* , according to equation (7).²⁰

The obvious outcome of a change in voters’ preferences is that, at the end of the term of office, a new central banker is elected whose preferences reflect the change in voters’ concerns for output and price stability. For the purpose of our discussion, however, we are interested in studying the case when the first-best outcome (the election of a new central banker) is ruled out. We consider two options: (a) keep the current central banker, who is no longer optimal but cannot be removed, or (b) short-circuit the independence of the domestic central banker by signing an international agreement that implies relinquishing domestic monetary sovereignty, for example, a commitment to passively peg the exchange rate to a foreign currency, made credible by a sufficiently high political cost of abandoning the peg.

What are the costs and benefits of option b ? If the shift in voters’ prefer-

18. The “independence” of the central banker during her term of office is crucial to the result, as it amounts to a form of precommitment. If the central banker could be recalled before the end of her term, it would be impossible to improve on the time-consistent equilibrium corresponding to $b = b_m$, which, by the first-order condition (5), is inferior to the equilibrium corresponding to $b = b^*$. The length of the central banker’s term of office is clearly crucial because, when a new one is elected, b^* can change. What is relevant, in the framework of this model, is that the length of office be at least as long as that of wage contracts.

19. In our empirical work, we test for a change in consumers’ preferences assuming that the median and the average voter—the only ones we can observe—coincide. This obviously depends on the distribution of preferences.

20. It is straightforward to show, from (7), that the derivative of b^* with respect to b_m is positive.

ences reflects an increased concern for inflation, then replacing the domestic monetary authority (elected at a time when inflation was not perceived as such a serious problem) with a foreign central banker more committed to price stability may be an attractive option. The cost is a higher variance of domestic output since the foreign central banker—to the extent that she cares—will stabilize output in her own country. The correlation between domestic and foreign real shocks will thus be an important factor in the decision to relinquish monetary sovereignty.

The choice between options *a* and *b* is illustrated in figure 12.3. The parameter *b*, shown on the horizontal axis, characterizes the preferences of the relevant central banker. On the vertical axis is the value of the median voter's loss function: $L(b, b_m)$ is the loss function under the "old" voter's preferences (b_m); it is minimized at $b = b^*(b_m)$. A shift in preferences, from b_m to $b_m' < b_m$, implies that the "optimal" central banker will be relatively more concerned about inflation also (b^* also falls along with b_m). The relevant comparison is between $L[b^*(b_m), b_m']$ —point A—and the value of the loss function at some other point, say for $b = b_f$, which corresponds to the relative weight that the foreign central banker attaches to price and output fluctuations (point B in the figure).

We shall first study the simpler case where $b_f = 0$: the foreign central banker is concerned only about price stability and gives no weight to fluctuations in output. This case is simpler because the covariance between domestic

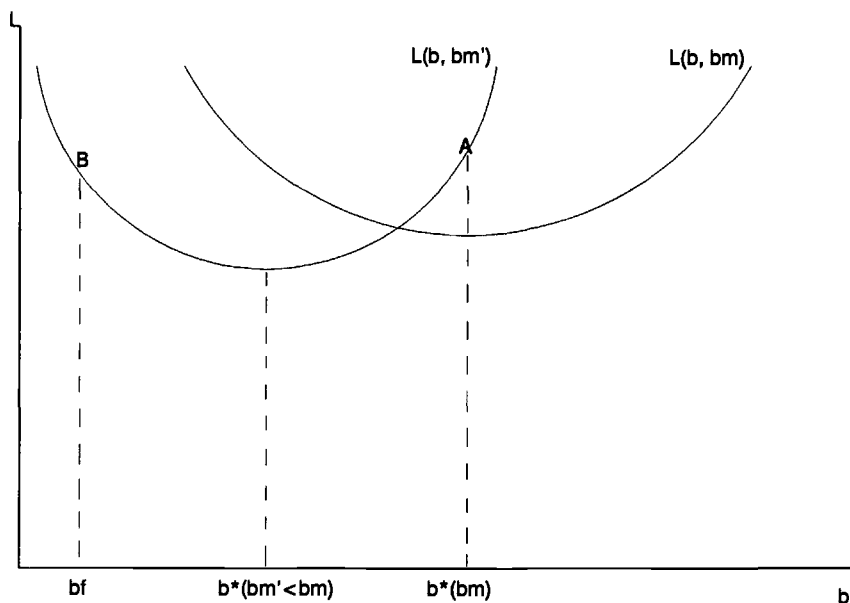


Fig. 12.3 Choice to relinquish monetary sovereignty

and foreign real shocks is obviously irrelevant. We shall then ask how the incentive to relinquish monetary sovereignty is affected by the covariance of real shocks when the foreign central banker is also trying to stabilize (her own) level of output.

