HWWA HAMBURG

DISCUSSION PAPER

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323

Hamburgisches Welt-Wirtschafts-Archiv (HWWA)
Hamburg Institute of International Economics
2005
ISSN 1616-4814

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This paper was prepared for a workshop on financial crises at the Oslo Summer School in Comparative Social Science Studies at the University of Oslo, 2-8 August 2004 and a conference on "Regional Monetary Co-operation and Co-ordination: The Experience in Europe and Feasibilities in Asia" at Fudan University, Shanghai, 25-26 October 2004. Financial support by DekaBank is gratefully acknowledged. I would like to thank Hyun Song Shin, Carsten Hefeker, Manfred Nitsch and participants at the Shanghai conference for valuable comments on the paper. All remaining errors are mine.

This version: 20 June 2005

Edited by the Department World Economy

HWWA DISCUSSION PAPER 323
June 2005

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ABSTRACT

This paper argues that, in contrast to the popular bipolar view on exchange rate choices, intermediate regimes in general and regional exchange rate systems such as the European Monetary System (EMS) in particular should not be ruled out per se even in today's world of highly mobile capital. The paper highlights that the 1992/93 crisis of the EMS' Exchange Rate Mechanism was a crisis of an exchange rate *system* and not just the collapse of unilateral pegs pursued by individual countries. Based on an assessment of credibility of the EMS before and during the crisis, the paper discusses distinct features that add to the credibility of regional exchange rate systems. It reasons that a system that is built around well-defined rules, and which is managed very carefully and co-operatively according to those rules, could be both credible and sustainable even in the 21st century.

Keywords: exchange rate regimes, regional monetary systems, EMS crisis, policy credibility

JEL Classification: F02, F33, F36, F42

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1. Introduction

One of the lessons that is often drawn from the financial crises of the last decade is that exchange rate pegs should no longer be considered as a sensible option in today's world of highly liberalised and technically sophisticated financial markets. Proponents of the bipolar view argue that "unilateral exchange pegs almost invariably go up in flames at some point" (Rogoff 1998, p. 169), and recommend that countries should leave the middle ground and instead of following intermediate regimes, choose between either a rigid fix, i.e. full dollarisation or a currency board, or free floating. With the same line of reasoning, regional exchange rate systems are deemed unsuccessful.

And yet a fear of floating (Calvo and Reinhart 2002) has led many countries, including those who severely suffered from currency crises, to maintain pegs towards the dollar or some form of currency basket. Even more, in some regions – particularly East Asia – proposals for a common basket peg (e.g., Williamson 1999) or other forms of regional monetary systems (e.g., Hefeker and Nabor 2005) to mimic Europe on its way to monetary unification are considered.[1]

The aim of this paper is to look once more at the causes of the 1992/93 Exchange Rate Mechanism (ERM) crisis in the European Monetary System (EMS) and to identify features that contributed to the functioning and eventual collapse of the ERM respectively. In particular, the paper seeks to analyse the credibility of the system and tries to identify requirements for successful (regional) exchange rate regimes.

The remainder of the paper is structured as follows. The next section dissects the problem of credibility that is inherent to currency pegs. Section three briefly reviews the literature on the causes of the ERM crisis and assesses the credibility of the EMS using Svensson's (1991) model of target zone credibility. Section four highlights features that enhance the credibility of an EMS-style monetary system to avoid financial crises. The final section concludes.

2. The problem with pegs

The sustainability of any exchange rate fix basically depends on its credibility, that is, both foreign and home agents must be convinced that the peg can and will be maintained for a long period of time. This can be demonstrated with a simple monetary model of the exchange rate (c.f. Rogoff 1998):

$$(2.1) \quad m_t - s_t = \eta[i_t - i_t^*]$$

$$(2.2) \quad E_t(s_{t+1} - s_t) = i_t - i_t^*,$$

[1] Eichengreen and Bayoumi (1999, p. 347) ironically note that "the apostles of European monetary integration have chosen this time to bring their message to Asia".

where m_t is the log of the domestic money supply, s_t is the log of the exchange rate, i_t is the home nominal interest rate, i_t* is the foreign nominal interest rate, and $E_t(s_{t+1}-s_t)$ is the expected rate of change of the log of the exchange rate. If the peg is fully credible, then $E_t(s_{t+1}-s_t) = 0$, and thus $i_t = i_t$*. But if investors, for whatever reasons, believe that the current peg will not be maintained and that the exchange rate will be allowed to depreciate in the near future, then $E_t(s_{t+1}-s_t) > 0$ and $i_t > i_t$*. This implies that if market participants expect the exchange rate to depreciate in the future, the peg can only be maintained through a rise in domestic interest rates. Theoretically the monetary authorities can infinitely defend the peg by reducing the domestic high-powered money supply, by contracting domestic credit and through intervention in the foreign exchange market (as long as they don't run out of international reserves or credit lines).

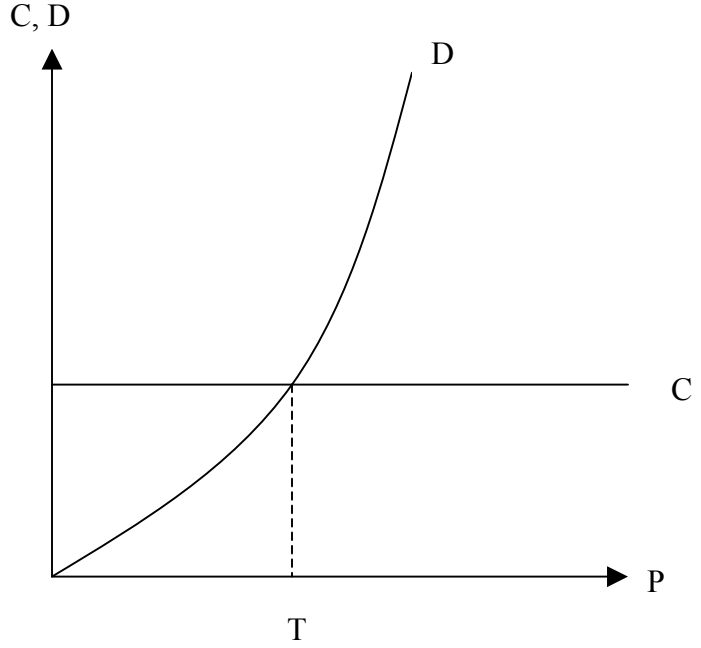
Even though an unconditional defence of a fixed exchange rate is always technically feasible, what is relevant for the stability of the exchange rate is not the technical feasibility of such a tough course of action, but rather its perceived costs. A sustained rise in short-term interest rates can have disastrous consequences for the domestic banking sector and can sharply dampen aggregate demand and investment activity. As Buiter et al. (1998, p. 85) point out, "It is because the authorities care about the side-effects of drastic monetary tightening that speculators can prevail."

There is a threshold point where defending a peg becomes too costly; and investors know that. This is where the speculative element comes in. Models of self-fulfilling currency crises (Obstfeld 1996) have theoretically shown that currency crises can occur even in the absence of balance-of-payment problems (the trigger of a crisis as described in first-generation models following Krugman (1979) et al.). Even if "the fundamentals are right", speculative action by market participants could challenge monetary authorities so much that the latter would have to adopt austerity policies that would completely choke off the domestic banking sector and economy. Political opposition would become so strong that the costs of keeping the peg become unbearable. Because market participants know that monetary authorities typically have other objectives besides the exchange rate fix, i.e. the health of the banking system and the economy in general, they know that sustained speculative pressure may eventually cause the monetary authorities to back down and let the currency float, thereby making expectations self-fulfilling. In a situation where the people go to the streets and start banging their saucepans, as happened in Argentina in 2001, no government will allow its central bank to indefinitely defend a peg.[2] It is the situation of a one-way bet that more or less invites speculators to attack a currency peg: if the peg is abandoned, this results in speculation profits; if it stays, the speculators only bear transaction costs in the form of short-term positions in foreign currency.

