DOES FINANCIAL OPENNESS INCREASE EXCHANGE RATE FLUCTUATIONS?

José Viñals

Economist, Research Department, Bank of Spain.
Assistant Professor of Economics, Stanford University.

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ABSTRACT

This paper analyzes the macroeconomic role of policies affecting the degree of openness of the capital account balance. The main questions addressed are the following: (1) does an increase in the degree of financial openness lead to larger or smaller exchange rate fluctuations? (2) how does it alter the intensity of the appropiate exchange rate intervention policy? and (3) how crucial is financial openness in explaining why -on average- some countries with current account surpluses have appreciating currencies and others depreciating currencies?

The main conclusion of the paper is that a larger degree of financial openness does not necessarily lead by itself to stabilizing or destabilizing capital flows. It is also necessary to know the sources and relative intensities of the shocks to the economy. Specifically, in the context of the model used, a larger degree of financial openness is shown to lead (a) to increased short-run exchange rate fluctuations in the case of domestic fiscal shocks and foreign interest rate shocks, (b) to reduced exchange rate fluctuations in the case of domestic supply shocks and foreign price shocks and (c) to be fully neutral in the case of monetary shocks. It is also shown that, while an economy may choose to open its capital account balance, it is not clear that a policy of fixed exchange rates (like the European Monetary System) is the best one to follow under the new circunstances. As before, this crucially depends on the type of shocks hitting the economy. Finally, financial openness can explain why some countries with current account surpluses have appreciating currencies while others have depreciating currencies.

Introduction

This paper explores several issues of theoretical interest and policy relevance regarding the financial opening of a small economy. The consequences of varying the degree of openness of the capital account balance for exchange rate volatility and current account dynamics are the main subjects of this work.

The macroeconomic effects of changing the degree of openness of the capital account balance are of great relevance for countries like Spain and Portugal, which have just become EEC members. Specifically, are they likely to experience larger exchange rate fluctuations as a result of the increase in financial openness? How should they reshape their exchange rate policies under the new circumstances? Should they join the European Monetary System, or should they retain a larger degree of freedom in setting their exchange rate policy? These are all important questions which, to my knowledge, have not yet been fully answered.

This is not to deny the existence of an abundant body of literature on the subject of financial liberalization, especially in developing countries. Two of the crucial questions discussed in that literature are: (1) whether the current or the capital account balance should be liberalized first; and (2) the appropiate speed at which the liberalization process should be carried out.

As Edwards (1984) points out in his recent review of the financial liberalization literature, there is a strong pressumption that the current account should be liberalized prior to the capital account. This presumption is logically based on the higher speed of adjustment of asset markets relative to goods markets (Frenkel (1982)).

This paper takes a different look at the opening-up of the economy. First, it is assumed that the correct order of liberalization is followed and that the current account is already quite open by the time the capital account starts to be opened. Second, rather than concentrating on the transition process from a financially closed to a financially open economy (Little, Scitovsky and Scott (1970), Mckinnon (1973, 1982), Edwards (1984), Obstfeld (1984)), the paper explores the different macroeconomic dynamics that result from various shocks in countries with relatively-closed as compared to relatively-open capital accounts. That is, rather than analyzing the process of financial opening, the paper compares two states of the world — one with a high degree of openness, other with a low degree of openness.

The first question addressed in the paper is, the extent to which the degree of financial openness of the economy leads to larger or smaller exchange rate fluctuations in response to various shocks. This is still an open issue, which has been much discussed within the "stabilizing vs. destabilizing" capital flows literature, starting with Friedman's (1953) paper[1]. That there are still contrasting positions in this subject nowadays is illustrated by the following views:

The first view claims that more open capital account balances lead to destabilizing capital flows which increase exchange rate fluctuations. In this light, Tobin (1978) has proposed "to throw some sand in the wheels of our excessively efficient international money markets" in order to reduce exchange rate fluctuations.

An alternative view is that a more open capital account leads to increased capital flows which reduce –rather than increase– exchange rate fluctuations. This is because current account imbalances can then be more automatically financed by stabilizing capital flows without requiring sharp exchange rate fluctuations. In his well-known Brookings paper, Dornbusch (1980a) stresses that:

> "Capital flows should operate in a stabilizing manner to finance transitory current account imbalances while allowing [real] exchange rates to cope with medium-term adjustment in the current account balance", [p.184-5].

It should be mentioned at this point that, in principle, in the absence of a microtheoretic model, there are no clear welfare implications to be derived from the degree of exchange rate variability or the intensity of its fluctuations. Consequenty, this paper takes a positive rather than a normative route in discussing exchange rate fluctuations. While sharp exchange rate fluctuations are normally perceived as "bad" by many policymakers and by the public at large, a formal model which incorporates welfare considerations must be constructed before one can prove or dissprove such assertions (Helpman and Razin (1979, 1982), Helpman (1981)).

It is quite apparent that the two above-mentioned views have very different implications regarding exchange rate policy, since, in practice, exchange rate intervention tends to intensify as exchange rate fluctuations become larger (Branson (1983)). If the first view is correct, a more open capital account may well lead to a more active foreign exchange intervention policy to smooth out exchange rate fluctuations. On the other hand, if the second view is correct, foreign exchange intervention policy will not be so necessary once the capital account has been opened. In the case of EEC countries, where they have the option of joining the EMS (cooperative peg) or pursuing independent non-coordinated exchange rate policies, knowing which of the two views is correct is of obvious policy interest.

The second question addressed in the paper is to what extent does the validity of the popular believe that "countries with current account surpluses have appreciating currencies and viceversa" ("the Kouri-acceleration hypothesis") hinges on the degree of capital account openness.

While Kouri (1976) and Dornbusch and Fischer (1980) have shown this popular belief to be correct only for unanticipated shocks in the context of fully open capital accounts (ie. perfect capital mobility), Frenkel and Rodríguez (1982) have argued that this may not be so if there are enough impediments to free capital flows internationally. The present paper explores the validity of these views under a slightly different dynamic specification than the one used by these authors.

The first section of the paper constructs a highly stylized aggregative model of an open economy, paying particular attention to goods and asset markets interactions in the short and long-run. Section II examines the response of the exchange rate and the current account to various shocks under different degrees of openness of the capital account. The final section briefly summarizes the main results of the paper and draws some policy implications.

I.– Capital Account Openness and the Structure of Goods and Asset Markets.

(a) The model

The model built in this section corresponds to an economy with flexible exchange rates and perfect foresight. It follows the approach taken by Kouri (1976) and Dornbusch and Fischer (1980) in emphasizing wealth-current account balance interactions. Since the main task to be accomplished here is to examine the role played by the degree of openness on capital account, the main distinguishing feature of the model is the allowance for less-than-perfect capital mobility.

Regarding the goods market, the economy produces a single, tradeable good that is an imperfect substitute for the good produced abroad. The domestic price level is flexible and full employment holds continously. One could think, alternatively, of an economy with rigid real wages and a constant less-than-full employment output level.