Pegging to a Central Banker Solely Committed to Price Stability

As we show in equation (A4) in the appendix, the choice between options *a* and *b* can be described by figure 12.4. On the horizontal axis appears $b^*(b_m)$, which characterizes the preferences of the central banker that were optimal before the shift in preferences. This is shown on the vertical axis: $(b_m - b_m')$. The locus through the origin describes the points where the median voter, following the shift in preferences, is indifferent between keeping the domestic central banker and deciding to short-circuit her independence by signing an international agreement that commits her to passively peg to her foreign counterpart. This will happen whenever the shift in preferences is sufficiently large, given how different the two central bankers available are: the domestic one, whose preferences are described by $b^*(b_m)$, and the foreign one, whose *b* equals zero. If the concern for inflation was relatively high to start with (thus resulting in a relatively high value of b^*), the shift must be large to convince the median voter to “adopt” a foreign central banker who

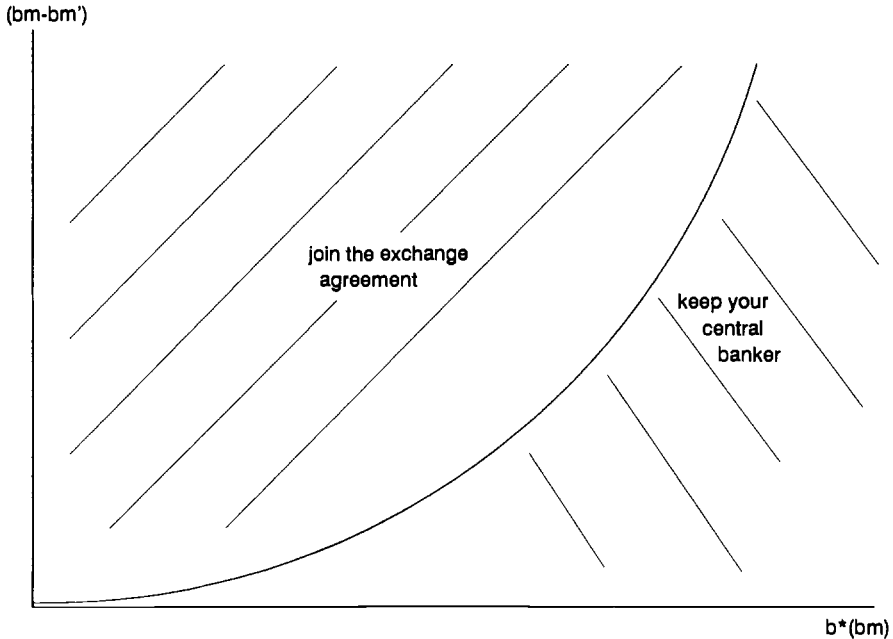


Fig. 12.4 Pegging to a central banker committed to price stability

cares only about price stability. An increase in the variance of domestic real shocks (that for given voters' preferences raises b^*) shifts the indifference locus upward: the shift in preferences must be larger to justify abandoning the home central banker, even if she is no longer optimal.

The Correlation between Domestic and Foreign Real Shocks

If the foreign central banker, like the domestic one, were chosen by majority rule, her concern for output stabilization would not be zero, as assumed above. We show in the appendix that, if the correlation between domestic and foreign real shocks is small, the higher is b_f (the parameter describing the preferences of the foreign central banker), the less likely is the median voter to decide to give up monetary sovereignty. This is true even if b_f happens to match the preferences of the new "optimal" central banker (from the viewpoint of the domestic voter), as long as the covariance of real shocks is small, because the home country imports a positive rate of inflation that abroad is justified by the gains in terms of output stabilization but at home is just a source of inefficiency.

This has the following important implication: if the correlation between domestic and foreign real shocks is zero, a foreign banker stubbornly committed to price stability is preferable, even relative to one who happened to attach the "optimal" weight to price and output stabilization.

As the correlation between domestic and foreign real shocks rises, the home country starts benefiting from the stabilization independently carried out by the foreign central banker: for a given shift in preferences, the higher the correlation, the more likely it is that the median voter will choose to relinquish monetary sovereignty. In terms of figure 12.4, an increase in the correlation between domestic and foreign real shocks shifts the locus downward, increasing the chances that the domestic central banker will be short-circuited. (A formal proof is provided in the appendix.)

12.5 Concluding Remarks

History has provided us with a number of examples of multiple-country fixed exchange rate regimes that have eventually fallen apart. At the top of the list is the Bretton Woods system, which collapsed in 1971. Early attempts at a European exchange rate system also failed—notably, the Snake that was formed in 1972 with ten members but had dwindled to only five small countries pegging to Germany by 1979, when it was replaced by the EMS.

In light of these failures, why has the EMS been so successful in reducing inflation differentials and stabilizing exchange rates among members and, indeed, in expanding its membership? This paper has argued that a key factor in explaining these successes has been a convergence in attitudes toward inflation and unemployment in Europe since the late 1970s. In contrast, analysts of the Bretton Woods collapse point to a growing divergence in attitudes

toward inflation, and in the resultant policy choices, from the late 1960s. However, the EMS was not initially viewed as a success. In its early years (1979–82), there is little evidence that membership in its exchange rate mechanism (ERM) forced countries to give up monetary sovereignty. France and Italy both followed quite expansionary monetary policies, in contrast to Germany. Both experienced rising inflation and underwent a series of large exchange rate adjustments. Interestingly, other countries that did not participate in the ERM, such as the United Kingdom (and the United States), did significantly reduce their inflation rates during the early 1980s. However, since 1982, there has been widespread convergence of policy and performance among ERM members, and membership has expanded to include Spain and the United Kingdom.

