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## *The Unstable EMS*

FROM THE STANDPOINT OF EUROPEAN MONETARY AFFAIRS, 1992 opened with a bang and closed with a whimper. In January, the European monetary system (EMS) celebrated five years of exchange rate stability: sixty full months without a realignment. The month before, the representatives of European Community (EC) member-states initialed the Treaty on Economic and Monetary Union concluded at Maastricht in the Netherlands. The transition to European monetary union (EMU) appeared to be fully underway.

By the end of the year, the European monetary system had endured—indeed, was continuing to experience—the most severe crisis in its fourteen-year history. Two of ten currencies, the Italian lira and the British

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pound, had been driven from the system. (Of the twelve EC countries, Greece is not a member of the exchange rate mechanism (ERM), while Luxembourg's franc is set at par to Belgium's franc.) Other currencies, including the Spanish peseta and the Portuguese escudo, had been devalued involuntarily.<sup>1</sup> Some of the affected countries reimposed capital controls. British Prime Minister John Major and others complained of "fault lines" running through the European monetary system.<sup>2</sup> The EC's monetary committee, the body responsible for coordinating the operation of the system, held three meetings in the final months of the year in a fruitless effort to identify and repair the system's flaws. Clearly, the process that was supposed to culminate in monetary union had suffered a serious setback.

As we explain in this paper, until the summer of 1992, anticipations of a smooth transition to monetary union had stabilized expectations and hence the operation of the EMS. At that point, the protracted process of negotiation and ratification allowed doubts to surface about whether the treaty would ever come into effect. This altered the costs and benefits of the policies of austerity required of countries seeking to qualify for European monetary union, leading the markets to anticipate that those policies would ultimately be abandoned.

Certain perverse incentives built into the treaty complicated the situation further. One of the four convergence criteria required of countries qualifying for European monetary union is that they maintain exchange rate stability: they must keep their currencies within their EMS fluctuation bands "without severe tensions" for at least two years before inaugurating monetary union. A speculative attack forcing a devaluation that prevents a country from satisfying this requirement might, by eliminating the lure of membership in the monetary union, induce its government to abandon its current policy regime. Because the country, once driven out of the EMS, might no longer qualify for EMU membership, it would have no incentive to continue pursuing the policies of austerity necessary to gain entry. Thus a speculative attack could prove self-fulfilling.

We develop this hypothesis by contrasting two models of balance-of-payments crises. The first, following Paul Krugman<sup>3</sup> and Robert P.

1. The Irish punt joined the list in early 1993.

2. Ivo Dawney and Robert Graham, "Major Calls for ERM Reform," *Financial Times*, September 20, 1992, p. 1.

3. Krugman (1979).

Flood and Peter M. Garber,<sup>4</sup> relates speculative attacks to economic fundamentals. Countries experience balance-of-payments crises because they run unsustainable monetary and fiscal policies or their competitiveness otherwise deteriorates. Krugman's own formulation requires current policies to be inconsistent with the exchange rate peg; we discuss a variant of the model in which an attack can occur even when current policies are consistent with the peg, but future policies are expected with certainty to shift in a direction inconsistent with its maintenance.

The second model, following Flood and Garber<sup>5</sup> and Maurice Obstfeld,<sup>6</sup> allows purely self-fulfilling speculative attacks to occur. In the absence of an attack, monetary policies remain unchanged and the exchange rate peg is maintained forever. If and only if an attack occurs, monetary policy will shift in a less restrictive direction, causing the exchange rate to depreciate. In the first model, the speculative attack merely anticipates events that would eventually occur; in the second model, in contrast, the attack provokes events that would not occur in its absence. For this model to be compelling, there must be an intrinsic reason why monetary policy would shift only in the event of an attack. As explained above, the Maastricht treaty provides such a reason. It makes exchange rate stability a precondition for participation in European monetary union. Once driven out of the EMS, a country could no longer qualify for EMU membership and hence would no longer have an incentive to pursue the policies of austerity required for entry. The force of this explanation is illustrated by the behavior of the United Kingdom, which, after having pursued high interest rate policies for more than two years, cut its discount rate in half as soon as it was driven out of the EMS—despite no other obvious change in economic circumstances, no change in government, and not even a change in the identity of the Chancellor of the Exchequer.

In the second section of our paper, we review recent EMS history; in the third, we analyze the requirements for operating pegged exchange rate systems. We then discuss four distinct explanations for the September 1992 crisis, working from the simplest to the increasingly complex. The first explanation, considered in the fourth section, is that persistent high inflation and rising labor costs in some EMS countries eroded their

4. Flood and Garber (1984a).

5. Flood and Garber (1984b).

6. Obstfeld (1986).

competitiveness and created balance-of-payments problems. For the vast majority of EMS countries, we find little support for this view in the data. Except in Italy, there is little evidence that wage inflation was inadequately compensated by increases in labor productivity.

In the fifth section, we analyze a second explanation. Starting in 1990, EMS countries suffered a massive asymmetric shock: German economic and monetary unification (GEMU). While this explanation also focuses on competitiveness, unlike its predecessor, it emphasizes that evidence of competitive difficulties will not be easy to detect in relative prices. As an asymmetric shock, GEMU required a change in relative prices and costs. Maintaining the historical relationship of unit labor costs between Germany and the rest of the EMS was not enough; prices and costs in other EMS countries actually had to decline relative to those prevailing in Germany. We analyze profitability in manufacturing and the current account of the balance of payments to ascertain whether the requisite adjustment took place; again, we conclude that in most cases it did. By the time the crisis erupted, most EMS countries had successfully carried out the changes in relative prices and costs required to maintain their EMS parities.

The sixth and seventh sections then introduce the two models that we believe best fit the facts: the Krugman model with speculative attacks driven by inevitable future policy shifts; and the Obstfeld model with multiple equilibria, contingent policy shifts, and self-fulfilling attacks.

Given four different interpretations of the crisis, it is natural to ask foreign exchange traders what they actually thought. Thus in the eighth section, we report the results of an extensive mail questionnaire administered to European foreign exchange dealers, which provides some support for our interpretation. The ninth section explains why governments and central banks found it so costly to defend their pegged rates once speculative attacks were underway, while the tenth section assesses the political economy of the crisis from the German Bundesbank's perspective.

The last two sections consider options for the future. We list the alternatives for completing the transition to European monetary union. These include attempting to proceed as before, but realigning more frequently; arranging a merger between the Bundesbank and the Bank of France; establishing an early two-speed EMU within the framework of the Maastricht treaty; and enhancing exchange rate flexibility. We con-



clude that none of these alternatives is viable.<sup>7</sup> This leaves the option of providing pecuniary disincentives against speculative attacks. Either levying a Tobin tax on foreign exchange transactions or requiring purchasers of foreign exchange to make non-interest-bearing deposits at the central bank would serve this purpose. It would thereby stabilize the EMS during the transition. Our recommendation is consistent with the provisions of the Single European Act and the Maastricht treaty. We recognize that both a Tobin tax and deposit requirements have disadvantages: they reduce the liquidity of the foreign exchange markets, which may discourage foreign investment and hinder efforts to develop financial markets. But it is not enough to point to these disadvantages. Critics must also offer a viable alternative.

### **The Three Stages of the New EMS**

EMS histories abound. Most conclude around 1987 or so, however, immediately before the system was dramatically transformed. This section provides a capsule history of the new EMS, the modified system that came into operation in 1987. Our account distinguishes three stages in its development.<sup>8</sup>

#### *No Realignments after 1987*

In the first phase of the new EMS, realignments were eliminated. From the inception of the EMS in 1979 through January 1987, there were eleven realignments—more than one a year, on average. By contrast, from January 1987 until the 1992 crisis, no further realignments oc-

7. One seemingly logical option—floating exchange rates—is strongly opposed by Europeans, a fact that is not always adequately appreciated. Their resistance results in part from the extent of intra-European trade, which renders exchange rate fluctuations costly. Previous experiences with floating rates, like that of the 1930s, have left a particularly bitter taste in the mouths of European policymakers. Moreover, Europeans fear that manipulation of exchange rates would represent a threat to the common market itself, for reasons we explain below. History also explains why Europe feels the need to firmly anchor Germany in an open trade and payments area; to achieve this goal, a common market and fixed exchange rates are viewed as essential.

8. The term “new EMS” was coined by Giavazzi and Spaventa (1990). Portes (1993) presents an analysis of these developments that parallels our own account.

**Table 1. Exchange-Rate Realignments within the EMS, 1979–87<sup>a</sup>**

Percent

<i>Date of realignment</i>	<i>Deutsche mark</i>	<i>Dutch guilder</i>	<i>French franc</i>	<i>Bel./Lux. franc</i>	<i>Italian lira</i>	<i>Danish krone</i>	<i>Irish punt</i>
September 24, 1979	2.0	...	...	...	...	-2.9	...
November 30, 1979	...	...	...	...	...	-4.8	...
March 23, 1981	...	...	...	...	-6.0	...	...
October 5, 1981	5.5	5.5	-3.0	...	-3.0	...	...
February 22, 1982	...	...	...	-8.5	...	-3.0	...
June 14, 1982	4.3	4.3	-5.8	...	-2.8	...	...
March 21, 1983	5.5	3.5	-2.5	1.5	-2.5	2.5	-3.5
July 22, 1985	2.0	2.0	2.0	2.0	-6.0	2.0	2.0
April 7, 1986	3.0	3.0	-3.0	1.0	...	1.0	...
August 4, 1986	...	...	...	...	...	...	-8.0
January 12, 1987	3.0	3.0	...	2.0	...	...	...

Source: Fratianni and von Hagen (1992, p. 22).

a. The numbers are percentage changes of a given currency's bilateral central rate against those currencies whose bilateral parities were not realigned. A positive number denotes an appreciation, a negative number a depreciation. On March 21, 1983, and on July 22, 1985, all parities were realigned.

curred. Table 1 presents the dates of these realignments and their composition.<sup>9</sup>

The need for realignments reflected the persistence of inflation differentials across EMS countries. Paul De Grauwe has noted that the standard deviation of inflation rates across EMS countries actually rose in the first four years of the EMS, compared to the preceding period.<sup>10</sup> Indeed, inflation differentials in this period were larger across EMS countries than across EC countries that did not participate in the system. The situation began to change in 1983, although inflation differentials remained substantial, narrowing only after 1987. Even thereafter, however, substantial differentials still remained between Italy, the United Kingdom, and Spain on the one hand and Germany on the other.

By 1987, it seemed that realignments had become a thing of the past.<sup>11</sup>

9. A twelfth realignment on January 8, 1990 replaced the Italian lira's wide band with the narrow EMS band by leaving the upper limit unchanged and raising the lower limit, thereby effectively raising the central rate against the DM by 3.5 percent. No change in the actual lira-DM rate was involved. Giavazzi and Giovannini (1989) and Gros and Thygesen (1992) provide short histories of the circumstances surrounding each realignment.

10. De Grauwe (1989).

11. Whether this change reflected a conscious policy decision is open to question. In any case, there were notable dissenters from the no-realignment strategy, including the German Bundesbank. See for example Deutsche Bundesbank (1991, p. 66). We return to these issues in footnote 12 and in the fifth and tenth sections below.

What led policymakers to ignore continuing inflation differentials and adopt the no-realignment strategy? The answer is particularly interesting in light of the 1992 crisis. The January 1987 realignment, the last one to occur under the old EMS, was widely viewed as unprecedented. It was attributed not to imbalances within the EMS but to extraneous factors. The leading culprits—a declining dollar and self-fulfilling speculative expectations—were precisely the same as in 1992! This interpretation led to revisions of EMS arrangements designed to strengthen intervention and encourage policy coordination (the Basle-Nyborg Agreement of 1987).<sup>12</sup> Credit facilities were extended for longer periods. For the first time, countries were permitted to draw on credits before a currency reached the limit of its EMS band. Imbued by confidence because of these innovations, policymakers discarded the realignment option.

### *No Capital Controls after 1990*

Intervals of exchange rate stability punctuated by occasional realignments were possible because controls protected central banks' reserves against speculative attacks. Inflation differentials continued to offer exchange market participants a one-way bet: given Italy's tendency to run a looser monetary policy than Germany, for example, it was easy to anticipate that the lira would have to be devalued sooner or later. When the time came, huge quantities of financial capital flowed from Milan to Frankfurt, threatening the Banca d'Italia's reserves and the EMS itself. Capital controls provided insulation from these pressures. They allowed monetary authorities to retain some policy autonomy for limited periods. Different inflation rates were thereby reconciled with pegged yet adjustable exchange rates.

As table 2 shows, these controls took a variety of forms, ranging from taxes on holdings of foreign currency assets to restrictions on the ability of banks to lend abroad. Controls were eliminated as an adjunct to the 1992 program to complete the internal market. It was hardly feasible to

12. The Basle-Nyborg Agreement, while liberalizing access to financing facilities for use in supporting weak exchange rates, in fact called for undertaking small realignments more frequently, perhaps by shifting the band without changing the exchange rate discretely, as with the 1990 realignment of the lira. How this recommendation came to be discarded remains an important subject for research.

**Table 2. Capital Controls for EMS Countries by Type of Transaction, 1988**Type of control<sup>a</sup>

Country	Securities		Loans		Other	
	Primary market	Secondary market	Trade related	Other	Deposit accounts	Other <sup>b</sup>
Belgium <sup>c</sup>	F/A	F	F	F	F	F
Denmark	F	F	A	A	A	A
France	R/A	F	R	R	F/R	F
Germany	F	F	F	F	F	F
Ireland	A	F/R	F/A	F/A	F/P	F/P
Italy	A/P	F/R	F/A	A	F/P	F/P
Luxembourg <sup>c</sup>	F/A	F	F	F	F	F
Netherlands	F	F	F	F	F	F
United Kingdom	F	F	F	F	F	F
Greece	A/P	A/P	A	A	R/P	R/P
Portugal	R/A	R/A	A	A	A	A
Spain	A	F/R	A	R/A	F/A	A

Source: Morgan Guaranty Trust Co. (1988, p. 5).

a. The first code refers to capital inflows, while the second code refers to outflows. If only one code is listed, we infer that the code applies to both inflows and outflows. The controls are coded as follows:

F = Free of controls.

A = Subject to authorization.

R = Subject to various restrictions as to maturity, size, and use of funds.

P = Prohibited, or subject to authorization that was usually not granted.

b. Includes money market instruments such as treasury bills.

c. A dual exchange market was maintained.

restrict the freedom of Italians to open bank accounts in Germany, for example, while eliminating all controls on intra-EC movements of portfolio capital and direct foreign investment—not to mention labor and commodities. Hence controls were a casualty of the Single European Act, which mandated their elimination by July 1, 1990 (except in Spain and Ireland, which were exempted until December 31, 1992, and Portugal and Greece, which were exempted until December 31, 1995).<sup>13</sup> Most EMS members had removed their capital controls by the beginning of 1990, while Spain and Portugal had significantly relaxed their controls before the crisis struck.

For a time, the no realignment–no controls strategy seemed to work even in the face of persistent inflation differentials. The question is what tied down nominal exchange rates when real exchange rates were diverging.

13. The Single European Act allows all EC countries to resort to emergency controls for a period of no more than six months. The Maastricht treaty, however, rules that out completely from the beginning of Stage II on January 1, 1994. See the appendix for more information.

*No Stability after 1991*

The answer, as revealed by the third stage in the evolution of the new EMS, was nothing more than self-validating expectations of continued stability. As soon as doubts began to surface, the viability of the new EMS was threatened.

The lira was the first ERM currency to weaken in the second quarter of 1992. Observers cited a declining U.S. dollar, which undermined Italian international competitiveness; the possibility of an extraordinary tax on bank deposits and government bonds; the country's large budget deficit; its high public debt; the ongoing government crisis associated with the inconclusive debate over deficit reduction; and the negative outcome of the Danish referendum on Maastricht. The Banca d'Italia intervened extensively over the summer. In the opening days of September, the currency weakened further. A 1.75 point increase in the Banca d'Italia's discount rate on September 4 (which brought the rate to 15 percent) and the government's decision to seek emergency powers bought a brief respite, but within a week the lira had crashed through its exchange rate mechanism floor.

Britain's exchange rate was also showing disturbing symptoms. In the second week of July, sterling fell to its lowest level against the DM since the April 1992 election.<sup>14</sup> The currency's weakness deepened in August. Britain reportedly expended at least \$1.3 billion of reserves that month to keep sterling from falling through its floor against the DM. The first week in September, the Bank of England borrowed \$14.5 billion of foreign reserves to finance further intervention, news of which allowed sterling to recover temporarily.<sup>15</sup>

On September 16, the Bank of England engaged in massive intervention in support of the pound, reportedly expending as much as \$20 billion, or half its total foreign exchange reserves.<sup>16</sup> Its discount rate was raised from 10 to 12 percent and a second increase to 15 percent was announced. None of these measures sufficed. Hemorrhaging reserves

14. The dominant explanation in the press was that the decline of the dollar rendered British goods uncompetitive against their U.S. substitutes. See, for example, *Economist*, September 19, 1992, p. 31.

15. Peter Norman, James Blitz, and Tracy Corrigan, "UK Will Borrow D-Marks to Aid £," *Financial Times*, September 4, 1992, p. 1, and Peter Norman, "Positive Response to Currency Plan," *Financial Times*, September 4, 1992, p. 22.

16. "A Ghastly Game of Dominoes," *Economist*, September 19, 1992, p. 89.

forced the government to withdraw sterling from the ERM at the end of the day. Italy pulled out later that night, and Spain devalued the peseta by 5 percent. Portugal devalued by 6 percent on November 22. (Simultaneously, Spain shifted its ERM band a second time, also by 6 percent, although no discontinuous devaluation of the peseta occurred.) Ireland devalued in January, and Spain and Portugal again in May.

Thus a period of nearly five years distinguished by the absence of realignments came to an ignominious end, imparting a painful lesson to central bankers and politicians who had thought that the preconditions for European monetary union were already in place.

### **Pegged But Adjustable Exchange Rates: The Necessary Conditions**

When the EMS was launched in 1979, few economists gave it much chance of surviving. It not only survived but grew and prospered. It is worth considering, therefore, what this experience reveals about the preconditions for maintaining pegged exchange rates. We focus on three: the capacity to undertake relative price adjustments, robust monetary rules, and ability to contain market pressures.

#### *The Capacity to Undertake Relative Price Adjustments*

Pegged rate systems face difficulties when significant changes are required in the relative prices of domestic and foreign goods, of traded and nontraded goods, and of labor and commodities. If nominal exchange rate changes are not permitted, the response must occur through the synchronous adjustment of numerous wages and prices. If some wages and prices adjust sluggishly, transitional output losses may result. Exchange rate changes can avert these losses by altering many prices at once. This is the daylight savings time argument for exchange rate adjustments.

This perspective suggests that pegged exchange rates can be sustained only if shocks requiring frequent and sizable relative price adjustments are infrequent; if individual wages and prices adjust smoothly; or if changes in nominal exchange rates are permitted in the event of exceptional shocks.

In practice, the first two conditions have not been met, while the third

has been a feature of all successful pegged rate systems. Such systems feature escape clauses providing for realignments in the event of exceptional shocks.<sup>17</sup> The EMS as initially designed, for example, explicitly provided for realignments.<sup>18</sup>

The theory of escape clauses emphasizes that realignments can be undertaken without undermining authorities' commitment to pegged rates if they are initiated in response to exceptional shocks that can be directly observed or otherwise independently verified, and if those shocks are not instigated by the authorities themselves—that is, if moral hazard is not a problem. German economic and monetary union is an example of such a shock; as we document below, the German Bundesbank argued that it was possible to realign in response without undermining confidence in the EMS.

In contrast, if the contingencies that trigger the escape clause are private information, the contingent rule may lack credibility.<sup>19</sup> The gains from possessing an escape clause may be outweighed by the losses associated with the expectations of devaluation, higher interest rates, and inflationary pressure engendered by its existence. From this perspective, the new EMS was a gamble in which the authorities traded the third necessary condition for a viable exchange rate system (the escape clause) for the added credibility of a fixed rate, in the hope that one of the other two necessary conditions (infrequent shocks or smooth domestic adjustments) would miraculously arise.

17. The theory of escape clauses has been revived recently by Grossman and van Huyck (1988), De Kock and Grilli (1989), Flood and Isard (1989), Obstfeld (1992), and Giovannini (1993).

18. This observation raises an important question about life after European monetary unification: what will substitute for exchange rate changes in the event of exceptional shocks? By now, an extensive literature exists on the prospective effects of EMU. Horn and Persson (1988) suggest that EMU, by increasing the credibility of policymakers' commitment to price stability, might enhance wage flexibility. Similarly, the Commission of the European Communities (1990) argues that EMU, by increasing the credibility of fiscal authorities' commitment not to bail out depressed regions, will encourage workers in such areas to moderate wage demands. Bertola (1988) argues that once exchange rates are immutably fixed, workers will respond by adjusting on other margins, enhancing wage flexibility and interregional migration. The one empirical study to date of these hypotheses (Blanchard and Muet, 1993)—a comparison of wage flexibility before and after the initiation of France's *franc fort* policy—finds little support for them. While the costs and benefits of monetary unification are not the subject of this paper, in the final sections we discuss the implications of our analysis for European monetary union.

19. Canzoneri (1985).

*Robust Monetary Rules*

Because the credibility of a pegged rate system requires that exchange rate changes should occur only in response to exceptional disturbances, realignments resulting from self-fulfilling speculative attacks must be ruled out. A necessary condition for precluding such attacks is to adopt robust monetary rules.

Later in this paper, we describe the conditions under which multiple equilibria and self-fulfilling speculative attacks may exist in the foreign exchange market. At this stage, we simply note that there are conditions in which a speculative crisis can occur—even though monetary policy is conspicuously consistent with balance-of-payments equilibrium. If investors anticipate that post-attack monetary policy will be loosened, then capital gains on foreign assets will be rationally anticipated. It is this *ex post* validation that makes an attack equilibrium possible alongside a no-attack equilibrium.

Under these circumstances, current and past policies do not suffice to rule out balance-of-payments crises; anticipated future policies matter as well. The escape clause feature of pegged rate systems—that the parity may be changed if exceptional shocks occur—is compatible with the credibility of the peg only if changes in monetary and exchange rate policy do not occur under other circumstances. Thus a robust monetary rule is one that precludes a shift to more accommodating policies in the presence of a speculative attack not grounded in fundamentals.

Such rules are our second necessary condition for the viability of a pegged rate system. The EMS prescription that a country wishing to change its parity must obtain the agreement of all other participating countries on both the principle of the parity change and its size functions as a mechanism committing countries to the pursuit of robust monetary rules.<sup>20</sup>

*Ability to Contain Market Pressures*

A third necessary condition for the viability of a fixed rate system concerns central bank actions in the event of a crisis. If the markets are

20. This collective decisionmaking rule was in fact adopted to avert beggar-thy-neighbor policies, but evolved into a way of imposing discipline on inflation-prone countries. Naturally, it was abandoned by the United Kingdom and Italy when they suspended their ERM memberships.



uncertain as to whether the authorities are prepared to follow a robust monetary policy rule, they may test the authorities' resolve by running on their reserves. A government's commitment to follow a robust policy may not be enough to stabilize the exchange rate if the government is newly constituted and the markets are still uncertain about the government's intention. This is an example of the private information problem emphasized by Matthew B. Canzoneri.<sup>21</sup>

A concerted effort is required to defeat a speculative attack motivated on these grounds. One way of doing so is to raise domestic interest rates to such heights that the capital gains accruing on foreign assets if a realignment occurs are outweighed by the return on interest-bearing domestic assets. Investors then have no further incentive to test the authorities' resolve. But the maintenance of stratospheric interest rates may be painful, as we explain below. Central banks seeking to contain market pressures may have to resort to alternative means.