The rate of change of the domestic holdings of net foreign assets ($\dot{b}$) is proportional to the current account balance[2]. It depends on (the log of) the real exchange rate, the real quantity of money, the real value of the stock of foreign assets held domestically, and real income. Equation (1) summarizes all these effects:

$$(1)\quad \dot{b}=\Theta_1(p^*+e-p)-\Theta_2(m-p)-\Theta_3(b+e-p)-\Theta_4 y;\quad \Theta_i \geq 0$$

where (all in logs) e is the nominal exchange rate, b is the quantity of foreign bonds domestically held, p is the domestic price level, p* is the foreign price level, m is the nominal quantity of money and y is real income. According to the equation, an increase in income or domestic wealth[3] worsens the current account, while a real exchange rate depreciation ($d(p^*+e-p)>0$) improves it. In what follows it is assumed that $(\Theta_1-\Theta_2-\Theta_3)>0$, meaning that the overall effect of an increase in the domestic price level is to worsen the current account, which seems reasonable.

The log of output demand is assumed to be a function of the real exchange rate, real money balances, the real value of the stock of foreign assets held domestically and fiscal policy (u).

$$(2)\qquad y = \beta_1(p^*+e-p) + \beta_2(m-p) + \beta_3(b+e-p) + u$$

where it is assumed that $\beta_i \geq 0$.

Equation (2) has output demand expanding with a real exchange rate depreciation; with an increase in the different components of real wealth –real money balances and real bonds–; and with a fiscal expansion.

Regarding asset markets, there are two nontradeable domestic assets -money and (inside)bonds- plus an internationally tradeable foreign bond. Money market equilibrium is represented by the equality between money supply and demand:

(3) $$m - p = -\pi_1 i + \pi_2 y, \qquad \pi_i \geq 0$$

Real money demand[4] depends positively on the log of real income and negatively on the domestic interest rate (i). The nominal quantity of money is taken as exogenously given under flexible exchange rates.

Finally, international capital flows are modelled to allow for various degrees of capital account openness, due to the possible existence of legal barriers to international capital flows. Because modelling imperfect capital mobility is quite a complex problem, this paper takes a short-cut. As in the pioneering contributions of Fleming (1962) and Mundell (1962) and the more recent ones of Dornbusch (1980 b) and Frenkel and Rodríguez (1982), it is assumed that capital flows respond to interest rate differentials over time when the capital account is not fully open. This is the traditional "flow" equilibrium approach, which stands in sharp contrast to the modern "stock" equilibrium approach. Our formulation encompasses both "flow" equilibrium -in the case of imperfect capital mobility- and "stock" equilibrium-when there is perfect capital mobility.

Domestic residents are allowed to hold domestic and foreign assets. Nevertheless, due to the presence of barriers to international capital flows, they cannot fully adjust their portfolios in response to changes in financial conditions. Consequently, they can only proceed slowly to adjust the quantity of foreign assets to the desired level. Equation (4) links international capital flows to interest rate differentials:

$$(4) \qquad -\dot{b} = \Phi(i-i^{*}-\dot{e}) \qquad\qquad \Phi \geq 0$$

where Φ is the degree of openness of the capital account, i^{*} is the foreign interest rate, and $\dot{e}$ is the expected (and actual, with perfect foresight) rate of change of the nominal exchange rate.

Notice that equation (4) also encompasses the case where the capital account is fully open and there is <u>perfect</u> capital mobility. In this case, $\Phi=\infty$, $i=i^{*}+\dot{e}$ and interest rate parity holds. On the other hand, as long as Φ is finite and non-zero, there is <u>less-than-perfect</u> capital mobility and interest rate differentials will persist, at least in the short-sun. As Φ gets larger, the capital account becomes more open.

By adding equations (1) and (4), it follows that current account imbalances are automatically financed through autonomous international capital flows (no change in official foreign exchange reserves under flexible exchange rates).

(b) <u>Solving the model</u>

We now solve the model described by equations (1) to (4). By substituting for the domestic price level and using the full employment assumption ($y=\bar{y}$), the evolution of the current account balance consistent with goods market equilibrium results from combining equations (1) and (2):

$$\dot{b} = \alpha_1 e - \alpha_2 b + \alpha_3 p^* - \alpha_4 m + \alpha_5 \bar{y} - \alpha_6 u \quad (5)$$

where α_1, α_2, α_3, α_4 and $\alpha_6 > 0$ and $\alpha_5 \gtrless 0$. The α_i' s are related to the "structural" parameters of equations (1) and (2) as shown in the appendix.

According to equation (5), the country increases its accumulation of foreign assets –ie, improves its current account balance– when the nominal exchange rate depreciates, the stock of foreign bonds held domestically is (exogenously) reduced, the price of the imported good increases, the nominal quantity of money is reduced and when there are contractionary fiscal shocks. It is unclear, however, whether the current account balance improves or worsens in the presence of supply shocks ($d\bar{y}\neq 0$). This is so because a positive supply shock ($d\bar{y}>0$) directly increases income and reduces net exports. At the same time, it reduces the domestic price level –which results in a real exchange depreciation that increases net exports– and increases real wealth –which reduces net exports. The combination of these effects is, in principle, ambiguous.

Turning now to asset markets, equation (4) can be rewritten as follows:

$$\dot{e} = (i - i^*) + \Phi^{-1} \dot{b} \quad (4')$$

While in the perfect capital mobility world, $\Phi=\infty$ and the current account term $\dot{b}$ dissapears from equation

(4'), this is not so when there is less-than-perfect capital mobility.

Intuitively, with a "fully open" capital account, the behavior of the exchange rate at each point in time is determined by interest rate differentials. As in the Kouri (1976), and Dornbusch-Fischer(1980) models, the capital account is <u>all</u> that matters for exchange rate determination at a given point in time, given relative asset supplies. The channel through which the current account affects the exchange rate is through changing relative asset supplies over time.

On the other hand, when the capital account is not fully open ($\Phi^{-1} \neq 0$), the exchange rate is not only driven by interest rate differentials alone but also by the size of the current account ($\dot{b}$). Consequently, the current account has an additional and more direct "flow" channel of influence besides the "stock" channel described above. In this case, the capital account <u>is not</u> all that matters for exchange rate determination at a given point in time. In the limit, when there is just no capital mobility at all ($\Phi = 0$), the exchange rate is solely driven by the current account; it fluctuates to achieve current account balance at every instant. Opposite to the perfect capital mobility case, the current account is <u>all</u> that matters for exchange rate determinacion in this "insular" economy (Harberger (1950), Meade (1951) and Tinbergen (1952)).

Using equation (3) to substitute for the interest rate in (4') and solving for the price level using (2), the following equation — incorporating asset market equilibrium conditions — is derived:

$$(6) \qquad \dot{e}=\gamma_1 e+\gamma_2 b+\gamma_3 p^*-\gamma_4 m+\gamma_5 \bar{y}+\gamma_6 u-i^*+\phi^{-1}\dot{b}$$

where γ_1, γ_2, γ_3, γ_4 and $\gamma_6>0$ and $\gamma_5 \gtrless 0$.

