A Model of Balance-of-Payments Crises due to External Shocks: Monetary vs. Fiscal Approaches

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Abstract

This paper develops a model for balance-of-payments (BOP) crises triggered by an external shock. Whether an external shock induces a BOP crisis depends crucially on the sequence of policy actions taken by the government's monetary and fiscal authorities. If the fiscal authority moves first and imposes an exogenous constraint on the monetary authority, an external shock can lead to a BOP crisis. However, if the monetary authority moves first and imposes an exogenous constraint on the fiscal authority, the same shock does not cause a BOP crisis.

Keywords: Balance-of-payments crises, External shocks, Sequence of policy actions
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1 Introduction

Conventional, first-generation models of balance-of-payments crises emphasize inconsistencies between the exchange rate, fiscal policy, and monetary policy (Krugman 1979; Flood and Garber 1984; Calvo 1987). These models all suppose that a domestic credit expansion inconsistent with the fixed exchange rate gives rise to a speculative attack that forces the exchange rate to be abandoned. The expansion of domestic credit which triggers the crisis is associated with the government's fiscal deficit, either directly or indirectly. When we consider a consolidated government in order to formalize BOP crises, either the fiscal deficit level or the domestic credit expansion rate must be exogenous, and the other must be endogenous. This ensures that the consolidated government's budget constraint is satisfied.

Krugman (1979) and Calvo (1987) took the fiscal deficit level to be fixed, and Flood and Garber (1984) took the rate of the domestic credit expansion to be fixed. In other words, in Krugman (1979) and Calvo (1987), the fiscal authority is the first mover who fixes the fiscal deficit level. The monetary authority then chooses endogenously the rate of domestic credit expansion in order to accommodate the fiscal deficit. In Flood and Garber (1984), by contrast, the first mover is the monetary authority who chooses the rate of domestic credit expansion. To accommodate this monetary expansion, the fiscal authority then chooses the fiscal deficit.

Lahiri and Végh (1998) were the first to note that these two approaches may have differing theoretical implications. By reexamining the first generation models of BOP crises, they show that the dynamics of a BOP crisis may depend on whether the monetary authority or the fiscal authority moves first. They found that if the monetary authority moves first, then the typical Krugman scenario always emerges; a BOP crisis always occurs at some finite time T. On the other hand, if the fiscal authority moves first, the dynamics of a crisis depends on the interest elasticity of money demand. If the interest elasticity of money demand is less than one, a BOP crisis occurs at some finite time T as in the Krugman scenario. However, if the interest elasticity of money demand is greater than or equal to one, a BOP crisis must occur immediately at time 0. The explanation is this. When a crisis occurs, money demand must fall. This fall in money demand reduces international reserves. The government's revenue from interest income on international reserves therefore deteriorates after the crisis. To satisfy its intertemporal budget constraint, the government must compensate for this loss of interest income from international reserves by earning higher revenues from inflation tax after a BOP crisis. However, if the interest elasticity of money demand is high, the government fails to raise enough the necessary sum as additional inflation tax. Since consumers have rational expectations and know that the government must violate its budget constraint, either the fixed exchange rate regime must collapse or the fiscal authority must reduce its spending level at time 0.

Below, we develop a model of BOP crises triggered by an external shock caused by a change in world interest rates. Empirical evidence has led to a consensus that changes in the world interest rate is central to an understanding of the recent capital inflows and ensuing sudden outflow episodes in emerging markets in Latin America and East Asia. Dooley *et al.*(1994) analyzed 21 debtor countries during the period 1986-92, and argue that international interest rates were the most important determinant of the surge in capital inflows, and that a rise in international interest rates could reverse those capital inflows. [1]

The possibility of BOP crises due to an external shock depends crucially on whether the monetary authority or the fiscal authority moves first and imposes an exogenous constraint on the other. We show that an external shock causes a BOP crisis if the fiscal authority moves first, but not if the monetary authority moves first. This is the case in which the interest elasticity of money demand is greater than one, so that after a crisis the government cannot compensate for the loss of interest income from international reserves by earning more inflation tax. Since consumers know that the government cannot satisfy its intertemporal budget constraint, a BOP crisis arises as soon as the external shock hits this economy.