One alternative is for strong-currency countries to intervene in support of weak currencies. This implies that they should accumulate reserves, which would appear to be painless. But strong-currency countries fear that unlimited intervention threatens price stability because it implies an increase in the monetary base.<sup>22</sup> Central banks that commit to intervene in unlimited amounts may renege when they perceive that domestic price stability is jeopardized. We show below that this problem has arisen under the EMS.

Another way of containing market pressures is to resort to restrictions on capital movements. Capital controls, as an administrative restriction, limit the funds that can be legally and profitably transferred between currencies over short periods.<sup>23</sup> Such administrative controls may be circumvented eventually; however, in the meantime, they prevent the exhaustion of foreign reserves and abandonment of the exchange rate peg. Even if the controls protect the pegged rate for only a

21. Canzoneri (1985).

22. This is not the case when intervention is sterilized, but sterilized intervention is widely regarded as ineffectual; see Obstfeld (1988). For a recent view to the contrary, however, see Catte, Galli, and Rebecchini (1992).

23. This is formally analyzed in Wyplosz (1986). With capital controls, a speculative attack is of bounded size per unit of time. Hence, there exists a volume of foreign exchange reserves (possibly augmented by foreign loans) that is sufficient to support the fixed rate regime. As we explain below, it would also be possible to use nonadministrative measures such as taxes on foreign exchange transactions to achieve the same effect.

few days, this can provide precious scope for organizing an orderly realignment (which under EMS rules requires extensive consultation) and hence for insuring the survival of the system.

To sum up, the three conditions that we cited as necessary for a pegged rate system—the capacity to undertake relative price adjustments, robust monetary rules, and ability to contain market pressures—characterized the European monetary system as initially designed but were eliminated under the new EMS. Ruling out realignments—whatever the anti-inflationary benefits in weak-currency countries—has made relative price changes more difficult to effect. Eliminating capital controls—whatever the virtues in terms of resource allocation—has left central banks bereft of protection from attacks. The desire to qualify for monetary union provided countries with the incentive to adopt robust policy rules consistent with the maintenance of fixed rates. Once the prospects for European monetary union dimmed, however, speculative attacks proved impossible to rebuff. The EMS became unstable.

### **Overt Competitiveness Problems**

The simplest—and hence most popular—explanation for the September crisis is that it resulted from competitiveness problems. In this view, certain countries experienced persistent inflation and rising labor costs, which undermined the competitiveness of their traded-goods sectors. The markets identified these countries and attacked their currencies once devaluation was overdue.<sup>24</sup>

From this perspective, the countries whose exchange rates have been shaken since September fall into three categories. In the first is Italy, which shows clear signs of deteriorating competitiveness. Strikingly, Italy was the first EMS country to suffer foreign exchange market difficulties in the summer and autumn of 1992. Thus, we conclude that simple competitive problems played a part—but only a limited one—in the September crisis.

The second category includes Spain and the United Kingdom (along with two countries outside the EMS, Sweden and Finland). Although they too suffered foreign exchange crises in September, the evidence on

24. For an official expression of this view, see Commission of the European Communities (1993).

competitiveness is more ambiguous. Some indicators suggest a problem, while others do not. In the third category are the other EMS countries that experienced exchange rate difficulties—France, Belgium, Denmark, and Ireland—none of which showed significant signs of deteriorating competitiveness.<sup>25</sup>

We present three competitiveness measures for each country: bilateral unit labor costs relative to Germany, multilateral relative unit labor costs adjusted for the business cycle, and the ratio of traded to nontraded goods prices at home.<sup>26</sup>

Figure 1 focuses on Italy, the only EMS country that shows unambiguous evidence of deteriorating international competitiveness. The unit labor cost indexes in figure 1 indicate a loss of competitiveness of some 20 percent for Italy since 1988. This is confirmed by the decline in the ratio of traded to nontraded goods prices.

Figures 2 and 3 examine Spain and the United Kingdom, the two other EMS countries that present some indication of competitive difficulties (although the evidence is not clear). In the case of Spain, real exchange rates, whether measured by labor costs or the price ratio between traded and nontraded goods, depict a massive real appreciation from the 1987 trough. One would expect a trend in this direction because of the Balassa-Samuelson effect, however.<sup>27</sup> Because Spain was growing rapidly during the period, this qualification renders the evidence for that country difficult to interpret.

There may also be some evidence of overvaluation for the United Kingdom. Interpretation of that evidence is complicated by the fact that

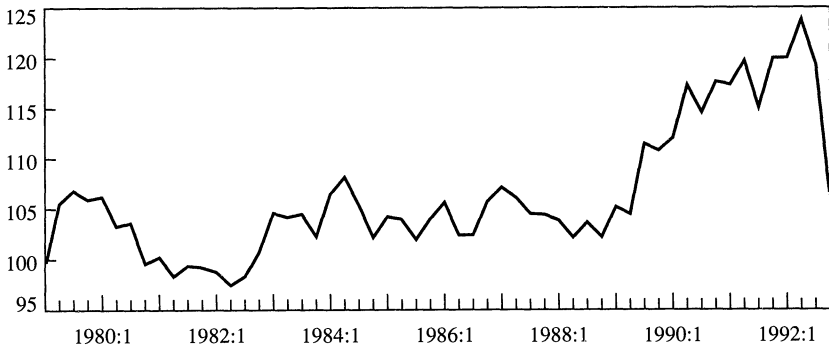
25. Limitations of the data for Portugal prevented us from undertaking a comparable analysis, but the data that exist suggest that Portugal also falls into this last category.

26. We measure bilateral unit labor costs by converting each country's unit labor costs in domestic currency into deutsche marks using the period average exchange rate. We prefer this measure to the multilateral one on the grounds that the latter is dominated by fluctuations in the U.S. dollar. The multilateral unit labor cost measure is based on the IMF index. In that index, the trade weights are a function of the shares of the sixteen foreign countries in the subject country's imports and exports, their relative shares in third markets, and the openness of their manufacturing sectors. It would not be appropriate, therefore, to construct bilateral unit labor cost comparisons relative to Germany by dividing the IMF index for the subject country by the IMF index for Germany because the two use different weights. As a measure of the relative price of traded and nontraded goods, we use the ratio of wholesale price to consumer price indexes.

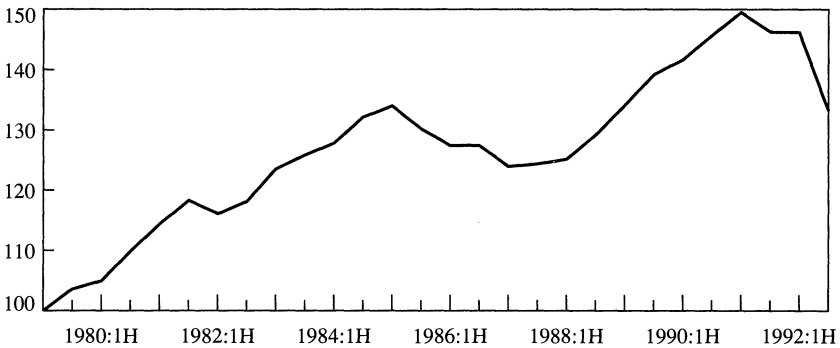
27. The Balassa-Samuelson effect is the tendency for the price level to be higher in high-income countries because of the relatively high price of nontraded goods. The same point applies to Italy, albeit to a lesser extent.

**Figure 1. Competitiveness Measures for Italy, 1979–92**

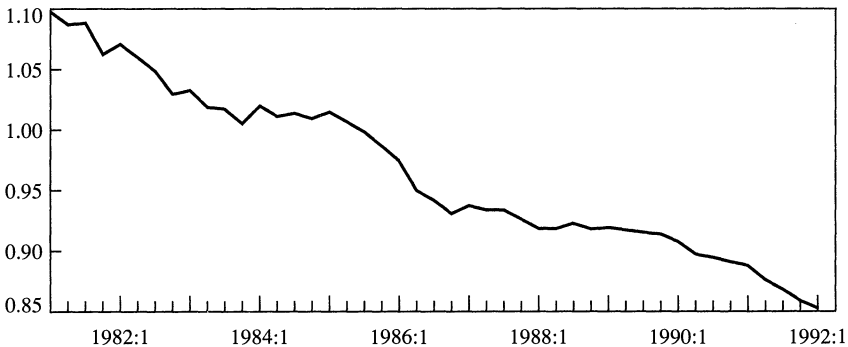
Index of multilateral relative unit labor costs



Index of bilateral relative unit labor costs



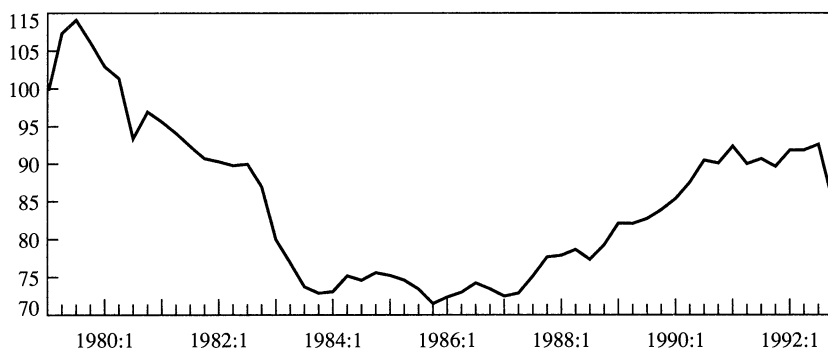
Traded to nontraded goods price index



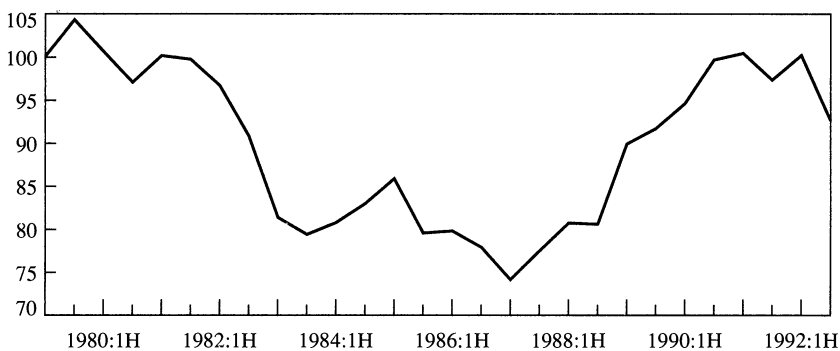
Source: Multilateral normalized relative unit labor costs are plotted quarterly and are from *International Financial Statistics*. Bilateral unit labor costs are plotted semiannually relative to Germany and are calculated using data from *OECD Economic Outlook*, various issues. Traded to nontraded goods price index is quarterly, from *Main Economic Indicators*, OECD, various issues.

**Figure 2. Competitiveness Measures for Spain, 1979–92**

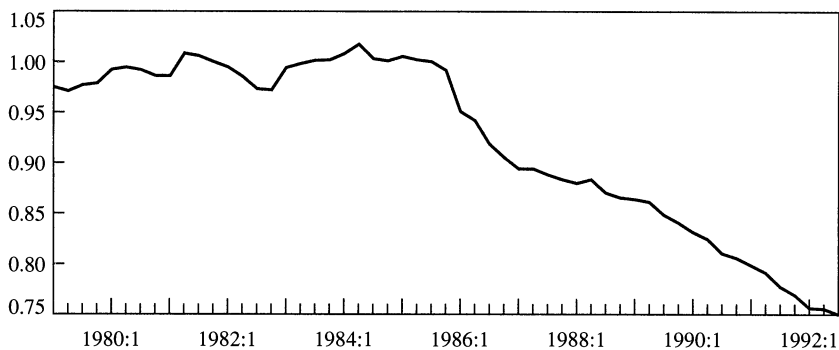
Index of multilateral relative unit labor costs



Index of bilateral relative unit labor costs



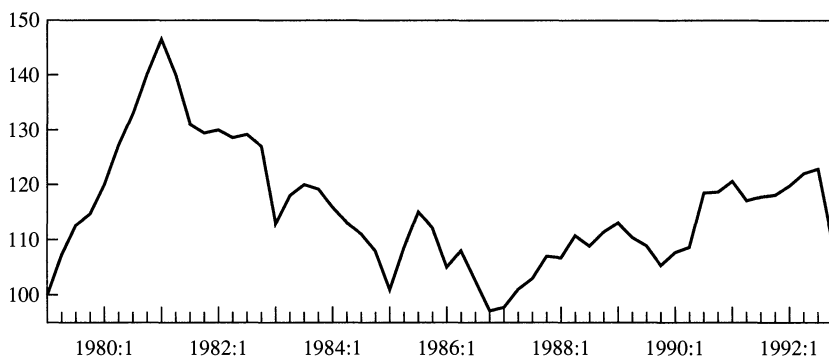
Traded to nontraded goods price index



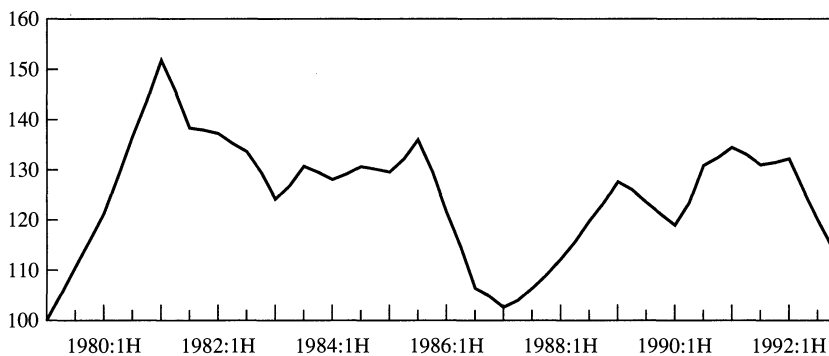
Source: Same as figure 1, except the index of traded to nontraded goods uses data from *International Financial Statistics*.

**Figure 3. Competitiveness Measures for the United Kingdom, 1979–92**

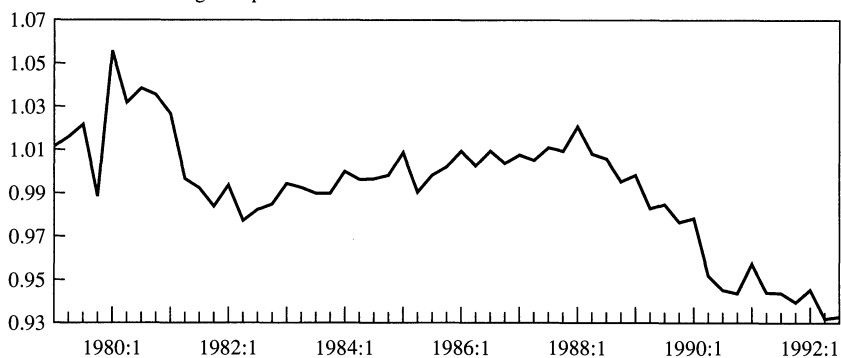
Index of multilateral relative unit labor costs



Index of bilateral relative unit labor costs



Traded to nontraded goods price index



Source: See figure 1.

the real appreciation predates Britain's entry into the ERM in October 1990. (Sterling did, however, shadow the ERM from 1987 onward.) The behavior of relative labor costs suggests that improvements were actually underway since entry. This observation creates some difficulty for those who argue that Britain's crisis was a product of the decision to join the ERM at an overvalued rate.

Sweden and Finland, while not ERM members, can be placed in this category as well. Finland suffered a massive shock because of the collapse of its Soviet trade; this required radical adjustments of the prices and costs of Finnish exports, which had to be redirected toward other markets. Sweden felt the repercussions of problems in neighboring Finland (with which it competed in products such as timber and minerals) and encountered difficulties in other markets, as well.<sup>28</sup> Both countries were grappling with widening budget deficits and serious banking problems. The labor cost indexes for Sweden in figure 4 suggest that a major deterioration had occurred in the late 1980s; however, a reversal was underway starting in 1990, which should have reassured foreign exchange market participants. In contrast, the price ratio of traded to nontraded goods shows no sign of recovery.

Figure 5 for Finland makes clear that a dramatic adjustment of wages and costs had taken place by 1992. But the magnitude of the Soviet shock makes it difficult to know whether these adjustments sufficed.

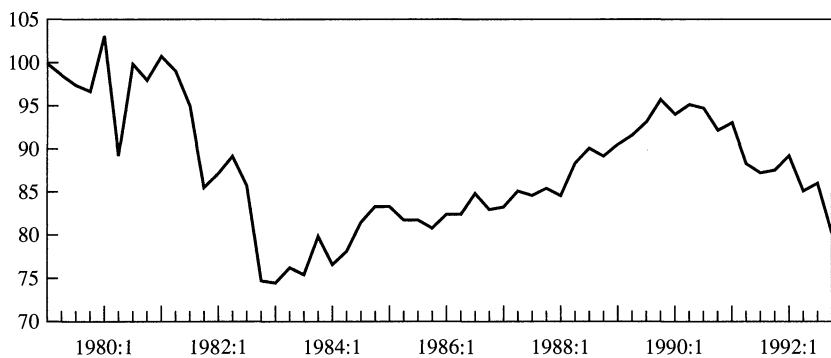
Figures 6 through 8 show these same competitiveness measures for Denmark, France, and Ireland, which also suffered attacks on their exchange rates starting in September. No sign of competitive difficulties appears in any of these countries, aside from the disquieting behavior of Danish unit labor costs. And the rise in Danish unit labor costs, centered around the mid-1980s, leveled off after 1986. There is little evidence of deterioration since that time.

On balance, we conclude that the divergent movement of prices and labor costs played a part—but a limited one—in the September crisis. This is an indictment of the no-devaluation policies of the new EMS (or of the macroeconomic policies followed by some of the participating countries). But this indictment is not universal. Aside from Italy and,

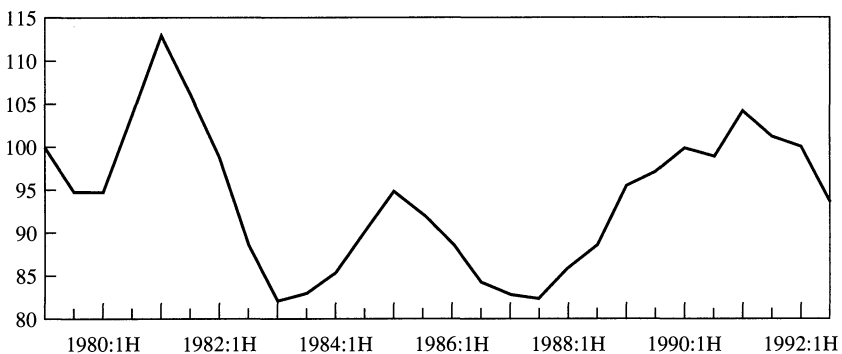
28. As the *Financial Times* reported, "Many investors also consider the krona heavily overvalued against the D-Mark. Sweden's export performance in recent years has been poor and there are no signs of an immediate improvement." James Blitz, "Central Banks Move to Ease Strain of the D-Mark," *Financial Times*, August 21, 1992, p. 2.

**Figure 4. Competitiveness Measures for Sweden, 1979–92**

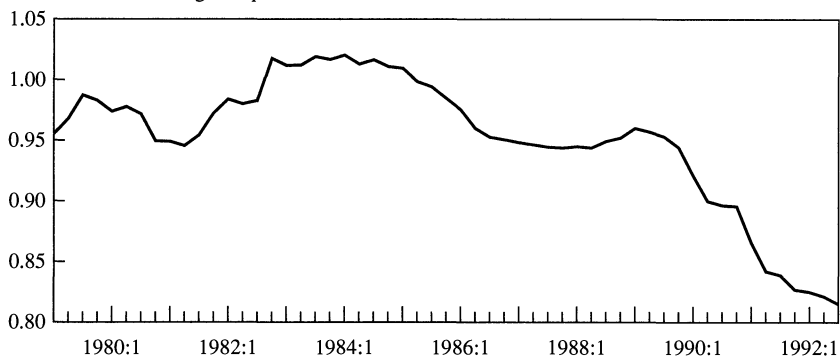
Index of multilateral relative unit labor costs



Index of bilateral relative unit labor costs



Traded to nontraded goods price index

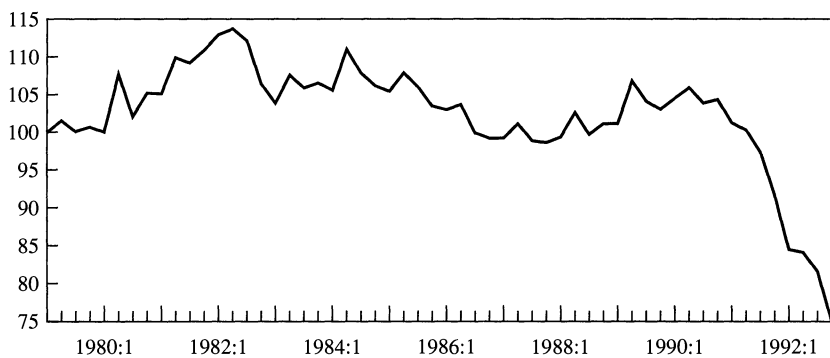


Source: See figure 1.

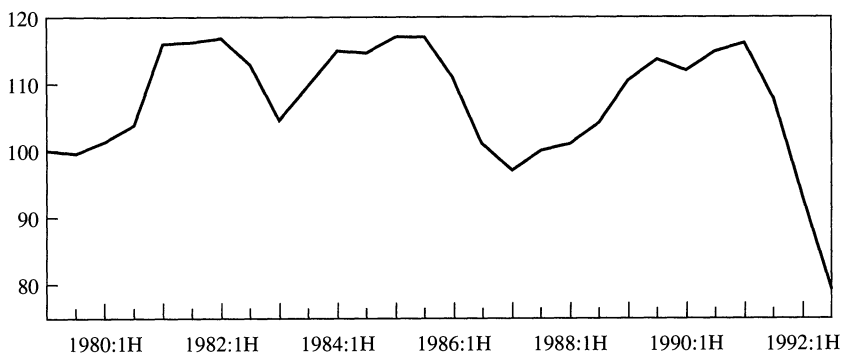


**Figure 5. Competitiveness Measures for Finland, 1979–92**

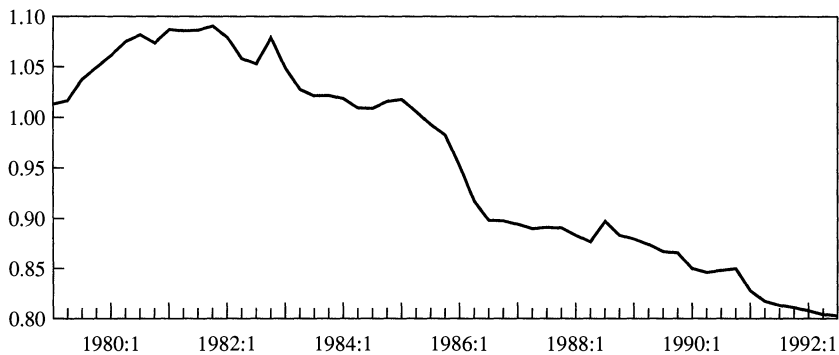
Index of multilateral relative unit labor costs



Index of bilateral relative unit labor costs



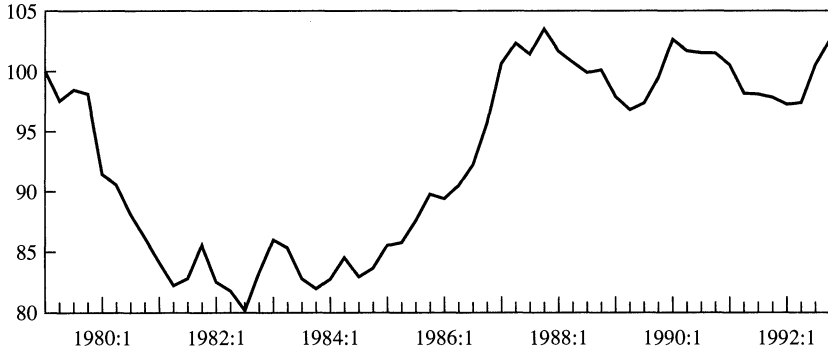
Traded to nontraded goods price index



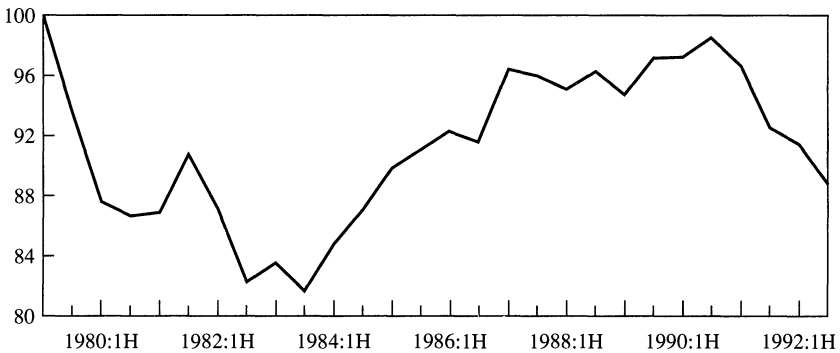
Source: See figure 2.