The equation relates the rate of appreciation ($\dot{e}<0$) or depreciation ($\dot{e}>0$) of the nominal exchange rate to goods and asset markets conditions. The γ_i parameters are related to the "structural" parameters of equations (1)–(4) in the appendix.

Given the current account ($\dot{b}$) one can see, by comparing equations (4') and (6), how the influence of the different variables on the exchange rate comes through their intermediate effect on interest rate differentials. The only ambiguity is in the sign of variable $\bar{y}$. A positive supply shock increases output, leads to a lower domestic price level and increases the real money supply, tending to lower the domestic interest rate. On the other hand, by increasing real income, real money demand also increases, and so does the domestic interest rate. Depending on which of these two forces dominates, the interest rate differential will go up or down, and so will the rate of change of the exchange rate ($\gamma_5 \gtrless 0$).

Equation (5) must be used to substitute for the term $\dot{b}$ in equation (6). After substituting and rearranging, the following dynamic system is obtained:

$$(7) \qquad \begin{bmatrix} \dot{e} \\ \dot{b} \end{bmatrix} = \begin{bmatrix} (\gamma_1+\phi^{-1}\alpha_1) & (\gamma_2-\phi^{-1}\alpha_2) \\ \alpha_1 & -\alpha_2 \end{bmatrix} \begin{bmatrix} e \\ b \end{bmatrix} + K$$

where:

$$(8)\quad K = \begin{bmatrix} (\gamma_3+\Phi^{-1}\alpha_3)p^* - (\gamma_4+\Phi^{-1}\alpha_4)m + (\gamma_5\Phi^{-1}a_5)\bar{y} + (\gamma_6-\Phi^{-1}\alpha_6)u - i^* \\ \alpha_3 p^* \qquad -\alpha_4 m \qquad +\alpha_5 \bar{y} \qquad -\alpha_6 u \end{bmatrix}$$

Notice that the only element of the matrix in system (7) which is ambiguous in its sign is $(\gamma_2 - \Phi^{-1}\alpha_2)$. This means that the partial effect of an increase in the stock of net foreign assets (b) may be to appreciate or depreciate the exchange rate (e) give intuition.

The stability properties and the dynamics of the economy are given by the elements of the matrix of the right hand side of system (7) and are ilustrated[5] in Figures 1a and 1b. As is typical in perfect foresight models which include assets, the economy exhibits a saddle point equilibrium. Accordingly, there is a unique convergent path to the steady-state (PF) out of the many perfect foresight equilibriun paths.

The figures represent the dynamic behavior of the system in exchange rate-net foreign assets space. While the stock of net foreign assets moves slowly over time, the exchange rate can jump up and down instantly. If one looks closely at system (7), it becomes quite clear that the degree of openness of the capital account is a key determinant of macroeconomic dynamics. Specifically, the upper right hand element of the matrix in (7) can be positive or negative depending on how open is the capital account ($\Phi \gtrless \alpha_2/\gamma_2$). Graphically, this determines the sign of the slope of the asset market equilibrium locus ($\dot{e}=0$), while leaving the $\dot{b}=0$,

FIGURE 1.a

HIGH CAPITAL MOBILITY

$\emptyset > \frac{\alpha_2}{\gamma_2} > o$

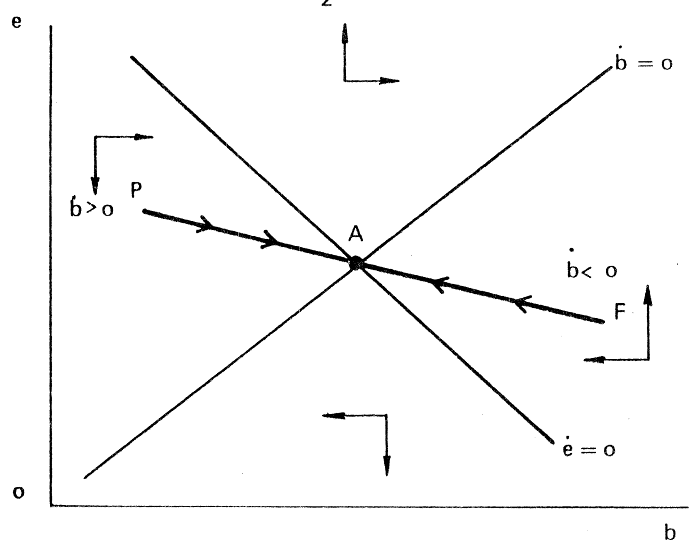
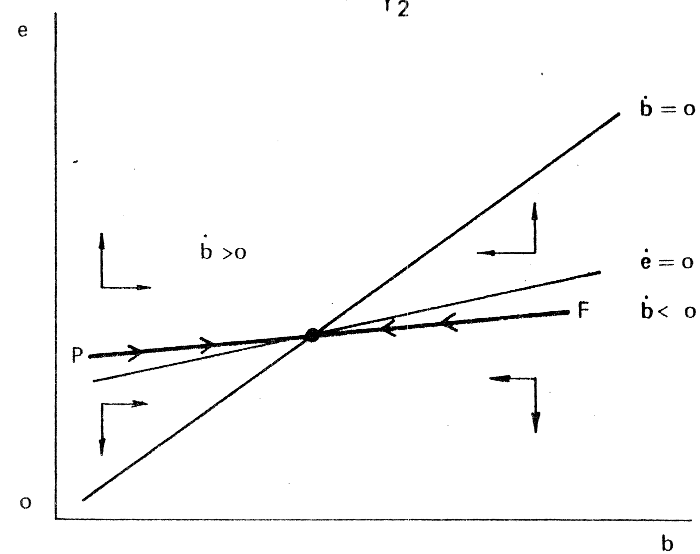


FIGURE 1.b

LOW CAPITAL MOBILITY

$o < \emptyset < \frac{\alpha_2}{\gamma_2}$



current account equilibrium locus unaffected. As a result, it also determines the slope of the perfect-foresight saddle path PF.

Figures 1a and 1b represent the macrodynamics of the system for the cases of "high" ($\Phi>\alpha_2/\gamma_2$) and "low" ($\Phi<\alpha_2/\gamma_2$) capital mobility.

The current account line ($\dot{b}=0$) is upward sloping in both cases. The reason is that an increase in the stock of net foreign assets (db>0) increases wealth and worsens the current account, through the rise in imports. For the current account to remain in balance, the exchange rate must depreciate (de>0). This relationship is quite independent of the degree of capital mobility, which is why the current account line $\dot{b}=0$ is the same in Figures 1a and 1b. To the left of the line, the exchange rate is too depreciated, and this leads to foreign asset accumulation ($\dot{b}>0$) through current account surpluses. The opposite happens to points to the right of the line, characterized by foreign asset deccumulation ($\dot{b}<0$) through current account deficits.