Below, Section 2 develops the model. Sections 3 and 4 examine the possibility of BOP crises caused by an external shock. Section 3 supposes that the monetary authority moves first and imposes an exogenous constraint on the fiscal authority. Section 4 supposes that the fiscal authority moves first and imposes an exogenous constraint on the monetary authority. Conclusions are presented in Section 5.

[1] Calvo et al.(1993,1994) analyze ten Latin American countries and show that the surge in capital inflows was mostly due to the fall in the US interest rate. Calvo et al.(1996) suggest that a rise in the US interest rate in early 1994 to tighten monetary policy triggered a reversal of the capital flows. See also Fernández-Arias (1996) and Frankel and Okongwu (1996).

2 The Model

2.1 Basic framework

Consider a small open economy perfectly integrated with the rest of the world in goods and capital markets. Free movement of the good implies that the law of one price holds: $P_t = E_t P_t^*$, where E_t, P_t, and P_t^* denote the nominal exchange rate, the domestic price of the good, and the foreign price of the good, respectively. Two assets are available to consumers in this economy: the domestic currency, M_t, and an internationally traded asset, B_t. Real money balances are denoted by $m_t (\equiv \frac{M_t}{P_t} = \frac{M_t}{E_t P_t^*})$. Real (private) foreign asset holdings are denoted by $b_t (\equiv \frac{B_t}{P_t^*})$. The financial wealth of consumers is denoted by a_t, so that

$$a_t = m_t + b_t. \tag{1}$$

The representative consumer's instantaneous utility depends on consumption, c_t. Thus, lifetime utility at time 0 can be written as:

$$\int_0^\infty u(c_t) e^{-\beta t}\, dt, \tag{2}$$

where $\beta\, (> 0)$ denotes the rate of time preference.

The flow budget constraint of the representative consumer is

$$\dot{a}_t = r a_t + y + \tau_t - c_t - i_t m_t - s_t. \tag{3}$$

Here, r is the (constant) world real interest rate, y denotes a constant flow endowment of the good in this economy, τ_t denotes government lump-sum transfers, and i_t denotes domestic nominal interest rates. Perfect capital mobility implies that interest parity condition holds such that

$$i_t = i_t^* + \varepsilon_t, \;\; i_t^* = r + \pi_t^*, \tag{4}$$

where i_t^* is the world nominal interest rate, ε_t is the rate of devaluation (or depreciation) $(\equiv \frac{\dot{E}_t}{E_t})$, and $\pi_t^* (\equiv \frac{\dot{P}_t^*}{P_t^*})$ is the foreign inflation rate. The term $i_t m_t$ indicates an inflation tax. Transaction costs (s_t), which are assumed to be increasing in consumption and decreasing in real money balances, are given by:[2]

$$s_t = c_t\, v\left(\frac{m_t}{c_t}\right), \;\; v'(\cdot) < 0, \;\; v''(\cdot) > 0. \tag{5}$$

[2]This use of transaction-costs formalism allows comparison of the welfare level with and without a BOP crisis. See McCallum and Goodfriend (1987), Lucas (1993), and Feenstra (1986) for general arguments on transaction costs. For a similar transaction-cost formalisms, see for instance Reinhart (1990) and Reinhart and Végh (1995).

