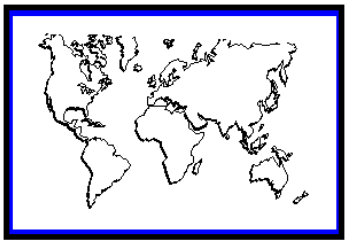
DOCUMENTOS DE ECONOMIA Y FINANZAS INTERNACIONALES

An empirical examination of exchange-rate credibility determinants in the EMS

Francisco Ledesma-Rodríguez
Jorge Pérez-Rodríguez
Simón Sosvilla-Rivero

March 2004

DEFI 04/01



FEDEA
Fundación de Estudios de Economía Aplicada

Asociación Española de Economía y Finanzas Internacionales

http://www.fedea.es/hojas/publicaciones.html

ISSN 1696-6376

An empirical examination of exchange-rate credibility determinants in the EMS[*]

March 2004

Francisco Ledesma-Rodríguez
(Universidad de La Laguna)
Jorge Pérez-Rodríguez
(Universidad de Las Palmas de Gran Canaria)
Simón Sosvilla-Rivero
(FEDEA and Universidad Complutense de Madrid)

ABSTRACT

This paper provides empirical evidence on the determinants of exchange rate credibility under the European Monetary System (EMS). To that end, we have considered both economic variables and political factors using data of eight currencies participating in the Exchange Rate Mechanism, covering the complete EMS history (1979-1998). Our results suggest that the level of international reserves, the real interest rate and right-wing governments would have positively affected the credibility of a given central parity, while the unemployment rate and the inflation rate would have negative influenced such credibility.

JEL classification numbers: C32, D72, F31, F33,
KEY WORDS: Credibility, Political variables, Exchange rates, European Monetary System.

Corresponding author:
Simón Sosvilla-Rivero
FEDEA
Jorge Juan, 46
28001 Madrid
Spain
Tel:+34-91-435 04 01
Fax:+34-91-577 95 75
e-mail:simon.sosvilla@fedea.es

[*] The authors thank José Viñals (Bank of Spain) who gave us access to the data on exchange rates and interest rates used in this paper.

1. Introduction

The European Monetary System (EMS) was initially planned as an agreement to reduce exchange rate volatility for a Europe in transition to closer economic and possibly political integration, as well as an attempt to foster economic integration and the co-ordination of economic policies in the now European Union (EU).

The centrepiece of the EMS was the Exchange Rate Mechanism (ERM), an adjustable peg system in which each participating country was assigned a specific range (target zone) within it its exchange rate could fluctuate with respect to the others. In order to keep the exchange rates within these margins, the participating countries were obliged to intervene in the foreign exchange market whenever their currency approached the limits of its band. Realignment of the parities by the monetary authorities was possible, provided that all the members of EMS agreed.

Following Krugman (1991), a growing theoretical literature has attempted to explain exchange rate movements inside official fluctuation bands such as those of the ERM with the help of target zone models (see Kempa and Nelles, 1999, for a review). The main result of the target zone model is that, with perfect credibility, the zone exerts a stabilising effect (the so-called "honeymoon" effect), reducing the sensitivity of exchange rates to a given change in fundamentals. Nevertheless, in a target zone with credibility problems, expectations of future interventions tend to destabilise the exchange rate (the so-called "divorce" effect), making it less stable than the underlying fundamentals (Bertola and Caballero, 1992).

Therefore, credibility becomes a key issue in examining the behaviour of a target zone agreement such as the ERM, since the possibility that the official authorities change the central parity could be anticipated by the economic agents, triggering expectations of future changes in the exchange rate that could act as a destabilising element of the system. In this context, credibility refers to the perception of economic agents with respect to the commitment to maintain the exchange rate around a central parity.

The aim of this paper is to provide empirical evidence on the determinants of exchange rate credibility using data covering the ERM history. As ERM credibility

varied over time as well as among European countries, we evaluate the influence of both economic variables and political factors that might help explain such behaviour.

2. ERM credibility and its potential determinants

2.1. Measuring credibility

There are several credibility measures that have been used in the empirical literature. Svensson (1991) presented a simple test to study the credibility of a target zone exchange rate regime with fluctuation bands. Bertola and Svensson (1993) propose the so-called the drift-adjustment method" to estimate realignment expectations that constitute an inverse measure of credibility. Edin and Vredin (1993) employ models of discrete to estimate the probability of realignment, using explanatory variables such as the interest rate differential, the inflation differential, the current account balance, and the unemployment rate.