**Figure 6. Competitiveness Measures for Denmark, 1979–92**

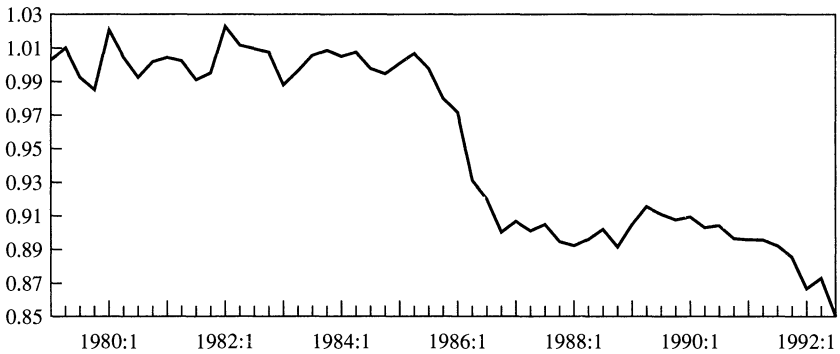
Index of multilateral relative unit labor costs



Index of bilateral relative unit labor costs



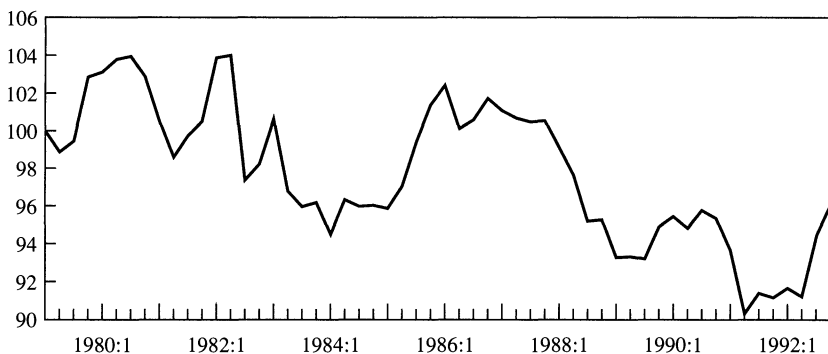
Traded to nontraded goods price index



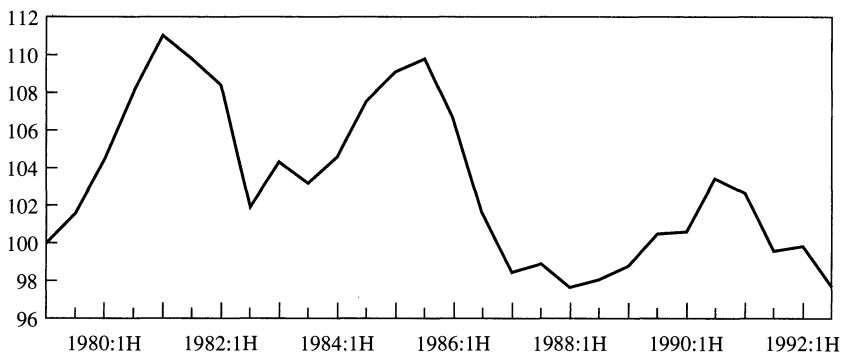
Source: See figure 1.

**Figure 7. Competitiveness Measures for France, 1979–92**

Index of multilateral relative unit labor costs



Index of bilateral relative unit labor costs



Source: See figure 1.

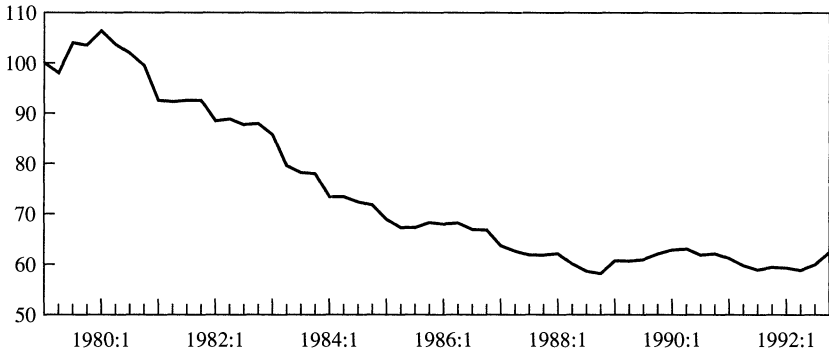
arguably, Spain and the United Kingdom, support for the simple competitiveness explanation of the crisis is hardly overwhelming.

### German Unification and Hidden Competitiveness Problems

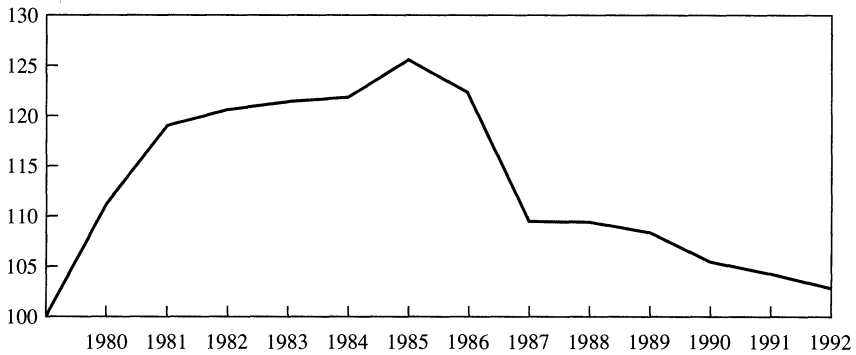
Even if relative unit labor costs in Germany and its EMS partner countries diverged only slightly, the latter still could have suffered competitive difficulties because of the asymmetric GEMU shock. German unification necessitated a decline in prices and costs in other EMS countries relative to those prevailing in Germany. That prices and costs

**Figure 8. Competitiveness Measures for Ireland, 1979–92**

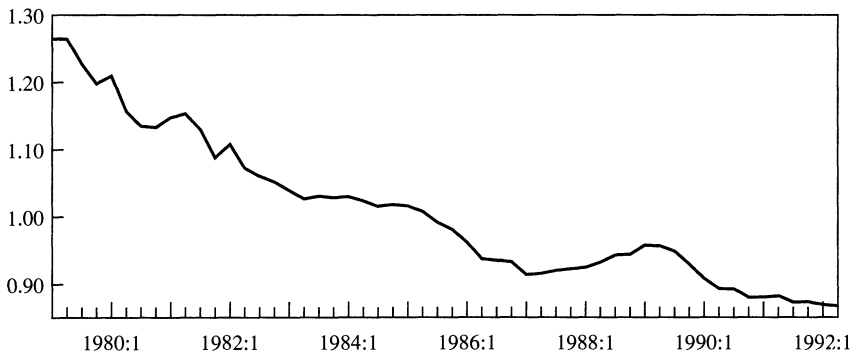
Index of multilateral relative unit labor costs



Index of bilateral relative unit labor costs



Traded to nontraded goods price index



Source: See figure 1. Irish bilateral unit labor costs are plotted annually.

evolved in parallel in Germany and other EMS countries does not therefore absolve other EMS members of the charge of inadequate competitiveness.

We develop this point with a simple model of the relative-price effects of German economic and monetary unification, and show how the requisite changes can be brought about under different exchange rate arrangements.

### *Modeling German Unification*

The instantaneous absorption by the Federal Republic of another country almost half its geographical size and one-quarter of its population was bound to affect economic conditions profoundly. Most early analyses concluded that an appreciation of the DM (a fall in prices and costs in other EMS countries relative to those prevailing in Germany) would be required in response to the shock.<sup>29</sup> A demand-side view noted that public and private spending rose considerably in the wake of unification.<sup>30</sup> Public spending was spurred by the need for investment in infrastructure and the rise in unemployment compensation. The surge in private spending in the East reflected consumption smoothing in anticipation of real wage gains. In the absence of a commensurate supply-side response, the pressure on home goods could only be accommodated by a real appreciation. A complementary supply-side approach stressed the existence of high-return investments in the East.<sup>31</sup> This placed upward pressure on real interest rates in Germany, attracting capital inflows and inducing a real appreciation.

Standard textbook models correctly predicted the macroeconomic consequences of the shock and pointed to the requisite adjustments. To drive home this point, we employ a simple two-country model in the tradition of Mundell-Fleming:

29. Typically these studies focused on the exchange rate change needed in the short run, largely neglecting long-run aspects. An exception is a paper by Begg and others (1990), which suggested that it might be necessary in the long run for the DM to depreciate to create a market for the additional German exports needed to service the foreign debt accumulated in the short run. The point is formally developed in Wyplosz (1991). Given our concern with the events of 1992, we focus here on the short run.

30. See Begg and others (1990) and Burda (1990).

31. See Siebert (1991) and Neumann (1992).

	<i>Germany</i>	<i>Other EMS Countries</i>
(1)	$m - p = ay - bi$	$m^* - p^* = ay^* - bi^*$
(2)	$y = hq - kr + \mu$	$y^* = -hq^* - kr^*$
(3)	$r = i - \dot{p}$	$r^* = i^* - \dot{p}^*$
(4)	$\dot{p} = cy$	$\dot{p}^* = cy^*$
(5)	$q = e + p^* - p$	
(6)	$i = i^* + \dot{e}$	

where all variables are in logs except for the real and nominal interest rates ( $r$  and  $i$  respectively). Asterisks denote foreign countries (for current purposes, the rest of the EMS), and dots over variables represent derivatives with respect to time. Equations 1 and 2 describe money and goods market equilibria where  $m$  is the money supply,  $p$  is the price level,  $q$  is the real exchange rate, and  $a$ ,  $b$ ,  $h$  and  $k$  are parameters. Output  $y$  denotes the deviation from trend. The unification shock (equivalently, a positive demand or negative supply shock) is represented by  $\mu$ ; for analytical simplicity, we model  $\mu$  as permanent.<sup>32</sup> Equation 3 defines the real interest rate in Germany and the rest of the EMS. Equation 4 is a naive Phillips curve, where  $c$  is a parameter.<sup>33</sup> Equation 5 defines Germany's real exchange rate relative to the other EMS countries. Equation 6 represents full capital mobility, as in the new EMS (where  $e$  is the domestic currency price of a unit of foreign exchange).

If  $z = p - p^*$  is the difference between price levels in Germany and the rest of EMS, then the system simplifies to

$$(7) \quad \dot{q} = \beta[2hq(a - bc) + z - (m - m^*) + \mu(a - bc)], \text{ and}$$

$$(8) \quad \dot{z} = \beta[2hbcq - kcz + kc(m - m^*) + bc\mu],$$

where the coefficient  $\beta$  is assumed to be positive.<sup>34</sup>

32. The shock might also be modeled as temporary, as in Wyplosz (1991). But this extension would not alter in any significant way the short-run responses upon which we focus here. Similarly, we neglect feedbacks through net exports without loss of generality.

33. Adding expectations would enrich the dynamics and complicate the presentation without substantively affecting the conclusions.

34. The coefficient  $\beta = [b + k(a - bc)]^{-1}$  must be positive for the system comprised of equations 7 and equation 8 to be saddle-path stable. We assume this to be the case in the following discussion. As usual, we treat the exchange rate as the nonpredetermined variable and the price level as the sticky predetermined variable.

If in response to the unification shock (when  $\mu$  becomes positive) money supplies  $m$  and  $m^*$  remain unchanged, the long-run equilibrium is reestablished when  $q$  falls by  $\mu/2h$  with  $z = 0$ . When exchange rates are allowed to float, this is also the short-run equilibrium as the deutsche mark appreciates by  $\mu/2h$  on impact. Price levels in Germany and other countries do not have to move. Output rises in the same proportion in both countries, perfectly spreading the unification shock across them. (If Germany reduces  $m$  to prevent its price level from rising, with  $m^*$  unchanged, a stronger initial appreciation will occur, followed by a decline of prices in Germany relative to those in the rest of the EMS.)

The same outcome can be achieved within the EMS so long as the deutsche mark is revalued at the time of unification. Thereafter, prices and output evolve in parallel in Germany and other EMS countries. Exchange rate flexibility is needed only once, when the shock occurs. If the new parity is chosen correctly, there is no need for further realignment.

### *The Conflict*

Aware of market pressures for an appreciation of its currency, the Bundesbank apparently desired a realignment of the DM as early as 1989. Revaluing the DM within the EMS requires the unanimous agreement of ERM countries, however. France, pledged to its *franc fort*, vetoed any change in its parity relative to the DM. Britain, which had just entered the ERM, argued that a downward realignment against the DM would undermine the credibility of its monetary strategy. The Bundesbank's preference for a realignment was rejected, apparently repeatedly.

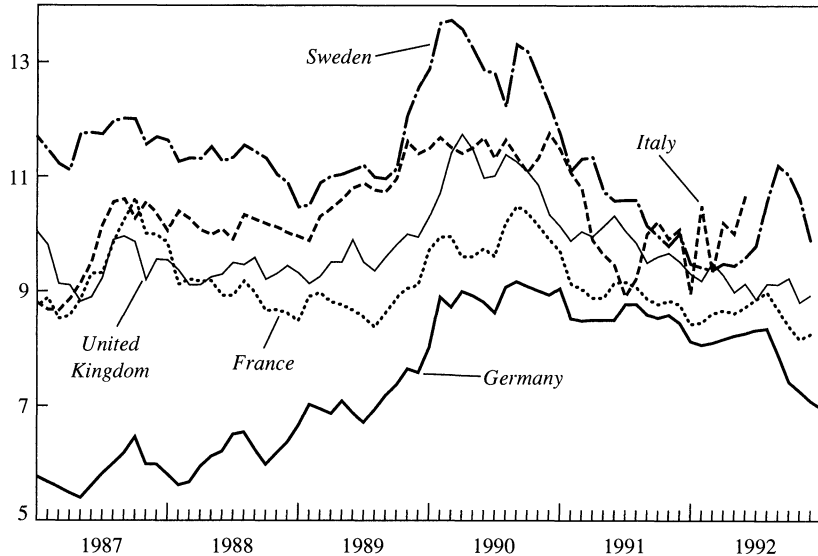
Assuming that the commitment not to realign was credible, domestic and foreign interest rates should have been equalized. (This is not far-fetched for the main EMS countries in 1990–91; figure 9 shows that by 1991, French and German long-term interest rates had more or less converged.) With  $i = i^*$ , equation 7 simplifies to

$$(9) \quad (1 - kc)\dot{q} = -2hcq - c\mu.$$

Although realignment was ruled out, the real appreciation (which still had to ultimately equal  $\mu/2h$ ) could only be achieved by increasing the level of German prices relative to price levels in other EMS countries. It is worth noting that, according to equation 9, the evolution of the real exchange rate and therefore relative inflation rates is independent of the

**Figure 9. Long-Term Interest Rates in Europe, 1987-92**

Percent per year

Source: *International Financial Statistics*.

monetary policies pursued by Germany and the rest of the EMS. Similarly, equation 10 shows that the ratio of output in Germany and the rest of the EMS does not depend on the policies chosen:

$$(10) \quad y - y^* = [\beta/(1 - \beta ak)][2bhq + b\mu].$$

Yet output and price levels are affected by policy actions, creating an unavoidable conflict of interest. The real appreciation required to accommodate unification can be achieved with many different combinations of price inflation in Germany and the rest of the EMS. Feasible options include a burst of inflation in Germany and stable prices elsewhere, a constant price level in Germany and a burst of deflation elsewhere, and moderate inflation in Germany combined with moderate deflation elsewhere. But, as in any fixed rate system, monetary policies in Germany and in the rest of the EMS cannot be set independently.

France and other countries may have thought that, by denying the Bundesbank its request for a realignment, they could force it to adopt a more expansionary monetary policy, thereby eliminating the need for



contractionary policies elsewhere in the EMS.<sup>35</sup> For its part, the Bundesbank did not conceal its desire to check inflation at home even if doing so implied disinflation elsewhere. If we model Germany as the Stackelberg leader and assume that the rest of the EMS adjusts monetary policy to peg its DM rate, we can combine equation 9 with equations 1 through 4 to obtain

$$(11) \quad \dot{p} = c\beta(bhq - kp + km + b\mu).$$

The implications of equations 9 and 11 are shown in figure 10.<sup>36</sup> The real exchange rate must appreciate from  $q_0$  to  $q_1$  in the long run. If Germany's money supply remains unchanged, the system moves over time from *A* to *B*: the required real appreciation is achieved through inflation in Germany caused by excess demand (or, equivalently, inadequate supply). The price level in the rest of the EMS may rise or fall.<sup>37</sup> If instead Germany uses its leadership to insure domestic price stability, the new long-run equilibrium is *D*. The real appreciation is now accomplished through disinflation and recession in the rest of the EMS. Because other EMS countries peg their currencies to the DM, they import Germany's tight monetary policy.<sup>38</sup> A conflict was thus unavoidable once the Bundesbank reaffirmed its commitment to check inflation and the other EMS countries confirmed their unwillingness to realign.

### *The Outcome*

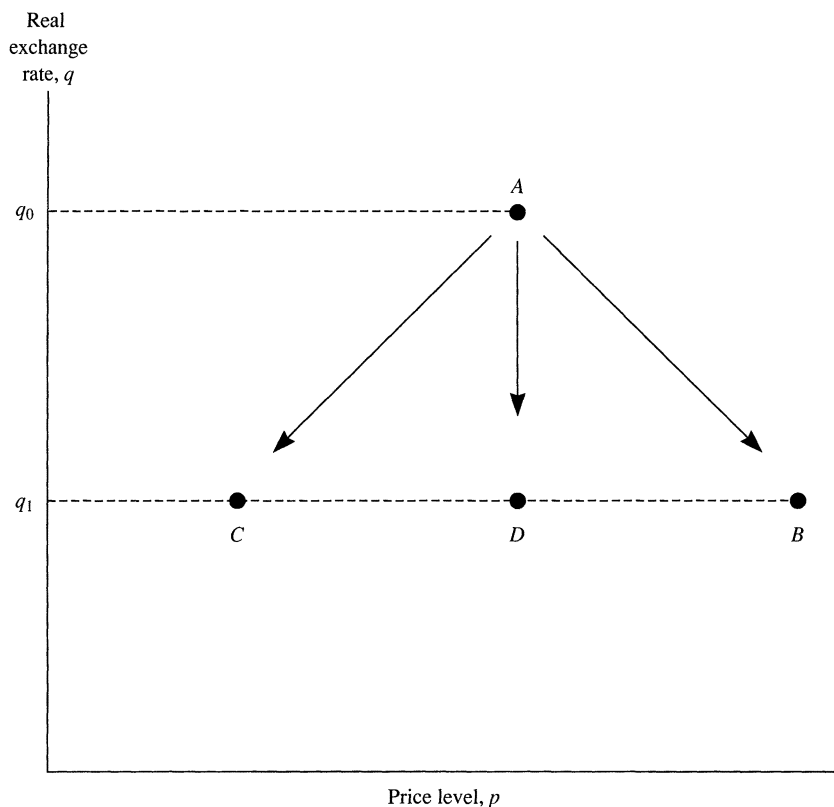
The implication of this model is that stable relative prices were not enough. Prices and costs in other EMS countries had to decline relative to those prevailing in Germany. As shown in figure 11, the other EMS countries in fact succeeded in reducing their inflation rates relative to Germany's.

35. An attempt to do so was made in October 1991. French short-term interest rates were brought below German levels in the hope that the Bundesbank would respond by adjusting German rates in the same direction. This did not occur; the French move had to be reversed promptly as capital began to flow out.

36. The system is dynamically stable. Once the exchange rate is fixed, dynamics are provided by the sluggish adjustment of domestic currency prices.

37. Here the behavior of prices depends on the sign of  $(bh - k)$  alone. This would not be the case in a model with output spillovers factored into equation 2.

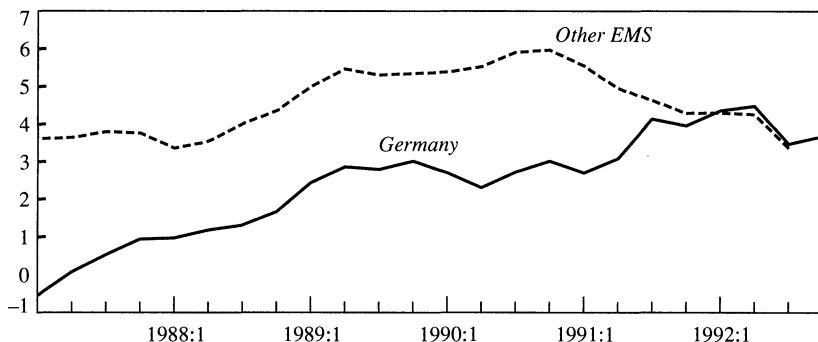
38. Indeed, the Bundesbank might pursue an even more contractionary policy, forcing more radical disinflation on other EMS countries and shifting the new long-run equilibrium to a point such as *C*.

**Figure 10. The Long-Run German Real Exchange Rate and Monetary Policy Options**

Without an empirically calibrated version of the model, it is difficult to say whether the observed changes in relative prices were enough. A way around this problem is to focus on the quantities that relative prices affect. The GEMU shock, as an increase in German spending, should have driven up the prices of goods produced and consumed in Germany relative to those produced and consumed abroad. As an increase in German investment relative to German saving, it should have weakened Germany's current account and strengthened those of its EMS trading partners. As an increase in German demand for the goods of its EMS trading partners, it should have enhanced profitability in other EMS countries. If other countries' current accounts in fact weakened, then

**Figure 11. Inflation in EMS Countries, 1987:1–1992:4**

Percent per year



Source: Authors' calculations using consumer price index data in *International Financial Statistics*. The other EMS line is a weighted average of EMS countries, excluding Germany, with weights based on 1987 GDP data.

the prices of their goods must have fallen insufficiently (or risen excessively) relative to the price of German goods. Similarly, if the profitability of their manufacturing sectors deteriorated rather than strengthened, price discipline outside Germany must have been inadequate. Absent the requisite relative price movements, other countries would have had to push up their nominal rates along with Germany's in order to restrict domestic demand and maintain external balance, reinforcing the negative trend in domestic profitability.

