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COMPETITIVENESS, REALIGNMENT, AND SPECULATION: THE ROLE OF FINANCIAL MARKETS

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ABSTRACT

Current and planned measures liberalizing the external capital accounts of France and Italy call into question the continued viability of the policy of periodic exchange-rate realignment followed to date in the European Monetary System (EMS). This paper is intended as a first step in studying the real and monetary effects of EMS-style realignments in a setting of free cross-border financial flows. The first set of results derived concerns a situation in which there are no *fundamental* factors behind domestic inflation. Under a policy regime in which domestic inflation automatically triggers devaluation, the economy can undergo self-fulfilling depreciation-inflation spirals, triggered by speculative attack on the exchange rate. Such spirals do not occur when realignments do not offset past inflation fully. The second set of results shows how an exchange rate collapse can occur after inflation is set off by expansionary fiscal policy. Sometimes, but not always, the crisis will be preceded by a period of capital inflows and real currency appreciation. In other cases fiscal expansion may set off an immediate crisis.

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Introduction

Since its inauguration in March 1979, the exchange-rate mechanism of the European Monetary System (EMS) has functioned with the aid of frequent currrency realignments--to date, more than one per year on average. In the eyes of many observers, the strategy of frequent realignment has allowed the system to survive in spite of the rather divergent macroeconomic policies pursued by the "Big Three" of the EMS, France, Germany, and Italy.[1] An apparently critical element in minimizing the financial disruption caused by realignments has been the control over cross-border financial flows maintained by France and Italy. The large onshore-offshore interest differentials that have emerged during currency crises suggest that capital controls have played an important role in insulating the French and Italian financial systems from the full force of speculative capital movements.

Current and planned measures liberalizing the external capital accounts of France and Italy call into question the continued viability of a widely-understood EMS policy of periodic realignment. Yet the speculative response of capital flows to expected parity change is an area that has received little attention in the academic literature.[2] The relative neglect of the role parity changes play in balance-of-payments crises is puzzling: empirically, devaluation fears are a leading--perhaps *the* leading--factor behind currency flight, just as speculative inflows are often inspired by hopes of revaluation. A further shortcoming of the existing literature is that, for the most part, it stops short of analyzing the possible *real* macroeconomic effects of exchange-rate crises.

This paper is intended as a first step in studying the real and monetary effects of EMS-type realignment policies in a setting of free cross-border financial flows. A simple model that serves as the paper's analytical framework is sketched in Section 1. The precise question then asked is: What kinds of equilibria can arise when markets expect a loss of home competitiveness against foreign goods to lead to realignment? Although much work remains to be done, the results of a preliminary investigation are quite suggestive.

The first set of results, described in Section 2, concerns a situation in which there are no *fundamental* factors (such as fiscal expansion) behind domestic inflation. Instead, Section 2 analyzes the economy's behavior under exchange-rate rules that allow cumulative inflation to trigger realignment automatically. The key finding is that such rules can induce multiple equilibria. Specifically, if realignment is expected to maintain or enhance external competitiveness, the economy has two equilibria. One of these involves an inflationary spiral in which speculators force a collapse of the fixed exchange rate and a depreciation of the currency to its new peg. When realignment is expected to aim at a real appreciation of the domestic currency, however, there is only one equilibrium: the inflation-depreciation spiral cannot occur.

These results suggest that under conditions of capital mobility, a systematic realignment policy may have disruptive effects--in financial markets, in the output and labor markets, and on domestic inflation. Although the results are model-specific and therefore should not be taken too literally, they also provide a rationale for the recent EMS practice of *only partially* offsetting differential inflation through currency realignment.[3]

A second set of results, explained in Section 3, studies expected realignment in a setting where domestic price inflation is already being driven by fundamentals (here, fiscal expansion). The possible equilibria of the economy depend on how fully the authorities attempt to offset past inflation through currency depreciation. If devaluation is large relative to past inflation, an exchange-rate collapse occurs as soon as an expansionary fiscal policy is enacted, but before any real appreciation has occurred. In the face of smaller devaluations, the fixed exchange rate can coexist with domestic inflation for some time before the inevitable collapse occurs.

1. The Model

A simple model with sticky output prices is the setting for the discussion; in line with the likely evolution of financial arrangements within the EMS, perfect capital mobility is assumed. Three basic hypotheses are (1) that the exchange rate is pegged entirely through the intervention of the home central bank, (2) that the home central bank has only a limited capacity to defend the exchange rate (in a sense to be made precise below), and (3) that the fixed exchange rate must be abandoned (at least temporarily) once this capacity has been exhausted. These hypotheses do not square perfectly with the facts of the EMS, but they lead to a useful benchmark model on which more realistic analyses can be built.

The analytical framework is the overshooting model of Dornbusch (1976) and Mussa (1977), as set out in the survey by Obstfeld and Stockman (1985). In the following description, variables other than interest rates are natural logarithms, and a variable such as $Dz(t)$ is the (right-hand) time derivative of z at time t. Perfect foresight is assumed, so no distinction is made between actual and expected rates of change.

With free capital mobility and perfect substitution between domestic- and foreign-currency bonds, the onshore domestic interest rate, $i(t)$, is related by interest parity to the (fixed) foreign rate, i^*, and the expected rate of domestic currency depreciation, $De(t)$:

$$(1) \quad i(t) = i^* + De(t).$$

The exchange rate $e(t)$ is the price of foreign currency in terms of domestic.