Ledesma-Rodríguez *et al.* (2003) compare theses available indicators according to their ability to detect the main events in the history of the ERM. Their results suggest that marginal credibility is the best indicator in order to capture true signals of realignments and not to convey false signals. This credibility measure was originally proposed by Weber (1991). It focuses on the ability of policy announcements to influence the public's expectations, trying to measure the impact of official announcements on exchange rates. It may be thought of as the weight placed on the announcement when the public forms their expectations. Given this evidence, we take marginal credibility as our credibility indicator, noting that, by construction, it recognises the changing nature of the history of the ERM.

2.2. Economic determinants

In order to identify those economic variables that can influence the exchange-rate credibility, we make use of the literature on currency crises [see Sosvilla-Rivero and Pérez-Bermejo (2003) for a recent survey]. In particular, we consider the following variables as a potential economic factors influencing the credibility of a given central parity:

- The level of international reserves (RES): The empirical evidence suggests that increases in the level of international reserves significantly reduces the probability

of a regimen change, enhancing the credibility of a given parity. We use data from the IFS (line 1l.d).

- The unemployment rate (U): An increase in this variable would signal weaker economic performance and then would increase the pressure on the domestic currency, leading to credibility losses. We use data from the IFS (line 67r).
- The inflation rate (INF): The higher the inflation rate, the likelier a devaluation. Therefore, one would expect a negative association between the inflation rate and credibility. In particular we use data on consumer price index from the IFS (line 64).
- Real interest rate (RIR): An increase in this variable would indicate lower risk of devaluation, and therefore would reduce the probability of future realignment, positively affecting the credibility a given parity. In particular we use data on long-term interest rate kindly provided by the Bank of Spain.

2.3. Political factors

There is a large and growing literature on political-economic analysis of monetary policy, but its application to exchange rates is almost non-existent[1]. Theoretical models in this literature fall basically into two categories: partisan and opportunistic. Partisan models stress the different parties´ preferences over inflation and unemployment, with right-wing government more likely to be concerned with fighting inflation and maintaining price stability [see, e. g. Hibbs (1987) and Alesina (1989)]. To captures partisan effects we use the variable PAR, defined as right-wing parties in percentage of total cabinet posts, weighted by days (Armingeon, Bayeler and Menegale, 2002).

3. Empirical results

We use data from eight ERM countries (Belgium, Denmark, France, Ireland, Italy, the Netherlands, Portugal and Spain). Data restrictions on political variables led us to use annual data. Given the central role of Germany in the European Union (see, e. g., Bajo-Rubio *et al.*, 2001), our exchange-rate credibility indicators are expressed in terms of the Deutschmark. The sample period runs from 1979 to 1998 (160 observations), covering the complete EMS history.

We estimate with cross-section weights feasible generalised least squares (FGLS) using White heteroskedasticity covariance, allowing for variances within a cross-section (countries) to differ across time. Table 1 reports the estimation results.

As can be seen, on one hand all the economic variables which theory suggest affects exchange-rate credibility are statistically significant at the 5% level (except for the unemployment rate which is significant at the 10%) and the signs of the estimated coefficients have the expected signs. On the other hand, and in line with the prediction of the Partisan theory, right-wing governments would have increased the credibility of a commitment to maintain a given central parity.

In order to check the robustness of our results to changes in the sample, we have analysed the sensitivity of the estimated coefficients to the exclusion of each country one at a time. As can be seen in Table 2, the estimated coefficients remain relatively constant, except for RES when excluding Belgium, for U when excluding Belgium, France, Ireland, the Netherlands and Spain, for INF when excluding Denmark and Ireland, and PAR when excluding Denmark, Ireland, Portugal and Spain. Nevertheless, it is interesting to note that all the parameters are within the 95% confidence interval we have estimated in Table 1, except for U when excluding Belgium and Spain, and for PAR when excluding Denmark. Therefore, this evidence can be taken as suggesting that our results are based on a relatively homogeneous sample of countries. Finally, note that when excluding Ireland, all the variables are statistically significant at the 1% level.

References

Alesina, A., 1989. Politics and business cycles in industrial democracies. Economic Policy 8, 55-89.

Alogoskoufis, G., Lockwood, B., Philippopoulos, A., 1992. Wage inflation, electoral uncertainty and the exchange rate regime: Theory and UK evidence. Economic Journal 102, 1370-1394.