The situation can be described by the following simple graphical model, which depicts the relationship between the costs D to defend a parity and the speculative pressure P. Defence costs (i.e., dampening economic activity through raising interest rates, loss of

[2] One should mention, however, that the Argentinean crisis was not triggered through self-fulfilling speculation and would thus be probably best described by a first-generation model emphasising the role of fundamentals.

reserves, debt accumulation) increase exponentially with rising speculative pressure. Defence costs also depend on the size of shocks, output gap, flexibility of labour markets etc.. The cost C of giving up the peg is a loss of reputation (political prestige, etc.), which here is assumed to be fixed. As long as P < T, the exchange rate peg is credible, because the costs of losing reputation in the case of abandoning the peg exceed the adjustment cost to defend it. If pressure rises beyond the threshold point T where defence costs equal the cost to give up the peg, the peg is no longer credible and thus likely to fail.



Of course, things are not that easy. In reality, the occurrence and the timing of a speculative attack are indeterminate, depending on expectations and strategic uncertainty regarding the co-ordination of the private sector. According to second-generation models of self-fulfilling currency crises, multiple equilibria are possible. If the fundamentals are sufficiently strong, no attacks will occur; if the underlying fundamentals become sufficiently weak, uncertainty disappears and there will be only one equilibrium in which an attack will instantly occur. But in the intermediate range, however, an attack is a probabilistic phenomenon. In that respect, second-generation models are very similar to first-generation models and predict that countries with weaker fundamentals are more crisis-prone than countries with strong fundamentals. The difference is that seemingly minor random events, or "sunspots" (Obstfeld 1996), could shift the exchange rate peg from a position of credibility into a position where it becomes unsustainable.

In a market in which agents are atomistic (i.e., have small net worth, are credit-constrained, and do not collude), a single speculator would find it impossible to build up enough pressure on his or her own to force the authorities to abandon the peg. A co-ordinated speculative attack is impossible in the absence of common knowledge.[3] No one will attack unless he or she expects a sufficient number of other agents to do the same thing at the same time. Only if expectations of a devaluation are sufficiently strong, will

[3] The co-ordinated attack problem is analysed in Morris and Shin (1997).

joint market action lead to an attack. This will only be the case in a situation where underlying economic or political weaknesses give rise to such expectations.

As Rogoff (1998, p. 157) points out, "The fine line between a successful currency defence and a costly collapse shows the profound strategic problem facing a monetary authority whose currency is subject to speculative attack." The question then is: what defines this fine line, i.e. what makes an exchange rate fix credible and thus successful? The first and most straightforward answer is: strong fundamentals. If the fundamentals are sufficiently strong, there is no ground for speculation. A second answer refers to the arrangements that determine the credibility of the peg, and this is of particular importance in the case of regional arrangements. To identify the features of successful exchange rate arrangements, the next sections looks at the EMS, widely considered a successful exchange rate arrangement[4] until its de facto collapse during the 1992/93 crisis.

3. The EMR crisis and credibility of the system

This section takes a look at the crisis of the ERM and tries to assess the credibility of the system.

3.1 Brief overview of the EMS

The EMS was set up in March 1979[5] with the aim of creating a „zone of monetary stability in Europe"[6]. The three main features of the EMS were (1) the ERM, (2) the European Currency Unit, and (3) financing facilities. The ERM consisted of a grid of bilateral exchange rate bands between each of the member currencies. Initially, each currency could fluctuate within a +/- 2.25 band (+/-6% for the Italian lira as well as for Spain, the UK and Portugal, who joined the ERM later) around its assigned bilateral central rate against another members of the ERM. As a reaction to the 1992/93 ERM crisis, the fluctuation margins were widened to +/-15% for all currencies in August 1993. Once two currencies reached the bilateral exchange rate margin, the authorities of both countries were obliged to intervene or take other appropriate measures to keep the exchange rate within the band.

The European Currency Unit (ECU) was a weighted basket currency of the member currencies and served as an "indicator of divergence" within the ERM. Each of the EMS currencies was given a central weight in the ECU basket, reflecting each country's economic importance, its share of intraregional trade and its commitment in the system's

[4] Against all expectations after the devastating experiences with the "snake" in the 1970s.

[5] The EMS succeeded the snake, a flawed attempt to secure intra-European exchange rate stability in the face of mounting difficulties in sustaining the Bretton Woods system of global fixed exchange rates. The snake was put into operation in April 1972, only four months after the Smithonian agreement, the last and unsuccessful endeavour to rescue the Bretton Woods system through a widening of the band around the dollar from 2% to 4.5%.

[6] Resolution of the European Council of 5 December 1978 on the Establishment of the European Monetary System (EMS) and related matters (reprinted in Gros and Thygesen 1998, pp. 58-63). For details of the EMS see chapters two and three of Gros and Thygesen (1998), for example.

financing facilities. To ensure that each member country had the necessary resources to intervene in defence of the bilateral exchange rate parities, extensive financing mechanisms were created. Twenty per cent of the member countries' gold reserves had to be deposited with the European Monetary Co-operation Fund (EMCF) in exchange for the equivalent value in ECUs. Furthermore, three kinds of credit facilities were created: the very short-term facility (VSTF), the short-term monetary support (STMS), and the medium-term financial assistance (MTFA). The importance and limits of such support mechanisms will be discussed in section four.

The institutional setting of the EMS did not change substantially over time. Table 1 provides an overview of events in the EMS. After a turbulent start which was accompanied by much scepticism regarding the system's success, and which saw seven realignments take place between the spring of 1979 and the spring of 1983, the EMS entered a period of relative stability. The emphasis was increasingly on nominal and real convergence and co-ordination of monetary policies to support exchange rate stability. The exchange rate as an external anchor proved to have a disciplining effect on national policies, and weak currency members with high-inflation histories successfully used the EMS as a way of importing the Bundesbank's anti-inflationary credibility. While average inflation rates between 1979 and 1983 ranged from 4.9% in Germany to 17% in Italy (Belgium 7%, Denmark 10.1%, France 11.8%, Ireland 15.8%, Netherlands 5.2%), they markedly decreased to a range of 1.1% in Germany and the Netherlands to 7.1% in Italy (Belgium 3.0%, Denmark 4.6%, France 4.3%, Ireland 4.6%) between 1984-88 (Tietmeyer 1998, p. 44).[7] The EMS seemed to have reached its aim of being a "zone of monetary stability".

Between 1983 and 1987, only four realignments were required, significantly fewer than in the first four years. After the January 1987 realignment, the EMS entered a new stage with additional participants (reflecting its increasing attractiveness) and without realignments for 67 months.[8] Giavazzi and Spaventa (1990) speak of the "new" EMS. The Single European Act of 1986 pushed for liberalising financial markets, including the removal of capital and exchange controls until July 1990. In the Basle-Nyborg Agreement of September 1987, the financing facilities for intervention obligations were substantially augmented. Credit facilities were extended for longer periods, and countries were permitted to draw on credits before a currency reached the limits of its EMS band.[9] Interventions were increasingly used to keep exchange rates within the bands to avoid realignments. Interventions to support weak EMS currencies became a regular feature; the EMS developed into a quasi-monetary union (Schiemann 1993, p. 2). Even at the height of the EMS crisis in September 1992, attempts to avoid a realignment of the

[7] The decline in oil prices certainly helped fight inflation, but the main effect can be attributed to stabilisation policies (Tietmeyer 1998, pp. 44-5).