This paper had two tasks. First, it presented some new empirical evidence to support the view that one important reason for the success of fixed exchange rates in the EMS has been a convergence of attitudes toward inflation and unemployment among EMS members. Second, it developed a theoretical framework to illustrate why shifts in attitudes of voters within a given country might lead that country to give up monetary sovereignty by pegging its exchange rate to a “leader.”

The theoretical section of the paper can be summarized as follows. Consider a country that has inherited a central bank with a prespecified stance toward fighting inflation—that is, preferences that were optimal given voters’ past preferences toward inflation and unemployment. Now suppose that the median voter becomes more concerned about inflation. There are two possible outcomes. First, the country might engineer a change in the anti-inflation stance of its own central bank. Whether this is possible depends on characteristics of the country in question, such as its political system, the timing of elections, and the freedom of its central bank from political suasion. The second, less preferable option is to tie the hands of the domestic central bank by committing to follow the monetary policy of a central bank that is more committed to fighting inflation. The gain from giving up monetary sovereignty is lower inflation. The cost is a reduced ability to stabilize domestic output. The paper shows that whether the country will choose to become (and remain!) a follower depends on how much domestic preferences have shifted, on how different the domestic and the potential leader’s central banks’ anti-inflationary stances are, and on the covariance between domestic output and the leader’s output.

The empirical section of the paper uses household survey data to look for shifts in attitudes toward inflation and unemployment in eight European countries during 1974–90. For each country, we regress expectations about the general economic situation on expectations about the behavior of inflation and unemployment and look for shifts in the structural coefficients. Our empirical results provide considerable evidence of such shifts.

There are three main findings. First, concern about inflation relative to un-

employment appears to have increased significantly in both Italy and France during our sample period. Both these countries had high inflation during the 1970s and opted to pull out of the Snake. But both reduced their inflation rates and stabilized their exchange rates during the EMS period. Interestingly, we find that much of the change in attitudes occurred *after* the EMS was already in operation—particularly for France. This could help explain why these countries did not adopt more anti-inflationary policies until the mid-1980s. Exchange rate realignments were not “politicized” and thereby made costly until after 1982. Before this time, ERM membership arguably required little reduction in monetary sovereignty. Second, we also find that the United Kingdom experienced an increase in concern about inflation in the late 1980s. Perhaps this shift in attitudes was a factor in the recent decision to join the ERM.

The final result is a surprise that we find intriguing: a shift in the opposite direction for households in Germany. During the mid-1980s, they appear to have become *less* concerned about inflation. Interestingly, some of the small countries that stayed with Germany in the Snake—that is, Belgium, the Netherlands, and Denmark—show a similar shift. (Such a shift is also evident in Ireland, which is somewhat more puzzling.) This finding provides a possible explanation for why Germany might be willing to stay in an exchange regime that requires it to accept a higher inflation rate.

Our analysis thus points to some key differences between Bretton Woods and the EMS that help explain why one system of fixed exchange rates collapsed while the other has expanded. Consider first the Bretton Woods experience. The early phase (1960–66) saw large inflation differentials, relative to the center (the United States), which had relatively low inflation. However, it was difficult to adjust exchange rates, resulting in large real misalignments. In the second phase (1967–71), exchange rate adjustments did occur, but there was no convergence in inflation rates. In fact, the differential reversed as U.S. inflation rose relative to inflation in most other members.

The EMS experience is strikingly different. Although there were also large cumulative inflation differentials (with low-inflation Germany at the center) in the first phase (1979–87), they were in large part offset by exchange rate realignments, and capital controls helped avoid disruptive speculative attacks. In the second phase (1987–91), exchange rate adjustments stopped; however, this was sustainable because of the convergence in inflation rates.

Thus, there are two important differences between the two systems. First, the EMS exchange rate mechanism facilitated smooth adjustments of exchange rates in the period before inflation rates converged. Second, a convergence in attitudes toward inflation (and unemployment) appears to have occurred in Europe during the 1980s. This shift in attitudes facilitated—and made sustainable—a convergence in inflationary performance.