If $m(t)$ is the home money supply, y the (fixed) level of domestic output, and $p(t)$ the money price of output, equilibrium in the money market occurs when

$$(2) \quad m(t) - p(t) = \gamma y - \lambda i(t).$$

Let p^* be the (fixed) foreign-currency price of foreign output, which is distinct from domestic output. Aggregate demand for domestic output is

$$(3) \quad d(t) = \phi[p^* + e(t) - p(t)] - \sigma[i(t) - Dp(t)].$$

Because the price of home output is sticky, aggregate demand and supply can differ in the short run.

Imbalances in the output market contribute to price adjustment, however, and the model's final element is an equation to describe price dynamics. Let $\tilde{p}(t)$ denote the output price that would currently clear the goods market; as in Mussa (1977), this price is defined as the solution to

$$(4)\quad y = \phi[p^* + e(t) - \tilde{p}(t)] - \sigma[i(t) - Dp(t)].$$

Then the inflation rate is given by

$$(5)\quad Dp(t) = \theta[d(t) - y] + D\tilde{p}(t),$$

where θ measures the sensitivity of inflation to excess output demand. The second term in equation (5) is central to the discussion below, as it captures the pure effects of inflationary expectations on the price level.

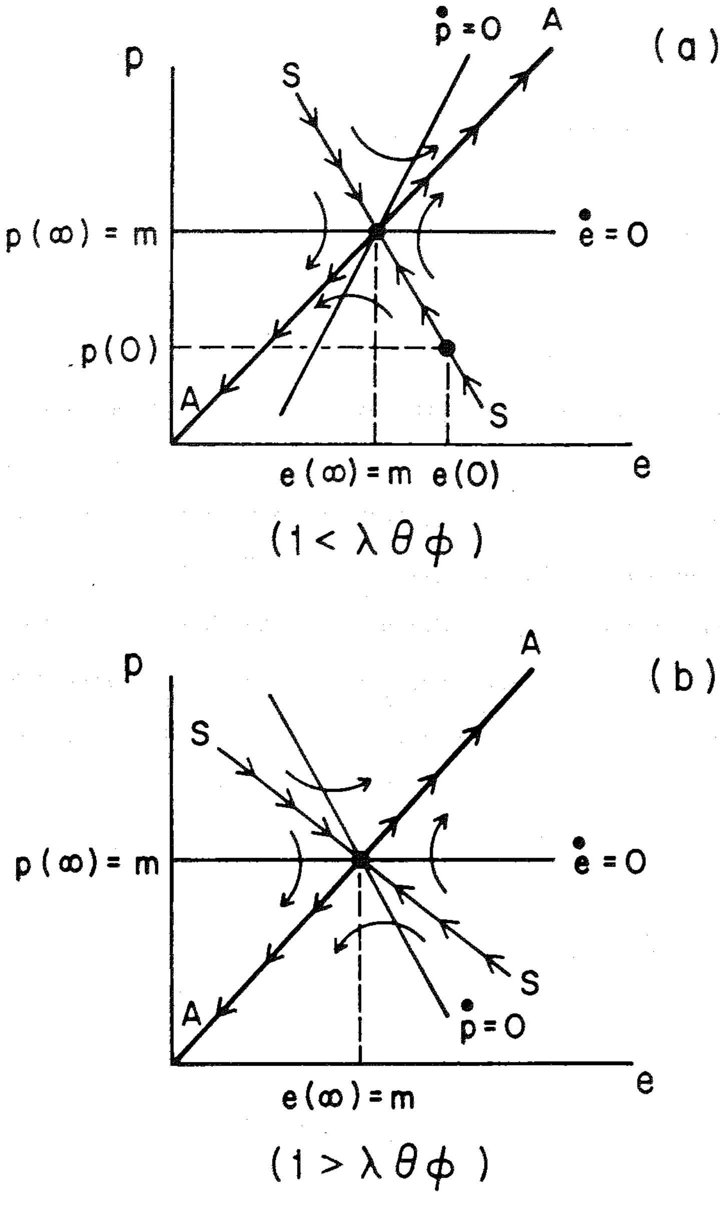
Assume now (for notational simplicity) that i^*, y, and p^* are zero. Then for a constant money stock, m, the stationary values of the exchange rate and price level are $e(\infty) = p(\infty) = m$, and the stationary value of the real exchange rate, $x(t) = p^* + e(t) - p(t)$, is therefore $x(\infty) = 0$. Under a floating exchange rate, the dynamics of convergence to this long-run equilibrium are given by the pair of differential equations

$$(6)\quad De(t) = \frac{1}{\lambda}[p(t) - p(\infty)],$$

$$(7)\quad Dp(t) = \theta\phi[e(t) - e(\infty)] + (\frac{1}{\lambda} - \theta\phi)[p(t) - p(\infty)]$$

(see Obstfeld and Stockman, 1985).[4]

Figures 1a and 1b show the two possible configurations of the system described by the preceding two equations. In each case the model has the familiar saddlepath property: for any initial price level $p(0)$, there is a unique equilibrium exchange rate on SS, $e(0)$, consistent with the economy's eventual arrival at its



p
S
$\dot{p} = 0$
A
(a)
$p(\infty) = m$
$\dot{e} = 0$
$p(0)$
A
S
e
$e(\infty) = m$ $e(0)$
$(1 < \lambda\theta\phi)$
p
A
(b)
S
$p(\infty) = m$
$\dot{e} = 0$
S
A
$\dot{p} = 0$
e
$e(\infty) = m$
$(1 > \lambda\theta\phi)$

Figure 1

long-run position. Also shown in the diagrams are the "anti" saddlepaths AA, which play an important role in the analysis below.