[8] Except for a technical adjustment of the lira in connection with the narrowing of the band width around the lira from +/-6% to +/-2.25% in January 1990.

[9] In fact, the Basle-Nyborg Agreement also called for undertaking small realignments more frequently, a recommendation which was never followed. The Agreement is reprinted in Gros and Thygesen (1998, pp. 104-5).

peseta, escudo and punt were made through the introduction of temporary capital controls.[10]

Table 1: A chronology of events in the EMS

Year	Date	Event
1979	13 Mar	EMS starts operation (+/- 2.25% band for all participants except the Italian lira with a +/- 6% band)
	24 Sep	German mark (+2%), Danish krone (-2.9%)
	30 Nov	Danish krone (-4.76%)
1981	23 Mar	Italian lira (-6%)
	05 Oct	German mark (+5.5%), Dutch guilder (+5.5%), French franc (-3%), Italian lira (-3%)
1982	22 Feb	Belgian franc (-8.5%), Danish krone (-3%)
	14 Jun	German mark (+4.25%), Dutch guilder (4.25%), French franc (-5.75%), Italian lira (-2.75%)
1983	21 Mar	German mark (+5.5%), Dutch guilder (+3.5%), Belgian franc (+1.5%), French franc (-2.5%), Italian lira (-2.5%), Irish punt (-3.5%)
1985	22 Jul	Belgian franc (+2%), Danish krone (+2%), German mark (+2%), French franc (+2%), Irish punt (+2%), Dutch guilder (+2%), Italian lira (-6%)
1986	07 Apr	German mark (+3%), Dutch guilder (+3%), Belgian franc (+1%), Danish krone (+1%), French franc (-3%)
	04 Aug	Irish punt (-8%)
1987	12 Jan	German mark (+3%), Dutch guilder (+3%), Belgian franc (+2%)
1989	19 Jun	Spanish peseta enters with +/-6% band
1990	08 Jan	Italian lira (-3.7%) and adopts +/-2.25% band
	08 Oct	British pound enters with +/-6% band
1992	06 Apr	Portugese escudo enters with +/-6% band
	14 Sep	Belgian franc (+3.5%), German mark (+3.5%), Dutch guilder (+3.5%) Danish krone (+3.5%), Portugese escudo (+3.5%), French franc (+3.5%), Irish punt (+3.5%), British pound (+3.5%), Itlaian lira (-3.5%)
	17 Sep	British pound and Italian lira suspend membership of ERM, Spanish peseta (-5%)
	23 Nov	Portugese escudo (-6%), Spanish peseta (-6%)
1993	01 Feb	Irish punt (-10%)
	14 May	Spanish peseta (-8%), Portugese escudo (-6.5%)
	02 Aug	widening of margins of fluctuations to +/-15% for all ERM currencies; Germany and Netherlands agree to bilaterally maintain their currencies in the +/-2.25% band
1995	09 Jan	Austrian schilling enters with +/-15% band
	06 Mar	Spanish peseta (-7%), Portugese escudo (-3.5%)
1996	14 Oct	Finish markka enters with +/-15% band
	25 Nov	Italian lira rejoins with +/-15% band
1998	16 Mar	Irish punt (+3%)
	02 May	selection of qualifying members for European Monetary Union (EMU)
1999	01 Jan	EMU comes into effect

Source: Pilbeam (1998, p. 446)
Note: - indicates a devaluation, + indicates a revaluation

[10] Ireland banned foreign exchange trading for foreigners, and Spain required foreigners wishing to move short-term funds into Spain to make 100 per cent non-interest bearing deposits at the central bank. Also Portugal introduced capital controls. Cf. Schiemann (1993, p. 4).

The period of tranquillity did not last forever: after five and a half years of nominal exchange rate stability, the EMS tumbled into its most severe crisis in its then fourteen-year history. Following the unexpected rejection of the Maastricht treaty by the Danish voters in a national referendum in June 1992, tensions in the foreign exchange markets increased, and ultimately two of the ten EMS currencies – the Italian lira and the British pound – were driven out of the system, while the Spanish peseta, the Portuguese escudo and the Irish punt had been devalued involuntarily.[11]

3.2 Explanations of the crisis

The debate over the causes of the ERM crisis is centred around two lines of explanations, based on first-generation and second-generation models of currency crises respectively. These two explanations, which stress the importance of fundamentals and the shift in investor sentiments respectively, will be briefly outlined before turning to an assessment of credibility in the ERM.

3.2.1 Fundamentals: first-generation models

First-generation models basically view financial crises as a result of weak fundamentals, antagonising the pursuit of an exchange rate peg. Stable exchange rates must be based on sound economic conditions, that is, authorities must pursue policies consistent with the requirements of a peg. Otherwise, fixed exchange rates will sooner or later become unsustainable and a revaluation will become unavoidable.

Tietmeyer (1998, p. 47) argues that "unfortunately […] some European countries did not heed this lesson, especially at the beginning of the nineties. Diverging prices and costs were not sufficiently reduced, whereas exchange rates remained nominally stable. Such differences largely continued to exist, meaning that the currencies of countries with lower inflation rates depreciated in real terms, whereas the currencies of less stability-conscious countries in some cases appreciated sharply in real terms." The persistence (or recurrence) of high inflation and rising labour costs in some EMS countries accordingly eroded their competitiveness and created balance-of-payment problems, eventually leading to crisis.[12]

The Danish referendum, from that perspective, "suddenly made the markets aware of the pent-up problems of divergence" and led to a "rediscovery" of the exchange rate risk (Tietmeyer 1998, p. 49). Seen from this angle, the crisis was purely a result of mounting divergence within the EMS.

[11] Finland, which was not an EMS member at that time, was the first to come under pressure and to abandon its unilateral peg, with the result of a depreciation of the markka by 15 per cent.

[12] The inflation convergence achieved in the mid-1980s indeed loosened. The average inflation rate between 1987 and 1992 in the countries with the most stable prices, i.e. the Netherlands and Germany, were 1.9% and 2.4%, respectively, whereas the UK, Italy, Spain and Portugal, for example, had rates of 6.0%, 5.7%, 5.9%, and 10.8% (cf. Tietmeyer 1998, p. 47). This argumentation is often extended by acknowledging that the underlying problems were aggravated through the loose fiscal and tight German monetary policy since German political and monetary unification.

Tietmeyer (1998, pp. 47-8) recalls that the Bundesbank continuously pointed to the growing divergences in the EMS and took a stand against the illusion of *de facto* monetary union, in which, according to prevailing opinion, no more parity changes would take place. In its 1990 annual report, the Bundesbank wrote:

> "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 be basically 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. […] This explains why a currency union that is not based on durable progress in the direction of convergence will remain under the threat of tensions. For this reason, changes in central rates within the EMS should not be excluded in principle during the transitional stages towards bringing about economic and monetary union." (Deutsche Bundesbank 1990, p. 66)

Eichengreen and Wyplosz (1993) test the Bundesbank view by applying three competitiveness measures (bilateral unit labour costs relative to Germany, multilateral relative unit labour costs adjusted by the business cycle, and the ratio of traded to non-traded goods prices at home) for EMS countries plus Sweden and Finland. They find limited support of real overvaluation. Only for Italy do they find some evidence that wage inflation was inadequately compensated by increases in labour productivity. They conclude that the divergent movement of prices and labour costs played only a limited part in the crisis.