From the consumer's flow budget constraint (3) and the transversality condition ($\lim_{t\to\infty} a_t e^{-rt} = 0$), the individual's lifetime budget constraint is given by:

$$a_0 + \int_0^\infty (y + \tau_t)e^{-rt}\,dt = \int_0^\infty (c_t + i_t m_t + s_t)e^{-rt}\,dt. \tag{6}$$

By maximizing the lifetime utility (2) subject to the budget constraint (6), and taking the transaction cost (5) into account, the following first-order conditions arise:[3]

$$i_t = -v'\left(\frac{m_t}{c_t}\right), \tag{7}$$

and

$$u'(c_t) = \lambda\,\mathcal{P}_t, \tag{8}$$

where

$$\mathcal{P}_t \equiv 1 + v\left(\frac{m_t}{c_t}\right) - \left(\frac{m_t}{c_t}\right) v'\left(\frac{m_t}{c_t}\right). \tag{9}$$

In (8), λ is the (time-invariant) multiplier associated with the budget constraint (6), and $\mathcal{P}_t$ denotes the effective price of consumption. When a consumer purchases an additional unit of the good, this purchase incurs transaction costs. The sum of the market price of the good and the transaction cost is the effective price denoted by $\mathcal{P}_t$. Therefore, by the first-order condition (8), the consumer equates the marginal utility of consumption to the shadow value of wealth, λ, multiplied by the effective price of consumption, $\mathcal{P}_t$.

Equation (7) shows that the consumer equates, at the margin, the reduction in transaction costs (which results from holding an additional unit of real money balances) to the opportunity cost, i_t. From this first-order condition (7), we obtain the following money demand function:

$$m_t = c_t\,l(i_t), \quad l'(i_t) = -\frac{1}{v''\left(\frac{m_t}{c_t}\right)} < 0. \tag{10}$$

[3]In order to abstract from the intrinsic sources of an economy's dynamics, the model assumes $\beta = r$. The intrinsic source causes movement even when all exogenous variables that affect the economy remain constant forever. The model therefore focuses on the extrinsic dynamic behavior caused by changes of the world nominal interest rate. This distinction between intrinsic and extrinsic dynamics is also made by Obstfeld and Stockman (1985). Samuelson (1947) refers to this distinction as that between "causal" and "historical" dynamic systems.

In other words, we have

$$m_t = L(i_t, c_t), \tag{11}$$

which implies that

$$\frac{\partial L}{\partial c_t} = l(i_t) > 0, \; \frac{\partial L}{\partial i_t} = c_t \, l'(i_t) < 0.$$

From (10), we can rewrite the effective price (9) as

$$\mathcal{P}_t(i_t) = 1 + v(l(i_t)) - l(i_t)v'(l(i_t)), \tag{12}$$

which implies that

$$\frac{d\,\mathcal{P}(i_t)}{d\,i_t} > 0, \tag{13}$$

so that the effective price is an increasing function of i_t.

The government's flow budget constraint is given by

$$\dot{h}_t = rh_t + \dot{m}_t + (\varepsilon_t + \pi_t^*)m_t - \tau_t, \tag{14}$$

where h_t denotes the stock of foreign assets held by the government (i.e., international reserves). The $\dot{m}_t$ and $(\varepsilon_t + \pi_t^*)m_t$ terms indicate seigniorage revenues. From the flow budget constraint (14) and the transversality condition ($\lim_{t\to\infty} h_t e^{-rt} = 0$), the government's lifetime budget constraint is given by

$$\int_0^\infty \tau_t e^{-rt}dt + m_0 = h_0 + \int_0^\infty (i_t m_t)\, e^{-rt}dt. \tag{15}$$

Let d_t denote real domestic credits:

$$d_t \equiv \frac{D_t}{P_t} = \frac{D_t}{E_t P_t^*},$$

where D_t is the nominal value of domestic credits. The central bank's balance sheet implies that

$$m_t = h_t + d_t. \tag{16}$$

The growth rate of the nominal domestic credit is denoted by μ_t:

$$\mu_t \equiv \frac{\dot{D}_t}{D_t}.$$

By differentiating $d_t(\equiv \frac{D_t}{E_t P_t^*})$ with respect to time, we find that

$$\frac{\dot{d}_t}{d_t} = \mu_t - \varepsilon_t - \pi_t^*. \tag{17}$$

From the growth rate of real domestic credits (17), the central bank's balance sheet (16), and the government's flow budget constraint (14), it follows that the government transfer policy is given by

$$\begin{aligned} \tau_t &= rh_t + \dot{d}_t + (\varepsilon_t + \pi_t^*)m_t, \qquad (18) \\ &= rh_t + (\mu_t - \varepsilon_t - \pi_t^*)d_t + (\varepsilon_t + \pi_t^*)m_t. \end{aligned}$$