The two roots of the system are $1/\lambda$ and $-\theta\phi$; it can be shown that a general solution takes the form

(8) $e(t) - e(\infty) = k_1 \exp(t/\lambda) - (1/\lambda\theta\phi)k_2 \exp(-\theta\phi t)$,

(9) $p(t) - p(\infty) = k_1 \exp(t/\lambda) + k_2 \exp(-\theta\phi t)$,

where k_1 and k_2 are parameters determined by initial conditions. Setting $k_1 = 0$ gives the equation for SS:

(10) $p(t) - p(\infty) = -\lambda\theta\phi[e(t) - e(\infty)]$.

Setting $k_2 = 0$ gives the equation for AA:

(11) $p(t) = e(t)$.

The unstable path AA thus coincides with a 45° ray from the origin.

2. Inflation and Realignment: Self-fulfilling Equilibria

To focus on the pure effects of an anticipated realignment policy, the model abstracts in this section from all disturbances that might alter the long-run equilibrium level of external competitiveness. The model thus concentrates on monetary factors alone, and asks if even under these relatively uncomplicated conditions, expected realignments can have disruptive effects on the macroeconomy. In particular, can expected realignments lead to equilibria that look like inflation-devaluation spirals?

The answer depends on the mechanism in place to fix the exchange rate. Here I assume that the policy authority allows the exchange rate to float once private capital outflows have reduced the domestic money stock to a *positive* lower bound of m_0. Such a situation would arise, for example, if the central bank's external credit lines provided insufficient foreign exchange to purchase outstanding domestic credit and if other tools for reducing the domestic component of the monetary base were unavailable.

The realignment rule followed by the policy authority must now be specified. Imagine that the exchange rate is initially fixed at the level $\bar{e}$ and that the corresponding long-run price level is $\bar{p}$. (To these prices there corresponds an endogenously determined money stock $\bar{m} = \bar{p} + \gamma y - \lambda i* = \bar{p}$.) The policy authority's rule is to devalue the currency to an exchange rate of $\bar{e}' > \bar{e}$ if the price level reaches the trigger value of $\bar{\bar{p}} > \bar{p}$.

Suppose first that $\bar{e}' \geq \bar{\bar{p}}$. The interpretation of this condition is that when p reaches the trigger point, the authorities devalue the currency to a level that (at a minimum) restores current external competitiveness to its long-run value. Clearly, one equilibrium of the model is the one in which nothing happens and the economy remains at the initial equilibrium, $e = \bar{e}$, $p = \bar{p}$. With no shocks disturbing markets, there is no reason for p ever to reach its trigger level and bring the realignment policy into play.

There is, however, a second equilibrium, illustrated in Figure 2. (The analysis henceforth assumes, without loss of generality, that the configuration of Figure 1a is the relevant one.) In this equilibrium, speculators mount an attack on the

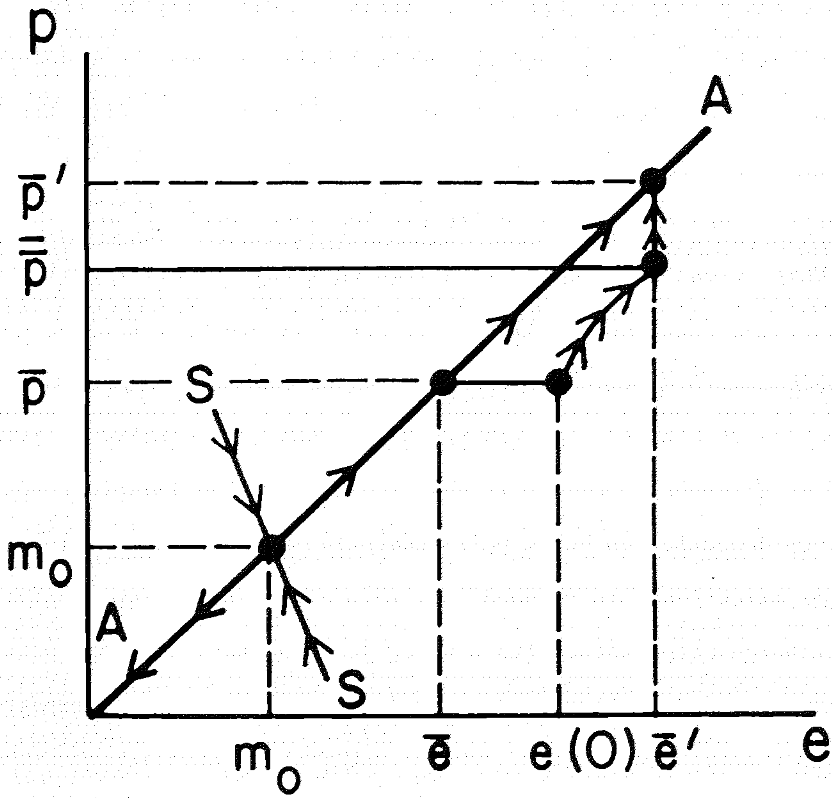


Figure 2

currency as soon as the realignment rule becomes known. Private capital outflows reduce the money supply to m_0 and force the central bank to withdraw from the foreign exchange market: the economy is know on an unstable path of the *floating-rate* system associated with a money supply equal to the minimal level m_0. The collapse results in a sharp currency depreciation [to e(0)], after which e and p rise together in an inflation-depreciation spiral. When p reaches $\bar{p}$, $e = \bar{e}'$ and the central bank can peg the exchange rate at this new level if no further realignment is expected.[5] Subsequently, rising domestic prices erode any short-term gain in competitiveness as p rises to its new long-run level, $\bar{p}' = \bar{e}'$.