Also government deficits and debt/GDP ratios (cf. table 2) give no convincing answer to why the Italian, British, Irish, French, Spanish and Portuguese currencies (to name just the most severely affected ones) came under so much pressure in autumn 2002. As Eichengreen (2001, p. 13) reasons, "Deficits might have been excessive, but this had been true before the Danish referendum, and there was no change in fiscal stance subsequently."

Table 2: Deficit/GDP and Debt/GDP ratios for ERM countries

	Deficit/GDP (%)					Debt/GDP (%)				
	1991	1992	1993	1994	1995	1991	1992	1993	1994	1995
Austria	2.4	2.0	4.1	4.4	5.5	56.6	56.1	63.0	65.2	68.0
Belgium	6.5	6.6	6.6	5.3	4.3	132.6	134.4	141.3	140.1	138.3
Denmark	2.1	2.9	4.5	3.9	2.1	60.9	63.1	66.8	68.7	68.8
Germany	3.3	2.9	3.3	2.5	2.3	42.7	47.3	51.8	54.6	62.5
Finland	1.5	5.8	7.9	5.5	5.0	23.2	42.7	56.2	62.7	69.1
France	2.2	4.0	6.1	6.0	5.0	41.1	45.6	52.9	56.8	59.5
Greece	11.5	12.3	13.2	12.5	11.4	81.7	88.6	117.1	119.8	120.2
Ireland	2.1	2.2	2.3	2.2	2.5	95.3	90.7	92.7	87.9	83.3
Italy	10.2	9.5	9.6	9.0	7.8	103.9	114.4	120.2	122.6	122.1
Luxembourg	1.0	2.5	2.1	2.3	1.4	6.0	7.0	7.0	7.0	8.0
Netherlands	2.8	3.8	3.2	3.0	3.3	76.4	77.1	78.5	79.0	79.4
Portugal	6.5	3.3	7.1	5.7	5.4	62.2	63.2	67.8	70.4	70.8
Spain	4.9	4.2	7.5	6.6	6.2	49.9	53.0	59.4	63.5	66.5
Sweden	1.1	7.5	13.4	10.4	9.2	53.7	69.8	74.6	79.4	84.5
UK	2.6	6.1	7.9	6.5	4.2	35.5	41.4	47.4	51.6	53.4

Source: Buiter et al. (1998, p. 54)

3.2.2 Speculation and self-fulfilling prophecies: second-generation models

The second line of explanation emphasises the role of speculation and self-fulfilling prophecies. Central to this approach is the interpretation of the Danish referendum as a signal to financial markets that concerted speculative pressure could effectuate a demise of currency pegs in the EMS. The weaknesses of fundamentals were known even before the referendum, and the only effective change was in expectations with respect to realisation of monetary union. Viewed from that angle, the crisis was not the result of fundamental disequilibria, but rather of the market's perception that the Danish referendum had moved the EMS from a position of credibility into a position of vulnerability (Eichengreen 2001).

Markets knew that exchange rate stability within the EMS was not the authorities' sole objective, and that they also cared about the health of the banking system and the economy in general (cf. section two). With European Monetary Union (EMU) in sight, the prospective benefits of keeping the exchange rate fixed (one of the Maastricht criteria for qualification for EMU) were high. Monetary authorities were thus expected to be more willing to accept slower growth and higher unemployment as a price for defending the exchange rate and thus their chances of participation in EMU. This calculation changed with the negative outcome of the Danish referendum. When polls for the French referendum also signalled a collapse of the Maastricht treaty (Schiemann 1993, p. 7), the realisation of EMU suddenly seemed to have become very uncertain.

In addition, slowing economic growth and high unemployment increased the costs of defending the peg (cf. table 3). This situation made room for speculators to test the durability of the system. Bad crisis management, i.e. the inability of policymakers to co-operatively cope with the situation and convince markets, did the rest.

Table 3: Unemployment rates (% of civil labour force)

	1987-89 average	1990	1991	1992
Belgium	10.0	7.6	7.5	8.2
Denmark	6.6	8.1	8.9	9.5
Germany (western)	6.1	4.8	4.2	4.5
France	9.9	9.0	9.5	10.0
Greece	7.5	7.0	7.7	7.7
Ireland	17.0	14.5	16.2	17.8
Italy	10.9	10.0	10.0	10.1
Luxembourg	2.1	1.7	1.6	1.9
Netherlands	9.2	7.5	7.0	6.7
Portugal	5.9	4.6	4.1	4.8
Spain	19.1	16.3	16.3	18.4
UK	8.7	7.0	9.1	10.8

Source: Eichengreen (2001, p. 35)

Having briefly discussed the background of the crisis and the main lines of explanations, the next section will examine the credibility of the EMS, so as to allow an appraisal of what makes and what undermines the credibility of regional monetary systems.

3.3 Testing ERM credibility

Most assessments of target zone credibility rely on the analysis of interest rate differentials based on a simple model by Svensson (1991).[13] Assuming the absence of risk premia, the uncovered interest parity condition states that interest rate differentials on similar assets with the same maturity must be equal to the expected rate of currency depreciation over the period so that

$$(3.1) \quad (1+i_t^{\tau})^{\tau/12} = (1+i_t^{*\tau})^{\tau/12} \frac{E(S_{t+\tau})}{S_t},$$

where i_t^{τ} is the domestic-currency interest rate at time t on an asset maturing at $t+\tau$, $i_t^{*\tau}$ is the corresponding rate on an asset denominated in the currency of the foreign currency, S_t denotes the spot exchange rate in period t defined in terms of domestic currency per units of foreign currency, and $E(S_{t+\tau})$ is the expected exchange rate at time $t+\tau$.

If the exchange rate is restricted to a band with lower and upper bounds $\underline{S}$ and $\overline{S}$ so that

$$(3.2) \quad \underline{S} \le S_t \le \overline{S},$$

this implies that the domestic interest rate i_t^{τ} will be restricted to a band

$$(3.3) \quad \underline{i_t^{\tau}} \le i_t^{\tau} \le \overline{i_t^{\tau}}.$$

Rearranging (3.1), the lower and upper bounds of the domestic interest rate band are then given by

$$(3.4) \quad \underline{i_t^{\tau}} = \left(1+i_t^{*\tau}\right)\left(\frac{\underline{S}}{S_t}\right)^{12/\tau} - 1 \text{ and}$$

$$(3.5) \quad \overline{i_t^{\tau}} = \left(1+i_t^{*\tau}\right)\left(\frac{\overline{S}}{S_t}\right)^{12/\tau} - 1.$$

The band can be thus written as

$$(3.6) \quad \left(1+i_t^{*\tau}\right)\left(\frac{\underline{S}}{S_t}\right)^{12/\tau} - 1 \le i_t^{\tau} \le \left(1+i_t^{*\tau}\right)\left(\frac{\overline{S}}{S_t}\right)^{12/\tau} - 1.$$

Computing these boundaries for a set of EMS countries vis-à-vis Germany gives the results presented in figures 1-4. The spikes indicate realignments of the respective currencies. As can be seen in figure 1, the eurofranc interest rate was outside the credibility boundaries for almost all the time until March 1990 (except for a credibility blip after the April 1986 realignment), implying that the FF/DM parity lacked credibility virtually at all times. Interestingly, it was within the credibility band since March 1990

[13] See also Marston (1995, pp. 114-9).

and remained there (with outliers in December 1990 / January 1991 and December 1991) during the months preceding the crisis. Only in August and September 1992, at the height of the crisis, did it again slip outside the credibility boundaries. Except for a brief return to credibility in October 1992, it remained outside the boundaries until February 1993.