From the consumer's flow budget constraint (3), the interest parity condition (4), and the government flow budget constraint (14), this economy's current account can be written as

$$\dot{k}_t = rk_t + y_t - c_t - s_t, \tag{19}$$

where $k_t(\equiv b_t + h_t)$ is the economy's (net) stock of foreign assets. This current account also indicates the resource constraint for this economy. From (19) and the transversality condition ($\lim_{t\to\infty} k_t e^{-rt} = 0$), the economy's intertemporal resource constraint is given by

$$k_0 + \frac{y}{r} = \int_0^\infty (c_t + s_t)e^{-rt}dt. \tag{20}$$

2.2 The external shock

We assume that in its initial steady state, this economy is under fixed exchange rates (i.e., $E_t = \bar{E}$). The fixed exchange rate regime remains in place so long as international reserves are positive. However, if international reserves reach zero, the peg will be abandoned and a flexible exchange rate regime will take its place.

Below, we shall study the possibility of BOP crises due to external shocks under alternative policies. One policy is constrained by an exogenous rate of domestic credit expansion; the other has the constraint of an exogenous government spending level. We shall examine how the external shock of an unexpected and permanent rise in the world nominal interest rate (though no change in the *real* world interest rate) can lead to BOP crises. At time $t = 0$, there is an unanticipated permanent increase in the world nominal interest rate from its value i_0^*, so that [4]

$$i_t^* = \begin{cases} i_0^* = r + \pi_0^*, & (t < 0) \\ i_1^* = r + \pi_1^*. & (0 \le t) \end{cases}$$

[4] Edwards and Végh (1997, p.256) take the changes of i^* (but no change in r) as

3 Exogenous rate of domestic credit expansion

We first consider the case in which the monetary authority moves first. The monetary authority chooses a rate of nominal domestic credit expansion. The fiscal authority then passively determines the transfer policy (18). The constant exogenous rate of domestic credit expansion is denoted by $\bar{\mu}$:

$$\frac{\dot{D}_t}{D_t} = \bar{\mu} > 0,$$

for all t (D_0 given). We suppose that, in the initial steady state, the monetary authority sets the nominal growth rate of domestic credits equal to the inflation rate:

$$\bar{\mu} = \pi_0^*. \tag{21}$$

From (17), this policy implies that real domestic credits remain at a constant level in the initial steady state. Without the domestic credit rule (21), there would be a continuous loss (or gain) of international reserves h_t under fixed exchange rates from the central bank's balance sheet (16).

The interest parity condition (4) implies that the rise in the world nominal interest rate i_t^* will increase the domestic nominal interest rate i_t under fixed exchange rates (i.e., $i_t = i_t^*$). From the first-order condition (7), the ratio of real money balances to consumption, $\frac{m_t}{c_t}$, must decrease on impact (i.e., at time $t = 0$). By substituting the transaction cost function (5) into the economy's resource constraint (20) and taking into account the money demand function (10), we can rewrite consumption as

$$c_t = \frac{rk_0 + y}{1 + v(l(i^*))}, \tag{22}$$

along a perfect foresight path with a constant i^*. Hence, an unanticipated permanent increase in i^* at time 0 must reduce the subsequent consumption level.