This second equilibrium is driven entirely by self-fulfilling expectations that there will be a crisis followed by inflation and a realignment.[6] Since a speculative attack causes a depreciation of the domestic currency, each speculator has an incentive to join in if he believes an attack is about to occur. The immediate real currency depreciation helps pull domestic prices up until the trigger price level is reached. In this alternative equilibrium, the exchange rate reaches its new peg just as the trigger price level is reached, so there is no need for a discrete anticipated jump in the exchange rate, which would be inconsistent with asset-market equilibrium (Krugman 1979). Although the exchange-rate collapse causes an immediate real depreciation, the currency subsequently appreciates in real terms during the transitional float that precedes the return to realigned fixed rates.

Perhaps surprisingly, there is only one equilibrium--the first of the two described above--when $\bar{e}' < \bar{p}$, so that the policy authority realigns without attempting to offset fully the price inflation that has occurred in the past. To see this, consider Figure 3. In the case shown there, the only exchange-rate paths avoiding a discrete jump at the moment of realignment call for an *appreciation* of the currency just after the attack that drives the central bank from the exchange market. This immediate appreciation means that the hypothesized speculative attack in fact never occurs: no individual speculator would find it profitable to participate. The economy thus remains at $e = \bar{e}$, $p = \bar{p}$ if it is believed that the realignment policy will not fully offset past inflation.

To understand the difference between the present case and the last one, observe that the post-attack change in the exchange rate is influenced by two factors, the initial drop in the money supply (from $\bar{m}$ to m_0) the expectation that the exchange rate will be pegged at the level $\bar{e}'$ in the future. The first factor pushes the price of foreign currency downward after the attack, the second pushes it upward upward.[7] The second factor dominates when the realigned exchange rate is more competitive because it is only by depreciating initially that the real exchange rate can be higher also when the central bank re-enters the foreign exchange market.

The case $\bar{e}' = \bar{\bar{p}}$ is a borderline case in which both equilibria are possible. In this case, the authorities peg at a nominal exchange rate that maintains the original level of competitiveness, given that p is at the trigger point. The initial speculative attack leaves the floating exchange rate at its pre-attack level $\bar{e}$, after which e and p rise together along AA until p reaches $\bar{\bar{p}}$. At this point the currency is again pegged and the economy is at a new stationary position.[8]

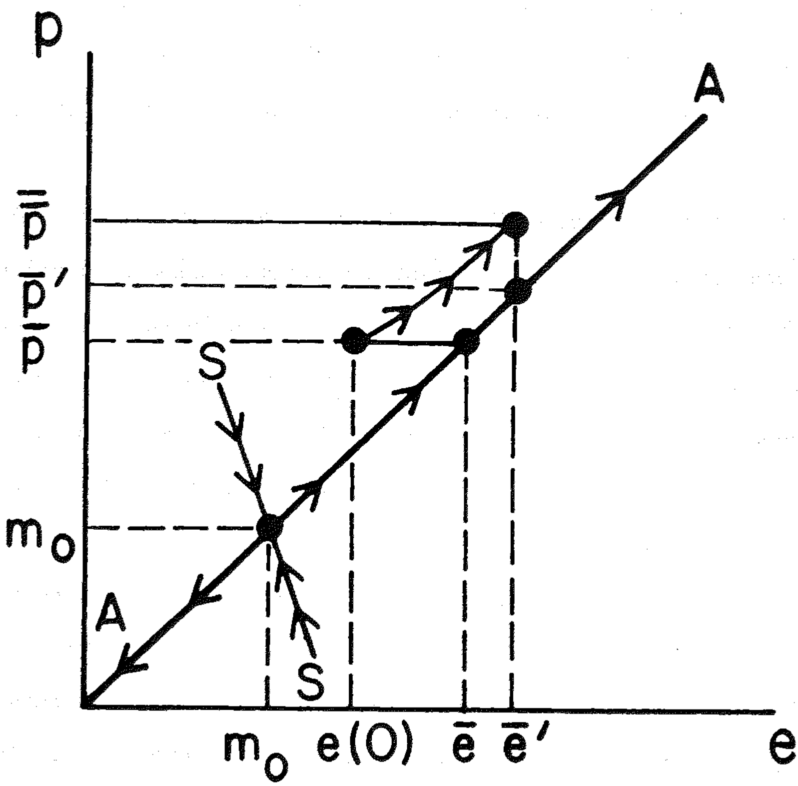


Figure 3

3. Attacks that Are Justified by Fundamentals

The previous section established the existence of multiple equilibria under an accommodative realignment rule. Central to the discussion was the precise form of the authorities' exchange-rate rule: under alternative rules the multiplicity can disappear. If the policy rule is to realign only after the *real* exchange rate has appreciated by a given amount, for example, the inflationary paths of the previous section are no longer supported by the policy rule, because the attack that sets off the inflation leads to a temporary gain in competitiveness, not a loss.