The case of the eurolira interest rate is pretty similar (cf. figure 2): it remained outside the credibility zone for most of the time, and only experienced short periods of credibility (April 1986 – April 1997, May 1989 – September 1989, February 1990 – August 1990, and February 1991 – September 1991). From September / November 1991, it remained outside the band until Italy suspended its membership in the ERM on 17 September 2002.

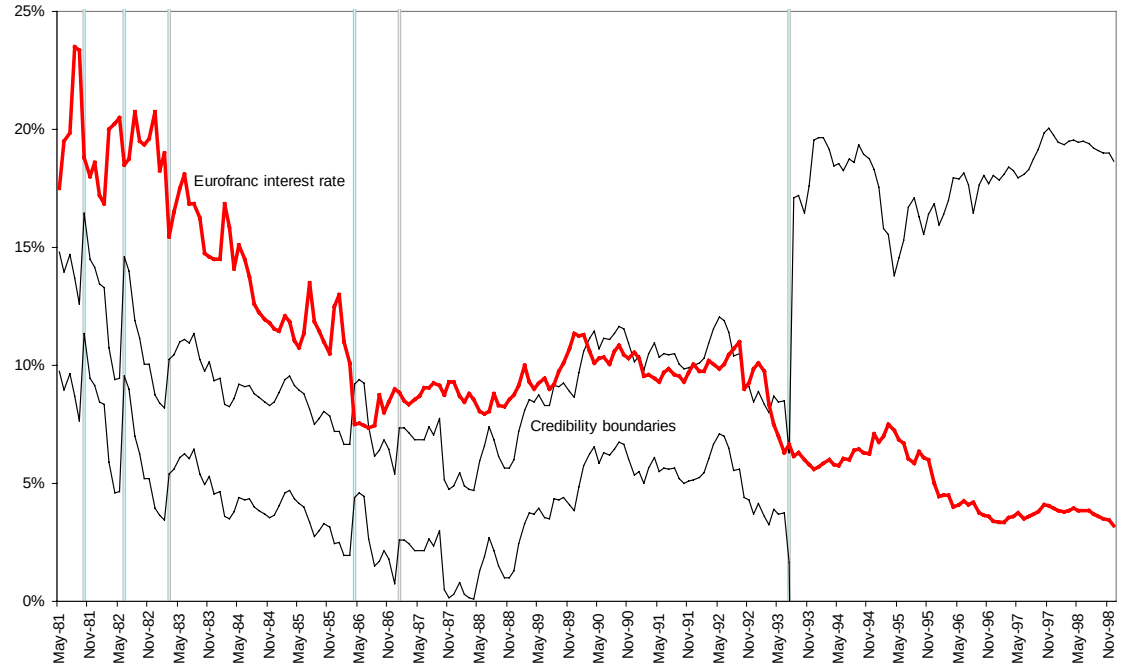
In contrast to the franc and the lira, the Dutch guilder, part of the "hard core" of the EMS, was always credible (figure 3). The pound also remained within its credibility boundaries throughout its short ERM membership (figure 4). Only in August 1992, just before suspension of its membership, did it lose credibility, suggesting that money markets anticipated a devaluation of the pound.

According to these results, the ERM does not appear much less credible (or: not more non-credible) in the months before the crisis than before. For France, paradoxically, the crisis occurred when the system, according to this test, was credible for the first time. Also, the abrupt swing from credibility to non-credibility in the British case in August 1992 cannot be well explained by significant changes in economic conditions. This supports the notion that the crisis was rather caused by a shift of market sentiments and expectations.

Using trend-adjusted measures of realignment expectations, which are also based on interest differentials, Rose and Svensson (1994) similarly find that the credibility of ERM pegs varies significantly over time, mostly for reasons which cannot be well explained by standard macroeconomic variables. While higher inflation differentials vis-à-vis Germany seem to reduce credibility, realignment expectations generally appear to be relatively disconnected from macroeconomic phenomena, to "a degree that is disconcerting from an economist's point of view" (Rose and Svensson 1994, p. 186).[14] Interestingly, they find that much credibility seems to be shared by all members of the system, but that this general credibility factor moves significantly over time, frequently reacting to non-economic events and not moving consistently in response to events that economic theory would consider relevant.

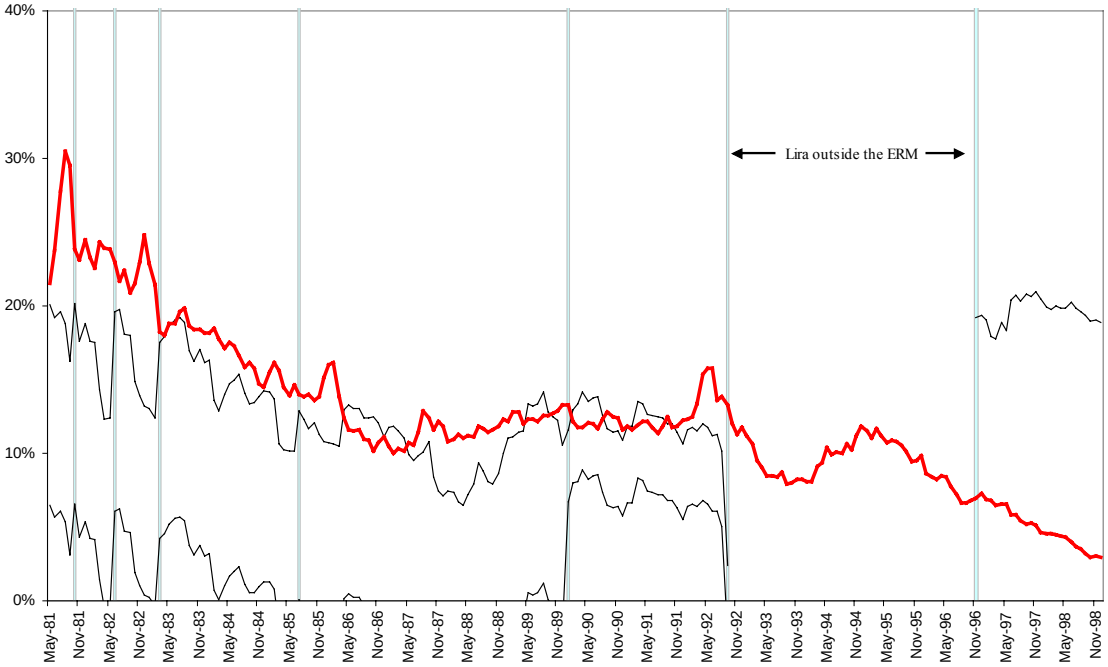
[14] Eichengreen, Rose and Wyplosz (1994) also cannot find evidence of significant differences in the behaviour of key economic variables between crisis and non-crisis periods in the EMS. (But they do find such evidence for non-ERM observations.)