On the other hand, the degree of openness on capital account is quite important for financial markets. As can be seen in Figure 1a, the asset market line ($\dot{e}=0$) is downward sloping when capital mobility is high, while the opposite is true in Figure 1b where capital mobility is low. But what is the reason for such an assymetry? This can be best explained by using the polar cases of perfect and zero capital mobility and disregarding expectations for the moment ($\dot{e}=0$ always). In that case the $\dot{e}=0$ and the PF paths coincide.

When the capital account is fully open, there is perfect capital mobility ($\Phi = \infty$) and $i = i^*$ in equation (4) along the $\dot{e}=0$ line. With interest rates being determined by the rest of the world, equation (3) states that -given real income and nominal money- there is a unique domestic price level compatible with monetary equilibrium. Consequently, the price level is constant along the $\dot{e}=0$ locus. If the economy is to the left of point A in Figure 1a and above the $\dot{b}=0$ line, it is in the foreign asset accumulation region. So, when the economy is at such a point on the $\dot{e}=0$ line, it is running current account surpluses ($\dot{b}>0$) and accumulating net foreign assets. This pushes up domestic wealth and leads to an excess demand for goods. In turn, this requires an increase of the domestic price relative to the foreign price level to maintain goods market equilibrium. Since the domestic price level is given along the $\dot{e}=0$ locus -so as to preserve monetary equilibrium- the relative price change must be accomplished by a nominal, and real, exchange rate appreciation. Therefore, as the economy moves along $\dot{e}=0$ towards point A, it keeps running current account surpluses while the domestic currency keeps appreciating. Consequently, in Figure 1a, the $\dot{e}=0$ locus is downward sloping and so is the PF locus (once expectations are allowed back in).

On the contrary, with a closed capital account, there is zero capital mobility ($\Phi=0$) and capital flows are unresponsive to interest rate differentials. As we have indicated before, in this "insular" economy case, the exchange rate just moves to keep the current account continously balanced. Graphically, the $\dot{e}=0$ and PF loci of Figure 1a, rotate counterclockwise until they become one with the $\dot{b}=0$ current account equilibrium locus. For example, an (exogenous) increase in the stock of net foreign assets would inmediately lead to an increase in wealth and domestic prices which would lead to an incipient current account deficit. Since capital flows are zero, the exchange rate depreciates instantly in the foreign exchange market until there is a zero current account. This explains why the $\dot{e} = 0$ locus has the same shope as the $\dot{b}=0$ locus[6]. In the less extreme case of low capital mobility, the $\dot{e}=0$, PF loci are upward sloping like the $\dot{b}=0$ line, although are not superimposed with it. This is the case graphically shown in Figure 1b.

A short summary of why the $\dot{e}=0$ and PF lines have so different slopes is the following: as we have said before, when capital mobility is high, the current account matters little (directly) for exchange rate determination at a given point of time. In this case, the exchange rate is solely driven by interest rate differentials. Therefore, the slope of the $\dot{e}=0$, and PF lines is the opposite of the $\dot{b}=0$ current account line. As capital mobility is reduced, the direct role of the current account in exchange rate determination gets larger, and the $\dot{e}=0$ and PF lines have a slope of the same sign as the current account $\dot{b}=0$ line.

At this stage, the model has behavioral implications analogous to those coming from the Kouri (1976) and Dornbusch and Fischer (1980) models under conditions of perfect capital mobility. In particular, when capital mobility is high, a country which runs a <u>surplus</u> has an <u>appreciating</u> currency along the saddle path. On the other hand, our results are similar to those in the Frenkel and Rodríguez (1982) model when capital mobility is low: a country which runs a <u>surplus</u> has a <u>depreciating</u> currency along the saddle path. The intuition behind this assymetry between the low and the high capital mobility cases has just been provided in the above paragraphs.

A final point that should be mentioned here is that the economy has a saddle point equilibrium characterization for both the high and low capital mobility cases. In other words, the discussion of the "stabilizing" vs. destabilizing" effects of capital flows is not well focused if taken to refer to the stability properties of the system. As indicated, the economy does not become more or less stable as the degree of capital mobility varies. Therefore, the only meaningful sense one can give to the "stabilizing vs. destabilizing" debate is that associated with larger or smaller exchange rate fluctuations. To this we turn in the next section.

II.- Short-Run Dynamics and The Long-Run

In the long-run ($\dot{e}=\dot{b}=0$), system (7) can be solved for the exchange rate and the net stock of foreign assets as functions of the exogenous variables:

$$(9)\quad \underset{(2\times1)}{\begin{bmatrix} e \\ b \end{bmatrix}} = - \underset{(2\times2)}{\begin{bmatrix} (\gamma_1+\phi^{-1}\alpha_1) & (\gamma_2-\phi^{-1}\alpha_2) \\ \alpha_1 & -\alpha_2 \end{bmatrix}^{-1}} \cdot \underset{(2\times1)}{K}$$

Table 1 summarizes the responses of the steady-state exchange rate and stock of net foreign assets to a variety of macroeconomic shocks: foreign prices (p^*), foreign interest rates (i^*), money (m), fiscal policy (u) and supply shocks ($\bar{y}$). Figure 2 graphically represents the long-run response of the system to each of the various shocks.

It is important to notice that in this model the long-run position of the economy is unaffected[7] by the degree of short-run capital mobility (as long as Φ is not actually zero). Mathematically, the long-run invariance of the exchange rate and net foreign asset position of the economy to the degree of capital mobility, can be explained by looking at equation (4). Rewriting the equation:

$$(4'') \qquad i = i^* + \dot{e} - \Phi^{-1}\, \dot{b}$$

it is clear that in the long-run, where $\dot{e} = \dot{b} = 0$, we just have $i = i^*$ (as long as $\Phi \neq 0$). Consequently, the parameter Φ, which proxies for the degree of openness of the capital account, dissapears as a determinant of long-run behavior.