This section demonstrates how speculative attacks can nonetheless occur when realignment is prompted by a current or prospective loss in external competitiveness due to *fundamental* factors. (In contrast, the inflations prompting the realignments described in the previous section were entirely the result of the prospect of accommodation.) Once again, the behavior of the model turns on the degree to which the authorities attempt to offset inflation through devaluation.

Under the posited conditions of a fixed exchange rate and interest parity, continuing domestic-credit expansion by the authorities would lead to steady foreign reserve loss rather than to real currency appreciation. I therefore assume that the source of real appreciation is, instead, fiscal. With a fixed exchange rate and a sticky price level, fiscal expansion induces temporary excess output demand and thus a gradual price-level rise that appreciates the currency in real terms and eventually restores output-market equilibrium. The specific scenario analyzed is one in which fiscal expansion sets off domestic inflation, but the market expects the policy authority to devalue some time before the full upward adjustment of the home price level is complete.

The model used in the previous sections can be extended to allow for aggregate-demand shocks such as fiscal-policy shifts. Write the aggregate-demand equation (3) as

$$d(t) = \phi[p^* + e(t) - p(t)] - \sigma[i(t) - Dp(t)] + g,$$

where g is a demand-shift factor. The steady state of the floating-rate model becomes $p(\infty) = m$, $e(\infty) = m - g/\phi$, $x(\infty) = e(\infty) - p(\infty) = -g/\phi$, for any constant money supply m. (Recall that $p^* = 0$.) The equation of the unstable linear path AA is now $p(t) = e(t) + g/\phi$: a rise in g causes a parallel leftward shift of AA in Figures 1a and 1b.

Figure 4 shows one example of how the economy can react to a fiscal stimulus followed by realignment. Initially $g = 0$ and the long-run values of the price level and exchange rate are shown as $\bar{p}$ and $\bar{e}$; a rise in g sets prices moving upward. (The nominal money supply must also rise over time, as a result of official intervention, to maintain equilibrium in the money market.) So long as the exchange rate remains fixed at $\bar{e}$, the economy moves vertically toward point E, the new long-run position that would eventually be reached in the absence of an exchange-rate change. Point E lies on A′A′, the "anti" saddlepath associated with a permanent level g of the demand-shift parameter.

Assume now that the market expects the authorities to realign the exchange rate at $\bar{e}'$ once the price level reaches $\bar{\bar{p}}$. In this case an attack occurs at point F, so that the economy is placed on a path of the floating-rate system associated with the minimal money supply m_0 (and the saddlepath S′S′). The equilibrium path is