We therefore examined the profit share in manufacturing (where available) and the current account of the balance of payments.<sup>39</sup> Italy's deteriorating current account and business profitability confirm our hypothesis of a competitiveness problem. The evidence for the United Kingdom is as ambiguous as before; while the profitability measure suggests an improvement in competitiveness since ERM entry, the current account shows a relapse in 1992. In the case of Spain, the profit share holds up nicely after 1988 despite the rise in labor costs, consistent with the arguments of those who would minimize competitive difficulties. For Finland and Sweden, profits and the current account both suggest that, by 1992, adjustment to earlier difficulties was underway. In none of the other countries experiencing an attack (France, Belgium, Denmark, and Ireland) does evidence of serious problems appear.

39. The underlying data are presented in Wyplosz and Eichengreen (1993).

By the fall of 1992, then, adjustment to the GEMU shock was well underway. Competitive disequilibria were being corrected. Even taking into account the effects of the GEMU shock on equilibrium relative prices and costs, we conclude—like Richard Portes<sup>40</sup>—that while competitiveness problems cannot be dismissed (aside from Italy and possibly Spain and the United Kingdom) it is difficult to find firm support for them, even when one focuses on data that take into account the asymmetric GEMU shock.

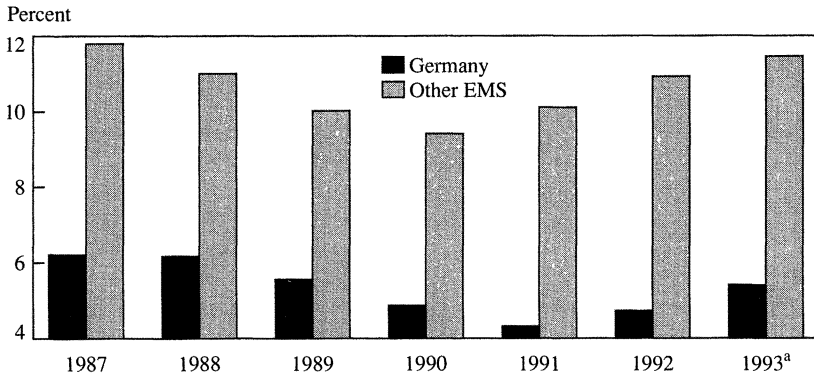
In addition, there is the troubling fact of timing. German unification occurred in 1990, but the EMS crisis occurred in 1992. Markets are forward-looking; traders make profits if they succeed in anticipating events. It seems peculiar that the imbalances set in motion by German unification should have destabilized EMS parities more than two years after the fact, and not earlier. The Spanish peseta, for one, was at the top of its EMS band only days before it was attacked. If the markets perceived that competitiveness problems were evolving over time, traders should have begun to sell pesetas in anticipation of future difficulties, driving the currency toward the bottom of its band before the fact. This did not occur.

### **Inevitable Policy Shifts**

In fact, markets may have been more sophisticated—not less—than we have so far given them credit. Even if current policies were consistent with the maintenance of ERM parities, the markets could have been anticipating a shift in future policies. The policies of austerity required to defend prevailing parities gave rise to growing unemployment, as shown in figure 12. As unemployment rose, the political or economic cost of maintaining those policies may have grown too heavy for governments and their constituencies to bear. Anticipating the inevitable, traders may have sold the currencies of these countries before the policy shift occurred.

Considerable informal evidence is consistent with this view. European unemployment was high and rising on the eve of the crisis. The budgetary austerity required to meet the convergence criteria forced

40. Portes (1993).

**Figure 12. Unemployment Rates in EMS Countries, 1987–93**

Source: Authors' calculations using *OECD Economic Outlook*, December 1992, and 1987 GDP numbers from *International Financial Statistics* to weight EMS countries excluding Germany.

a. Based on OECD projections.

governments to implement painful measures of fiscal austerity, which elicited howls of protest. The Spanish government proposed reductions in the rate of unemployment benefits, for example, provoking labor unrest. In Britain, intense criticism was levied against the decision to maintain high interest rates in the face of an incipient recession.

To analyze this explanation more systematically, we use a one-country version of the model presented above (with no unification shock). All variables are defined as before.

$$(12) \quad m - p = ay - bi,$$

$$(13) \quad y = h(e - p) - kr,$$

$$(14) \quad i = r + \dot{p},$$

$$(15) \quad \dot{p} = cy, \text{ and}$$

$$(16) \quad \dot{i} = i^* + \dot{e}.$$

Because we assume that the country is small, the foreign price level and interest rate are taken as constant and normalized to zero. The model reduces to

$$(17) \quad \dot{e} = \beta[ah(e - p) + (1 - kc)(p - m)], \text{ and}$$

$$(18) \quad \dot{p} = \beta c[bh(e - p) - k(p - m)].$$

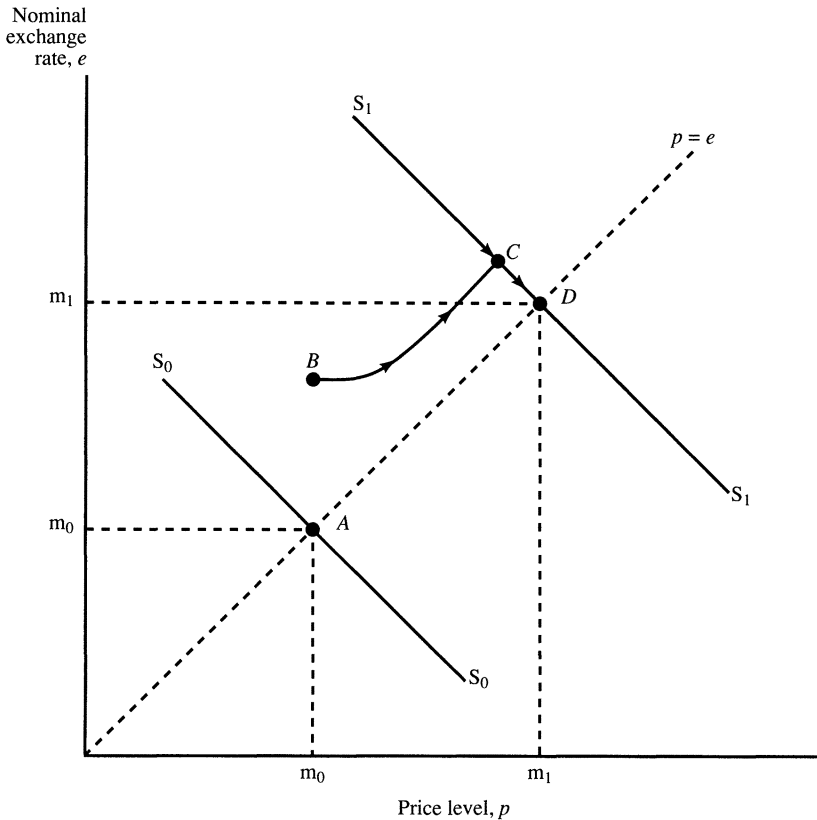
**Figure 13. Long-Run Equilibria as a Result of Central Bank Monetary Policy**

Figure 13 represents the long-run equilibrium with a money supply  $m_0$  and an associated stable convergence path  $S_0S_0$ .<sup>41</sup> The money supply remains unchanged so long as no disturbance occurs. The system rests at point  $A$  with a pegged exchange rate  $e_0 = m_0$  if policy is not expected to change. In this equilibrium, the exchange rate corresponds to the fundamental  $m_0$ .

41. As in the case of the German unification shock, we assume that  $\beta = [b + k(a - bc)]^{-1}$  is positive so that the system is saddle-path stable. We treat the exchange rate as the nonpredetermined variable and the price level as the predetermined variable. The convergence path is shown as downward-sloping, which occurs if  $1 > kc + ah$ . None of the conclusions is affected in the case in which  $1 < kc + ah$  and the convergence path is upward-sloping.

In contrast, the expectation that at a future date monetary policy will be relaxed from  $m_0$  to  $m_1$  implies long-run equilibrium at point  $D$ . When the markets realize that policy will change, they attack the currency. This attack exhausts the authorities' foreign exchange reserves, forcing them to abandon the exchange rate peg. This attack occurs before the shift in monetary policy itself. Indeed, it may occur as soon as the markets become aware that monetary policy will change; otherwise unexploited profit opportunities would exist. The period of floating begins with a depreciation that causes a jump from  $A$  to  $B$ . Although the monetary authorities initially keep the money supply unchanged at  $m_0$ , the knowledge that it will be raised subsequently to  $m_1$  weakens the exchange rate immediately. Following the jump depreciation, the exchange rate continues to depreciate along the path  $BC$ . Point  $C$  represents the instant when the money supply is increased to  $m_1$ , just preceding the last phase in the transition along the path  $CD$ .

Our third model of the September crisis thus considers it a consequence of market anticipations of an inevitable shift in monetary policies provoked by rising unemployment. A complete analysis of this explanation must recognize that governments, in deciding whether to shift to less restrictive policies, weighed the benefits as well as the costs of the prevailing regime. The costs were associated with unemployment; the benefits were associated with qualifying for monetary union. Thus anything that reduced the likelihood that these benefits would still exist in the future should have influenced the calculations of monetary authorities and governments.

An implication of this trade-off is that the stability of exchange rates should be correlated with the prospects for European monetary union. This was clearly the case in 1992. The weakness of the lira dated from the day the negative outcome of the Danish referendum was known. The lira, the British pound, the Danish krone, and the French franc all fell on June 3, the first trading day after the referendum. The Danish *nej* was a surprise; it had not been forecast by the opinion polls. Initially, reports stated that legal experts saw no way that the Maastricht treaty, or even parts of it, could be approved and enacted by only eleven EC member-states.<sup>42</sup> Doubts were compounded by press reports that confusion

42. The main factor disturbing the lawyers was that the Maastricht agreement is an amendment to the Treaty of Rome and is bound by Article 236 of that treaty, which requires unanimous approval by all member-states.

about the treaty's viability would stoke German concerns about the wisdom of pressing ahead with European monetary union. Italian businessmen voiced fears that the Danish rejection would undermine Italy's resolve to comply with the convergence criteria laid down at Maastricht.<sup>43</sup>

Ireland's ratification of the treaty on June 18 did little to change the outlook. The lira did strengthen slightly once the Irish results were known. But uncertainty remained about the outcome of the French referendum in September and the implications of the Danish *nej*.<sup>44</sup> Until these questions were resolved, traders pondered three possible outcomes: that Maastricht would collapse, that eleven of the twelve EC states would go ahead with EMU, or that there would be a two-speed Europe in which some states would unite their currencies and others would not.<sup>45</sup>

In August, French opinion polls perturbed the markets on a regular basis. On Wednesday the fifth, for example, the DM rose against other European currencies as traders anticipated the release of a negative polling result later in the day. As it turned out, the poll indicated that a slim majority of French voters favored the treaty, "but the result proved too inconclusive for most dealers, and the German currency drifted further upwards."<sup>46</sup>

The turnaround occurred on Tuesday, August 25, when for the first time a poll predicted a slim rejection of the treaty, by a margin of 51 to 49 percent.<sup>47</sup> Sterling fell to within one-half pfennig of its floor against the DM as "the prospect of European monetary union collapsing has be-

43. On German doubts, see Quentin Peel, "Bonn Anxious that German Doubts on EMU May Grow," *Financial Times*, June 4, 1992, p. 4. On Italian concerns, see Robert Graham, "Italian Business Fears Loss of Resolve," on p. 5 of the same issue. As Robert Graham reported, "Ever since the Danes rejected the treaty in a referendum at the beginning of the month, businessmen and bankers have been concerned that the process of closer European integration would be slowed and the resolve of the Italian authorities to tackle the country's deteriorating public finances would be weakened." "Italian Banks Increase Prime Rate to 14 Percent," *Financial Times*, June 23, p. 2.

44. France's referendum was called by President Mitterrand in the aftermath of the Danish rejection. He calculated (incorrectly) that a strong *oui* would relaunch the process.

45. See James Blitz, "D-Mark Firm Despite EMU Vote," *Financial Times*, June 20–21, 1992, p. 13.

46. James Blitz, "Sterling/D-Mark Hits New Low," *Financial Times*, August 6, 1992, p. 28.

47. Alice Rawsthorn, "French Support for Union Drops," *Financial Times*, August 26, 1992, p. 1.



come a strong incentive for investing in D-Marks.”<sup>48</sup> Another poll on August 28, with an even larger negative margin (53 percent), pushed the lira through its floor against the DM and led to weakness in other EMS currencies.<sup>49</sup> On August 31, Commission President Jacques Delors threatened to resign if the French rejected the treaty, warning that a negative vote would jeopardize European unity itself; the pound, lira, and French franc continued to slide.<sup>50</sup>

We can more systematically analyze the impact of these events on expectations by examining the behavior of forward exchange rates. Figure 14 displays daily data on spot rates, one-year-ahead forward rates, and EMS bands. The data for Italy are graphic reminders of the shaky credibility of the lira’s EMS peg. From 1987 through early 1989, the forward rate was consistently below the bottom of the band. In contrast to other EMS currencies, the forward rate was again below the bottom of the band at the beginning of 1992. This is consistent with our conclusion that the markets perceived Italy as having more competitiveness problems than other EMS countries. The forward discount then grew to sizable proportions during the summer.

The behavior of the British pound and the Spanish peseta (as shown in figure 14) is strikingly different. Following the two countries’ entry into the ERM, their forward rates consistently remained within the band. Even in the days leading up to the lira devaluation (September 14), the two currencies’ forward rates did not drop out of the band. Again, this is consistent with our conclusion that Britain’s and Spain’s competitiveness problems were less pronounced than Italy’s.

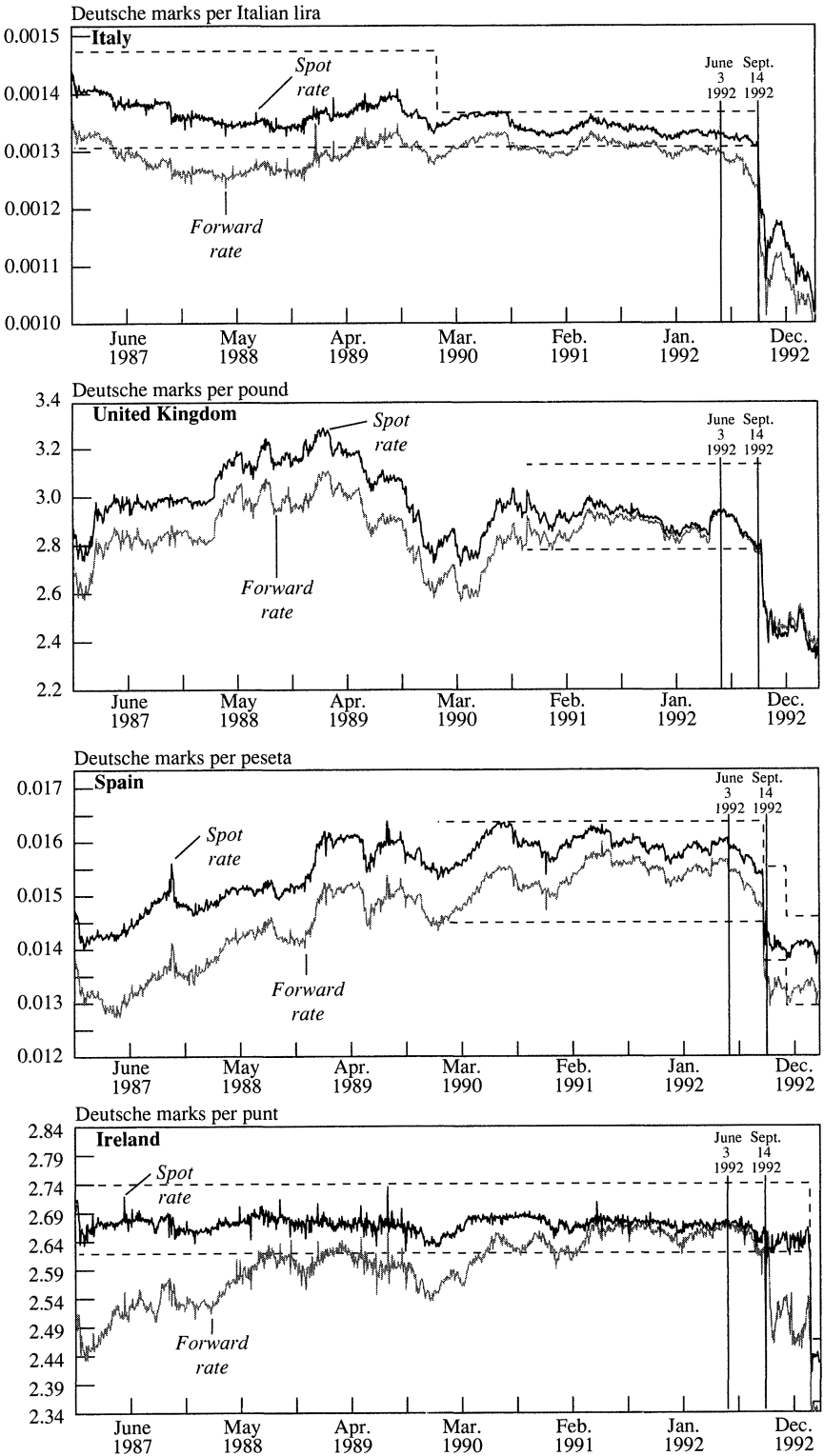
Figure 14 also plots forward rates for four other countries for which there is even less evidence of competitive difficulties: Ireland, France, Denmark, and Sweden. It is striking that these countries saw their forward rates drop out of the band after the Danish referendum and before September 14. (For comparison, we also provide data on the rock-solid Dutch guilder.)

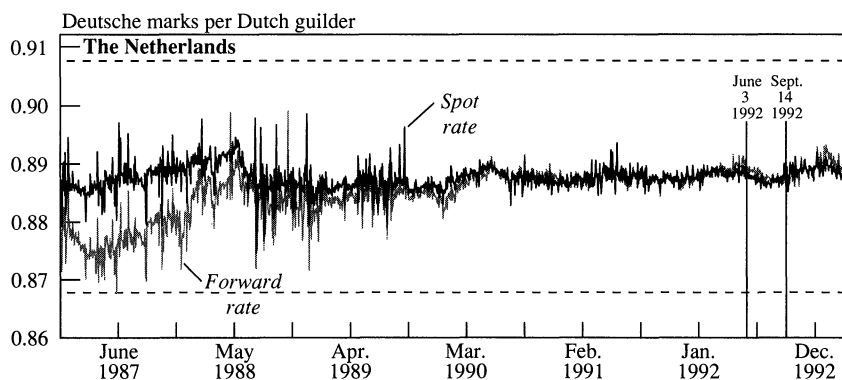
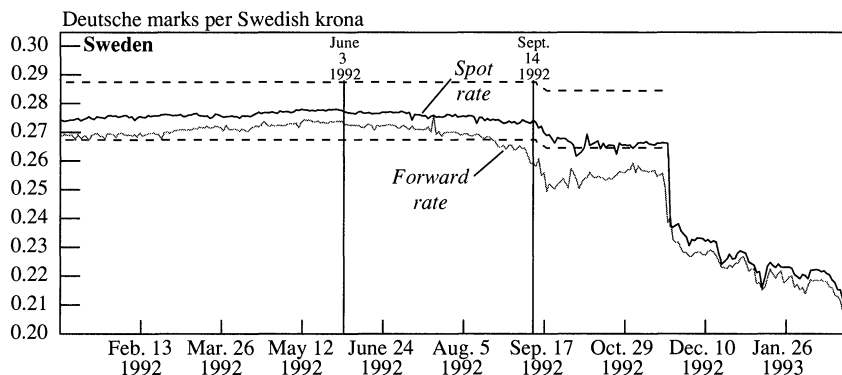
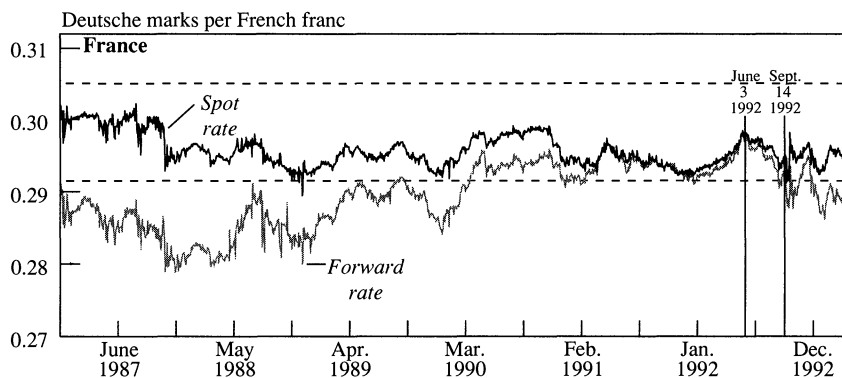
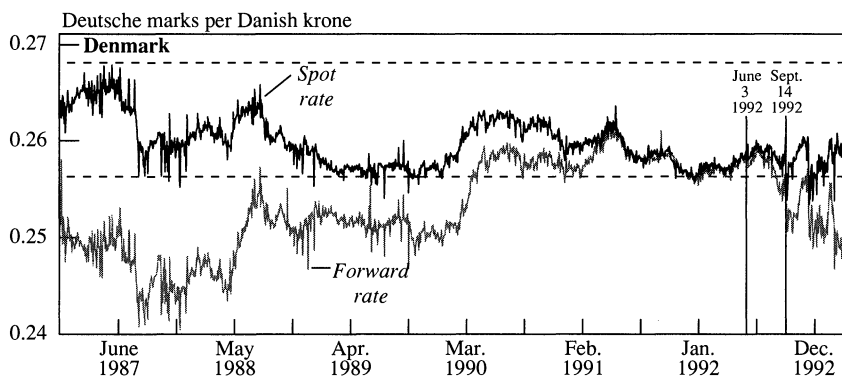
48. James Blitz, “Close Shave for Sterling,” *Financial Times*, August 26, 1992, p. 26. See also Peter Marsh and James Blitz, “EC Ministers Rule Out Realignment of ERM,” *Financial Times*, August 29–30, 1992, p. 1.

49. Alice Rawsthorn, “French Doubts on Maastricht Grow,” *Financial Times*, August 29–30, 1992, p. 3.

50. Lionel Barber and William Dawkins, “French No Vote Would Destabilize Europe, EC Warns,” *Financial Times*, September 1, 1992, p. 1,

**Figure 14. Spot and Forward Exchange Rates in EMS Countries, 1987–92<sup>a</sup>**





Source: Data Resources Inc. (DRI) and Sveriges Riksbank.

a. Dashed lines are EMS currency bands for each currency plotted vis-à-vis the deutsche mark. The forward rate is the one-year-ahead forward exchange rate. Tic marks are 115 trading days apart for all panels except Sweden.

To a considerable degree, the data support the explanation for the crisis based on deterministic shifts in future policies. In particular, this explanation is supported by the correlation between obstacles to ratifying the Maastricht treaty and difficulties in foreign exchange markets. As these obstacles mounted, the balance of costs and benefits shifted away from policies that would support the exchange rate in order to qualify for EMU and toward more expansionary policies that would respond to rising unemployment.

Nonetheless, certain facts sit uneasily with this interpretation. Unemployment was rising everywhere, not only in those countries that were attacked. Incumbent governments were weak throughout Europe, not just where speculative crises erupted. While some countries that were attacked shifted their policies in more stimulative directions subsequently, others did not. All this leads us to believe that a fourth and final explanation is required based on multiple equilibria and self-fulfilling speculative attacks.