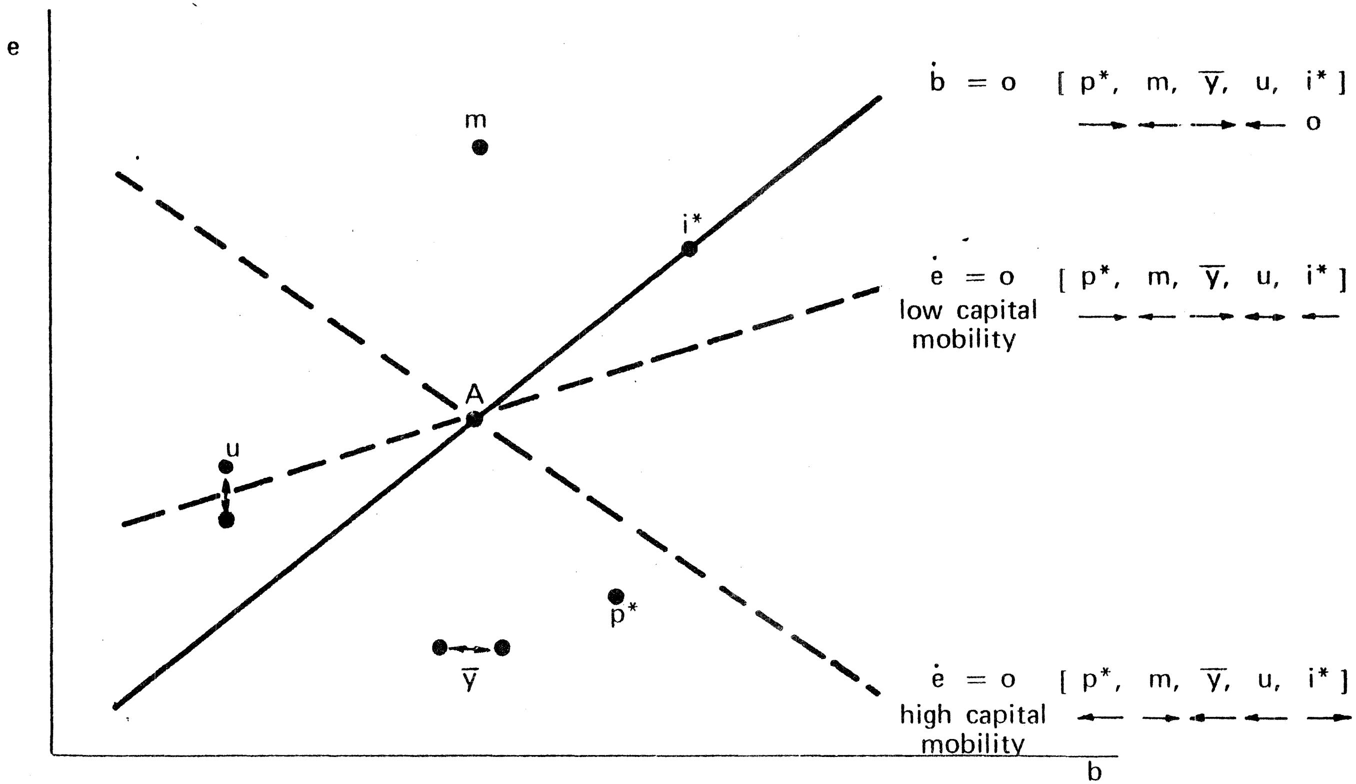
Intuitively, the long-run is "long-enough" for the partial adjustment of financial portfolios through international capital flows to be completed. Nevertheless, the short-run dynamic adjustment of the economy in response to various shocks varies quite a lot under different degrees of openness on capital account (see the contrast between Figures 1a and 1b).

TABLE 1. LONG – RUN EFFECTS

	dx				
	dp^*	dm	$d\overline{y}$	du	di^*
$\frac{de}{dx}$	$-D^{-1}(\alpha_3\gamma_2 + \alpha_2\gamma_3) < 0$	1	$-D^{-1}(\alpha_5\gamma_2 + \alpha_2\gamma_5) \lessgtr 0$	$D^{-1}(\alpha_6\gamma_2 - \alpha_2\gamma_6) < 0$	$D^{-1}\alpha_2 > 0$
$\frac{db}{dx}$	$D^{-1}(\alpha_3\gamma_1 - \alpha_1\gamma_3) > 0$	0	$D^{-1}(\alpha_5\gamma_1 - \alpha_1\gamma_5) \lessgtr 0$	$-D^{-1}(\alpha_6\gamma_1 + \alpha_1\gamma_6) < 0$	$D^{-1}\alpha_1 > 0$

$D = \alpha_1\gamma_2 + \alpha_2\gamma_1 > 0$

FIGURE 2: LONG RUN EFFECTS WITH HIGH AND LOW CAPITAL MOBILITY



(1). We have assumed that $\alpha_5, \gamma_5 > o$ to simplify the graphical presentation.

(2). The arrow below a variable in parenthesis indicates the direction in which the corresponding locus shifts following an increase in the variable.

Having described why changes in the degree of openness of the capital account do not influence the long run movement of the exchange rate or any other variable, we now turn to short-run dynamics. The effects of the various (unanticipated) shocks[8] are discussed in the low and high capital mobility scenarios.

(a) Monetary shock (dm>0)

Having assumed continuous full employment and having neglected the Lucas-Sargent-Wallace "surprise" effect in the specification of the output supply function, monetary neutrality holds for both anticipated and unanticipated shocks. As indicated, one could also think of this as happening in an economy with automatic full wage-indexation.

In such an economy, a change in the money stock leads to no real changes; the exchange rate (and the domestic price level) instantly jumps one for one with the money supply as the economy moves from point A to B in Figures 3a and 3b. The new log-run equilibrium is instantly reached through an exchange rate depreciation.

Observe how the behavior of the economy following a monetary shock does not depend on the degree of capital mobility. This is due to the fact that there are no resulting short-run current account imbalances that need to be financed through private capital flows. Restrictions on international capital flows are, therefore, not binding in this case.

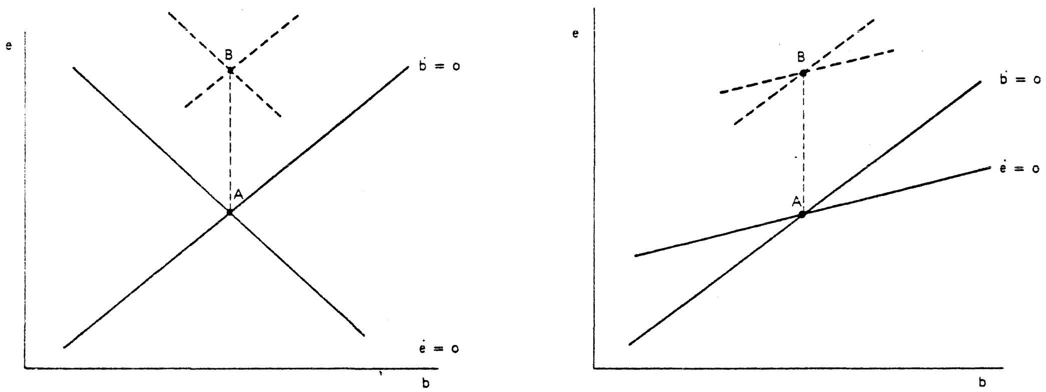
(b) Foreign interest rate shock ($di^*>0$)

Consider the effects of an unexpected increase in the foreign interest rate i^*. There is now an advantage in buying the more profitable foreign asset. With high capital mobility, the resulting incipient capital outflow is so intense as to create an expectation of future appreciation to make the stock of domestic assets willingly held. This is graphically represented by the sharp exchange rate depreciation (overshooting) occurring instantly from point A to B in Figure 4a. At point B, the depreciated nominal exchange rate leads to a current account surplus which continues as the economy moves along the saddle path. Along this path, there are current account surpluses and the currency appreciates by the reasons given in Section I. When the long-run is reached at point C, the currency has depreciated overall and the stock of foreign assets has been increased, with respect to the initial position A.