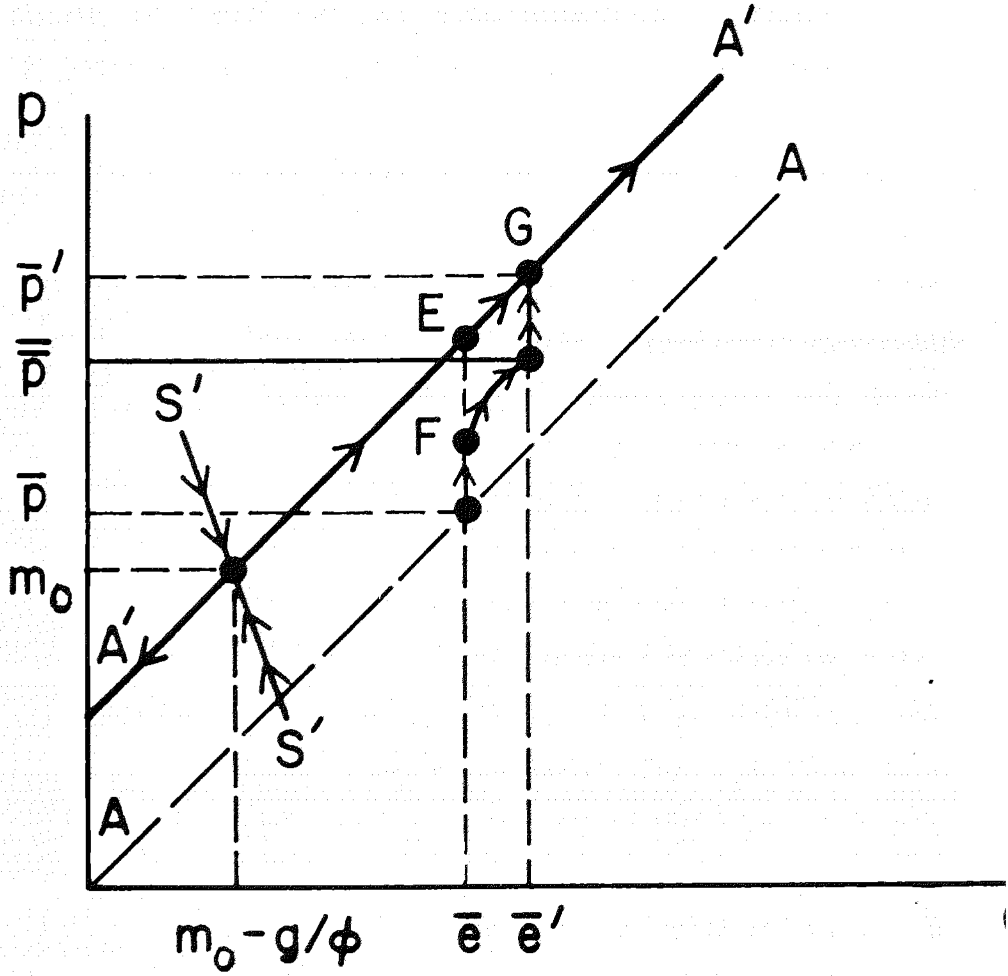


Figure 4

the unique one with the property that e reaches $\bar{e}'$ just as p reaches $\bar{p}$. No discrete jump in e takes place at the moment of re-pegging (though there is a sharp capital inflow that raises m), and the economy converges afterward to point G as inflation falls to zero. Clearly the devaluation has no long-run effect on the real exchange rate, but it does cause a higher long-run price level.

Two features of the path just described deserve emphasis. First, even though the eventual attack is perfectly foreseen, there is an initial period following the fiscal impulse during which prices rise, the capital account is in surplus, and the exchange rate remains fixed. The pattern of capital inflows and real currency appreciation followed by external crisis is reminiscent of events that accompanied the stabilization plans undertaken in Latin America's Southern Cone in the late 1970s. Second, competitiveness continues to deteriorate during the transitional period of floating (since p is rising faster than e below A'A', which itself has a 45° slope). Thus, realignment occurs after a *steady* deterioration in competitiveness, in contrast to the example of the last section. There, the real exchange rate first depreciated (as a result of collapse), then appreciated as realignment approached.

As Figure 5 shows, however, other adjustment paths are possible. In Figure 5, the authorities' realignment policy calls for a devaluation so large that competitiveness is (temporarily) restored to its original, pre-fiscal-expansion, level. In this case the fiscal expansion sparks an *immediate* collapse and a nominal currency depreciation to point F. The associated real currency depreciation is completely reversed during the

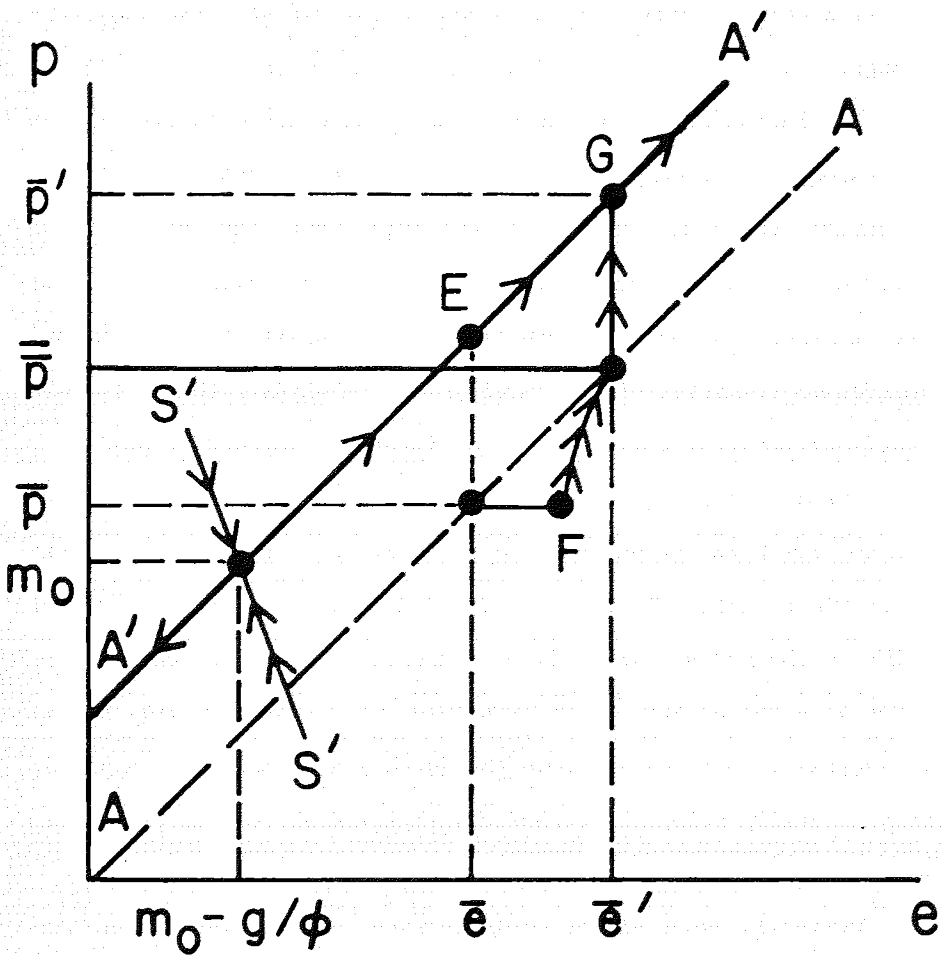


Figure 5

transitional float that brings the economy to $e = \tilde{e}'$, $p = \bar{\bar{p}}$. After re-pegging, there is a further loss in competitiveness as inflation brings the economy to point G. Once again, there is no ultimate gain in competitiveness as a result of the exchange-rate change.