Since the nominal domestic interest rate i_t increases and the consumption level c_t decreases, it follows from the first-order condition (7) (or (11)) that

reflecting the world business cycle (and analyzed the external shock on a small open economy having a banking sector). As suggested by Calvo et al.(1996), we can formalize a change of i^* either by a change in π^* but no change in r, or vice versa. For rising r, it is necessary to introduce an endogenous rate of time preference, following Uzawa (1968), or an upward-sloping supply curve of funds (for example, Agénor (1998)) to ensure the existence of a steady state after crises.

the real money balance level m_t must decrease at time 0. In fact, m_t decreases on impact from $L(r+\pi_0^*, c_0)$ to $L(r+\pi_1^*, c_1)$.

The rise in the world nominal interest rate i_t^* reduces the real growth rate of domestic credits d_t. From (17), the real domestic credit decreases from time $t = 0$ as shown in Figure 1. The real domestic credit d_t eventually approaches zero.

Next, we consider the time course of international reserves. From the time courses of the real money balance m_t and real domestic credit d_t, and using the central bank's balance sheet ($m_t = h_t + d_t$), we can determine the discrete change in international reserves (h) at time $t = 0$ as follows:

$$\Delta h = \Delta m = L(r+\pi_1^*, c_1) - L(r+\pi_0^*, c_0) < 0. \tag{23}$$

As already argued, the real money balance m_t remains constant after $t = 0$, and the domestic credit d_t approaches zero. After the discrete jump at time $t = 0$, therefore, the level of international reserves h_t gradually recovers until it reaches the same level as the new steady state level of real money balances $L(r+\pi_1^*, c_1)$ (since d_t approaches zero).[5]

4 Exogenous fiscal spending

Next, we analyze the case where the fiscal authority moves first. The fiscal authority sets its spending level first for transfer $\bar{\tau}$. The monetary authority then determines the growth rate of domestic credit μ in order to achieve this government transfer policy ($\bar{\tau}$) by (18).

It follows from the government budget constraint (14) that if the fiscal authority sets its spending level $\bar{\tau}$ as

$$\bar{\tau} = rh_0 + \pi_0^* L(r+\pi_0^*, c_0), \tag{24}$$

then

$$\dot{h}_t = 0,$$

in the initial steady state. This ensures that there will be no BOP crises (without external shocks). Alternatively, we can obtain (24) by assuming

[5] We assume that h_0 is greater than $L(r+\pi_0^*, c_0) - L(r+\pi_1^*, c_1)$ in order to exclude the trivial case in which a BOP crisis would occur at time 0 regardless of alternative policies. When i_t rises (from $r+\pi_0^*$ to $r+\pi_1^*$), consumers would draw reserves by $L(r+\pi_0^*, c_0) - L(r+\pi_1^*, c_1)$. The case $h_0 \leq L(r+\pi_0^*, c_0) - L(r+\pi_1^*, c_1)$ implies that h_0 is too short for the central bank to defend the fixed exchange rate system from the impact shock (or the external shock is too large to defend the system) regardless of policy (fiscal-led or monetary-led). Obviously, there would be no difference between policies in this trivial case in which the initial level of reserves is too short or the external shock is too large.

that $\dot{d}_t = 0$ in the government transfer policy (18). In other words, the fiscal policy (24) also implies that $\dot{d}_t = 0$.

As in the previous section, we consider the effect of an unanticipated and permanent rise in the world nominal interest rate on an economy. The effect of this external shock on consumption and real money balances are the same as in the case where the monetary authority moves first. That is, the increase in the nominal interest rate causes consumption to fall from the initial level c_0 to a lower level c_1 by (22) through an increase in the transaction cost. The real money balance m_t must also decrease from the initial level $L(r + \pi_0^*, c_0)$ to a lower level $L(r+\pi_1^*, c_1)$ due to a rise in the nominal interest rate. Hence, the level of international reserves h_t must decrease at $t = 0$ by the amount $L(r + \pi_0^*, c_0) - L(r + \pi_1^*, c_1)$, which corresponds to a decrease in real money balances at that time.