[1] The exception being Alogoskoufis *et al*. (1992), who present a model of exchange-rate policy for the UK, and Drazen (2000) who explains contagion in the exchange rate crises based on political factors.

Armingeon, K. Bayeler, M., Menegale, S., 2002. Comparative political data set, Institute of Political Science, University of Bern.

Bajo-Rubio, O., Sosvilla-Rivero, S., Fernández-Rodríguez, F., 2001. Asymmetry in the EMS: New evidence based on non-linear forecasts. European Economic Review 45, 451-473.

Bertola, G., Caballero, R.J., 1992. Target zones and realignments. American Economic Review 82, 520-536.

Bertola, G., Svensson, L.E.O., 1993. Stochastic devaluation risk and the empirical fit of target zone models. Review of Economic Studies 60, 689-712.

Drazen, A., 2000. Political Contagion in Currency Crises. In: P. Krugman (ed.), Currency Crises. University of Chicago Press, Chicago.

Edin, P.-A., Vredin A., 1993. Devaluation risk in target zones: Evidence from the Nordic countries. Economic Journal 103, 161-175.

Hibbs, D., 1987. The American political economy. Macroeconomic and electoral politics. Harvard University Press, Cambridge, Mass.

Kempa, B., Nelles, M., 1999. The Theory of Exchange Rate Target Zones. Journal of Economic Surveys 13,173-210.

Krugman, P., 1991. Target zones and exchange rate dynamics. Quarterly Journal of Economics 106, 669-682.

Ledesma-Rodríguez, F., Navarro-Ibañez, M., Pérez-Rodríguez, J., Sosvilla-Rivero, S., 2003. On the credibility of a target zone: Evidence from the EMS, centrA Working Paper E2003/33 (available at http://www2.fundacion-centra.org/pdfs/E200333.pdf).

Sosvilla-Rivero, S., Pérez-Bermejo, F., 2003. Credibility and duration in target zones: Evidence from the EMS", FEDEA Working Paper 2003-18 (available at ftp://ftp.fedea.es/pub/Papers/2003/dt2003-19.pdf).

Svensson, L.E.O., 1991. The simplest test of target zone credibility. IMF Staff Papers 38, 655-665.

Weber, A., 1991. Reputation and credibility in the European Monetary System. Economic Policy 12, 58-102.

Table 1. Estimation results		
	Coefficient	*t*
RES	0.0722	3.1679
U	-0.0039	-1.7838
INF	-3.5854	-3.0185
RIR	0.0238	9.0249
PAR	0.0278	2.2297
$\overline{R}^2$	0.9913	
Log-likelihood	243.66	

Note: For space considerations, we do not report the estimates of the country fixed effects.

Table 2: Sensibility analysis to country exclusion					
	RES	U	INF	RIR	PAR
NONE	0.0722 (3.1679)	-0.0039 (-1.7838)	-3.5854 (-3.0185)	0.0238 (9.0249)	0.0278 (2.2297)
BELGIUM	0.1026 (1.9346)	-0.0076 (-2.1873)	-3.5135 (-1.2708)	0.0296 (6.2174)	0.0289 (1.5027)
DENMARK	0.0610 (1.9537)	-0.0034 (-1.1812)	-2.7746 (-1.7109)	0.0260 (6.3967)	-0.0010 (-0.3254)
FRANCE	0.0701 (2.6422)	-0.0062 (-2.7378)	-3.7170 (-2.8143)	0.0256 (11.6299)	0.0237 (1.7447)
IRELAND	0.0579 (2.6504)	-0.0082 (-5.3780)	-4.5501 (-4.2968)	0.0265 (15.066)	0.0341 (3.3225)
ITALY	0.0642 (3.0070)	-0.0041 (-1.6672)	-3.6649 (-3.0827)	0.0221 (5.1895)	0.0221 (1.9018)
NETHERLANDS	0.0803 (3.0156)	0.0014 (0.4840)	-3.4705 (-2.4811)	0.0245 (9.9955)	0.0252 (1.7794)
PORTUGAL	0.0757 (3.3622)	-0.0040 (-1.7794)	-3.2357 (-2.4865)	0.0212 (4.5877)	0.0331 (2.4816)
SPAIN	0.0718 (3.3279)	0.0027 (0.9070)	-3.5143 (-3.1076)	0.0211 (8.5409)	0.0129 (1.0145)

Note: *t*-values in parenthesis