If, on the other hand, capital mobility is low, (Figure 4b) the incipient capital outflow resulting from the move towards the foreign asset is relatively smaller and so is the exchange rate depreciation at point B. This occurs because the depreciation leads to a current account surplus which partly offsets it (undershooting) so that there is an expectation of further depreciation. As before, the depreciation of the exchange rate leads to a series of current account surpluses while the currency keeps depreciating, by the reasons given in Section I. Long run equilibrium is reached eventually at point C. At this point, there is a depreciation of the exchange rate and an increase in the stock of net foreign assets just identical to those observed at point

FIGURE 3.a
HIGH CAPITAL MOBILITY

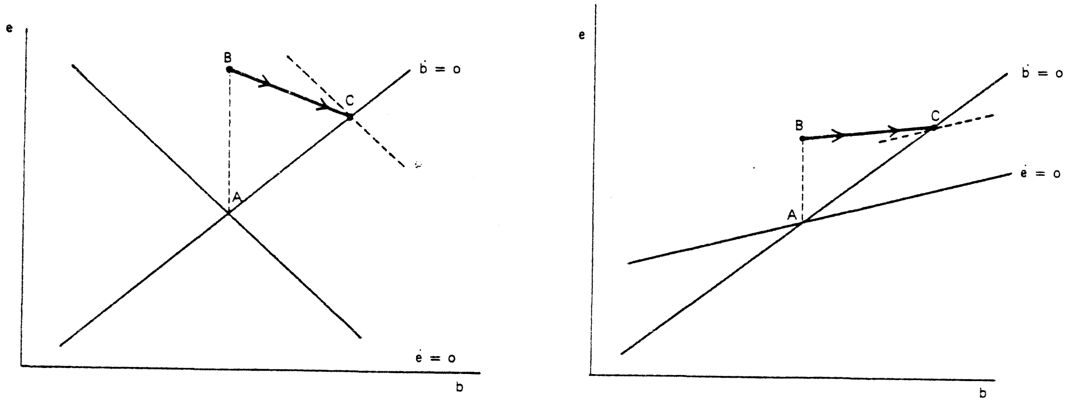
FIGURE 3.b
LOW CAPITAL MOBILITY



A monetary shock (dm > o)

FIGURE 4.a
HIGH CAPITAL MOBILITY

FIGURE 4.b
LOW CAPITAL MOBILITY



An interest rate shock (di* > o)

C in Figure 4a. Intuitively, the higher foreign interest rate leads to the desire to accumulate foreign assets by the domestic economy. This is done by running current account surpluses.

In conclusion, although long-run fluctuations in the exchange rate are not affected by the degree of openness of the capital account following foreign interest rate shocks, things are different in the short-run. As shown, the exchange rate fluctuates by more in the short-run (overshoots) with a more open capital account. In the popular sense, capital flows are destabilizing in this case.

(c) Fiscal shock (du>0)

When capital mobility is high, an unexpected fiscal expansion leads to an increase in the demand for domestic goods, which raises the domestic price level. This, in turn, reduces the real money supply and puts an upward pressure on the domestic interest rate. With the now favourable interest rate differential, there is an incipient capital inflow which appreciates the exchange rate, moving the economy from point A to B in Figure 5a. The exchange rate overshoots, and an expectation of a future depreciation is created. With the appreciated exchange rate, the economy runs current account deficits financed by capital inflows while the currency keeps depreciating from B to C.

On the other hand, when capital mobility is low (Figure 5b), the incipient capital inflow caused by the favourable interest rate differential leads to a smaller exchange rate appreciation, which results in the expectation of a further appreciation. This is so because as the exchange rate instantly appreciates, a current account deficit surfaces, which puts downward pressure on the appreciation, and the exchange rate undershoots between points A an B. From point B onwards, the appreciated exchange rate leads to a series of current account deficits which are accompanied by the continuous appreciation of the currency until the long-run equilibrium is reached at C. In the long run, the economy goes to a position which exhibits an appreciated currency together with a decumulation of net foreign assets[9].

From comparing the low and high capital mobility cases, it turns out that the exchange rate appreciates by more following a fiscal shock when the capital account is more open. In the popular sense, capital flows are destabilizing.

(d) Foreign price shock ($dp^*>0$)

Figure 6a shows that, when capital mobility is high, an increase in the foreign price level leads to an instantaneous exchange rate appreciation to maintain asset market equilibrium. As explained before, asset market equilibrium requires that the price level remains constant along the $\dot{e}=0$ locus when capital mobility is perfect. Therefore, when the foreign price level increases, the exchange rate instantly appreciates to restore monetary equilibrium at an unchanged price level. This explains the leftward shift of the $\dot{e}=0$ line in Figure 6a when capital mobility is high.

FIGURE 5.a
HIGH CAPITAL MOBILITY

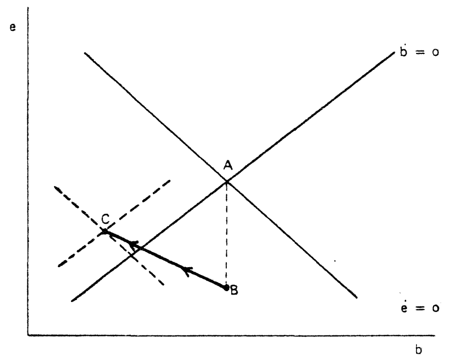
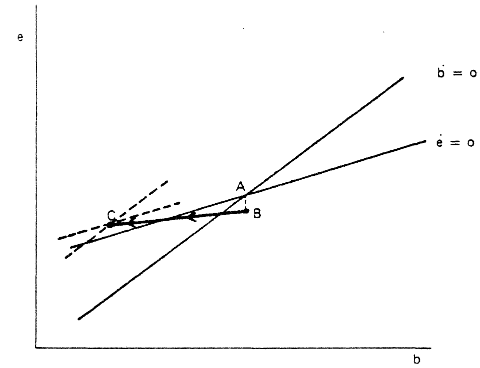


FIGURE 5.b
LOW CAPITAL MOBILITY



A fiscal shock (du > o)

FIGURE 6.a
HIGH CAPITAL MOBILITY

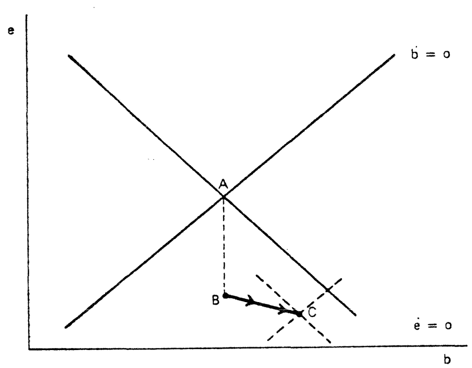
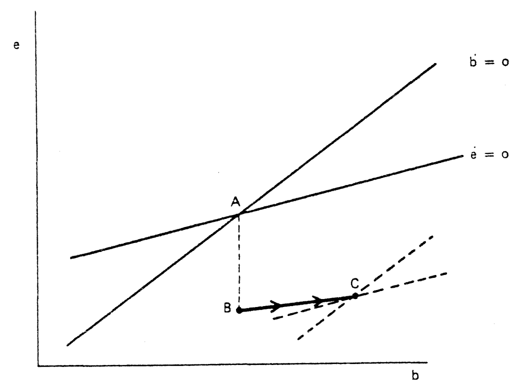


FIGURE 6.b
LOW CAPITAL MOBILITY



A foreign price shock (dp* >o)

Since the economy must always be on the saddle path, it instantly moves from point A to B through an appreciation of the exchange rate. Because the saddle path is below the new $\dot{e}=0$ locus at point B, there are expectations of appreciation given that $\dot{e}<0$ at such point. Over time, the economy moves from point B to C by running current account surpluses. There surpluses come from the improvement in competitiveness caused by the increase in the foreign price level. In the long run, the exchange rate appreciates and the economy accumulates foreign assets.