### **Self-Fulfilling Speculative Attacks**

The idea that a pegged exchange rate can be successfully attacked in the absence of any problem with fundamentals, either expected or future, rests on the principle of self-fulfilling attacks that arbitrarily shift the foreign exchange market between alternative equilibria. That multiple equilibria can exist in foreign exchange markets was pointed out by Flood and Garber<sup>51</sup> and Obstfeld.<sup>52</sup> An attack can occur even if the stance of policy is consistent with balance-of-payments equilibrium and the pegged exchange rate is sustainable indefinitely. Yet if investors anticipate that monetary policy will be modified as the result of an attack—becoming looser than the preattack policy—then capital gains on foreign assets will be rationally anticipated. It is this *ex post* validation that makes attack and no-attack equilibria viable simultaneously.

This model must be clearly distinguished from that of Krugman<sup>53</sup> and Flood and Garber,<sup>54</sup> described above. That model has a unique equilib-

51. Flood and Garber (1984b).

52. Obstfeld (1986).

53. Krugman (1979).

54. Flood and Garber (1984a).

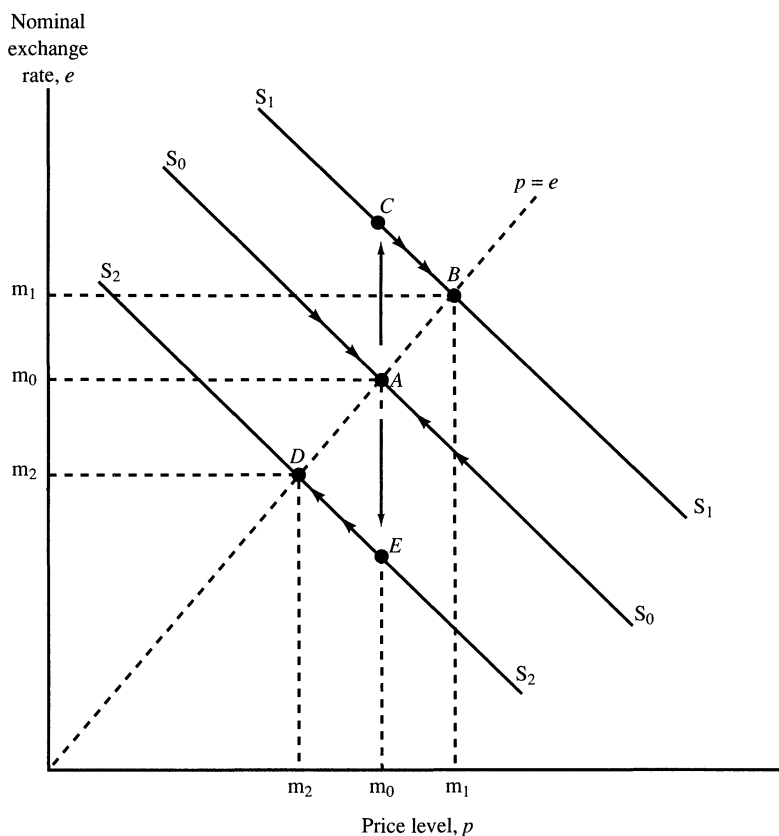
rium: the exchange rate is attacked only if a balance-of-payments problem already exists, implying the eventual exhaustion of reserves. Equally, the model of multiple equilibria we develop in this section should be distinguished from the model developed in the previous section. There, equilibrium is unique: the exchange rate is attacked only if an anticipated future balance-of-payments problem exists, inevitably implying the eventual exhaustion of reserves.

Self-fulfilling attacks are different. In the preceding models, the markets merely anticipate the crisis; in models of self-fulfilling attacks, they provoke it. The policy shift is contingent; it occurs if and only if an attack occurs. In the absence of the attack, no balance-of-payments problem exists and the current exchange rate can be maintained indefinitely. But if an attack occurs because market participants rationally anticipate that, if (and only if) attacked, policy will be modified in a more expansionary direction, then the attack can succeed, shifting the economy to a different equilibrium.

To illustrate these points, we again use the single-country model of the preceding section. But we now assume that central bank policy remains invariant in the absence of an attack. How events evolve in the event of an attack depends on the central bank's reaction. We explore two alternatives, under the assumption of perfect foresight. The first alternative is the case of a "wet" central bank that, in the event of an attack, increases the money supply from  $m_0$  to  $m_1$ . The corresponding long-run equilibrium is at point *B* in figure 15. Should a speculative attack unfold, depreciation would occur immediately as the economy jumps from *A* to *C* on the new stable path  $S_1S_1$ . Over time the system converges to *B* along that stable path.<sup>55</sup> The attack is self-fulfilling. The currency is weak because of the monetary authorities' lack of credibility in reacting to the attack.

The second equilibrium describes the case of a "dry" central bank that credibly commits to react to an attack by decreasing the money supply from  $m_0$  to  $m_2$ . The corresponding path is shown by the jump from *A* to *E* followed by convergence to the long-run equilibrium point *D* along the stable path  $S_2S_2$ . This second equilibrium will not be observed be-

55. This trajectory resembles Rudiger Dornbusch's overshooting result. (Undershoot would occur if the convergence path slopes upward.) Here, however, the money increase is the perfectly anticipated endogenous response of the central bank to the speculative attack and not, as in Dornbusch (1976), an exogenous change in the money supply.

**Figure 15. Long-Run Equilibria after a Central Bank Reacts to a Speculative Attack**

cause, under the perfect foresight assumption, a speculative attack will not occur when the exchange rate is expected to appreciate.

For this model of multiple equilibria to be compelling, there must be specific grounds for supposing that it applied to the events of September. In other words, there must be an intrinsic reason to have anticipated a shift in policy if and only if an attack occurred. In fact, incentives for just such a shift were built into the Maastricht treaty.

The relevant provisions of the treaty are summarized in the appendix. For current purposes what matter are the so-called "convergence criteria" that must be met by countries seeking to qualify for monetary

union—particularly the condition requiring a country to maintain a stable exchange rate (within the normal, narrow EMS fluctuation band) for the two preceding years without “severe tensions.” The downside of this otherwise judicious rule is that tensions provoked by the market may disqualify a country from European monetary union and thereby introduce scope for self-fulfilling attacks. This in turn would remove the government’s incentive to maintain the current policies whose principal benefits resulted from qualifying the country for EMU. A rational government would shift toward more accommodating monetary policies only if attacked. But the knowledge that it had this incentive to change policy in the event of an attack provides foreign exchange traders with the incentive to undertake it. While the treaty can be interpreted as precluding EMU membership only by countries that actively sought to devalue, as opposed to those that did so involuntarily, it seems unlikely in practice that countries that experienced fatal crises forcing them to realign would be regarded favorably by the European Monetary Institute (EMI) and the European Commission when it came time for them to evaluate conformance with the convergence criteria.<sup>56</sup>

“Severe tensions” in 1992 would be more likely to lead a government to conclude that its prospects for participating in EMU had been significantly damaged if two additional conditions were met: first, that EMU is likely to begin relatively early, giving devaluing countries little time to repair their reputations; and second, that countries missing the boat when it leaves the dock will find it difficult to board later. The timing of Stage III, the formal start of EMU, is uncertain. The European Commission and the European Monetary Institute must indicate to the Council no later than the end of 1996 which countries meet the convergence criteria. If only a minority of EC countries do so, Stage II may continue until January 1, 1999, the last possible date for the inauguration of EMU. Again, the Commission and the EMI must report in 1998 as to which countries satisfy the conditions and thus can form the initial nucleus of the monetary union. Other countries may be admitted once it is determined that they satisfy the conditions.

But if a majority of EC countries meet the convergence criteria, Stage III may start earlier. Most commentators have interpreted the provision

56. We return to this point in the eleventh section. Also see the appendix.

that the European Monetary Institute and the Commission must report no later than the end of 1996 as implying that Stage III will not commence before that point (that is, the beginning of 1997). In fact, nothing in the treaty prevents the EMI and the Commission from reporting earlier in Stage II if they believe that a majority of countries satisfy the convergence criteria. In theory, they could report on January 2, 1994, the second day of Stage II, using the performance of countries during Stage I as their basis for concluding that the convergence criteria were satisfied. Theoretically, nothing prevents Stage III from beginning as early as next year.<sup>57</sup>

Moreover, an implication of the convergence criteria is that the conditions applied to the first group of participants may be looser than those applied later. This argument is spelled out by Alberto Alesina and Vittorio Grilli.<sup>58</sup> They show that once a subset of EMS countries that share a preference for relatively low inflation forms a monetary union, they may resist enlarging it to include other countries preferring higher inflation, because this may push up the union's common inflation rate, making things worse for the initial members. This can be true even when every country would be better off with a Community-wide monetary union than with no monetary union at all.<sup>59</sup>

In summary, this section's model shows that self-fulfilling attacks can occur in theory. The events of the summer of 1992 confirm that they can occur in practice. In particular, the Maastricht treaty's provisions regarding membership and starting date for EMU created scope for self-fulfilling attacks. Whether certain EMS countries also had competitiveness problems will continue to be debated. Our point here is that there were good reasons to anticipate a speculative crisis even in the absence of such problems.

57. The dominant view in 1992 was that the earliest date of real importance was January 1, 1997. The procedure for early start-up was seen as a diplomatic gesture toward France, with little chance of activation. If this view is correct, it tends to weaken the explanation of self-fulfilling attacks, but can be used to winnow scenarios for the future of EMU that we discuss in our concluding sections.

58. Alesina and Grilli (1993).

59. Alesina's and Grilli's model is based on strong assumptions, notably that the common inflation rate of the EMU will be chosen by the median voter, with one vote per country. It nonetheless makes a useful point that the early entrants may reap most of the benefits of EMU without admitting the laggards, and that, insofar as the latter have different characteristics, the former may erect barriers to subsequent accession.



**Table 3. Reasons for the Crisis**

Percent

<i>Question and response</i>	<i>Very important</i>	<i>Important</i>	<i>Not important</i>
<i>What in your opinion was the most important factor in making changes in ERM currencies likely?</i>			
Lack of public support for the Maastricht treaty	33.1	44.4	15.0
Persistent inflation in:			
Italy	27.8	39.1	22.6
Spain	21.8	37.6	28.6
UK	15.0	40.6	32.3
Germany	38.3	35.3	18.0
High German interest rates	68.4	21.1	6.0
Realignment was overdue anyway	39.8	27.1	24.1
Instability of Swedish and Finnish currencies	10.5	33.8	42.9

Source: Authors' calculations based on their February 1993 survey of European foreign-exchange traders.

## A Survey of Foreign Exchange Markets

Given the four interpretations we have presented to explain the September crisis—overt or hidden competitiveness problems, anticipated policy shifts, and speculative attacks unrelated to competitiveness—it seems natural to ask market participants which ones informed their actions. In the second half of February 1993, we therefore mailed a questionnaire to all European traders listed in the *Currency and Instrument Directory*.<sup>60</sup> Although some dealers are not listed in this directory, it represents nearly the entire population of foreign exchange traders. We sent out 560 questionnaires and received 132 responses, a respectable response rate for a mail survey. The results are tabulated in tables 3 through 7.

The survey responses provide some support for all four interpretations. However, we would argue, the balance of sentiment supports anticipated future policy shifts and self-fulfilling attacks. In table 3 we tabulate answers to the question, "What in your opinion was the most important factor in making changes in ERM currencies likely?" Many respondents checked more than one alternative. Yet inflation—the

60. Citibank (1990). We sent questionnaires only to the heads of trading rooms or to senior traders, not to each individual in the same financial institution. Nonetheless, in more than half the cases, we sent two or more questionnaires to a particular financial institution.

**Table 4. Why Did Central Banks Give Up?**

Percent

<i>Question and response</i>	<i>Very important</i>	<i>Important</i>	<i>Not important</i>
<i>In September, central banks ultimately gave up defending certain European currencies. What explains this decision?</i>			
Central banks' reserves are always insufficient	23.3	40.6	30.8
Central banks' reserves are insufficient now that most exchange controls in Europe have been removed	28.6	38.3	28.6
Central banks worried that further interest rate increases would destabilize banking systems	21.8	47.4	24.1
The Bundesbank worried that further intervention would threaten price stability	22.6	45.1	26.3
Central banks worried that further interest rate increases would worsen domestic economic conditions	64.7	23.3	3.8

Source: Authors' calculations based on their February 1993 survey of European foreign-exchange traders.

source of speculative attacks in models emphasizing current fundamentals—is not one of the most popular answers.

An exception to this generalization is the view of German inflation. The response that German inflation made a realignment likely must be interpreted differently than concern about inflation in other countries because the DM, rather than one of the currencies attacked, was the strong currency against which the others were devalued. Emphasis on German inflation is properly interpreted as an indication that traders anticipated high interest rates and tight money, which would exacerbate unemployment in other EMS countries. This interpretation is supported by the emphasis respondents placed on the high level of German interest rates, which heightened deflationary pressure and unemployment in other countries, again increasing the likelihood of a future policy shift.

Only 22 percent of the respondents claim to have been expecting a realignment before the Danish referendum.<sup>61</sup> This confirms our point that the timing of the 1992 attacks does not fit well with interpretations

61. Some respondents may have exaggerated their foresight. This bias supports our argument by suggesting that even less than the 22 percent of respondents who claimed to have anticipated a realignment before the Danish referendum really did so.

**Table 5. Expectation of Imminent Changes in ERM Parities**  
Percent

<i>Question and response</i>	
<i>When did you first begin to think that changes in ERM exchange rates were imminent?</i>	
Before the Danish referendum in June	21.8
Just after the Danish referendum	46.6
Upon hearing about public opinion polls in France during the run-up to the referendum	15.1
Around the time of the Finnish crisis and devaluation	6.8
Around the time of the Swedish crisis in September	6.8
Other	9.1

Source: Authors' calculations based on their February 1993 survey of European foreign-exchange traders.

emphasizing current fundamentals. The importance respondents attached to the two referenda supports our third interpretation, which emphasizes rising unemployment and future policy shifts.

Once the initial attacks occurred, the relative importance traders attached to different factors could have changed. Fundamentals could have become increasingly important in countries such as Ireland that traded heavily with the first EMS countries forced to devalue.<sup>62</sup> Alternatively, lack of confidence in EMS currencies could have spread contagiously. Responses that “the markets had ‘tasted blood’ (realized that there were profits to be made)” are consistent with this view. Tables 6 and 7 suggest that factors other than fundamentals outweighed considerations of trade and competitiveness. Not surprisingly, competitiveness played a larger role in spillovers within the EMS than in spillovers from the Nordic countries to the EC.

We think that this survey sheds considerable light on what happened during the September crisis. The emphasis respondents placed on inflation suggests that fundamentals played some role; it is no coincidence, in other words, that the Italian lira was first to be attacked, followed by sterling and the peseta. But fundamentals do not explain the timing or course of the attacks. Whether the markets forced a change in policy or simply anticipated it remains an open question. One fact points in the direction of the former explanation: in enumerating what factors they

62. Forty percent of Ireland's exports went to EMS countries that had been forced to realign by the end of 1992. These and the following figures on 1991 trade shares are from the IMF's *Direction of Trade Statistics* (1992).

**Table 6. Devaluation Contagion within the ERM**

Percent

<i>Question and response</i>	
<i>Did the weakness of some ERM currencies late in the summer lead you to anticipate weakness of other ERM currencies?</i>	
The 90.2 percent responding yes gave these reasons:	
Devaluing countries are able to undercut competitors	53.4
Markets "tasted blood" (realized that there were profits to be made)	76.7
Other	4.5

Source: Authors' calculations based on their February 1993 survey of European foreign-exchange traders.

consider when assessing the prospects for a particular currency, dealers gave a low ranking to unemployment, suggesting that they attached relatively little weight to the possibility that a deteriorating employment situation would inevitably force a government to abandon its defense of the currency.

### **Life without Capital Controls**

The removal of capital controls has changed the European monetary environment in two significant ways. First, the absence of controls renders official foreign exchange reserves redundant—or nearly so. Reserves are dwarfed by the resources that markets can bring to bear. This in turn implies the need for very high interest rates to defend an exchange rate when the markets attack it. Second, these high interest rates can seriously and negatively affect economic activity, the government budget, the housing market, and the stability of the financial system if they are maintained for extended periods. And in a foreign exchange market with multiple equilibria, they may have to be maintained at high levels indefinitely.

#### *Market Pressures*

Daily turnover on foreign exchange markets exceeds \$1 trillion—more than the total official foreign reserves of all IMF member countries combined—according to the Bank for International Settlements.<sup>63</sup>

63. See "Realignment Merchants," *Economist*, September 26, 1992, p. 90.

**Table 7. Devaluation Contagion from Outside the ERM**  
Percent

<i>Question and response</i>	
<i>Did the weakness of non-ERM countries (those of Finland, Sweden, and Norway, for example) lead you to anticipate weakness of ERM currencies?</i>	
The 50.4 percent responding yes gave these reasons:	
Devaluing countries are able to undercut competitors	23.3
Markets have "tasted blood" (realize that there are profits to be made)	42.9
Other	3.8
The 49.6 percent responding no gave these reasons:	
ERM central banks can borrow from one another	22.6
EC countries mostly trade with one another	24.8
EC countries' financial markets are deeper	36.1
Other	1.5

Source: Authors' calculations based on their February 1993 survey of European foreign-exchange traders.

These numbers dwarf the otherwise-impressive quantities of intervention in which the EC countries engaged during the crisis: \$46 billion in July and August, and \$228 billion in September and October.<sup>64</sup>

Relative to reserves, then, the supply of speculative capital is in effect perfectly elastic. Under these circumstances, only very high short-term interest rates may prevent the exhaustion of foreign exchange reserves. Table 8 illustrates this point for various devaluation expectations. To offset a 10 percent devaluation with a 90 percent likelihood of occurring in ten days, risk-neutral investors will require annualized interest rates of 762 percent.<sup>65</sup> In this light, it is not surprising that Sweden was forced to raise its overnight rate to an annualized rate of 500 percent at the peak of its crisis.

Are countries at the mercy of the markets, or can capital controls increase their room for maneuver? As table 4 reports, survey respondents attached surprisingly little importance to the presence or absence of controls: nearly half the respondents listed as unimportant the fact that reserves are insufficient now that controls have been removed. Yet

64. Alogoskoufis (1993). The figures refer to estimates of gross intervention.

65. These rates are calculated with the simplifying assumption that foreign assets do not bear interest. Because interest rates on DM bank deposits were on the order of 7 percent, this approximation changes the results very little.

**Table 8. Interest Rate Required to Render Investors Indifferent between Holding Domestic and Foreign Assets**

Percent per year

<i>Probability of event</i>	<i>Event</i>	
	<i>5 percent devaluation in 10 days</i>	<i>10 percent devaluation in 10 days</i>
50 percent	85	238
70 percent	136	442
90 percent	201	762

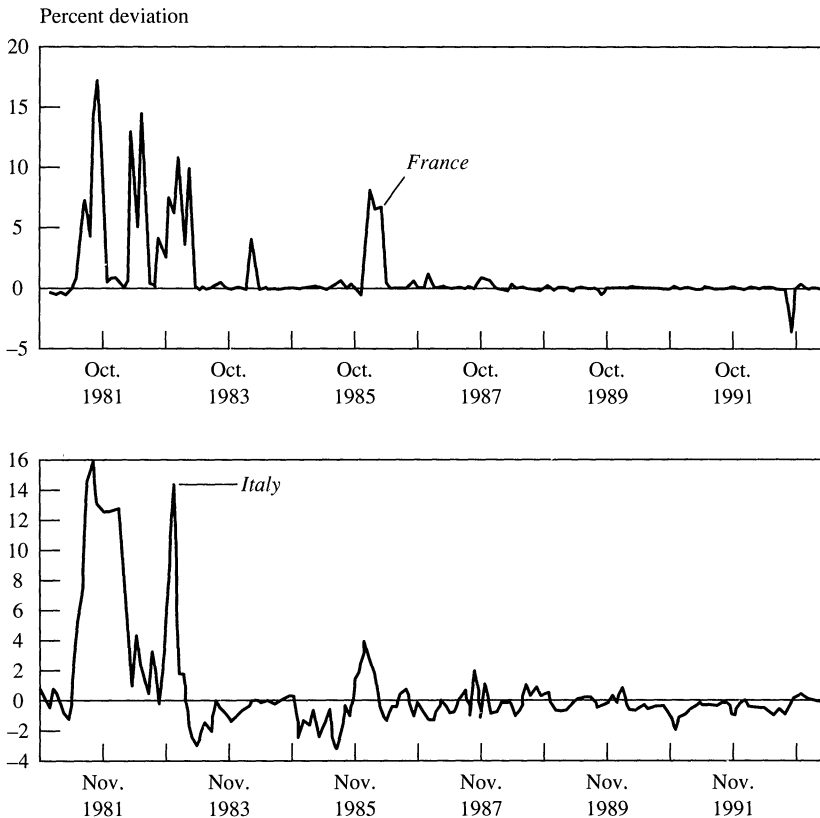
Source: Authors' calculations.

there is at least circumstantial evidence that capital controls play a significant role. Of the countries subjected to the fiercest attacks, none of those that were forced to leave the ERM maintained capital controls. In contrast, all of those countries that managed to realign and remain within the ERM still had controls in place. Moreover, Ireland removed its controls on January 1, 1993, and was forced to realign shortly thereafter.

Further evidence is provided by deviations from covered interest parity, a standard measure of the magnitude of controls. In figure 16, speculative attacks are easily identifiable in France and Italy before January 1990 and July 1990, respectively, when controls were lifted; the data confirm that countries that maintained controls enjoyed very substantial insulation between onshore and offshore interest rates on comparable assets.<sup>66</sup> Ireland, one of the few EMS countries to retain significant capital controls in 1992, provides a recent example. At the time of the crisis, Irish controls allowed domestic interest rates to be nearly 80 (annualized) percentage points lower than they would have been without controls, measured by the deviation from covered interest parity shown in figure 17.

In response to our argument that controls play an important role in supporting pegged exchange rates, it might be argued that France and Denmark, which did not have controls, were also attacked but were not

66. Note that covered interest differentials can remain even in the absence of controls because of transactions costs, information costs, differential default risk on assets denominated in different currencies, and expectations that capital controls may be reimposed before the interest-bearing assets mature, as Frankel and MacArthur (1988) have argued. However, their magnitude should be relatively small.

**Figure 16. Spread between Offshore and Onshore Interbank Rates for France and Italy**

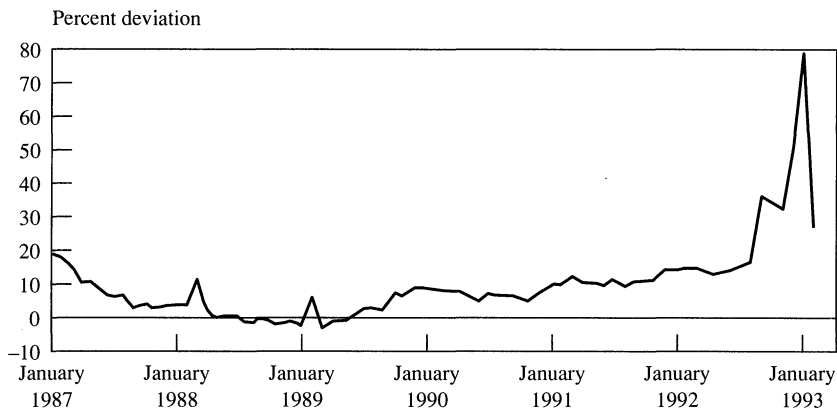
Source: Authors' calculations using DRI bid rates.

a. The figure shows the difference between interest rates for one-month maturities in London, where interest rate parity holds, and in Paris and Milan, respectively, where controls are applied.

forced to devalue. It is not as difficult as it might seem to reconcile this objection with our conclusion because there is an alternative to controls: unlimited intervention by other countries. Both Denmark and France were recipients of massive (effectively unlimited) support by the Bundesbank, as we analyze below.