Appendix

Relinquishing Monetary Sovereignty to a Foreign Central Banker Solely Committed to Price Stability

We first consider the case where the foreign central banker is solely committed to price stability: that is, the relative weight that she assigns to output stabilization is $b = b_f = 0$. After a shift in the median voter's preferences, from b_m to b'_m , the choice between pegging and keeping the domestic (suboptimal) central banker depends on the difference between the expected values of the loss function at $b = b^*(b_m)$ and $b = b_f = 0$:

$$(A1) \quad E\{L[b^*(b_m), b'_m]\} - E\{L(0, b'_m)\}.$$

Noting that for any given value of a central banker's preferences, b , the expected loss for a voter with preferences b_m is

$$(A2) \quad E[L(b, b_m)] = .5(b^2 + b_m)[k^2 + \sigma_e^2/(1 + b)^2],$$

and using the median voter's first-order condition, equation (7) in the text, it can be shown that (A1) is equal to

$$(A3) \quad \sigma_e^2 \frac{b^*}{1 + b^*} \left\{ (b_m - b'_m) - (b_m - b^*) \left[1 + \frac{b^*(2 + b^*)}{(1 + b^*)^2} - b^* \right] \right\}$$

where $b^* \equiv b^*(b_m)$. (A3) is positive for

$$(A4) \quad (b_m - b'_m) > b^* + \left[\frac{k}{\sigma_e^2} b^*(1 + b^*)^3 \right] \left[1 + \frac{b^*(2 + b^*)}{(1 + b^*)^2} \right] \\ \equiv f(b^*, \sigma_e^2).$$

It can also be shown that both $\partial f/\partial b^*$ and $\partial^2 f/\partial (b^*)^2$ are positive, thus justifying the graph in figure 12.4. Moreover, $df/d\sigma^2 = (\partial f/\partial b^*)(\partial b^*/\partial \sigma^2) + \partial f/\partial \sigma^2$ is also positive: an increase in the variance of domestic real shocks shifts the indifference locus upward.

The Covariance between Domestic and Foreign Real Shocks

We now assume that $b_f > 0$, the parameter that characterizes the preferences of the foreign central banker, is positive and smaller than $b^*(b_m)$. In this case, the choice whether to relinquish monetary sovereignty depends on the sign of

$$(A5) \quad E\{L[b^*(b_m), b'_m]\} - E\{L(b_f, b'_m)\}.$$

Note that (A5) can be decomposed as follows:

$$E\{L[b^*(b_m), b'_m] - L(0, b'_m)\} + E[L(0, b'_m) - L(b_f, b'_m)].$$

The term in the braces corresponds to expression (A1), whose sign depends on the sign of (A4); the term in brackets is equal to

$$(A6) \quad -b_f^2 k_f^2 - (1 + b'_m) [b_f / (1 + b_f)]^2 \sigma_f^2 + 2 b'_m [b_f / (1 + b_f)] \sigma_{df},$$

where k_f is the foreign output target, σ_f^2 is the variance of foreign output shocks, and σ_{df} is the covariance between the shocks to foreign and domestic output. If shocks are uncorrelated, a positive value of b_f (motivated by the fact that the foreign central banker cares about output fluctuations in his own country) reduces the incentive to "adopt" the foreign central banker. As we noted in the text, if the covariance were zero, a foreign central banker who happened to be the ideal one after the shift in preferences would be worse than one stubbornly committed to price stability. The intuition requires remembering (from the first-order condition described in eq. [7] in the text) why the median voter would choose a central banker with a positive b_f , thus resulting in a positive average inflation rate: only because a positive value of b_f dampens the variance of output. But if foreign output shocks are uncorrelated with domestic shocks, from the viewpoint of home residents a positive value of b_f is just a source of inefficiency; it keeps inflation positive with no effects on the variance of *domestic* output. The third term in the expression shows instead that, the higher the covariance between foreign and domestic output shocks, the higher the likelihood that "adopting" the foreign central banker may be a superior option. This is because the correlation between domestic and foreign shocks allows the home country to benefit from the stabilization independently carried out abroad.

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Comment Michele Fratianni

Although Susan Collins and Francesco Giavazzi's paper does not deal directly with the Bretton Woods system, its relevance for this conference's theme comes from their assessment of the failure of Bretton Woods and the implications for the construction of a stable, fixed exchange rate area in Europe. The message is that Bretton Woods broke down because it lacked flexibility in exchange rate adjustment and because the participating countries had different views about the desirable rate of inflation. In contrast, "common attitudes toward inflation are a necessary condition for the viability of a fixed exchange rate system," in particular the European Monetary System (EMS) and its evolution into a full-fledged monetary union.

The conclusion of the paper is that the successful reduction of inflation differentials in the EMS stems from "a convergence in attitudes toward inflation and unemployment in Europe since the late 1970s." In turn, the source of this convergence is that voters in France and Italy became more "conservative" (i.e., more concerned about inflation) in the 1980s, whereas voters in Germany became less "conservative."

While I agree that inflation convergence has taken place because of changes

in attitudes about the role of inflation,¹ I would like to raise some methodological points about the way Collins and Giavazzi reach their conclusions and, at the end, suggest an alternative to the hypothesis of a shift in voter preferences: namely, a shift in central bank attitudes about the role of inflation in the economy and the adoption of medium-term monetary targets aimed at reducing the rate of inflation.