When capital mobility is low, the increase in the foreign price level also leads to an instantaneous exchange rate appreciation. Since the new saddle path is now above the new $\dot{e}=0$ locus, there is an expected depreciation ($\dot{e}>0$) at point B in Figure 6b. Over time, the economy moves along the saddle path. Long-run equilibrium is reached at C through a series of current account surpluses and a depreciating currency. The overall depreciation of the currency from B to C comes from the important direct role of the current account in exchange rate determination, as explained in Section I.

By comparing Figures 6a and 6b it can be observed that, following a foreign price shock, the exchange rate experiences a smaller short-run appreciation in an economy which is more open on capital account. In the popular sense, capital flows are stabilizing.

(e) Supply shock ($d\bar{y}>0$)

A supply shock is represented by a change in $\bar{y}$ (ie. exogenous change in real wages). Because supply shocks have direct effects on goods and asset markets, their macroeconomic effects are harder to predict in this model, as can be seen in Table 1. However, it seems reasonable to expect that a favorable supply shock would lead to a situation like the one shown in Figures 7a and 7b. In the long-run, a favorable supply shock is shown to increase the foreign asset position of the economy and to appreciate the exchange rate. Intuitively, a positive supply shock increases production over absorption and leads to a series of current account surpluses, with the economy accumulating foreign assets in the process.

In both the low and high capital mobility cases, the positive supply shock causes an instantaneous appreciation of the exchange rate at point B in Figures 7a and 7b to maintain asset market equilibrium. From point B to the long-run equilibrium position at point C, the economy experiences a series of current account surpluses. However, as pointed out in Section I, these surpluses will be accompanied by an appreciating currency when capital mobility is high (Figure 7a) and by a depreciating currency when capital mobility is low (Figure 7b).

In this case, a more open capital account comes with smaller short-run exchange rate fluctuations. In the popular sense, international capital flows are stabilizing.

FIGURE 7.a
HIGH CAPITAL MOBILITY

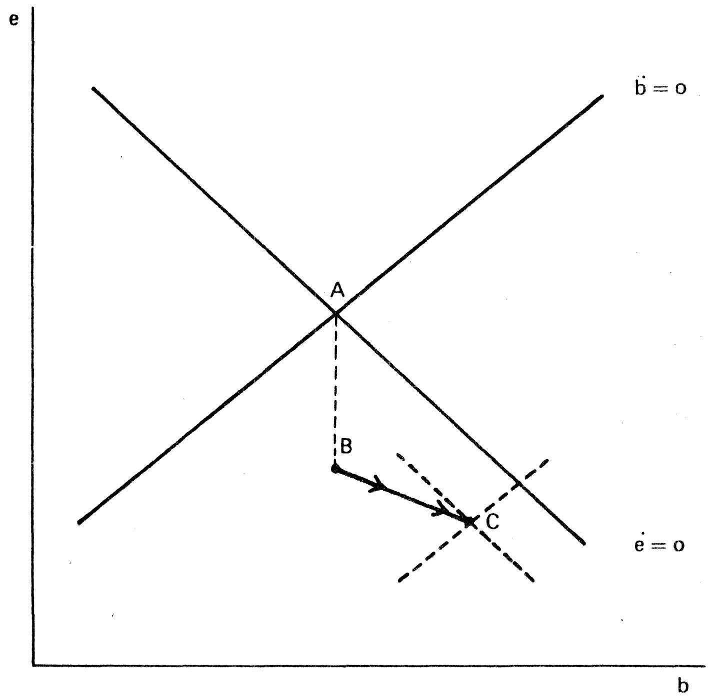
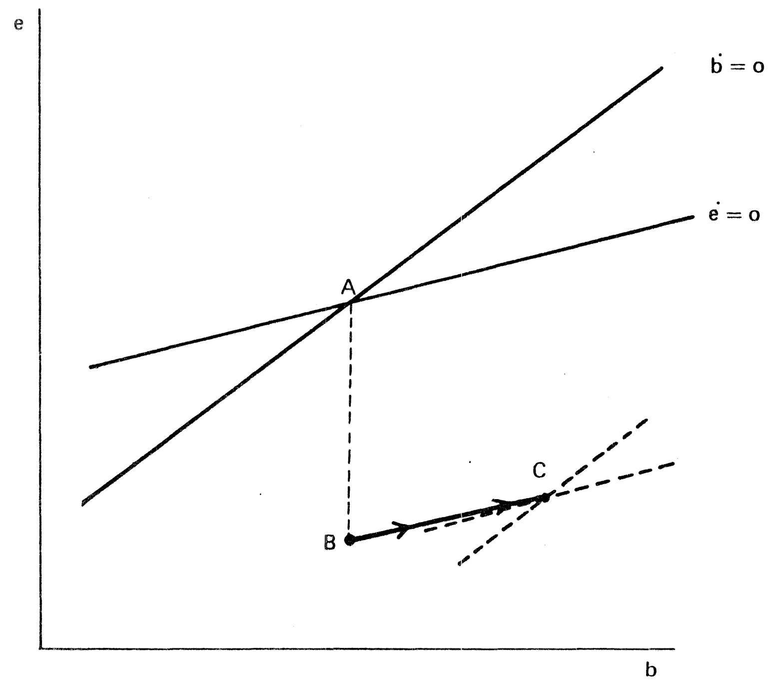


FIGURE 7.b
LOW CAPITAL MOBILITY



A supply shock ($d\bar{y} > o$)

Conclusions

This paper has made use of a simple model to address a series of questions related to the degree of openness of the capital account. The main findings can be summarized as follows:

1.- A change in the degree of openness of the capital account does not make the economy more or less "stable" in the technical sense. The economy exhibits a saddle-point equilibrium both when capital mobility is high and when is low.

2.- Variations in the degree of openness of the capital account do not affect the long-run behavior of the exchange rate although they alter its short-run behavior.

3.- The existence of a more open capital account implies: (a) larger short-run exchange rate fluctuations in the presence of domestic fiscal shocks and foreign interest shocks; (b) smaller short-run exchange rate fluctuations in the presence of domestic supply shocks (reasonably) and foreign price shocks; (c) the same exchange rate fluctuations with monetary shocks.