We now show that the level of international reserves h_t either recovers or deteriorates further after its fall due to the shock at time $t = 0$, depending on the interest elasticity of money demand. This quantity is defined as

$$\eta_L \equiv -\frac{i_t}{L_t}\frac{d\,L_t}{d\,i_t}.$$

The government's flow budget constraint (14) gives us $\dot{h}_t$ after time $t = 0$:

$$\dot{h}_t = r\{h_0 + \Delta h\} + \pi_1^* L(r + \pi_1^*, c_1) - \bar{\tau}, \tag{25}$$

since $\dot{m}_t$ is zero for $t \geq 0$. Δh denotes the discrete change of h_t at time $t = 0$. Substitution of (23) into (25) yields

$$\begin{aligned}\dot{h}_t &= rh_0 + \pi_0^* L(r + \pi_0^*, c_0) - \bar{\tau} \\ &\quad + (r + \pi_1^*)L(r + \pi_1^*, c_1) - (r + \pi_0^*)L(r + \pi_0^*, c_0).\end{aligned} \tag{26}$$

By substituting (24) into (26), we obtain

$$\begin{aligned}\dot{h}_t &= (r + \pi_1^*)L(r + \pi_1^*, c_1) - (r + \pi_0^*)L(r + \pi_0^*, c_0), \\ &= i_1 L(i_1, c_1) - i_0 L(i_0, c_0),\end{aligned} \tag{27}$$

where $i_1 = r + \pi_1^*$ and $i_0 = r + \pi_0^*$. This expression indicates that whether the international reserves level h_t recovers or deteriorates further depends on the interest elasticity of money demand η_L.

4.1 The case $\eta_L \leq 1$

We first consider the case where the interest elasticity of money demand, η_L, does not exceed one. In that case, we have

$$\frac{d(i_t L_t)}{di_t} = L_t\{1 - \eta_L\} \geq 0.$$

Hence, if $\eta_L \leq 1$, then by (27) the level of international reserves starts increasing (or remains constant) after its abrupt drop at time $t = 0$. If the level increases, h_t will recover until it reaches $L(r + \pi_1^*, c_1)$ as in the previous section concerning the constant expansion rate of domestic credit.

Since the money demand is constant after the shock ($L(r + \pi_1^*, c_1)$), it follows from the central bank's balance sheet (16) that the domestic credit d_t decreases if h_t increases. The real domestic credit d_t will approach zero (if h_t remains constant after the shock, d_t also remains constant).

4.2 The case $\eta_L > 1$

If the interest elasticity of money demand is greater than one, then (27) implies that international reserves start to fall at time $t = 0$. If international reserves reach zero, the peg will be abandoned. In that case, the domestic nominal interest rate would jump from $i_1 (= r + \pi_1^*)$ to $i_T (= r + \pi_1^* + \tilde{\varepsilon})$, where i_T denotes the nominal interest rate after a BOP crisis ($i_T (= r + \pi_1^* + \tilde{\varepsilon}) > i_1 (= r + \pi_1^*)$), and $\tilde{\varepsilon}$ is defined as

$$\bar{\tau} = (\pi_1^* + \tilde{\varepsilon}) L(r + \pi_1^* + \tilde{\varepsilon}). \tag{28}$$

Equation (28) follows upon substituting $h_t = 0$ (and $\dot{h}_t = 0, \dot{m}_t = 0$) into (14), since after a BOP crisis the government will lose all international reserves. Consumers rationally expect this jump in the nominal interest rate. Hence a speculative attack can occur before international reserves reach zero, as the typical BOP crisis theory suggests.

In this case, we also must check whether the government's intertemporal budget constraint (15) holds after a BOP crisis. Suppose that the BOP crisis happens at some finite time T, as argued above, *and* the government's intertemporal budget equation (15) holds. Then it must follow by substituting $\tau_t (= \bar{\tau})$ and $i_t L_t$ ($= i_1 L_1$ ($0 \leq t < T$) and $i_T L_T$ ($T \leq t$)) into (15) that

$$\begin{aligned} \bar{\tau} - rh_0 + rm_0 - i_1 m_1 &= e^{-rT}[(r + \pi_T + \tilde{\varepsilon})L_T - (r + \pi_1)L_1] \\ &= e^{-rT}[i_T L_T - i_1 L_1] < 0. \end{aligned} \tag{29}$$