The Theoretical Construct

My first point concerns the applicability of the scenario motivating the model adopted by Collins and Giavazzi (see Alesina and Grilli 1991). An election takes place, the outcome of which is a shift to the “right”—that is, more concerned with inflation—of the median voter. The model assumes that the existing central banker, who has more liberal views on inflation than the median voter, cannot be dismissed because of central bank independence. The government faces two options. Either it keeps the old central banker and accepts a higher inflation rate than the median voter desires, or it signs an international agreement whereby the exchange rate is pegged to a currency of a country that is credibly committed to a high degree of price stability.

This scenario lacks plausibility for two reasons. First, in countries like France and Italy, the governor of the central bank serves at the discretion of the government. Dismissing the governor carries for the government a lower cost than signing and sticking to the above-mentioned international agreement. Second, going back to the formation of the EMS, we have two examples—at opposite ends of the inflation spectrum—of governments signing the EMS agreement that do not fit the motivation underlying the model. The first is Germany, whose chancellor, Helmut Schmidt, short-circuited the Bundesbank, not because of undesirable inflation policies pursued by the bank, but because he wanted to use the EMS to achieve political union in Europe: “I had always regarded the EMS, not only as a mere instrument to harmonize the economic policies of the EC member countries, but also as part of a broader strategy for the political self-determination in Europe. . . . France under Giscard was prepared for the loss of sovereignty that would come at the end of this road; the Bundesbank and many of the German professors of economics, who think of themselves as experts, were not prepared for it (and still are not today)” (Schmidt 1990). Italy, on the other hand, offers another type of illustration that is also hard to reconcile with Collins and Giavazzi’s argument. The Italian government entered the EMS to actually discipline itself, an objective that had eluded the Bank of Italy for a long time. The then governor of the bank, Paolo Baffi, wrote that “the participation of our

1. In fact, empirical evidence suggests that the change in attitudes in the early part of the 1980s is more important in explaining EMS convergence than the popular alternative of German dominance in the EMS (Fratianni and von Hagen 1990).

country in the EMS implies a commitment to reach in a short time a degree of monetary stability equivalent to the Community average of which we are a part; beyond the exchange rate, this commitment includes public finances, productivity, wages, and prices" (Banca d'Italia 1979, 375).

Household Survey Data and Empirical Testing

My second point concerns the use of the European Community household survey data and the empirical procedure. Given the importance of the data for the strategy and conclusions that Collins and Giavazzi reach, a more thorough discussion of what the surveys represent would have been useful. To begin with, the question on price trends (*PT*) clearly refers to the *expected change* of the inflation rate and not the *expected level* of the inflation rate, whereas the questions on general economic conditions (*EP*) and unemployment (*UT*) refer to the *expected level* of the variables over the next twelve months. In contrast, the loss function (1) is written in terms of *expected levels* of *EP*, *PT*, and *UT*. Furthermore, following Collins and Giavazzi's assumption that *EP* expresses a utility level dependent on *PT* and *UT*, the responses to *EP*, *PT*, and *UT* are linked by a rationality criterion. To check this, I arbitrarily looked at the survey data for France and Italy for the period 1974:1–1983:1 (there was a break in the series after 1983) to see whether the three responses were consistent in the sense that when respondents indicated that *PT* and *UT* would deteriorate *EP* would decline, or vice versa. I found that five out of fifty-four observations violated this consistency requirement. Unless respondents are irrational, this finding suggests that at least one more variable is missing in the information set of individuals when expressing their sentiments about future values of *EP* or, more generally, that the assumed preference function is not empirically valid.

One obvious candidate for a missing variable is output growth. Changes in the unemployment rate are an imperfect proxy of output growth, and even more so in European countries where *UT* has remained relatively high, despite "decent" economic growth. Hysteresis effects, labor market rigidities, and laws that hamper labor mobility are some of the reasons why changes in unemployment rates do not correlate well with output growth (Commission of the European Communities 1984; Lawrence and Schultze 1987). The omission of a potentially important variable, such as output growth, from equation (2) creates the problem that the residual term in the equation captures movements of the omitted variable. Since *UT* and output growth are related, it follows that *UT* is not independent of the error term, with the attendant econometric consequences.

Finally, supposing for argument's sake that the missing variable poses no problem in the sense that it is constant over time, how does one interpret the regression results of the paper? I believe that the estimated coefficients have more to do with the relative ability of households to forecast unemployment

rates and changes in inflation rates than with welfare weights and that the variable EP has more to do with an overall index of combining different forecasts than a welfare index.

Some evidence in favor of this proposition comes from Papadia and Basano (1981), who looked at the properties of PT . They transformed the price trend survey data responses into quantitative values of the *expected* rate of inflation using a logistic (and linear) function. The transformed series behaves rationally in the (weak) sense that it can forecast the rate of inflation more accurately than purely autoregressive estimates of the inflation rate. I do not know of any comparable work on the unemployment rate. Yet, on the basis of this evidence, I submit an alternative explanation of the estimated values of b —the relative weight on unemployment—in the regressions. Households got better in forecasting inflation rates in the 1980s because the mean and variances were shifting downward in high-inflation France and Italy. In sum, the downward shift in the estimate of b for France and Italy could reflect improvements in forecasting PT relative to UT .