Figure 1: 12 month eurofranc interest rate and credibility bounds



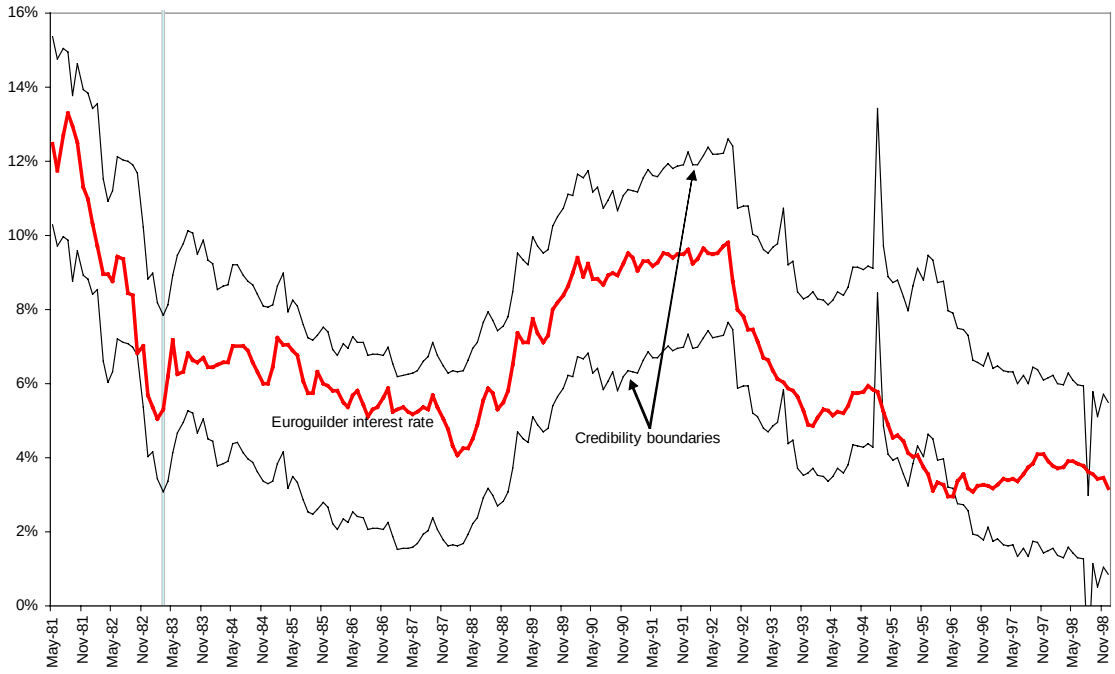
Source: Own calculations with data from BIS and Global Financial Database

Figure 2: 12 month eurolira interest rate and credibility bounds



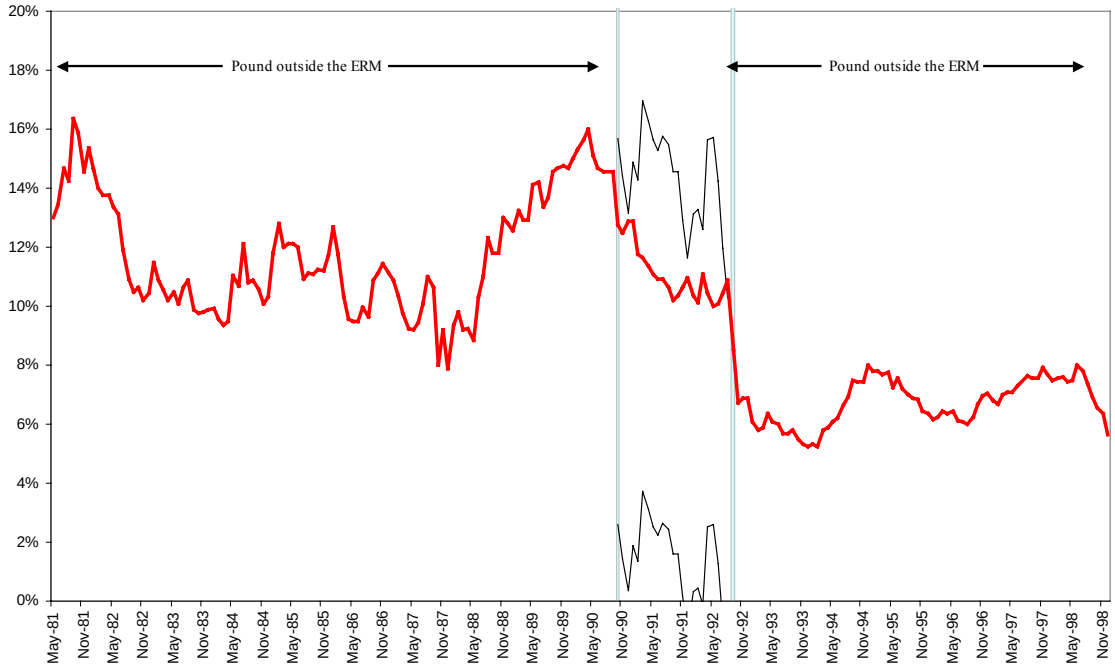
Source: Own calculations with data from BIS and Global Financial Database

Figure 3: 12 month euroguilder interest rate and credibility bounds



Source: Own calculations with data from BIS and Global Financial Database

Figure 4: 12 month europound interest rate and credibility bounds



Source: Own calculations with data from BIS and Global Financial Database

Rose and Svensson (1994) also find a relatively high level of ERM credibility in the months preceding the crisis, which persisted until late August 1992. They conclude that the currency crisis of 1992 does not appear to have been anticipated by financial markets. Also other research – such as Eichengreen and Wyplosz (1993), who use the forward exchange rate, or Campa and Chang (1996), who estimate realignment probabilities derived from option prices to measure market expectations – indicates that both private-sector agents as well as policy-makers appear to have been taken by surprise by the events of mid-September.

A review of the literature on the ERM crisis and an analysis of ERM credibility in this section have shown that economic variables only go half way in explaining the occurrence and timing of the ERM crisis. This suggests that at least part of the success and stability of the EMS/ERM, but also the causes for its eventual collapse, seem to be attributable to its very design and how it was run by policymakers. The remainder of the paper will therefore discuss the design of the EMS/ERM to identify features that add to the credibility of such a system.

4. Is an ERM-style system feasible nowadays?

> „What was possible in Europe in the 1980s, a European Monetary System of multilateral exchange rate pegs with periodic realignments, was possible then only because of the widespread maintenance of capital controls. What was possible in Europe in the 1990s, a European Monetary System of somewhat wider bands, was possible only because a credible commitment to move to monetary union in short order anchored expectations. No EMS-style arrangement will be viable elsewhere in today's world of high capital mobility."

This quotation of Eichengreen (1998, pp. 22-3) gives a very clear answer to the question posed above. Yet this section will try to provide a more differentiated answer and identify features that could enhance the viability and credibility of an EMS-style monetary system in today's world.

The following aspects will be discussed:

- Co-operation between the monetary authorities of the countries involved
- Independent central banks and robust monetary rules
- Flexibility and the importance of realignments
- Fluctuation margins
- Support funds
- Capital controls

Co-operation between the monetary authorities of the countries involved

Buiter et al. (1998, chapters 8-9) highlight the fact that the ERM crack-up was a crisis of an exchange rate *system*, rather than the collapse of a collection of unilateral pegs individually pursued by a number of countries. They see a central cause of the crisis in the lack of co-ordination of monetary and exchange rate policies within the system. The

crisis, they argue, "was in the first instance a conflict among monetary authorities and a failure of the European system as a policy coordination mechanism." (Buiter et al. 1998, p. 134)

Following German unification, the German government pursued excessive fiscal policy, with the consequence of rising inflation. The Bundesbank responded with a high interest rate policy which increased the strain on the Bundesbank's weak ERM sisters (Bank of England and Banca D'Italia) and ultimately led the lira and sterling to resign from the ERM, because the pursuit of such high interest rate policies would have killed their economies. In that respect, the crisis was the result of the system's inability to find a co-operative response to a shock that increased the asymmetries within the system.

A co-operative solution could have been a generalised ERM realignment with a conjunct cut of interest rates by Germany. The Bundesbank's interest rate cut would have given leeway to the UK and Italy not to raise interest rates further, and a modest realignment involving all ERM currencies would have lowered German import prices, which would have helped to ease inflationary pressures in Germany. Furthermore, it would have protected the other ERM countries against the destabilising shock of the UK's and Italy's exit that left the ERM in troubled waters for another year.