The lesson of this example is that the expectation of an over-energetic attempt to restore competitiveness despite a structural shift in the real exchange rate can set off an immediate run on the currency. Such runs occur even before any real appreciation emerges, and thus may appear to be without foundation in market fundamentals. Nonetheless, they are the result of rational anticipations of future exchange-rate policy.

The fiscal policy shock analyzed here is not the only one calling for a change in the long-run real exchange rate. A very plausible situation involves expected devaluation after an adverse shift in the demand for domestic exports. (Such a devaluation could have the advantage, in principle, of shortening the period of recession that results from the shock.) A puzzling result is easy to verify using the techniques employed above: In many cases an equilibrium does not exist.

Obviously, much of the analysis above rests heavily on the assumption of continuous-time trading. A discrete-time model would allow devaluations that were not preceded by transitional floats, although paths similar to those analyzed above would still be possible. Arguably, the continuous-time trading assumption is reasonably close to reality.

4. Implications and Extensions

The model examined above is simple, but its implications are stark. A policy of attempting to accommodate domestic inflation through *real* devaluation can lead to multiple rational-expectations equilibria. One of these involves an exchange crisis and a subsequent spiral of inflation and depreciation that ultimately leave the economy with a permanently higher price level and exchange rate. In contrast, a policy of partial accommodation--if credible--precludes the inflationary equilibrium. As noted in the introduction, this reasoning may provide one rationale for the failure of EMS realignments to fully accommodate differential inflation in recent years.[9]

Exchange-rate crises can also arise in response to realignments that attempt to offset inflation due to expansionary fiscal policy. Inflation and real appreciation may continue for some time before a collapse occurs, even though an eventual collapse is anticipated by the market. A sufficiently large anticipated devaluation may, however, cause an immediate attack that itself postpones the inevitable real appreciation.

The model used above clearly leaves many unanswered questions. For example, is a single-country analysis applicable to situations in which several EMS members may be intervening to defend a parity?[10] A related question concerns the equilibria that arise when the authorities' ability to defend a rate is *not* limited in the manner assumed above, so that the authorities *can* and do purchase the entire money supply to defend the exchange rate. This possibility would appear to rule out the multiple equilibria of Section 2, but not obviously to preclude the attacks of Section 3, since the public could reduce its money holdings to zero just before devaluation.

At a deeper level, one must ask whether there are plausible policymaker preferences that might generate the types of realignment rules examined in this paper. All of these questions raise difficult problems for economic analysis, but they are central to understanding the present and prospective functioning of the EMS.

Appendix: **Algebraic Analysis of Self-fulfilling Equilibria**

An algebraic analysis of the inflationary equilibrium discussed in Section 2 clarifies some aspects of self-fulfilling paths. Such an analysis can be based on equations (8) and (9), the general solutions for the dynamic system describing the floating-rate model.

To construct an inflationary equilibrium, one must find a transition time T and constants k_1 and k_2 such that $e(T) = \bar{e}'$ and $p(T) = \bar{\bar{p}}$ when $e(t)$ and $p(t)$ follow the equations

$$e(t) - m_0 = k_1 \exp(t/\lambda) - (1/\lambda\theta\phi)k_2 \exp(-\theta\phi t),$$

$$p(t) - m_0 = k_1 \exp(t/\lambda) + k_2 \exp(-\theta\phi t),$$

that is, when the post-attack floating rate is determined in a system with money supply m_0. One initial condition is given by the stickiness of prices: $p(0) = \bar{p}$. So there are three conditions--one initial, two terminal--to determine the unknown parameters T, k_1, and k_2.

The solution for T is given implicitly by the nonlinear equation

$$A(T) = B(T), \tag{12}$$

where

$$A(T) = \frac{(\bar{\bar{p}} - m_0) - (\bar{p} - m_0)\exp(-\theta\phi T)}{(\bar{e}' - m_0) + (1/\lambda\theta\phi)(\bar{p} - m_0)\exp(-\theta\phi T)},$$

$$B(T) = \frac{\exp(T/\lambda) - \exp(-\theta\phi T)}{\exp(T/\lambda) + (1/\lambda\theta\phi)\exp(-\theta\phi T)}.$$

Figure 6 illustrates how T is determined by (12). Note that as T $\rightarrow \infty$, $A(T) \rightarrow (\bar{\bar{p}} - m_0)/(\bar{e}' - m_0)$ while $B(T) \rightarrow 1$. Thus, for realignment rules such that $\bar{e}' \geq \bar{\bar{p}}$, at least one intersection of A(T) and B(T) is guaranteed. Intersections are also possible for some nonaccommodative realignment rules, of course, but these do not define equilibria because the currency would have to *appreciate* immediately after the speculative attack that sets off the inflation.

One case that is easy to analyze explicitly is the borderline case referred to in the text, in which $\bar{e}' = \bar{\bar{p}}$. In this case the solution to (12) is

$$T = \lambda \log[(\bar{\bar{p}} - m_0)/(p_0 - m_0)].$$

Direct calculation shows that the appropriate initial conditions are $k_1 = \bar{p} - m_0$ and $k_2 = 0$, which imply that the equilibrium floating exchange rate immediately after the attack is

$$e(0) = \bar{e},$$

the original peg. After the attack, the exchange rate therefore moves toward its new peg along the path AA in Figure 2. The adjustment process is in this case a pure inflation that does not affect relative output prices.