Peculiar Results

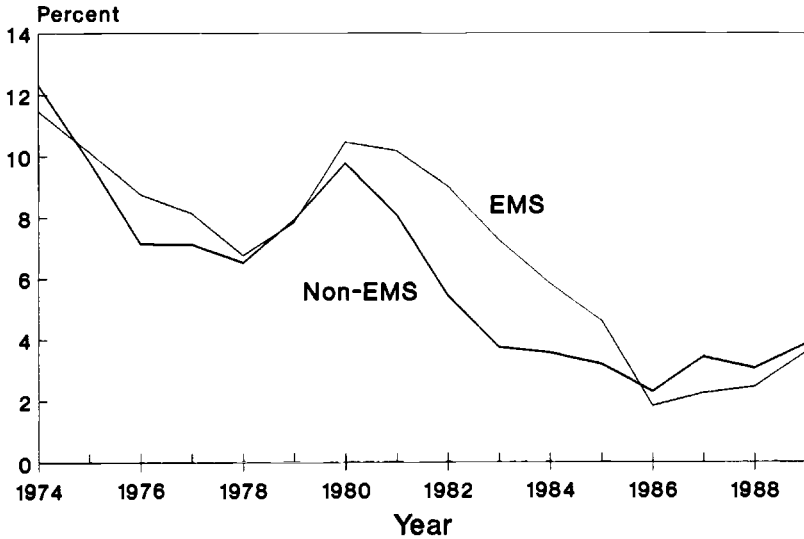
While the empirical results for France and Italy accord with our intuition, those relating to Germany do not: the estimated b rises sharply for Germany after October 1988. This, by itself, is a stunning result in light of the history of the EMS since the last realignment of January 1987. France and, to a lesser extent, Italy have repeatedly complained about tight German monetary policy while at the same time preventing the deutsche mark from realigning upward. In contrast, the convergence of the b 's among the three countries should have spelled French and Italian acquiescence to German monetary policy.

An Alternative Hypothesis

As I mentioned earlier, there is something to the story of a change in attitudes about inflation rates. Figure 12C.1, showing annual percentage changes in the consumption price deflator for EMS countries and a group of non-EMS countries, suggests that such a change can be approximately dated at the end of the 1970s. The failures of active demand management of the 1970s led policymakers of the industrial countries to gradually switch to medium-term monetary targeting aimed at reducing the rate of inflation.² Such a switch did not exclusively affect the EMS countries; the non-EMS countries were affected as well.³ Indeed, the two lines are so close as to suggest that there is nothing unique about EMS countries' inflation rates (Fратиани and von Hagen

2. See Chouraqui and Price (1984). Quantitative monetary targets were adopted by Germany (1974), Italy (1974), Canada (1975), France (1977), Japan (1977), the United States (October 1979), and the United Kingdom (March 1980).

3. The data come from Fratianni and von Hagen (1992, chap. 2). Non-EMS countries consist of Australia, Austria, Canada, Finland, Greece, Japan, Switzerland, the United Kingdom, and the United States. The weights used in adding individual countries' inflation rates are based on 1982 GDP shares.



Growth rate

Fig. 12C.1 EMS and non-EMS consumption deflator

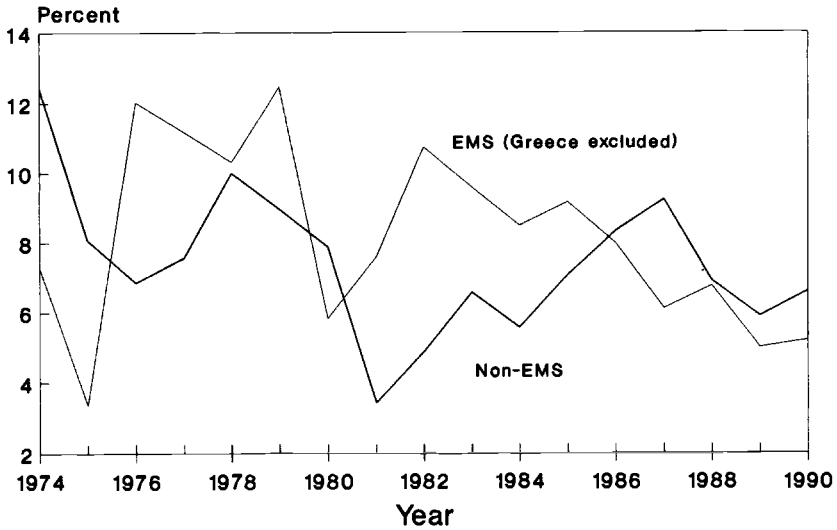


Fig. 12C.2 EMS v. non-EMS money base growth

1992). Further corroborating evidence comes from figure 12C.2, showing the growth rates of the aggregate EMS and non-EMS monetary base.⁴ Camen, Genberg, and Salemi (1991) apply an inverse control procedure to infer the

4. The countries and weights are the same as those for the inflation rate.

objectives of the Bundesbank and the Banque de France and find that the latter gave a much larger weight to inflation after June 1982. Such a shift makes the French central bank behave more like the Bundesbank.