Such a bargain, a German interest rate reduction in return for a general realignment of ERM currencies, had been negotiated at the ministers of finance meeting in Bath on 5-6 September 2002, but yielded no positive results (Eichengreen 2001).[15] A co-operative solution was not achieved, and the crisis occurred.

Also Padoa-Schioppa (1994, pp. 14-5) believes that

> "The difficulties encountered by the ratification process precipitated the crisis of the ERM but were not its underlying cause, which was plainly traceable to what in academic jargon is called a 'co-ordination failure'. […] There was the refusal to accept a general realignment and even to call a meeting of the Monetary Committee or of the ministers and central-bank governors when, in September 1992, a general realignment might have calmed the markets. The realignment procedure, once embarked on, did not produce a credible new grid. At various times, and in various ways, through unhelpful declarations that exited markets as well as through policy decisions that caused unnecessary friction, the system was destabilized by its very custodians."

As an example, contradictory statements of the parties involved certainly did not help to convince markets of the smooth functioning of the system. This point is illustrated by an episode described by Buiter at al. (1998, pp. 56-7):

> "In talking to the press [after the Bath summit], the British chancellor [Lamont] referred to a German "commitment" not to raise interest rates. The use of the term "commitment" did not please the president of the Bundesbank. One day later, Schlesinger stated in an interview that the Bundesbank position had in fact not changed since August. According to the reports of the

[15] The British Prime Minister John Major (1999, p. 323) accounts that Bundesbank president Helmut Schlesinger acknowledged Germany's willingness to cut interest rates in conjunction with a general realignment of ERM currencies but that France refused to go along (cf. Eichengreen 2001, p. 18). See also Eichengreen and Wyplosz (1993, pp. 111 ff.).

> financial press, "Lamont's scuffle with the Bundesbank came at a particular sensitive time and led money managers, corporate treasurers and others in the currency markets to reevaluate their strategies."[16]"

Such contradictory statements clearly undermine the credibility of any system and make it more vulnerable to attack. It is the typical situation of a crisis in which tensions arise, and in which the parties involved come under stress. It is therefore important to lay out the rules in order to ensure a co-operative mechanism for finding a solution, before a crisis has arrived. Effective policy co-ordination is an indispensable necessity for gaining and maintaining credibility.

Acknowledging the character of the ERM crisis as a crisis of an exchange rate *system* clearly shifts the focus of attention towards the management of the *system*, which in this case had been relatively poor. Speculation had been given ground because of the cacophony of policy-makers responsible. From this point of view, the characterisation of the ERM crisis as a second-generation crisis triggered by self-fulfilling speculation is incomplete.

Independent central banks and robust monetary rules

The long-running debate over rules versus discretion in the conduct of monetary policy[17] has nowadays been decided in favour of a rules-based approach, with all major central banks following more or less well-defined monetary rules. Irrespective of an external exchange rate goal, (de facto) central bank independence and a clear monetary objective function are seen as state of the art for modern central banking.

Establishing a strong, independent central bank with strong inflation aversion is an important way to keep down inflationary expectations. While beneficial for any economy, this is particularly important for countries with an external anchor, because central bank independence provides credibility to the peg.

The credibility of a peg requires that any exchange rate change, i.e. a break of the central bank's promise to keep the parity fixed, should only occur in response to exceptional disturbances. Devaluations resulting from self-fulfilling speculative attacks must be ruled out. To exclude such attacks, robust monetary rules are needed. Hence, it is not sufficient to rule out balance-of-payment crises through the sound conduct of current and past policies – anticipated future policies matter as well. Robust monetary rules must ensure that changes in monetary and exchange rate policy will only take place in exceptional circumstances. Eichengreen and Wyplosz (1993, p. 62) thus define a robust monetary rule as one that "precludes a shift to more accommodating policies in the presence of a speculative attack not grounded on fundamentals."

[16] Muehring (1992, p. 11).
[17] See for example Kydland and Prescott (1977) and Fischer (1990).

Flexibility and the importance of realignments

A further, crucial lesson of the ERM crisis is the necessity to incorporate a certain degree of flexibility into the system. Of particular importance is the capacity to undertake relative price adjustments, that is, the possibility of realignments.

As Eichengreen (1996, p. 163) notes, when the EMS was created in 1979, Germany had a third of a century of experience, from the Bretton Woods system and the snake, suggesting that deficit countries would hesitate to adjust. Germany hence acknowledged the necessity of allowing for realignments within the system.

Pegged exchange rate systems face difficulties when significant changes are required in the relative prices of domestic and foreign goods, of traded and non-traded goods, and of labour and commodities.[18] If the nominal exchange rate is fixed, adjustments have to occur through changes in wages and prices (or the movement of labour). If wages and prices are rigid (at least downwards) transitional output losses may result. A revaluation can bring about the needed price adjustments at once and with fewer frictions, because money illusion will make changes in the relative prices less obvious and painful. If labour markets are not sufficiently flexible and prices are sticky, pegged exchange rate systems can only be sustained if nominal exchange rate adjustments, i.e. revaluations, are allowed for in the case of exceptional shocks.

"Adjustments of central rates"[19] was indeed an explicit and frequently used instrument of the EMS until the January 1987 realignment. Jochimsen (1993, p. 187) criticises that these rules "were forgotten during the second half of the 1980s, where one mistook the goal of keeping exchange rates stable as already constituting the result of actually holding them stable, without regard to the corresponding exigencies of adjusting domestic fiscal policies and collective bargaining accordingly."

Similarly, Tietmeyer (1998, p. 52) scathes that "Maintaining unrealistic central rates for too long proved to be the Achilles' heel of the EMS. Thinking in terms of political prestige and national honor played a thoroughly significant role in this."

The literature on exit strategies[20] highlights that realignments can be undertaken without undermining the credibility of the system if they are undertaken only in exceptional circumstances and if the cause can be directly observed or otherwise independently verified. Furthermore, moral hazard from the authorities' side must be excluded. The German unification was such a shock, and the Bundesbank indeed argued that is was possible to realign in response to this shock without undermining the credibility of the EMS (Eichengreen and Wyplosz 1993, p. 61). But conflicting views and national pride circumvented a general realignment. This failure to achieve a general realignment led to crisis and illustrates that it is "absolutely essential to de-politicize the fixing of exchange

[18] Cf. Eichengreen and Wyplosz (1993, pp. 60-1).
[19] Article 3.2 of the Resolution of the European Council of 5 December 1978 on the Establishment of the European Monetary System (EMS) and related matters (Gros and Thygesen 1998, p. 59).
[20] See for example Eichengreen et al. (1998).

rates." (Jochimsen 1993, p. 187) In addition, it exemplifies the desirability of generating a discussion on parity changes in good times (Tietmeyer 1998, p. 52).

Fluctuation margins

An aspect also related to the flexibility of exchange rate systems is the matter of fluctuation margins. Krugman (1991) showed that a target zone can lead to an effect he calls "target zone honeymoon": assuming that exchange rates are at least partly determined by the formation of expectations, he shows that the very existence of a target zone can have a stabilising effect on the exchange rate. When the exchange rate approaches the upper or lower band, market participants will expect the central bank to intervene, so that the exchange rate will move away from the band. These expectations will then suffice to drive the exchange rate away from the band, without need for intervention by the central bank. This honeymoon effect, however, depends on the credibility of the target zone. If it lacks credibility, the market participants will at best take a wait-and-see approach, or otherwise launch an attack, in expectation of an overshooting of the exchange rate, in case that the peg is abandoned. The system could thus cause the crisis it was created to prevent.