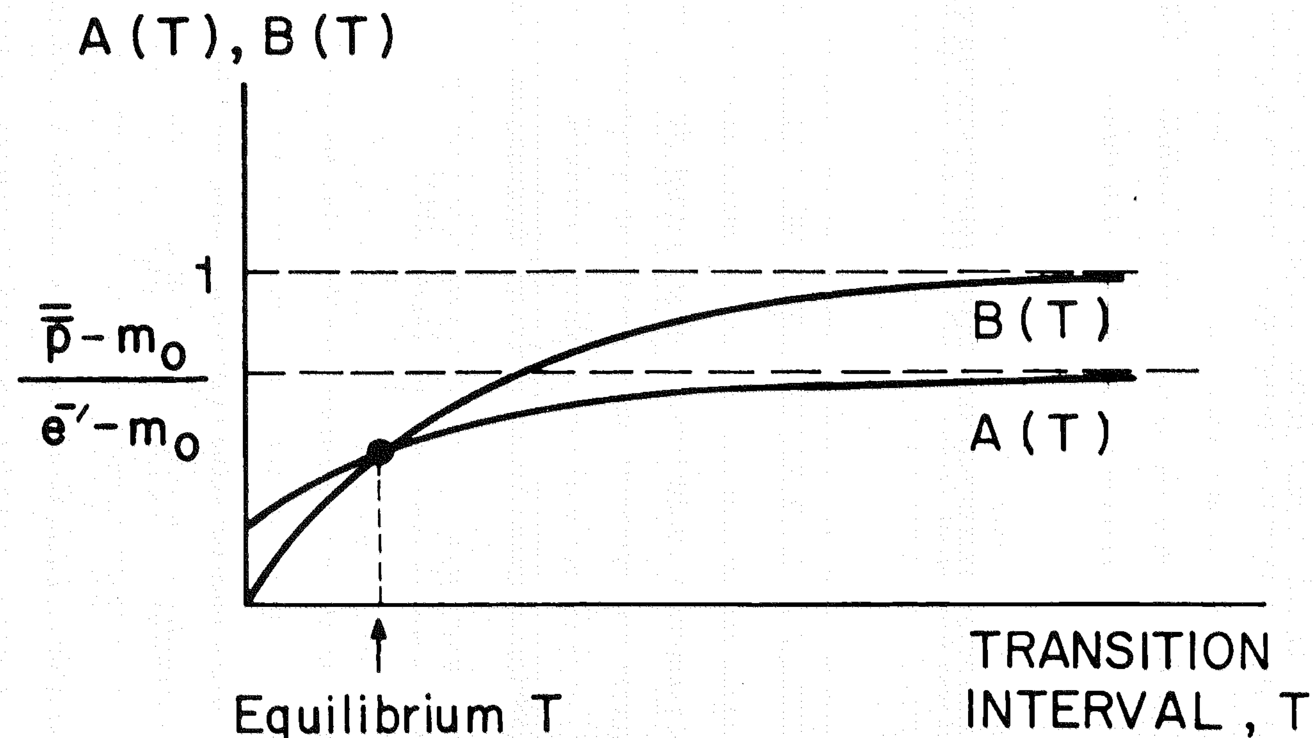

A (T), B (T)
1
$\frac{\bar{\bar{p}} - m_0}{\bar{e}' - m_0}$
B (T)
A (T)
Equilibrium T
TRANSITION
INTERVAL, T

Figure 6

Footnotes

*I am grateful for helpful conversations with Guillermo Calvo and Stephen O'Connell; for critical comments from participants in the Conference on the EMS, especially Marcus Miller; and for suggestions I received in a seminar at the Research Department of the International Monetary Fund. All errors are, however, my own. Financial support from the National Science Foundation and the Alfred P. Sloan Foundation is acknowledged with thanks.

1. Among recent reviews of the EMS experience are Collins (1987), Giavazzi and Giovannini (1986), Rogoff (1985), and Ungerer et al. (1986).

2. Exceptions include Blanco and Garber (1986), Feenstra (1985), Gros (1987), and Obstfeld (1984). As will become apparent below, some of Feenstra's conclusions, although reached in a financial setting more descriptive of some developing economies than of Europe, are quite relevant for analyzing prospective developments in the EMS.

3. See, for example, Giavazzi and Pagano (1988).

4. Equations (6) and (7) follow from (1), (2), and the fact that under price-adjustment rule (5), the real exchange rate is driven to its long-run value of zero according to the equation $Dx(t) = -\theta\phi x(t)$.

5. A similar response to anticipated devaluation is analyzed by Feenstra (1985) in a flexible-price model of currency substitution

based on utility maximization. Notice that, in contrast to the case discussed in Obstfeld (1984), the length of the transitional period of floating is *endogenous* here. This is also true of the transitional float analyzed in the next section.

6. The alternative equilibrium provides another example of the type of self-fulfilling crisis studied in my 1986 paper. The role of self-fulfilling accommodative policies is studied in a different context by Corden (1986).

7. See, for example, Flood and Garber (1983) or Obstfeld and Stockman (1985).

8. An algebraic analysis is given in the Appendix.

9. A natural question is whether capital controls preclude multiple equilibria by preventing, or at least minimizing, speculative reserve outflows. Models of anticipatory wage and price setting, such as Calvo (1983), suggest a tentative negative answer. The question deserves a thorough analysis, however.

10. For a clear account of EMS intervention arrangements, see the paper by Mastropasqua, Micossi, and Rinaldi in this volume.

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