In sum, my alternative to the Collins-Giavazzi hypothesis is that the disinflation of the 1980s was to a large extent the result of changes in attitudes of the monetary authorities toward inflation. Clearly, this alternative does not preclude the Collins-Giavazzi hypothesis of the median voter becoming more conservative. While central bank preferences will ultimately have to converge with those of the electorate, I believe that the disinflation of the 1980s was the result of the central bankers leading the charge, with the public trailing right behind.

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Comment Niels Thygesen

This paper by Susan Collins and Francesco Giavazzi is an original and intriguing contribution to our efforts at understanding why the European Monetary System (EMS) has succeeded where the Bretton Woods system failed. The EMS has moved through three stages of increasingly tight exchange-rate management: (1) an initial stage for the first four years since the start in March

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1979 during which the system looked like a crawling peg, although devaluations sometimes did not fully offset excess inflation; (2) a disciplinary stage, lasting also nearly four years, as most non-German participants aimed to squeeze their inflation rates by maintaining as stable exchange rates as possible for their currencies against the deutsche mark; and (3) a third stage, now lasting for more than five years, during which rates have moved only within the fluctuation margins.

This process of gradually increasing emphasis on nominal convergence is usually analyzed as the result of changing perceptions among policymakers as to the unemployment-inflation trade-off, combined with a shift in preferences toward a greater weight on the objective of price stability. Both authors have made important contributions to the literature on these explanations of why a number of member states of the European Community have chosen to modify their policies and why they have opted to do so through participation in the EMS. In the present joint paper, the authors advance the hypothesis that the shift in policy was preceded by a shift in voter preferences toward more aversion to inflation; in the absence of an opportunity to replace their domestic central bank leadership with a more "conservative" one to reflect this shift, voters have been content to see monetary sovereignty constrained by pegging to the deutsche mark. Furthermore, the authors devise an ingenious way of using survey data to evaluate empirically if, and when, changes in preferences can be identified. This empirical study is the most novel and commendable part of the paper.

Since January 1974, the Directorate-General for Economic and Financial Affairs of the European Commission has published at intervals of four months the results of a questionnaire study of household perceptions of recent trends in the economic performance of the respondents' country and expectations as to the next twelve months. Two specific questions are asked, namely, with respect to changes in the rate of inflation and in the unemployment percentage. Consumers are also asked to evaluate the general macroeconomic situation of their country. The questionnaire also asks three questions relating to the particular situation of the individual respondents with respect to their financial situation, savings, and intended major purchases. The authors focus on the three first questions and assume that the responses to the general macroeconomic question can be seen as weighted averages of the responses to the two specific questions on inflation and unemployment. They discuss in a careful and well-documented way possible dates for one or more breakpoints in the weights of the two macroeconomic indicators that add up to the general evaluation by consumers and find interesting and surprising results for most of the seven main countries that have participated in the EMS since its start and for the United Kingdom. The main results suggest that voters in France and Italy had revised their preferences in the direction of greater emphasis on lower inflation before, or early, in the EMS experience, hence giving political impetus to the gradual tightening of the system that occurred with some delay,

and that, in contrast, voters in Germany and the Netherlands shifted their preferences in the opposite direction—toward greater emphasis on employment—at different points in time in the second half of the 1980s. This latter shift is interpreted by the authors to imply growing political support in the anti-inflationary bastions for the increasing inflationary risks implied by an EMS in which exchange rates have become *de facto* frozen.

There are three reasons why I find these rationalizations of the evolution of the EMS less than fully convincing.

The first is that the evaluation by consumers of the general economic situation may depend on more macroeconomic indicators than simply the inflation and unemployment rates. The authors themselves point out that there is significant autocorrelation in several of the national equations, which could be an indication of the omission of one or more explanatory variables. One likely candidate as omitted variable is an indicator of the sustainability of the government's economic policy, expressed, say, by the ratio of government debt to GDP—or the rate of change of this ratio—which has been a focal point of the public debate in several EMS countries in the 1980s. Other possible candidates are the current imbalance and an indicator of competitiveness; discussion of external imbalance has also figured prominently in the evaluation of the general performance of the European economies in the 1970s and 1980s.

A second reason for questioning the outcome of the empirical analysis is the simplified and linear way in which the two main indicators of economic performance enter the preference of consumers. For example, the authors remark that German consumers appear to have shifted toward greater tolerance of inflation in late 1986. This was at a time when consumer prices were falling slightly as the combined result of a sharp drop in oil prices and an extended period of tighter budgetary policies from 1982 onward. Presumably, German consumers recognized at the time that inflation had been dealt with quite effectively, so that concern could justifiably be expressed primarily with respect to observed rising unemployment. Conversely, French and Italian consumers were well justified in the late 1970s and early 1980s in focusing their concerns on inflation, which remained stubbornly at the double-digit level. The importance of the level of the two indicators disappears when the preferences are expressed only in terms of changes in them.