In this context, the width of the band is of great importance. Narrow bands allow for risk-free one-way bets, creating incentives for speculative attacks. Wider bands, in contrast, make currency speculations more risk-prone, since they allow for a reversal of exchange rate movements. While wider bands also reduce the stabilising effects of target zones, they also sharpen the awareness of the stability policy response to be borne by the countries themselves, by making convergence deficits in the member countries become manifest more easily (Tietmeyer 1998, p. 50). To reduce the susceptibility of a target zone system, it is hence better to choose wide exchange rate bands than bands that are too narrow.

Support funds

As discussed in section two, austere interest rate policy can be used to defend a peg only to a limited extent. The only other means to defend the peg, besides capital controls, is the use of foreign reserves for intervention in the foreign exchange markets.

Building up large amounts of foreign reserves can certainly help to increase the credibility of a peg. Having a "war chest" emphasises a country's ability to forcefully fend off speculative attacks. Holding reserves, however, is costly. Furthermore, even a country with a vast amount of reserves can come to its limits in the case of large speculative movements. Fortunately, in the case of a common exchange rate system, common support mechanisms are an additional way of ensuring markets that the peg can and will be defended.

For this reason, and also as a lesson from the experiences with the snake[21], the French secured a provision in the EMS Act of Foundation, authorising weak governments to draw unlimited support from their strong-currency partners. In the conviction of Giscard, the French president, a European exchange rate system would only function if the burden was shared equally between the strong and weak currencies (Bernholz 1999, pp. 754-5).[22]

The EMS was hence established with a very short-term financing facility (VSTF), providing support which was "unlimited in amount". There is, however, a problem with central banks' mutual assistance. Supporting the weak currency has monetary policy effects on the country with a strong currency: irrespective of whether the central bank intervenes itself or makes its own currency available to other central banks for intervention purposes, bank liquidity is expanded and controlling monetary expansion is therefore made more difficult (Tietmeyer 1998).

It was exactly this reasoning that led the Bundesbank – with reference to the Emminger letter[23] – to curtail interventions during the EMS crisis. After heavy intervention in support of the attacked EMS currencies, it sensed its internal monetary stability under threat. By early September 1992, M3, the Bundesbank's target money aggregate, was rising at an annual rate of almost 10 per cent, far above its target of 3.5 to 5.5. per cent (Eichengreen and Wyplosz 1993, p. 110).

It is therefore important to understand that while support mechanisms can be an important tool to increase the credibility of a regional exchange rate system, they cannot be taken as a substitute for the pursuit of economic policies consistent with the external exchange rate objective.

Capital controls

A final point to be raised is the matter of capital controls. Capital controls, for obvious reasons, make things much easier for policymakers who have to guard a pegged exchange rate regime.

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[21] Also the snake contained support mechanisms, but as Eichengreen (1996, pp. 159-60) reports, "The European Monetary Cooperation Fund [of the snake] possessed little authority, central bank governors being unprepared to delegate their prerogatives. Meeting separately as the Committee of Central Bank Governors, they were supposed to set guidelines for national monetary policies but did little more than coordinate foreign-exchange market intervention. In the end, there existed no regional analogue to the International Monetary Fund to monitor policies and press for adjustments. The absence of such an institution meant that the strong-currency countries could not be assured that their weak-currency counterparts would undertake policy adjustments. Therefore the foreign support they were willing to provide was necessarily limited."

[22] The details of the envisaged extended support mechanism were indeed the key points mostly discussed when the decisions were being formulated in the second half of 1978 and early 1997 (Bernholz 1999, p. 755).

[23] The Emminger letter refers to a letter which Otmar Emminger, the Bundesbank president who signed the EMS, wrote to the German government to ask for a clause permitting the Bundesbank to opt out from the EMS intervention obligations if they threatened the Bundesbank's mandate to secure price stability. The government acquiesced (see Eichengreen and Wyplosz 1993, pp. 109 ff.). The Bundesbank was heavily criticised for limiting its support at some stage. But as Eichengreen and Wyplosz (1993, p. 109) put it, "it is obvious that no central bank would ever commit unconditionally to unlimited lending."

There has been growing support for the view that EMS-like systems cannot survive in the absence of capital controls. Capital controls, it is argued, played an important role in the functioning of the EMS:

> "In the 10 years between its creation in 1979 and 1990, when capital accounts were freed, there were 12 realignments, most of them involving several currencies. With few exceptions, these realignments came in the wake of speculative attacks, yet the system survived. The first attack that occurred after capital liberalization was lethal" (Wyplosz 2004, p. 262)

It is out of question that the handling of the 1992/93 crisis would have been facilitated and that authorities would have had more leeway to come up with solutions if there had still been capital controls. But one can also argue that once the avalanche had been set off, capital controls would not have changed much. As mentioned before, Ireland, Portugal and Spain actually re-introduced capital controls during the crisis, but this did not prevent the punt, the escudo and the peseta from remaining under speculative pressure and from facing devaluation in February (punt) and May (peseta and escudo).

Also, as argued before, a better, more co-operative crisis management could have avoided the crisis, or at least limited its damages. And finally, as pointed out earlier, speculative attacks do not occur entirely out of the blue. If the system is credible, it is also sustainable.

5. Conclusions

Just as the EMS was built upon the lessons from its unsuccessful predecessor, the snake, and the Bretton Woods system, the experiences with the EMS are worth being borne in mind when considering the desirability and feasibility of similar regional arrangements in today's world of highly mobile capital.

When the EMS was set up, it was greeted with much scepticism regarding its viability. After all, "the Bretton Woods system had broken down for good reasons that were still valid when the EMS was invented." (Padoa-Schioppa 1994, p. 71) It nevertheless proved to be a success, at least for most of its time. One of the lessons Padoa-Schioppa (1994, p. 71) draws from the EMS experience is that

> "the EMS has shown that there is a way out of the dilemma often presented to policy-makers: whether to move back to some sort of Bretton Woods system of exchange rate relationships, which is inevitably too rigid and probably not feasible today, or to live in a world of totally unregulated exchange rate relationships, with all the problems, dangers, and difficulties that were a feature of the 1970s."

This paper has argued that, in contrast to the popular bipolar view on exchange rate choices, intermediate regimes in general and regional exchange rate systems à la EMS in particular should not generally be ruled out even in today's world of highly mobile capital. It has highlighted the fact that the ERM crisis had been the crisis of an exchange rate *system*, and not simply the collapse of a collection of unilateral pegs triggered by self-fulfilling speculation. It tried to show that there exist distinct features that indeed add

to the credibility of regional exchange rate systems, and argued that a system that is built upon the lessons of the EMS and is managed very carefully and co-operatively could be both credible and sustainable even in the 21st century.

Of course, the requirements for successful pegs in general, and regional exchange rate systems in particular, are very high, especially if the countries involved have reached the stage of economic and financial development where it is conventional to remove capital controls. Some may argue that the requirements are too high. A very strong commitment is required from all parties willing to engage in a regional exchange rate system, and the willingness to subordinate internal economic objectives under the objective of exchange rate stability is essential. A crucial precondition for any regional monetary arrangement to be successful is a far-reaching consensus on policy preferences.

In the context of the ERM crisis, Tietmeyer (1998, p. 39) pointed out the original meaning of the Greek word *krisis*, meaning "decisive turning point", not implying a turn for the better or the worse. In that understanding, the ERM crisis can also be seen as a "curative purgation crisis" (Schiemann 1993, p. 1) which helped to remind European countries in the run-up to EMU of the importance of policy coherence and strong policy commitment to secure the credibility of the system. In that respect, the ERM crisis, just as all the other crises that were to follow in the 1990s and early 2000s, should be a reminder and a warning to those countries considering any form of exchange rate pegging. But it does not need to discourage such thoughts.

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