4.- While in a situation of sufficiently high capital mobility current account surpluses (deficits) come together with appreciating (depreciating) currencies along the adjustment path to unexpected shocks, the opposite happens when capital mobility is low. Consequently, the degree of capital mobility is a crucial determinant of the joint exchange rate --current account dynamics (Frenkel and Rodríguez (1982)).

The results in (1) (2) and (3) stand in sharp contrast with the "stabilizing vs destabilizing" views stated in the introductory section of the paper. Indeed, each of these views could prove to be the right one for a different subset of macroeconomic shocks.

Finally, a word on exchange rate policy. In the standard analysis of the "optimal" exchange rate strategy, the monetary authority chooses the degree of intervention so as to maximize an objective function that usually depends on the variance of prices and output around desired levels. Since money is neutral in this model, changes in the quantity of money lead to proportional movements in the exchange rate and the price level.

Because in this model monetary policy cannot affect the level of output, the "price" objective is the only one remaining. In that case, if the monetary authority is committed to achieving price stability, an exchange rate intervention strategy can be easily designed to fully achieve this goal.

For instance in the case of a foreign interest rate shock, it can be shown that the adjustment of the economy in Figures 4a and 4b from A to B to C is characterized by a higher price level than the initial one. An exchange rate intervention policy that varies the quantity of money so as to keep the exchange rate unchanged in the face of the upward pressures coming from the asset accumulation process, fully reaches the price stability objective. Furthermore, since the exchange rate –and the price level– fluctuate by more in the case of high capital mobility, the intensity of intervention will increase in this case (compare Figures 4a and 4b).

On the other hand, an increase in the foreign price level has on impact an inflationary effect when the exchange rate is kept fixed. However, as shown in Figures 6a and 6b, if the exchange rate is left free to vary it appreciates, contributing to offset the initial inflationary effect of the shock. In this case, a strategy of keeping the exchange rate stable may hurt rather than help reaching the price stability goal, with either low or high capital mobility.

Therefore, as these two examples make clear, it is not always the case that price stability can be achieved through a strategy of keeping the exchange rate stable. Consequently, whether a fixed exchange rate regime (like the EMS) is a preferable alternative or not depends on the particular set of shocks experienced by the economy.

It is true that all these results come from a simple model which ignores demand determination of output and gradual price adjustment in the short run. It is also true that they may also depend on the way financial openness is modelled. Nevertheless, the model helps to clarify certain important issues regarding the likely consequences of financial openness for exchange rate behavior and current account dynamics. The dependence of some of the results on the predominant sources of macroeconomic shocks points towards the need for related empirical work.

NOTES

1.- The papers by Driskill (1981) and Turnovsky and Bhandari (1982) explore the sensitivity of exchange rate behaviour to the degree of sustitutability between domestic and foreign assets with continuous portfolio equilibrium. Although this is sometimes refered to as the "imperfect capital mobility" case, there are no barriers at all to international capital flows. Our view, rather, is to allow for the existence of barriers to free international capital flows. These prevent instantaneous portfolio equilibrium from taking place in "low" capital mobility countries.

2.- We do not distinguish between the current account and the trade balance in this model.

3.- All domestic bonds are inside bonds and do not constitute net wealth.

4.- Money demand does not depend on wealth in equation (3). There seems to be considerable empirical support for this way to proceed.

5.- It can be shown that in Figure 1b, the slope of the $\dot{e}=0$ line $(\alpha_2-\Phi\gamma_2/\alpha_1+\Phi\gamma_1)$ is always smaller than that of the $\dot{b}=0$ line (α_2/α_1). In the limit, as $\Phi\to 0$, the $\dot{e}=0$ line moves counterclockwise until it becomes identical to the $\dot{b}=0$ line. For non zero Φ's, the $\dot{e}=0$ line is therefore always flatter than the $\dot{b}=0$ line.

6.- Notice that the $\dot{b}=0$ (current account) line is a long-run equilibrium condition. In the short-run, however, the system must satisfy the equilibrium conditions in the goods and asset markets, represented in this case by the $\dot{e}=0$ line. The $\dot{e}=0$ line can also be regarded as the BP = 0 (balance of payments) equilibrium locus that must be satisfied at every point of time. Accordingly, the BP=0 line will be identical to the $\dot{b}=0$ line when capital mobility is zero ($BP=\dot{b}=0$). For low enough capital mobility, the BP=0 ($\dot{e}=0$) line will have the same slope as the $\dot{b}=0$ line, while the opposite will be true for high enough capital mobility.

7.- Obviously this result would not hold in models in which the issue of "financial openness" is linked to the degree of substitutability between assets (Turnovsky and Bhandari (1982)).

8.- The general tone of our conclusions also holds for anticipated shocks.

9.- As can be seen in equation (8), the coefficient associated with the fiscal policy variable can be positive or negative. It can be shown that when capital mobility is "high" $(\gamma_2 - \Phi^{-1}\alpha_2) > 0$, then $(\gamma_6 - \Phi^{-1}\alpha_6) > 0$, also; however, when capital mobility is "low" $(\gamma_2 - \Phi^{-1}\alpha_2) < 0$, then $(\gamma_6 - \Phi^{-1}\alpha_6) \gtrless 0$. This makes the positive sloping $\dot{e} = 0$ line of Figure 2 to shift rightwards or leftwards, which affects short-run dynamics. Specifically, there is one case (not showns in Figure 5b) where a fiscal expansion leads on impact to an exchange rate depreciation and to a current account surplus. This last case is not discussed in the text, concentrating instead on the more likely scenario. The paper by Sachs and Wyplosz (1984) also contains symilar ambiguities concerning the effects of fiscal policy and the role of asset substitutability.

APPENDIX

$$\alpha_1 = \frac{(\theta_1-\theta_3)\beta_2 + \theta_2(\beta_1+\beta_3)}{\Delta} \qquad \gamma_1 = \frac{\beta_1 + \beta_3}{\pi_1\Delta}$$

$$\alpha_2 = \frac{\theta_3(\beta_1+\beta_2) + (\theta_1-\theta_2)\beta_3}{\Delta} \qquad \gamma_2 = \frac{\beta_3}{\pi_1\Delta}$$

$$\alpha_3 = \frac{\theta_1(\beta_2+\beta_3) + (\theta_2+\theta_3)\beta_1}{\Delta} \qquad \gamma_3 = \frac{\beta_1}{\pi_1\Delta}$$

$$\alpha_4 = \frac{(\theta_1 - \theta_3)\beta_2 + \theta_2(\beta_1 + \beta_3)}{\Delta} \qquad \gamma_4 = \frac{\beta_1 + \beta_3}{\pi_1\Delta}$$

$$\alpha_5 = \frac{(\theta_1 - \theta_2 - \theta_3) - \theta_4\Delta}{\Delta} \qquad \gamma_5 = \frac{\pi_2\Delta - 1}{\pi_1\Delta}$$

$$\alpha_6 = \frac{\theta_1-\theta_2-\theta_3}{\Delta} \qquad \gamma_6 = \frac{1}{\pi_1\Delta}$$

$$\Delta = \beta_1 + \beta_2 + \beta_3 > 0$$

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