### *Costs of Defense*

Sufficiently high interest rates should be capable of rebuffing even the most concerted speculative attack. If so, then understanding the crisis

**Figure 17. Deviations from Covered Interest Rate Parity for the Irish Punt**

Source: Authors' calculations using DRI data on one-month maturities.

requires an explanation of why some governments refused to hold interest rates at high levels. Market participants clearly recognized that high interest rates were painful, as responses to our survey showed in table 4. The question is through what channels this pain was experienced.

In this section, we consider four areas that high interest rates might affect: economic activity, the housing market, the banking system, and the budget. In all four cases, even stratospheric interest rates—like Sweden's 500 percent overnight rates—have relatively small effects as long as they are maintained for short periods. Only when high rates are maintained for extended periods does the pain prove intolerable.

Critically, however, when the potential source of instability is multiple equilibria in the foreign exchange market, it may be necessary to maintain high rates for extended periods. This is what governments concluded was intolerable in the final months of 1992.

**IMPACT ON ECONOMIC ACTIVITY.** Criticism of high interest rates on the grounds that they depressed economic activity was rampant in the fall of 1992.<sup>67</sup> Of course, this is the standard reason that governments are thought to dislike high rates.

Starting in 1990, the upward pressure on short-term interest rates was

67. For example, for commentary on Ireland, see "Down the Fast Track to a Pot of Gold," *Financial Times*, October 14, 1992, p. 2.



considerable. But in terms of the determinants of investment activity and other macroeconomic aggregates, long-term interest rates are likely to matter more. The upward movement of long-term nominal rates was minimal, as shown in figure 9. Because there was little reason to expect a change in inflationary expectations over long horizons, the figure provides a reasonable picture of the evolution of long-term real rates. Thus insofar as changes in interest rates exercise their real effects through standard macroeconomic channels, it would appear that their effect on the European economy remained minimal. Only if the rise in interest rates was expected to be long-lived and thereby to affect the entire term structure would one expect to see activity dramatically affected.

**IMPACT ON MORTGAGE INTEREST RATES.** In the United Kingdom and Ireland, mortgage interest payments are indexed to money market rates.<sup>68</sup> Hence higher money market rates can impose a significant cost on homeowners. Assume a mortgage rate of 10 percent. If the money market rate increases to 20 percent for two weeks, then the annual mortgage rate (computed as a geometric average of monthly rates and adjusted yearly) increases to 10.4 percent. If the overnight rate increases to 100 percent for two weeks, the annual mortgage rate rises to 12.8 percent. These are significant but not intolerable costs.

If, however, defense of the currency requires high money market rates to be maintained for longer periods, the impact on mortgage rates can be dramatic. Even a relatively "modest" money market rate of 20 percent maintained for three months raises the annual mortgage rate to 12.4 percent, while a 100 percent interest rate lifts it to a punishing 27.7 percent. Higher mortgage rates can in turn have a predictable negative effect on the housing market. Unless the authorities believe that high interest rates will succeed in quickly repelling a speculative attack, they may hesitate to pursue this option because of the screams of homeowners.<sup>69</sup>

68. Arrangements are similar in Sweden. When the Swedish central bank raised its marginal lending rate from 16 to 75 percent in the second week of September, the banks announced that they were raising home loan rates by 5 percentage points to 22.5 percent and short-term property loans by 3.5 points to 21 percent. But because approximately 85 percent of the loans are not indexed, the blow was quite limited.

69. In the United Kingdom, mortgage lenders welcomed sterling's departure from the ERM on the grounds that it heralded lower interest rates; they therefore begged the government not to reenter the mechanism. See David Owen and Chris Tighe, "Tory MPs Fight Shy of the ERM," *Financial Times*, September 18, 1992, p. 5.

IMPACT ON THE BUDGET. Equally important for some countries is a third channel through which high interest rates affect the economy: the government budget. Interest rate increases can have a significant impact on the budgetary position in countries with high debt-to-GDP ratios. In Italy, for example, where the debt-to-income ratio exceeds 100 percent and significant amounts of debt are short term, every percentage point increase in the Banca d'Italia's discount rate adds 13 trillion lire to the budget deficit.<sup>70</sup>

In addition, there is the danger that higher interest rates will transform the exchange rate crisis into a debt crisis. The average maturity of the Italian public debt is three years. Gross debt issues amount to more than half of GDP each year.<sup>71</sup> Any hint that the budget deficit is about to widen significantly because of increased debt-service costs could alarm bondholders and make the next round of financing perilous.<sup>72</sup>

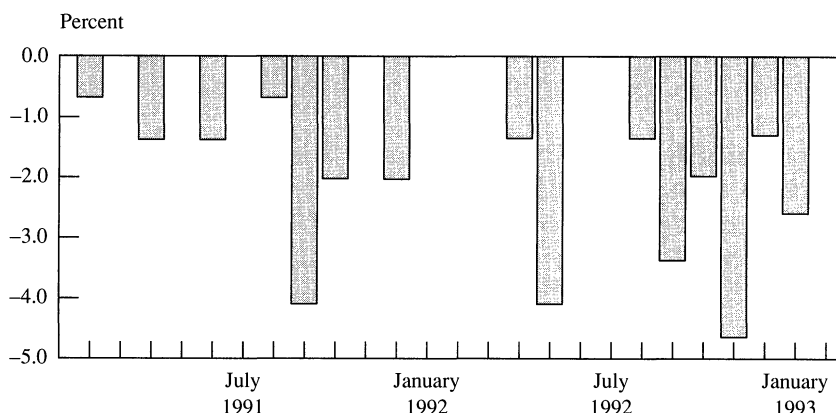
But again, the duration of the interest rate increases is critical. If rates rise only temporarily, the increased debt-service burden is relatively modest. Indeed, assuming a manageable debt-service burden, a temporary increase in rates can make absorbing new issues more attractive because of their temporarily high yield.

IMPACT ON THE BANKS. A final channel through which high interest rates can adversely affect the economy is by destabilizing the banking system. High central bank lending rates increase the cost of credit to commercial banks. This undermines bank profitability and capital adequacy, in the worst case requiring the government to bail out the banks. Bailouts shift the cost of stabilizing the banking system onto the government balance sheet, with negative implications for inflation, the current account, and ultimately exchange rate stability. When asked why central banks gave up defending certain currencies, about two-thirds of survey respondents ranked as important or very important worries that fur-

70. See James Blitz, "Italian Lira: The Sick Currency of Europe," *Financial Times*, July 22, 1992, p. 2. See also estimates that every point of short-term interest rates (as opposed to the discount rate) adds 15 trillion lire. (Edward Balls, "The Delicate Art of Persuasion," *Financial Times* August 4, 1992, p. 14.) These estimates assume that the higher interest rate is maintained for at least two years; Pierluigi Ciocca of the Banca d'Italia confirmed this in private communication.

71. *La Lettre du C.E.P.I.I.* (January 1993, p. 1).

72. For models of debt runs, see Alesina, Prati, and Tabellini (1990) and Giavazzi and Pagano (1990).

**Figure 18. Changes in Ratings of Banks in Europe, 1991–93<sup>a</sup>**

Source: International Bank Corporate Analysis, 1993.

a. Difference between the number of banks with rankings that are upgraded and those that are downgraded, as a percentage of all rated banks. Countries included are Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. No bar signifies that there were no changes in bank ratings for that particular month.

ther interest rate increases would destabilize banking systems; this is shown in table 4.

Evidence of the difficulties of European banks is provided in figure 18. It reports the difference between the number of banks whose financial status is upgraded and downgraded by International Bank Corporate Analysis, a rating agency based in London. The deteriorating financial condition of European banks is evident in the fact that the numbers are consistently negative. The difference in numbers of downgradings and upgradings peaks in September 1991; in May 1992, immediately before the first phase of the crisis; in the subsequent September, following the rise in discount rates; and again in the following November. This suggests a correlation between the interest rate policies pursued to defend EMS parities and the difficulties of the banks.

Again, however, that impact is likely to be powerful only if rates are held at high levels for extended periods. Furthermore, both commercial and central banks found ways to soften the effects. In Sweden, for example, where overnight rates were raised to an annualized rate of 75 and then 500 percent, the Riksbank employed a graduated ladder of interest rates. Each bank has its own interest rate scale, which is set according to its capital. In September only SwedishKr 1.6 billion of the SwedishKr

46.6 billion of bank borrowings from the central bank bore the highest ("marginal") interest rate. The average overnight lending rate was 23 percent for banks borrowing from the central bank when the marginal rate was 75 percent, and 50 percent when the marginal rate was 500 percent.<sup>73</sup>

In France as in Sweden, resident commercial banks were spared the full blow of the increase in short-term rates to more than 20 percent. They enjoy privileged access to the Bank of France's biweekly allotments, on which the rate was not raised. This—along with strong moral suasion by the authorities—explains the differential between the London and Paris rates on the franc. (The London rate soared relative to that prevailing in Paris; a differential of nearly five percentage points opened up at the height of the crisis.)<sup>74</sup>

Another way high interest rates may destabilize the banking system is through their impact on the property market. If high interest rates are maintained for an extended period, the consequences can include weak demand for loans, an increase in the number of foreclosures, and a further decline in property prices—all of which would be bad news for the banks. Again, none of these effects is likely to operate powerfully if the increase in interest rates is short-lived.

### *Implication*

Our analysis of the four channels through which high interest rates affected the economy points to the same conclusion; stratospheric rates are tolerable for short periods, but become impossible to bear if maintained for long. If European central banks stopped defending their ex-

73. See Sara Webb, "Sweden Awaits Return of the 'Hot Money,'" *Financial Times*, September 11, 1992, p. 2, and the Riksbank. For an excellent analysis of the Swedish crisis, see Hörngren and Lindberg (1993). The Riksbank also provided its banks and financial institutions with a large number of special facilities at much lower rates (Sveriges Riksbank, *Annual Report 1992:4*, p. 20).

74. Still, there is no doubt that banks suffered. The Association of French Banks asserts that holding the prime rate to 10 percent when overnight money and even three-month interest rates commanded 12 percent was costing the bankers Ffr 300 million (\$54 million) a month, a substantial sum compared to the value of the commercial banks' demand and time deposits (about Ffr3.9 billion). It has been suggested that the banks, rather than incurring the wrath of the government by raising lending rates, refused to lend at all. See William Dawkins, "French Banks Seeking Base Rate Rise," *Financial Times*, October 3, 1992, p. 2.

change rates, they must have grown convinced that their high interest rates would prove impossible to reduce quickly.

The Swedish case supports this conjecture. Toward the beginning of the crisis, the Riksbank raised its marginal rate to 500 percent. But the reserves that had been lost during the crisis did not flow back in as soon as the crisis passed, even after turbulence in other markets died down. When capital again flowed out in November (the total outflow during one week reached SwedishKr 158 billion, in comparison with an outflow of SwedishKr 60 billion in September), it would have been necessary to ratchet interest rates back up, without any assurance that it would stop the hemorrhage of reserves that had continued after the first rate increase.<sup>75</sup> At this point the Riksbank stopped defending the krona.

That a short period of high interest rates would not permanently curtail adverse speculation is an implication of the existence of multiple equilibria. High rates could defer the speculative attack so long as they are maintained, as we explained in the discussion surrounding table 8 above. But as soon as rates are lowered, the markets have the same incentive as before to attack. Once they do, the exchange rate depreciates as the government shifts to a more accommodating policy. In the presence of multiple equilibria, interest rates therefore have to be maintained indefinitely at high levels to stabilize the exchange rate.<sup>76</sup> This is what central banks were unwilling to tolerate in 1992.

### **The Political Economy of the Crisis**

Stratospheric interest rates could be used to defend exchange rate pegs at best to a limited extent. The only means available to defend the pegs was therefore unlimited foreign support.

#### *Did Countries Expect Unlimited Support?*

Foreign support, after all, was supposed to be what distinguished the EMS from other fixed exchange rate arrangements. It featured a very

75. Sveriges Riksbank (1993).

76. Insofar as reserves have fallen in the course of previous crises, it may be necessary to ratchet domestic rates up to even higher levels.

short-term financing facility (VSTF) (first established in 1972 as part of the snake, the failed attempt to stabilize intra-European exchange rates that had preceded the EMS). The VSTF exists because of the obligation to intervene when a currency reaches the edge of its fluctuation band.<sup>77</sup> When a bilateral exchange rate reaches the maximum permissible distance from its declared central parity (2.25 percent in the normal EMS band, and 6 percent in the case of the wider band temporarily given to some new entrants to the system), both central banks concerned are required to intervene. While the strong-currency country might in principle purchase third currencies in exchange for its own currency, it was agreed when the EMS was established that interventions should be conducted in the currencies concerned. According to the EMS Act of Foundation, “interventions shall in principle be effected in currencies of the participating central banks. These interventions shall be unlimited at the compulsory intervention rates.”<sup>78</sup>

Moreover, the EMS agreement gave countries reason to expect unlimited support when their currencies fell to the bottom of the band. Again, the Act of Foundation is unambiguous: “To enable interventions to be made in Community currencies, the participating central banks shall open for each other very short-term credit facilities, unlimited in amount.”<sup>79</sup>

The VSTF worked to the satisfaction of all concerned until 1992. Many of the eleven realignments that took place between 1979 and 1987 occurred in the midst of incipient crises that were contained temporarily by large-scale intervention organized under the provisions of the VSTF until an orderly realignment could be arranged.<sup>80</sup>

77. Amounts lent under the provisions of the VSTF must be repaid with interest within seventy-five days of the end of the month in which the intervention took place, but the loan can be renewed automatically for three months, and conditionally for another three months. More details on the mechanics of these operations are provided by Giavazzi and Giovannini (1989, pp. 38–39). Prior to the Basle-Nyborg Agreement of 1987, the repayment period was forty-five days. Central banks can also use the VSTF for intramarginal intervention, but in this case, access is not automatic.

78. The act is formally known as the European Council Brussels Resolution, Article 3.7, and was passed on December 5, 1978. This passage appears in Article 2.2, Section I, Document 8. See Commission of the European Communities (1984, p. 130).

79. European Council Brussels Resolution, Article 6.1, Section II, Document 8. See Commission of the European Communities (1984, p. 130).

80. Mastropasqua, Micossi, and Rinaldi (1988).

*Why Countries Should Have Known Better*

With hindsight, it is obvious that no central bank would ever commit unconditionally to unlimited lending.<sup>81</sup> The question is how a presumption to the contrary could have come about. Otmar Emminger, the Bundesbank governor who signed the EMS Act, had obtained beforehand from the government of the Federal Republic of Germany a clause permitting the Bundesbank to opt out from these responsibilities. Emminger apparently saw nothing peculiar about this arrangement, as he recalls in his memoirs.

Of particular importance for us were the agreements between the Government and the Bundesbank, especially concerning the underpinning of the Bundesbank's autonomy with regard to monetary policy. These agreements have been summarized in a letter written by me and addressed to the Federal Government in November 1978. Its essence was as follows:

'The autonomy of the Bundesbank in monetary policy would particularly be put in jeopardy if strong imbalances with the future EMS resulted in extreme intervention obligations which would then threaten the value of the currency. This would make it impossible for the Bundesbank to carry out its legal obligations. Referring to repeated assurances from the Chancellor and the Finance Minister, the Bundesbank is starting from the premise that, if need be, the German government will safeguard the Bundesbank from such a situation of constraint, either by a correction of the exchange rate in the EMS or, if necessary, by discharging the Bundesbank from its intervention obligations.'

The decisive factor regarding the policy of stability was without a doubt the intention to keep the Bundesbank's intervention obligations to an acceptable minimum.<sup>82</sup>

The government acquiesced. Economics Minister Otto von Lambsdorff went to the Bundestag on December 6, 1978, and stated, "The adjustment of the exchange rate has always been the responsibility of the Government and not of the Bundesbank. The Bundesbank has the responsibility to intervene, and the option not to intervene if it is its opinion that it is not able to do so."<sup>83</sup>

For many years this distinction was incompletely appreciated. Through the early years of the EMS, capital controls and realignments

81. The analogy with the domestic lender-of-last-resort function suggests that a central bank will demand the right to choose whether to bail out an insolvent or illiquid institution, and will insist on oversight privileges in return.

82. Emminger (1986, pp. 361–62).

83. Emminger (1986, pp. 361–62).

obviated the need for unlimited intervention. Things were different in 1992, when neither capital controls nor the realignment option remained. What happened once the crisis started building in June necessarily remains a matter of speculation (no pun intended). There is no question that the Bundesbank initially responded by intervening in support of the lira, acquiring some \$4 billion of foreign exchange. It then grew worried over its ever-growing reserves (some DM 92 billion in September 1992 alone). By early September, its target monetary aggregate M3 was rising at an annual rate of nearly 10 percent (far above the target range of 3.5 to 5.5 percent).

### *The Bundesbank's Objectives*

Accurately characterizing the Bundesbank's objectives is crucial to understanding the political economy of the crisis. Those objectives have always been clearly and consistently stated. As early as 1990, it was the Bundesbank's view that:

To the extent that the stability of exchange rates or even the pronounced strength of a number of partner currencies that do not belong to the "hard core" of the EMS can be explained essentially by inflation-induced higher rates of interest, it can basically be justified only if it is consolidated by a domestic economic policy that is durably geared to stability. If success is not achieved in coping with the structural causes of inflation within a reasonable period of time, it will probably become increasingly difficult over the long term to avoid having recourse to exchange rate adjustments.<sup>84</sup>

German economic and monetary unification brought these conflicts to a head. The Bundesbank dutifully asked for a DM appreciation. When rebuffed, it correctly warned that exchange rate adjustments were unavoidable. As pressure built in the summer of 1992, it responded initially by fulfilling its intervention obligations. But doing so heightened the conflict between two of its priorities: safeguarding the EMS and maintaining price stability. On Friday, September 11, after a day of massive and unprecedented Bundesbank purchases of lira, Chancellor Helmut Kohl traveled to Frankfurt to meet with Bundesbank officials and discuss the dilemma. Given the 1978 agreement with the Federal Government, it is plausible that the Bundesbank, meeting the Chancellor in the

84. Deutsche Bundesbank (1991, p. 66). We thank Otmar Issing for bringing this quotation to our attention.



midst of a concerted attack, invoked its right to limit its intervention on the grounds that doing otherwise—given foreign resistance to realignment—might threaten price stability.<sup>85</sup>

This conjecture is supported by the fact that, over the following weekend, Bundesbank President Helmut Schlesinger sought to arrange a general realignment of EMS currencies in return for a reduction in German interest rates.<sup>86</sup> The Italians are known to have been reluctant to devalue, as were the British and the Spaniards when sounded out a couple of days later. Notwithstanding their recalcitrance, unlimited non-sterilized interventions and loans through the VSTF could have, in principle, succeeded in supporting the existing parities. But by denying its request for a DM revaluation, the other ERM member countries subjected the Bundesbank to demands for intervention incompatible with its commitment to monetary stability.

With hindsight, common sense suggests that a commitment to unlimited intervention is not time-consistent.<sup>87</sup> The September crisis simply brought to the surface an obvious fact: with no realignments and no capital controls, the new EMS was insupportable.

Why, of all the currencies attacked, did only two—the Danish krone and the French franc—escaped unscathed? One interpretation is that the Bundesbank provided more extensive support for these than for other EMS currencies. The Bundesbank has long been a strong supporter of the coronation theory, according to which monetary union is the last step in a long process of convergence of national monetary policies. A possible implication of the coronation theory is that France and Denmark had already established their commitment to convergence and hence were worthy of support. As members of the “convergence club,” France and Denmark had inflation rates even lower than Germany’s. Other countries that had made less progress toward convergence may have been deemed less worthy of support.

85. It might be the second time that this clause has been used. Neumann and von Hagen (1992) report that the Bundesbank already invoked it in 1983 when the French franc was under attack.

86. For a detailed account of these negotiations see Peter Norman, “The Day Germany Planted a Currency Time Bomb,” *Financial Times*, December 12–13, 1992, p. 2.

87. While a central bank might commit to this before the fact, it would have strong incentives to renege afterwards. A few early commentators on the EMS Act, such as Vaubel (1980) emphasized this point. For further discussion, see Begg and Wyplosz (1993).

In light of its commitment to domestic price stability, the Bundesbank simply did not have the latitude to provide unlimited support to all EMS currencies. It logically attached priority to the defense of certain currencies such as the franc and the krone. In addition to their membership in the convergence club, France and Denmark were pivotal countries politically. France's participation in the monetary union was essential to prevent the latter from degenerating into a DM area and denying Germany the political and diplomatic concessions (such as a Community foreign policy) it desired as its *quid pro quo* for European monetary union.<sup>88</sup> Denmark remained (along with the United Kingdom) one of only two EC countries that had not yet ratified the Maastricht treaty. To withdraw support for the krone at a time when the Danish government had initiated a second campaign to secure ratification might have torpedoed the entire EMU process.

In contrast, Italy, Spain, and Portugal neither played such a critical role politically nor clearly belonged to the EMS's hard core. The first statement also applies to Ireland; the second applies to the United Kingdom. Thus it is logical that the Bundesbank would have devoted its scarce resources to other currencies first.

There is a further hypothesis: that the Bundesbank saw in the crisis the opportunity to shape a monetary union more to its liking—specifically, one purged of its weaker members. Supporting this view is a disquieting pattern of public statements by Bundesbank officials.<sup>89</sup>

On August 25, Reimut Jochimsen, a member of the Bundesbank's policymaking council, suggested that a realignment could be in the offing. On August 28, Johann Wilhelm Gaddum, a member of the seven-man permanent directorate, expressed the view that there was no reason to cut German interest rates. On September 10, anonymous sources within the Bundesbank suggested that the pound should be devalued. On September 15, newspapers reported sources in the Bundesbank as suggesting that a sterling devaluation could not be ruled out. And on September 16, Helmut Schlesinger was widely quoted as saying that Europe's financial difficulties remained unresolved. Each of these statements worked to destabilize weak EMS currencies.

88. For further analysis of this issue-linkage interpretation of the political economy of European monetary union, see Garrett (1993) and Eichengreen and Frieden (1993).

89. Ivo Dawney and Andrew Fisher, "Britain Points Finger at Germany," *Financial Times*, September 17, 1992, p. 1.

Until the relevant memoirs and records are published, this hypothesis cannot be tested. The comments above could be dismissed simply as ill-advised statements in the heat of battle. What is clear, in any case, is that it was not realistic to expect adequate support, given the size of the attacks made possible by fully liberalized markets. Equally clear is that governments should not expect to receive unlimited and unconditional support in future EMS crises.

### **The Way Forward**

The September 1992 crisis confirmed an elementary but strangely neglected principle of international economics: the incompatibility of pegged exchange rates, monetary policy independence, and full capital mobility. In drawing implications for the transition to EMU, it is essential to bear in mind that the ideal solution of simultaneously achieving all three of these desiderata is ruled out. Any workable solution will have to sacrifice at least one of them, and thus will inevitably meet with objections. In this last section, we present six options for the future, proceeding from the least to the most likely.

#### *Attempting to Proceed as Before*

The first alternative is to attempt to proceed as before, in the belief that future disturbances as severe as German economic and monetary unification are unlikely. In this view, EMS countries can simply rededicate themselves to harmonizing their macroeconomic policies, and exchange rate stability will follow. Our analysis makes clear that the events of September were more than a delayed reaction to a onetime shock. In addition, they reflect intrinsic sources of instability that are still very much present. Ample scope remains for self-fulfilling speculative attacks to repeatedly destabilize the EMS. Neither the absence of extraneous shocks nor policy convergence can rule out self-fulfilling attacks. If this is the correct way of viewing the events of September, then proceeding as before is not feasible.