A third reason for questioning the results—not unrelated to the first two—is linked to the fact that the empirical study fails to identify shifts in preferences at times when voter dissatisfaction with the general economic situation found expression in rather massive swings of the political balance. In France, the center-right government of President Giscard d'Estaing and Prime Minister Raymond Barre, which had followed a steady policy of squeezing down inflation—although without much success—was ousted from office in 1981 and replaced by a socialist government committed to expansionary policies and ready to take greater inflationary risks. This does not square well with the

shift toward greater aversion to inflation implied by the consumer survey after October 1979. Equally puzzling is the failure of the survey to pick up the shift in voter preferences expressed in the switch from a Labour to a Conservative government in the United Kingdom in May 1979. Given the major role that the aim of reducing inflation played in the campaign that brought Mrs. Thatcher to power in that election, the empirical results are surprising to an economist, at least. There are also less important questions with respect to the timing of the evolution of preferences in some other countries, although, on the whole, they appear more plausible.

The three reasons given for questioning the reliability of the empirical results of the paper should not be seen as a criticism of the authors' effort to use previously unexploited data in a novel and imaginative way to address an important and striking phenomenon: why a number of European countries have adopted changes in macroeconomic policies, going so far in a noninflationary direction that EC governments have now even agreed to sign a new treaty that recognizes price stability as the primary objective of monetary policy.

While I fully recognize the pioneering nature of the empirical analysis, I have more reservations as to the linkage made by the authors to the theoretical literature on commitment to price stability by adopting an increasingly rigid exchange rate regime. It appears to me farfetched to assume that voters have influenced the choice of exchange rate regime in order to bring about a cession of national monetary sovereignty through participation in the EMS. The gradual evolution of the EMS that can be observed in the 1980s has become clear only *ex post*, and it seems more likely that the central banks and governments have participated in it as a result of their experience of how their economies worked and because the central banks—with their inherent bias toward price stability—have gradually gained the upper hand in policy-making as capital mobility increased and monetary management became more market oriented and less susceptible to national preferences.

In other words, the voters did not have to impose a shift in their preferences on their respective central banks; the latter were quite ready to seize the opportunity to conduct policies geared increasingly to low inflation. From this perspective, studies of the evolution of central bank independence and of the decisions to liberalize capital movements and push financial integration seem more relevant to an explanation of changes in the EMS than an analysis of shifts in voter preferences. Studies of the latter may, however, be illuminating for evaluating to what extent such changes have been supported by the voters. The main conclusion of the paper is that the consumer surveys can be interpreted as indicative of such support in the higher-inflation countries. At the same time, the excellent results in achieving a high degree of price stability in the low-inflation countries by the mid-1980s may have facilitated their acceptance of a system that has entailed slightly higher inflationary risks for them toward the end of the period of observation.

General Discussion

Fred Bergsten reflected on a parallel between Germany's current position in the EMS and the U.S. position at the end of Bretton Woods. He argued that the Germans are still devoted to fighting inflation but have lost the use of the exchange rate instrument under the existing EMS—hence they have ended their opposition to monetary union. This is similar to the U.S. situation in 1971. The United States wanted to depreciate but in that case felt that it could do so only by breaking the system. *Charles Wyplosz* disagreed. In his view, Germany is running European monetary policy and has not lost its ability to fight inflation. The German concern with monetary union is over losing its monetary independence to other countries. *Alberto Giovannini* argued that, as long as the EMS exists, the option to realign remains. However, with full monetary union, the option is no longer there. This is his explanation for why there is German opposition to monetary union.

Charles Wyplosz suggested that the reason for the growing success of the EMS since 1979 was a flow investment by European central banks in the stock of credibility. During the post-Bretton Woods period, different central banks have gone through different learning processes, culminating in the 1980s with the view that credibility was paramount.

Sebastian Edwards wondered what the authors' surveys were actually capturing. He thought that responses by individuals in each country to questions about unemployment and inflation might be strongly influenced by the overall level of optimism or pessimism, which in turn would be colored by exogenous events such as the Falklands War in the United Kingdom, capital controls in France, or the World Cup in Italy.

Allan Meltzer reflected on the lessons of Bretton Woods for the EMS. He argued that, during the 1970s, the Germans learned that revaluation did not inflict permanent harm on their export industries, so they learned not to resist adjustment as they had in the 1960s. The French learned that the only way to maintain the EMS system was to disinflate and that, by doing so, there would not be permanent effects on unemployment. In addition to having learned the lesson from Bretton Woods of the need to allow adjustment, the Europeans (especially the Germans) did not want to continue absorbing U.S. inflation, as they had under Bretton Woods and throughout the 1970s. Thus, in 1979, the year the EMS began, the Germans told Paul Volcker at Belgrade that they were no longer willing to support the dollar.