The inequality in (29) follows from the fact that $\eta_L > 1$ (and thus $i_T L_T - i_1 L_1 < 0$). However, substitution of (23) into (25) together with the fact that $\dot{h}_t < 0$ for $t \geq 0$ gives

$$\bar{\tau} - rh_0 + rm_0 - i_1 m_1 > 0, \tag{30}$$

which contradicts (29). The reason why the government's budget constraint is not satisfied is this. After a BOP crisis, the government loses interest income from international reserves. It must therefore collect more inflation tax than before to finance the fixed fiscal transfer $\bar{\tau}$. However, if money demand is too interest elastic (i.e., $\eta_L > 1$), the government cannot collect enough inflation tax to satisfy its intertemporal budget constraint. A BOP crisis must then occur immediately the external shock hits the economy, since consumers rationally expect that the government will violate its intertemporal budget equation.

It follows that if $\eta_L > 1$, a BOP crisis must arise with the impact. This change in the nominal exchange rate ensures that the government's intertemporal budget constraint will be satisfied. The domestic nominal interest rate also increases at the impact, from $i_0(= r + \pi_0^*)$ to $i_T(= r + \pi_1^* + \tilde{\varepsilon})$ (not to $i_1(= r + \pi_1^*)$). Consequently, by (22), the consumption level in the crisis case is lower than in the no-crisis case c_1 of the previous section.

5 Conclusion

We have examined the possibility that the same shock leads to different results according to the monetary approach and the fiscal approach. An unanticipated permanent rise in the world nominal interest rate which does not cause a crisis if the monetary authority moves first can provoke a BOP crisis if the fiscal authority moves first. If the fiscal authority imposes an exogenous constraint on the monetary authority, and if the interest elasticity of money demand is high, an economy faces an immediate BOP crisis. This is because the high interest elasticity of money demand prevents the government from compensating for the loss of interest incomes from international reserves by earning more revenues from inflation tax. Hence, the government fails to satisfy its intertemporal budget constraint. Since consumers rationally expect this government to violate its intertemporal constraint, a BOP crisis must arise as soon as an external shock hits the economy.

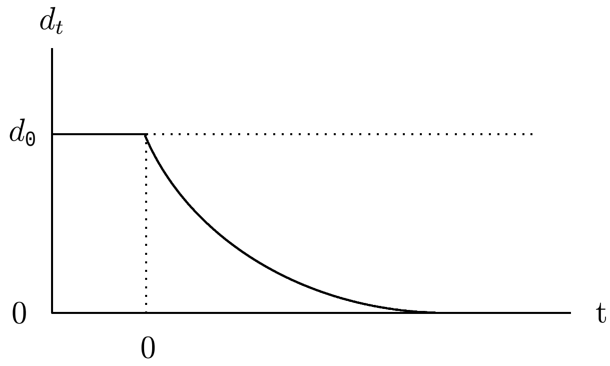
The policy implication of this model is immediate. A government with good discipline in its monetary policy is more resistant to BOP crises. Combined with a disciplined monetary policy, a flexible fiscal policy works well in absorbing an external shock. By contrast, a government with ill discipline in its monetary policy is more likely to suffer crises. Since an inflexible fiscal policy prevents a government from absorbing an external shock, the economy may lapse into crisis.

Lahiri and Végh (1998) argue in their conclusion that "one needs to exercise greater caution in modeling the sequencing of the policy actions between the monetary and the fiscal authority while formalizing BOP crisis scenarios (p.19)." For the external shock examined above, the contrast between monetary and fiscal approaches is more pronounced than in Lahiri and Végh's

(1998) case. In fact, whether a BOP crisis occurs at all, and not just its timing, depends on which of these two approaches is chosen.

Figure

Figure 1: Real domestic credit (Monetary approach)



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