#### *Proceeding as Before But with More Realignments*

The Bundesbank's own preference would be to proceed as before but with more realignments to compensate for policy divergences. But, as

we explained in our discussion of escape clauses and robust monetary rules, periodic realignments are problematic when capital markets are free of controls. If there is one clear lesson to be drawn from the September crisis, it is that markets anticipate events. Central banks that believe they can peg the exchange rate for significant periods and then change it discretely overlook this elementary fact.

A variant of this approach is more continuous realignments—that is, shifting the band without discretely changing the exchange rate and thereby allowing the rate to fluctuate over wider range. As we explained in the third section, this is likely to aggravate credibility problems because the markets will have reason to doubt that the authorities are committed to supporting the exchange rate when it approaches the edge of the existing band. Insofar as more frequent shifts of the band allow the exchange rate to fluctuate over a wider range, this option creates the same objections as generalized floating, which we consider below.

#### *A Shotgun Wedding between Germany and France*

Marginally more likely is a shotgun wedding (perhaps the better analogy would be an elopement) between Germany and France. If the two countries credibly commit to close harmonization of monetary policies and to unlimited intervention of whichever currency weakens, the DM-franc rate could provide a stable core to which other northern European currencies could attach themselves.

The idea of a *de facto* monetary union centered on Germany is not unprecedented. For ten years, the Netherlands has forsaken monetary sovereignty in order to peg the guilder to the franc. More recently, Belgium, Denmark, and Austria (not yet an EC member) have adopted Dutch-style policies. Once France and Germany establish a pact, Belgium, Denmark and the Netherlands could quickly join. In much the same way that the EC grew from a core group of six countries to its current membership of twelve, what started as an alliance between two of the leading monetary powers of Europe could eventually encompass most of the continent.

The problem with this scenario is that, in contrast to the *de facto* monetary union between Germany and the Netherlands (and the more formal union between Belgium and Luxembourg), a Franco-German marriage would not be a union of one large and one small country, where the

latter delegated all control of household finances to the dominant marital partner.<sup>90</sup> Germany is unlikely (to put it mildly) to grant seats on the Bundesbank's board to officials from the Bank of France. France will not soon give Germany control of its macroeconomic policies, in the absence of which unlimited intervention is unacceptable to the Bundesbank. The Maastricht treaty creates a broader institutional framework and safeguards within which some such compromises and trade-offs should be palatable. Outside of it they remain unacceptable, as Helmut Schlesinger made clear in a speech on March 30, 1993.<sup>91</sup> Absent institutional innovations of this sort, a commitment to stabilize the DM-franc rate can always be abandoned or reversed. Under these circumstances, statements that the two governments "desire" or "intend" to stabilize the rate, however earnest, will not be regarded as credible.

### *An Early Two-Speed EMU*

Credibility requires an institutional framework like that attempted by the Maastricht treaty. But revising that treaty would require several years of intergovernmental conferences and yet more years for ratification. If the timetable is to be accelerated, therefore, this must be done within the confines of the existing treaty. The treaty is commonly read as preventing the initiation of Stage III (full monetary union) before January 1, 1997. But as we explained above, nothing in principle prevents the EMI and the Commission, which must report before the end of 1996, from reporting as early as the beginning of 1994. The treaty only states that Stage III must begin after Stage II, and that Stage II begins on January 1, 1994.

That a majority of EC countries must satisfy the convergence criterion requiring two years of exchange rate stability might seem to be the binding constraint on an early start. Of the twelve, only six—France, Germany, Belgium, the Netherlands, Luxembourg, and Denmark—will

90. Luxembourg openly delegates control of its monetary policy to Belgium, while the Netherlands does so de facto with Germany. This asymmetry in the size of cooperating countries may imply that exchange rate stabilization can be effected in North America without resorting to monetary union, assuming such stabilization eventually becomes necessary in conjunction with the North American Free Trade Agreement, as we suggest below.

91. Christopher Parks, "Schlesinger Warns on EMU Shortcuts," *Financial Times*, March 30, 1993, p. 2.

have displayed two years of exchange rate stability at the beginning of 1994 (assuming no additional unforeseen events). Greece, a non-EMS country, is not a candidate, while Italy and the United Kingdom would first have to reenter the ERM and then wait two years. Whether a majority of EC countries can be said to satisfy this criterion therefore hinges on the evaluation of Ireland, Portugal, and Spain. The relevant protocol to the treaty states that "the Member State [must have] respected the normal [2.25 percent] fluctuation margins . . . without severe tensions for at least the last two years before the examination."<sup>92</sup> This would appear to rule out Ireland's participation before early 1995 and Spain and Portugal's for at least two years (because they have both retained the wider margins of fluctuation). However, the protocol continues, "In particular, the Member State shall not have devalued its currency's bilateral central rate against any other member State's currency *on its own initiative* for the same period."<sup>93</sup> The on-its-own-initiative proviso might provide a loophole through which Ireland could slip and deliver the required majority.<sup>94</sup>

But strong-currency countries like Germany would allow this loophole to determine the starting date of EMU only if it were crystal clear that the member-state(s) in question satisfied the other convergence criteria. Projections for 1993, assuming no GDP growth in EC countries, show no country satisfying both the debt and deficit requirements. Unless these positions change dramatically, it seems unlikely that the on-its-own-initiative loophole would be allowed to determine the outcome.

### *More Exchange Rate Flexibility*

Monetary policy independence, widely regarded as useful for policy purposes, and full capital mobility, as mandated by the Single European Act, can be reconciled with one another by flexible exchange rates. This is why generalized floating is sometimes advanced as a natural response

92. Treaty on European Union (the Maastricht treaty). See Commission of the European Communities (1992, Article 109; p. 41, and Protocol, Article 3, p. 185).

93. Treaty on European Union (the Maastricht treaty). Emphasis added. See Commission of the European Communities, 1992, Protocol, Article 3, pp. 185–86).

94. The prospective expansion of the Community cannot relax this constraint. Austria comes close to satisfying the convergence criteria, but its application is being processed in parallel with those of Finland and Sweden, which do not. EC procedures make it virtually impossible to expedite the admission of one country but not the others.

to the EC's monetary dilemma. Italy and the United Kingdom have shown the way and evince little regret.

This proposal, most popular in U.S. academic circles, is heretical in the European context. For historical reasons—competitive devaluation and related monetary conflicts in the 1930s are believed to have soured the European political climate—aversion to floating in Europe is intense.<sup>95</sup> European countries are more open to trade than the United States, which means that exchange rate fluctuations are more disruptive and give rise to stronger political objections. The Common Agricultural Policy (CAP), designed to stabilize domestic currency prices of certain agricultural products, is disrupted by floating rates.

These problems become more acute with the progress of the Single European Act. As intra-European trade expands and substitutability between the products of competing suppliers grows, exchange rate fluctuations will give rise to even more import penetration, intensifying the pain experienced by import-competing producers. The Common Agricultural Policy will become more difficult to operate in the face of exchange rate changes. Exchange rate fluctuations have always created strong incentives for illicit cross-border shipments of agricultural goods whose domestic currency prices are supported. But while this has long been a problem, it becomes intractable with the removal of border controls and inspections as a consequence of the Single European Act.<sup>96</sup>

Finally, there is the objection that floating will prevent Europe from reaping the benefits of the single market. How, it is asked, could meaningful commodity and factor market linkages be created in the presence of a dozen (or, following enlargement, fifteen) national currencies fluctuating against one another? One answer is that firms and traders can

95. The importance of this historical legacy in conditioning European attitudes is emphasized by Giavazzi and Giovannini (1989). Recall that initiatives to stabilize intra-European exchange rates after the breakdown of the Bretton Woods System started immediately with the establishment of the snake.

96. For details, see Eichengreen (1993). Many economists—ourselves included—would argue that economic efficiency would be enhanced by eliminating the CAP, and that if the trade-off is between flexible rates and the CAP, Europe is better off sacrificing the latter to secure the former. But there is good reason to conclude that this trade-off is not politically feasible in the short run, as recent demonstrations against agricultural liberalization in France underscore. Over a longer horizon, one can imagine that the CAP could be transformed into a system of lump-sum income supports for European farmers, which would reduce its distortionary effects and remove one obstacle to greater exchange rate flexibility in Europe without creating political resistance.

hedge exchange rate risk. Unfortunately, protection is expensive. In particular, investors in plant and equipment with a long service-life have little protection available at an affordable price.<sup>97</sup> R.L.A. Morsink and Willem Molle report some evidence that exchange rate variability depresses direct foreign investment among EC countries.<sup>98</sup>

The single most damning objection is political. Once European markets become more integrated because of the Single European Act, wide exchange rate swings may become unbearable for firms confronted by a surge of competing imports suddenly sold at bargain prices because of the exchange rate change. That they would seek political redress is predictable. Fluctuations within a wide target zone could be interpreted as the intended result of beggar-thy-neighbor policies. Political pressure would mount in strong-currency countries to offer some form of protection from members engaging in "exchange dumping." Countries such as the United Kingdom, if thought to be manipulating their exchange rates in order to steal a competitive advantage, would be given a choice between participating in the monetary union project or being expelled from the single market. What is ultimately at stake, therefore is the single market project itself.<sup>99</sup>

The United States and Canada offer a puzzling contrast. They have pursued economic integration over the years without yet prompting calls for exchange rate stabilization, much less currency unification.<sup>100</sup> This remains true despite very pronounced fluctuations in Canada's effective real exchange rate (which mainly reflects movements relative to

97. Even three-month contracts in excess of \$1 million can cost 2 percent or more. Options running more than five years to maturity are virtually unknown; 80 percent run less than one year.

98. Morsink and Molle (1991).

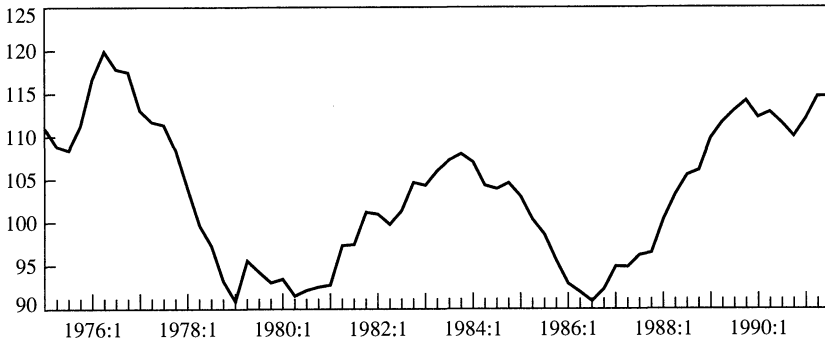
99. "L'affaire Hoover" illustrates the point. The Hoover Company stopped producing vacuum cleaners in France in early 1993 in favor of expanding its operations in Scotland, partly in response to sterling's depreciation against the franc. The decision elicited heated French and EC-level complaints.

100. Schott and Smith (1988) note that the AFL-CIO argued at an early stage in Canadian-U.S. free trade negotiations that an undervalued Canadian dollar conferred on producers north of the border an unfair competitive advantage; the union pressed for eventual one-to-one parity. But Schott and Smith conclude that this argument was an isolated exception to general neglect of the exchange rate issue. Similarly, Harris (1991) argues for the desirability of exchange rate management to prevent persistent misalignments, but does not link the need for stabilization to integration. For further discussion, see Bayoumi and Eichengreen (1993).



**Figure 19. Canadian Real Effective Exchange Rate, 1975:1–1991:3**

Index, 1985 = 100

Source: *International Financial Statistics*.

the United States). These fluctuations, on the order of 25 percent, as shown in figure 19, would be regarded as unbearable in Europe. Why this has not been true of Canada remains an open question. A plausible conjecture is that as North American economic integration proceeds, political pressures for exchange rate stabilization will intensify. They may spread to the United States as integration with Mexico goes forward and certain U.S. industries find themselves at a competitive disadvantage because of a depreciation of the peso.

A compromise between pegged and freely floating rates for Europe might be wider fluctuation bands. If bands are sufficiently wide to remove the need for realignments, there will be no incentive for speculative attacks. If parity adjustments are sufficiently frequent, the band can be adjusted around the exchange rate without requiring the rate itself to move discretely.

Unfortunately, such arrangements tend to pose credibility problems. If the exchange rate is allowed to fluctuate widely and the band is shifted frequently, it will be difficult for observers to determine whether the authorities are adjusting the parity only in response to exceptional disturbances or in fact reverting to preexisting inflationary tendencies. Capital might not flow in stabilizing directions when the rate moved to the edge of the band, and the target zone honeymoon would be lost. A high probability of realignment when the exchange rate drifted toward the edge of the band could destabilize the entire arrangement, replacing the target

zone honeymoon with a target zone divorce.<sup>101</sup> For all these reasons, however appealing they are in theory, floating exchange rates are not feasible in Europe in practice.

### *Throwing Sand in the Wheels of Speculation*

This leaves only one alternative, which itself has significant disadvantages. This is an explicit or implicit tax on foreign exchange transactions. One option is a Tobin tax of, say, 1 percent on each purchase or sale of foreign exchange (a 2 percent tax on a roundtrip transaction). Such a tax would discourage speculators from taking one-way bets. It could not support weak currencies permanently, but it would provide time to organize orderly realignments. Because it is not an administrative (that is, a quantitative) restriction, it would be permissible under the provisions of the Maastricht treaty and the Single European Act.

Our preferred option is an implicit tax. This would require financial institutions purchasing foreign exchange with domestic currency for their own account or on behalf of customers to make non-interest-bearing deposits with the central bank. The Banca d'Italia pioneered such policies in the 1970s. Countries could emulate the specific measures adopted by the Spanish government during the September crisis, when it required institutions purchasing foreign currency against the peseta to deposit a sum equivalent to the transaction, interest-free, with the Bank of Spain for one year. Again, because deposit requirements are not an administrative prohibition, they do not violate either the letter or the spirit of the Maastricht treaty or the Single European Act.

Both measures work by raising the cost of cross-border capital flows. An appealing feature is that they penalize short-term capital movements more heavily than long-term investments. A 1 percent tax on each transaction (2 percent on a roundtrip transaction) represents an annualized cost of nearly 8,000 percent on a one-day shift, 180 percent over a week, 27 percent over a month, but only 0.2 percent over 10 years. Because speculative attacks are based on short-term positions, such a tax would limit the amount of intervention required to support currencies and, where necessary, provide time to arrange orderly realignments.

The strength of the Tobin tax is its transparency. Deposit requirements, while more opaque, have the advantage that the implicit tax in-

101. Bertola and Caballero (1992).

creases with the interest rate. In normal times, when interest rates are low, so is the opportunity cost of the funds deposited in non-interest-bearing accounts. Under the Bank of Spain's measure, the implicit tax is an annualized 5 percent if the interest rate is 5 percent. The violation of interest parity is modest. But if it becomes necessary to raise interest rates in response to speculative pressure, the opportunity cost increases accordingly. If interest rates are raised to triple-digit levels, as in Sweden and Ireland during their crises, the implicit tax rises to triple-digit levels. The wedge between domestic and foreign interest rates widens accordingly, reducing the dislocations to the domestic economy caused by policies of exchange rate support.

If the point of the policy is merely to provide enough time to arrange an orderly realignment, then a modest Tobin tax would do. But in the presence of multiple equilibria, the authorities may wish to resist the pressure to realign. Then it may be necessary to raise interest rates for an extended period, in which case deposit requirements have a comparative advantage.

These measures have disadvantages, as we explain momentarily. But it is not enough for critics to point to their disadvantages. They must offer an alternative. And they must show that their alternative is feasible, unlike those we have listed above.

It might be thought that deposit requirements would thwart the creation of an integrated financial market. Recall, however, that a deposit requirement is not an administrative control. No one would be prevented from undertaking any financial transaction. Such a measure would no more prevent the development of a single financial market than modest national taxes on carrots prevent the development of a single carrot market.

A second invalid objection is that, to work, such measures would have to be coordinated internationally. Those who invoke this view note that foreign exchange is traded all over the world. But this fact is irrelevant: deposit requirements work by reducing the cost to the government in question of supporting its exchange rate. By creating a wedge between domestic and foreign interest rates analogous to the capital-control wedges documented in the eighth section, they would limit the domestic dislocations caused by policies of defense.

Other objections carry more weight. Deposit requirements could discourage the development of local financial markets. When Spain intro-

duced them in September 1992, for example, the blow to its burgeoning financial market was severe. To minimize these costs, the measure should be applied only for a transitional limited period and ideally by all ERM countries simultaneously.

A related danger is that, by reducing the liquidity of financial markets, such a measure discourages long-term as well as short-term inward investment. Foreign investment might be depressed, not by the fact that investors would have to pay 1 percent to repatriate their funds, but by the tendency to discourage the development of local financial centers, which would increase bid-ask spreads and related thin-market problems.

A further danger is that the imposition of deposit requirements would weaken monetary discipline and jeopardize the convergence process. Aware that they provide additional room for maneuver for national policymakers, these officials might utilize their newfound freedom recklessly. While this danger is real, the same objection applies to widening or eliminating fluctuation margins. For all these reasons, a deposit requirement is not the best of all worlds. Our point is that it is the best of all *possible* worlds.

## Conclusion

A basic axiom of international economics is the incompatibility of fixed exchange rates, full international capital mobility, and national policy autonomy. From this perspective, the instability of the EMS is no surprise. Between 1987 and 1990, realignments were spurned and capital mobility was perfected by the removal of capital controls, but the option of independent policies was not abandoned. Given this incompatibility and some time, an EMS crisis was all but inevitable. The only mystery is how its outbreak was deferred for so long.

We have distinguished four explanations for what triggered the 1992 crisis: overt competitiveness problems in certain high-inflation countries; hidden competitiveness problems associated with German economic and monetary union; anticipated future competitiveness problems caused by a predictable backlash against policies pursued to maintain competitiveness; and speculative crises of a purely self-fulfilling nature. As our discussion of the various national experiences makes

clear, we believe that all four explanations apply to the 1992 crisis, although to extents that vary across countries. But for those concerned with future options, the final explanation is key.

Those who remain optimistic about the prospects for the EMS<sup>102</sup> and about the viability of the existing blueprint for European monetary union fail to appreciate how the very structure of the Maastricht treaty is conducive to multiple equilibria and self-fulfilling speculative attacks. To salvage the Maastricht blueprint, it is not sufficient for governments to rededicate themselves to policies of austerity or to raise interest rates to high levels for limited periods. Neither step will necessarily succeed in fending off speculative attacks. In addition, the structure of the European monetary system and the blueprint for European monetary union must be changed.

The options for resolving this dilemma are a forced march to European monetary union or taxing foreign exchange transactions. In practice the first option—a Franco-German alliance or an early two-speed EMU—is not feasible for political reasons. This makes us reluctant advocates of the last alternative: throwing sand in the wheels of international finance.

## APPENDIX

### *A Brief Overview of Monetary Aspects of the Maastricht Treaty*

THE MAASTRICHT TREATY laid down four convergence criteria that had to be met by countries that qualified to participate in European monetary union.<sup>103</sup> Countries would have to have achieved a high degree of price stability; their average rate of CPI inflation during the twelve months preceding the initiation of monetary union could be no more than 1.5 percentage points higher than the inflation rates of the three EC member-states with the lowest inflation. Countries would have to have maintained stable exchange rates (within their normal EMS fluctuation

102. See, for example, the Commission of the European Communities (1993).

103. The treaty followed the recommendations of the Delors Committee (Committee for the Study of Economic and Monetary Union, 1989).

bands) for the two years preceding entry without devaluing their currencies. Their long-term interest rates during the year preceding entry could be no more than 2 percentage points higher than those of the three member-states that best controlled inflation. Countries would have to have achieved a “sustainable fiscal position”; their budget deficit could be no more than 3 percent of GDP, and their gross public debt could not exceed 60 percent of GDP.<sup>104</sup>

The treaty specified a transition to take place in stages. Stage I, beginning with the removal of capital controls in 1990, was to be marked by the reduction of inflation and interest rate differentials and by a stabilizing of exchange rates. Stage II, to begin on January 1, 1994, would prepare actively for monetary union. Domestic laws would have to be changed to conform to all aspects of the Maastricht treaty. In particular, national central banks would have to be made fully independent, as specified in the treaty. A transitional entity, the European Monetary Institute (EMI), would be created at the beginning of Stage II. It would coordinate member-countries’ monetary policies in the final phases of the transition and plan the move to monetary union.

Stage III would inaugurate monetary union and establish the European Central Bank (ECB). National central banks would continue to exist as subsidiaries of the ECB, mostly to take charge of bank supervision and provide hospitality for academic conferences.

104. Unlike the first three conditions, the fourth is subject to significant qualifications. For analysis and discussion see Kenen (1992), Buiter, Corsetti, and Roubini (1993), and Eichengreen (1992).

## *Comments and Discussion*

**William H. Branson:** This paper by Barry Eichengreen and Charles Wyplosz clearly lays out the facts and data and chronicles the events leading to the collapse of the European monetary system (EMS), or, more precisely, its exchange rate mechanism (ERM), in the fall of 1992. The paper presents one model of multiple equilibria rational speculative attacks and two models of shocks to the fundamentals, current or expected, and argues that the model of speculative attacks is more relevant to explain the collapse. I question the utility of the particular models presented in the paper to analyze the problems to which they are applied, and I disagree with the emphasis on the speculative attack explanation of the collapse, so most of my comments will discuss these points. The paper continues with a clear discussion of the political economy of the collapse, with which I agree. It ends with a recommendation of a Tobin tax on foreign exchange transactions; this follows from the emphasis on the speculative attack explanation, so I also dissent on this point.

After a brief introduction, the second section of the paper describes the three stages of the new EMS since 1987 as no realignments, no controls, and no stability. The discussion is accurate, but its structure implies that the combination of no realignments and no controls leads to no stability, anticipating the preference for the speculative attack explanation of the collapse. The third section begins the analysis with a discussion of three necessary conditions for a system of pegged, but adjustable, exchange rates, the old pre-1987 EMS. The three conditions are scope for relative price adjustments in the event of relative real disturbances, robust monetary rules to prevent rational speculative attacks, and capacity to contain market forces, just in case. I agree with the first point, but have difficulty with the argument supporting the second, and therefore with the third, as well.

The discussion of robust monetary rules in the third section alludes to, and is based on, the Obstfeld speculative attack model with multiple equilibria, which is discussed in the seventh section. That discussion

uses the structure of the model of expected shocks to the fundamentals presented in the sixth section, so I will combine my comments on these two sections here, focusing on the speculative attack argument for robust monetary rules.

In the speculative attack model, speculators correctly anticipate that a “wet” government will ease monetary policy after an attack; thus the government is forced to do so by the attack. Accordingly, an attack not based on fundamentals succeeds. This descriptive story uses the model of the sixth section to illustrate its points. I have problems at several levels with both the speculative attack story and the supporting model.

The attack is said to occur because the speculators know that they will make capital gains on foreign assets when they repurchase the depreciated home currency. But the purchasing power of these capital gains is eliminated by the rise in the home country’s price level, proportionate to the depreciation. Between equilibria in equations 17 and 18,  $e$ ,  $p$ , and  $m$  all change by the same amount, moving from point  $A$  to point  $B$  in figure 15. The only asset in the model is the home country’s real money held by the private sector, and it is unchanged between equilibria. At a deeper level, it is unclear why the attack equilibrium exists. If the government knows that it is wet and will succumb to the attack, then as soon as it sees the horde of rational representative-agent speculators crowding at the foreign exchange window, it will give way, increase the money supply, and devalue, rather than lose reserves. The speculators will then secure no capital gains, and they know this. Thus they will not bother to mount the attack in the first place.

The technical properties of the model are also somewhat unclear. Figure 15 has saddle paths  $SS$ , derived from figure 13, and the exchange rate jumps from point  $A$  to point  $C$ . However, the dynamic properties of the coefficient matrix of  $e$  and  $p$  in equations 17 and 18 are unclear. If we assume that  $e$  is the jump variable for the  $SS$  paths in figures 13 and 15 to exist as shown, the constant- $p$  locus (not shown) should be positively sloped, and the constant- $e$  locus negatively sloped. But from equation 17, the slope of the constant- $e$  locus is  $\{1 - [(1 - kc)/ah]\}$ , which has an indeterminate sign that could easily be positive. Sufficient assumptions could rule this out, but that would further weaken the utility of the model in illustrating the story.

To sum up, the story of multiple equilibria with speculative attacks is plausible, and robust monetary rules may be useful in sticking to the



fundamentals equilibrium, but the model employed here does not support the story very well. However, it may well be that the model that would support the story is sufficiently technical to be included in an appendix or reference list. If the multiple equilibria problem turns out to be theoretically implausible or empirically unsupported, then the need to contain the market, and this paper's argument for the Tobin tax, are correspondingly weakened.

The fourth section of the paper reviews data on competitiveness as evidence that the collapse was not caused by a change in the fundamentals. The relevance of this material is undermined a bit in the fifth section by the clear discussion of German reunification as the disturbance to fundamentals. The basic problem was not a deterioration in the competitiveness of the non-German EMS members and other countries pegging to the EMS; it was essentially a fiscal shock coming from Germany, as is described in the fifth section. The data in the fourth section are useful in indicating where the pressure would appear first, however. The deterioration of the competitive position in Italy is clear, and the collapse of Finnish trade with the Soviet Union weakened Finland's position. The case of Sweden is less clear, however. The competitiveness measures for Sweden in figure 4 turned around in 1989.

The fundamentals shock from the German reunification is described in such a convincing way in the fifth section that I am surprised to see the speculative attack model survive as the preferred explanation at the paper's end. The fiscal expansion that accompanied the reunification caused a real appreciation of the equilibrium value of the deutsche mark (DM). This can be seen in several ways. In the standard Mundell-Fleming model used in the paper, the fiscal expansion puts upward pressure on German interest rates, causing a capital inflow and appreciation of the equilibrium value of the DM.<sup>1</sup> This is shown in figure 10. This is the standard result, although I have a problem with the use of the model as specified here. From equation 7, the slope of the constant- $q$  locus is given by the term  $- \{1/[2h(a - bc)]\}$ ; its sign is unclear. The saddle path (not shown) may not exist.

The Mundell-Fleming model does not include the specification of portfolio balance with home and foreign assets, and therefore does not

1. This model is similar to the two-country Dornbusch model used in Branson (1988) to analyze the effects of a potential fiscal tightening in the United States.

include the stock equilibrium condition of current account balance.<sup>2</sup> In a model of this sort, the fiscal shift accompanying the German reunification is a shift in the German equilibrium international net credit position. Germany has gone to the international credit markets to finance the reunification. If it began in a position of current account balance—as the United States did in a similar episode beginning in 1981—to reduce its net credit position, Germany would have to run a current account deficit for a time. This would require a real appreciation. Eventually, to restore current account balance, the appreciation would have to be reversed, as it was in the case of the United States. Because Germany began out of equilibrium with a current account surplus of about \$50 billion, there was a possibility that the adjustment could have been achieved by a one-time appreciation that eliminated the surplus, with no eventual reversal of the path of the DM. In any event, Germany now has a current account deficit, so some reversal is to be expected.

Both the Mundell-Fleming model and the portfolio balance model provide a third way to see the need for appreciation of the DM in real terms. The fiscal expansion increases relative demand for German versus world goods, or for nontraded versus traded goods in Germany. Both effects require a real appreciation to restore equilibrium.

The equilibrium real appreciation shown in figure 10 is a deterioration in equilibrium German competitiveness. This is mirrored by an improvement in equilibrium competitiveness in the other EMS countries, to provide the aggregate current account surplus that would match the German deficit. This implies that in the figures of the fourth section on competitiveness, the *equilibrium* values would have jumped down in 1990, when the *equilibrium* real DM appreciated, as shown in figure 10. Thus the fourth section might be reinterpreted to say that because none of the measures did jump down, the competitiveness of all the other countries deteriorated as a result of German reunification. This reinterpretation, consistent with the movement in figure 10, would make the data of the fourth section argue *for* the fundamentals model—not against it.

The policy conflict that followed the reunification shock is described well in the fifth section. The DM could appreciate in real terms either

2. See Branson and Marchese (1988) and Branson (1993) for an application to the current topic.

through a combination of German inflation relative to the rest of the EMS, or by a nominal appreciation. The Bundesbank stood against relative inflation and repeatedly requested a realignment. The request was refused by the partner central banks, which had tied the credibility of their anti-inflationary policies to the DM. Just when they thought they had achieved credibility by attaching themselves to the stable center, the shocks started coming from the center! They remained tied to the DM, getting the negative effects of both high interest rates and the real appreciation of the DM against the dollar and the yen.

The effects of the reunification shock, combined with the Bundesbank's determination not to inflate, seem clear in the data. From late 1989 to mid-1990, long-term interest rates in Germany increased by more than 200 basis points. In early 1990, German long rates rose above those in the United States and have stayed above since. With their currencies still tied credibly to the DM, the rest of the EMS countries experienced increases in their long-term rates. During the same period, the DM appreciated in real terms by about 8 percent, pulling the rest of the EMS along with it. The German investment and fiscal boom continued through 1991, while the rest of Europe slipped into recession. German monetary policy tightened sharply in late 1990 and short-term interest rates continued to climb until the crisis of September 1992. This brought German growth to zero by the end of 1992. When the crisis came in September, each of the partners devalued separately, destroying the credibility that they had sought to maintain by refusing to let the DM appreciate unilaterally.

My view is that the collapse of the ERM came from the reunification shock and the inability of the new EMS to allow an upward revaluation of the DM. The timing of the crisis was influenced by the Danish and French referendums. The pressure was building in the balloon, and it had to burst sometime and somewhere. The place was Helsinki, and then Rome—the weakest points in the system. I think this view is supported by the data and arguments in the Eichengreen-Wyplosz paper. The paper describes the fundamentals shock clearly in the fifth section, but barely mentions this analysis in the conclusion. I do not see why the authors so strongly support the speculative attack model, except perhaps that it is consistent with their policy conclusion.

**Rudiger Dornbusch:** The crash of the EMS in the fall of 1992 was more spectacular than anyone had imagined, even officials at the Bundesbank, who always knew it could not last and did not mind a bit. Central banks were far more hard-nosed about defending currencies than had been imagined, and financial markets called their bluff with verve and gusto. Much public money was distributed to strong-armed speculators—enough for Lawrence Summers, now Undersecretary of the U.S. Treasury, to comment that the British surely would have been better off spending \$25 billion on roads and bridges, rather than blowing it in the foreign exchange market. Barry Eichengreen and Charles Wyplosz offer a careful, although controversial, account of the events and the policy lessons that might be drawn from the collapse.

I differ from their analysis in four specific ways. First, their claim that no pervasive competitiveness problem existed is not persuasive. Second, I question the model of self-fulfilling expectations. Third, I have problems with the authors' policy recommendations to facilitate the transition from an EMS into an EMU. Finally, I question the usefulness of the Maastricht treaty, which is taken for granted in their paper.

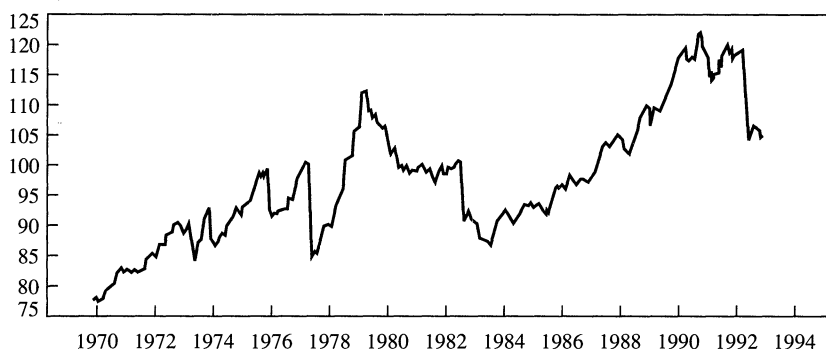
### *Competitiveness*

The paper argues that Italy probably had competitiveness problems, while the United Kingdom and Spain perhaps had some such problems, and other countries had none. To support this contention, the authors present indexes of unit labor costs. There are three reasons why this approach is not fully satisfactory; I will comment on each, using Spain as an example.

Discussion figure D1 shows Spain's real exchange rate based on (non-food) manufacturing wholesale prices and using trade weights of forty countries. It is apparent that from 1984 to 1992, the real exchange rate appreciated steadily. Much of that appreciation may have been justified by the prospects of joining the Common Market. But, just as in the case of Mexico and NAFTA today, there must be a limit on the charitable interpretation; perhaps as much as 15 or 20 percent overvaluation had accumulated. Basically, the Spanish model amounted to a government-labor agreement on wages, always excessive in view of a fixed exchange rate, with inflationary consequences insufficiently contained by high interest rates and the competitive bite of a fixed exchange rate.

**Figure D1. Spanish Real Exchange Rate, 1970–92**

Index, 1980–82 = 100



Source: Unpublished data from Morgan Guaranty Trust Company.

Another indication of competitiveness shifts away from manufactured goods to nontraded ones. Using the Union Bank of Switzerland comparison of the price level in various cities, with Zurich equal to 100, Madrid stood at 77.3 in 1988, just above Frankfurt (76.6) and Paris (76.2).<sup>1</sup> By 1991, Madrid had climbed to 93.8, while Frankfurt and Paris remained virtually the same.

The authors recognize that real appreciation took place; they refer to a “massive real appreciation” since 1987. They do not consider this a loss in competitiveness, but rather a reflection of Spain’s high productivity growth (also called the Balassa-Samuelson effect). In fact, however, the data do not bear this out. Spain’s economy-wide productivity growth averaged 1.3 percent from 1987 to 1990; the measure for industry was only 0.03 percent (measured as real GDP per person employed). Thus, Spain’s productivity was faring very poorly—the opposite of a situation in which the Balassa-Samuelson effect might be significant.

By the early 1990s, the Spanish boom was petering out. The budget deficit was large, the current account deficit was big, unemployment was rising, and very high real interest rates projected further deterioration of macroeconomic performance. Even if the measured real exchange rate shown in discussion figure D1 had not deteriorated, a broad range of indicators would have to be considered to determine whether the situation could be sustained. Rising unemployment, no prospects for a major re-

1. See Union Bank of Switzerland (1991).

**Table D1. Spanish Macroeconomic Indicators, 1980–92**

<i>Indicator</i>	<i>1980–90</i>	<i>1990</i>	<i>1991</i>	<i>1992</i>
GDP growth rate <sup>a</sup>	2.8	3.6	2.4	1.0
Unemployment rate	17.4	15.9	17.0	20.1
Inflation rate <sup>a</sup>	9.9	6.7	5.5	5.3
3-month real interest rate <sup>a</sup>	5.1	8.5	7.7	8.0
Current account <sup>b</sup>	– 1.0	– 3.7	– 2.9	– 4.1
Budget deficit <sup>b</sup>	4.3	4.0	5.0	5.2

Source: Author's calculations using OECD *Economic Outlook*, December 1992, and data from Banco Santander.

a. Percent per year.

b. Percent of GDP.

duction in real interest rates, and an already significant budget deficit suggest that a problem existed. This conclusion is clear in discussion table D1, which presents macroeconomic indicators for Spain. Moreover, interest rates can be low only if the currency is perceived as undervalued, and hence expected to appreciate; no such prospect was present in Spain, and the only possibility for low rates would be in the context of a major realignment.

The perception that by 1991–92, Spain had an overvalued currency is reinforced by the events in Eastern Europe. The Czech Republic and Hungary, for example, had emerged as new potential competitors. They have substantially the same levels of education and sophistication as Spain, they are located much closer to Germany, their wages are a small fraction of those in Spain, and their labor relations are far more favorable than those in ossified, socialist Spain. No surprise then that foreign direct investment in Spain risked drying up and that existing businesses might even be relocated.

In summary, then, a number of arguments suggest that Spain had a real exchange rate that was overvalued. Accordingly, it was only a question of time and circumstances until an adjustment would occur. High interest rates and a willingness to raise them further could postpone such a day of reckoning for a long time but, as Herb Stein has said, something that cannot last forever will ultimately come to an end. Some of the same arguments made for the case of Spain apply to other economies.

The central fact of the EMS has been this: no single currency had an equal chance of appreciating and depreciating against the DM. Each was soft relative to the DM. That implied a significant bias in the foreign exchange market. For some currencies, including those of Italy and Spain,

the bias grew over time and ultimately was just waiting for events to force a speculative attack. There was no difference between the attacks of the fall of 1992 and the attacks on the dollar/DM rate in the 1960s.

### *Hard and Soft Strategies*

The authors elaborate a model in which central banks act as though their money is hard until their bluff is called; then, once the currency has been taken out of the EMS, they display their true “soft” nature. The story is inappropriate in two ways. First, as a rendition of policy, it describes Italy very poorly. Interest rates remain extremely high and, once the lira was toppled, a veritable and amazing range of reforms got underway. The impossible happened every day and still continues. Pervasive privatization has been accepted politically and is actually moving forward; budget balancing is proceeding against all odds; the political system is being cleaned out; and, most importantly, interest rates have *not* been cut in half. In fact, contrary to the model, discipline about inflation is central to the Italian strategy. No one would question that today Italy looks far more serious than before the attack.

The same question must be raised for France, although the currency remains in the EMS. Imagine France left and cut interest rates by half. Would that mean that France had gone soft on inflation? With no inflation to speak of and with a mounting recession, moving to real interest rates of 2 to 3 percent would be far from a soft strategy. Germany has an inflation problem and France does not; not matching Germany’s interest rates would not mean that France is soft. Thus the model of self-fulfilling expectations may ultimately be correct for the United Kingdom, but it is really not a good story for Italy, nor would it be for France if the franc were forced out of the EMS.

### *Policy Recommendations*

The authors opt for a Tobin tax or reserve requirements against foreign exchange transactions as the transition device. The Bundesbank, in preparation for the EMS, insisted that all members demonstrate that they could hold their rate without the protection of controls.

Moving away from that prescription and allowing the transition to happen behind fences until separate monies have vanished is a bold but

poor strategy. Countries have to work less hard to converge—not only in inflation, but also in competitiveness. By the time the shift to a single currency would be about to happen, the issue of one last alignment would become an overwhelming possibility. No amount of talk could preclude it and therefore crises would continue. For years, capital markets would be focused on this issue, rather than on allocating capital internationally.

Of course, there are other possibilities. One would be to fix permanently the current account rates but to free capital account exchange rates and allow the free flow of capital. Such a system of dual rates would not interfere with countries' ability to set interest rates. It would be messy, but far less messy than a pervasive system of controls. Of course, a still better idea would be to get rid of the Maastricht treaty and move instead to a two-track EMS strategy.<sup>2</sup> Countries such as Italy or Spain would do better with a crawling peg exchange rate mechanism that allows them to maintain moderate inflation and competitiveness while focusing on the problem of rebuilding their economies. Germany, the Netherlands, and France, in contrast, should have a fixed rate without any margins.

### *DM Fixation*

In the late 1980s, the EMS evolved into a system in which failure of progress on convergence led central bankers to increasingly emphasize the value of credibility—of staying the course even if the rewards were becoming questionable and the price increasingly stiff. The situation was reminiscent of the 1930s, in which adhering to the gold standard was the conservative thing to do, even if it hurt an economy. For countries such as Italy and Spain, and, for a while, the United Kingdom, aligning with the DM was a substitute for a domestic policy toward inflation and growth. Obviously, central bankers had painted themselves into a corner. Having asserted that leaving the EMS was inconceivable on credibility grounds, tantamount to losing the entire buildup of reputation overnight, this way of thinking became a profound obstacle to sound policymaking. It remains so today.

It is difficult to believe that Spain would adopt a crawling peg; Spain

2. See Dornbusch (1990) for a discussion of this option.



uses the fixed rate to contain inflation—having failed to solve the problem of organizing a competitive labor market. Occasional currency crises and permanently high real interest rates are part of that misguided strategy.

In France, the one sound strategy would be to let the currency float, cut interest rates by half, and leave Germany with the problem of defending the franc (against too much of a depreciation, and hence a German competitiveness crisis). The immediate result would be lower rates across Europe as Germany suddenly had to play defensively. German real appreciation would have gone too far and real interest rates would have to be cut to compensate.<sup>3</sup> But, in France, this is considered unsound, just as it was in the 1930s to leave gold. As a result, DM fixation means that France will continue to follow Germany's anti-inflation policy, even though it has no inflation problem. This is the magic spell of gold and the DM or France's lack of confidence in its own policies.

### *Maastricht Is an Anachronism*

In the postwar period, Western Europe integrated for two reasons. One was to preserve peace between Germany and France, and the second was to build a strong barrier against communism. Along the way, the European Community widened, with the inclusion of a growing number of countries, including Portugal, Spain, and Greece. Also, the agenda widened on the economic front to carry forward a stronger market integration. Of the two basic objectives, the first—peace between Germany and France—was accomplished decades ago, and the second has become obsolete. The question is whether the objective of Maastricht still makes sense.

A far better strategy than trying to create a common currency for Germany and, say, Portugal—which have no shared history or for that purpose anything in common—is to widen the European community to the East. The right issue for today is to bring in Hungary, Poland, the Czech Republic, and other Eastern European countries, just as in the 1980s, there was good reason to integrate Portugal, Spain, and Greece.

These Eastern European economies have as much claim to being part of Europe as does Greece, Portugal, or Spain, and their need for integra-

3. See Dornbusch and Wolf (1992) on the real exchange rate and real interest implications of German unification.

tion on economic and political grounds is far more urgent. The Maastricht agenda draws an even sharper line between Eastern and Western Europe than exists today. The more the West pushes its integration, the more it excludes the East. The more the West integrates, the more difficult it is to accept that the East would join an arrangement in which the poor make the laws and the rich pay the taxes. If anything, the pursuit of Maastricht must be interpreted as a desperate dash forward to erect insurmountable barriers to integration with the East. It does so in fact, whether that is the intent or not.

### **General Discussion**

Several panel members took up the theme of whether monetary union in Europe was necessary or desirable. Greg Mankiw questioned whether a monetary union was necessary for the EC common market project to proceed. James Tobin noted that free trade does not require a fixed exchange rate. Stanley Fischer pointed out that there is a floating exchange rate between the partners of the world's largest bilateral trading relationship—the United States and Canada.

Others pointed to the relevance of the United States as an established monetary union. Robert Gordon recalled the finding of Olivier Blanchard and Lawrence Katz (*BPEA*, 1:1992) that in the United States, high labor mobility accomplished most of the adjustment to regional shocks in demand. Without such mobility, Gordon seriously doubted whether the diverse countries of Europe could form a stable monetary union. Robert Hall wondered whether the United States is in fact an optimal currency area. He pointed to the 1861–79 period in which California retained the gold definition of the dollar, while other states shifted to the greenback. Following recent shocks to the California economy, the process of adjustment might be eased if the state had its own currency. Rudi Dornbusch suggested that because the California state government had, in mid-1992, paid its employees in scrip, the state was already moving toward having its own currency.

Charles Wyplosz labelled some of the cynicism among U.S. economists about European monetary union as the American view of Europe. Europeans themselves recognize the political imperative of uniting Eu-

rope. In particular, historical fears about the strength of a united Germany have accelerated the recent drive for deeper integration. The plans for monetary union are one manifestation of this. However, up to now, the positive role of the EMS has been to stop competitive depreciations and to provide an anchor for disinflation in the European economy. Wyplosz therefore argued in favor of amending, rather than scrapping, the Maastricht treaty because he feared that abandoning the treaty could abort European economic integration more generally. Dornbusch noted that the Maastricht treaty was itself an amendment of the Treaty of Rome and, as such, could be amended without serious harm. In contrast to Wyplosz, he reasoned that competitive devaluations were precisely what was needed to enable the Bundesbank to loosen its tight monetary grip on the European economy.

William Branson further underlined the political imperative that is driving European monetary integration; despite the evidence of only minimal gains from monetary union, strong forces in Europe continued to promote it. Stanley Fischer pointed out the divergence between the views of the German government, which favors a strong Paris-Bonn axis, and the Bundesbank, which appears to be opposed to EMU, including a French-German monetary union. He suggested that the Bundesbank had an interest in seeing Italy and Britain forced out of the EMS, and so had done little to support them when their currencies came under pressure last year. Nevertheless, Fischer believed it was still likely that the Maastricht plans would proceed, with six of the currencies aboard for the next stage of plans for EMU. William Nordhaus suggested that the difficult and costly experience of German economic and monetary union could have blunted the appetite for monetary union throughout Europe.

Dornbusch questioned the assertion that the recent experience of fixed exchange rates without the support of capital controls was unprecedented in modern times, pointing to 1925–31 as another such period. Eichengreen responded that he felt that the interwar period showed the importance of robust monetary rules if fixed exchange rate systems are to survive. Robert Solomon noted the historical precedent of Britain re-joining the gold standard in 1925 at an unrealistic parity. He suggested that Britain had repeated the mistake by joining the ERM at too high a rate in 1990.

Nordhaus saw the paper as a search for the match that lit the blaze of realignments in 1992. However, he questioned whether the authors' model was adequate to capture the "tipping" phenomenon that they envisaged, which had brought on a "feeding frenzy" of speculators. Wyplosz responded to the two discussants' comments that the paper had too quickly rejected the Krugman-type model of speculative attack based on diverging fundamentals. He acknowledged that both models considered in the paper, the Krugman-type and the multiple equilibria type, had some explanatory power. However, he continued to favor the latter view, based on the self-perpetuating expectations of speculators, because of the apparently random timing of the recent attacks. By September 1992, macroeconomic adjustment was well underway in Europe. The deutsche mark was undergoing real appreciation as a result of rising German inflation and falling inflation in the rest of Europe; hence the fundamentals would not have suggested an attack at that time. In addition, the authors' survey of traders indicated that only a minority were worried about devaluations before the French referendum on Maastricht. This suggested that few were concerned about underlying fundamental problems before then.

As a way forward in Europe, Solomon proposed fixed but adjustable exchange rates, rather than irrevocable monetary union. Tobin countered that adjustable pegs are inherently unstable. Wyplosz agreed with Tobin that with high capital mobility, an adjustable peg in itself would not solve European monetary problems. He clarified that the paper's proposal of restrictions on capital flow referred to short-term capital only. He acknowledged that this was a second-best policy argument, but noted that short-term capital controls were in place in many EC nations until recently. Countries, such as Spain or Portugal, that reverted to controls had time to arrange for realignment, while those that had not resorted to controls, such as Britain or Italy, were quickly forced out of the ERM. In response to Dornbusch's suggestion that Germany and France move rapidly toward fixed exchange rates while the ERM continues for other countries with wider bands, Eichengreen expressed concern that wider bands would cause credibility problems. These would make it difficult to preserve the EMS without some restrictions on speculative capital flows.

Tobin reminded participants that his original proposal for a "Tobin tax" was limited to a transactions tax and was not tied to the use of ad-

ministrative controls on capital flows. He noted that his original argument was made in the context of floating rates, but agreed that it applied also to fixed rates. Wyplosz highlighted the irony of the pendulum swing in mainstream views about exchange rates: from supporting fixed rates in the 1960s to favoring floating rates in the 1970s, and now leaning back toward favoring varieties of fixed rate regimes.

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