Department of Economics, University of Maryland
International Finance (Econ 741)
Fall 2006
Prof. Carlos A. Végh
Handout # 6A

THE MONETARY APPROACH TO THE BALANCE OF PAYMENTS

This handout – which corresponds to Chapter 6 of the book – shows how abstracting from interest bearing assets in the model of Handout # 5 "removes the veil" and introduces interactions between the monetary and real sectors of the economy. By so doing – and under predetermined exchange rates – this handout's model captures the essential elements of the monetary approach to the balance of payments. The model assumes that money is the only asset (i.e., there are no internationally-traded bonds). Unless otherwise noticed, the same notation as in Handout # 5 is used. There is only one good for which the law of one price holds. The foreign currency price of the good is assumed to be constant (and equal to unity).

1 Consumer's problem

- Utility function:

$$\int_0^\infty [u(c_t) + v(m_t)] \exp(-\beta t) dt, \tag{1}$$

where c_t is the consumption good and $m_t (\equiv M_t/E_t)$ denotes real money balances (E is the nominal exchange rate in terms of units of domestic currency per unit of foreign currency).

- Consumer's flow constraint:

$$\dot{m}_t = y + \tau_t - c_t - \varepsilon_t m_t, \tag{2}$$

where y is the constant endowment of the good and ε_t is the rate of devaluation.

- First-order conditions follow from maximizing (1) subject to (2), using standard optimal control techniques:[1]

$$u'(c_t) = \lambda_t, \tag{3}$$
$$\dot{\lambda}_t = \lambda_t(\beta + \varepsilon_t) - v'(m_t), \tag{4}$$

  where λ_t is the co-state variable.

2 Government

The government holds non-interest bearing international reserves (say, dollars). Its flow constraint is

$$\dot{h}_t = \frac{\dot{M}_t}{E_t} - \tau_t. \tag{5}$$

Proceeding as in Handout # 1, we get (recall that $\pi^* = 0$):

$$\dot{h}_t = \dot{m}_t - d_t(\bar{\theta} - \bar{\varepsilon}).$$

To ensure that the predetermined exchange rate regime is sustainable over time, we assume $\bar{\varepsilon} = \bar{\theta}$. Hence:

$$\dot{h}_t = \dot{m}_t. \tag{6}$$

Changes in international reserves will thus reflect changes in real money demand.

3 Equilibrium conditions

Combining (2) with (5), we obtain:

$$\dot{h}_t = y - c_t. \tag{7}$$

Notice that since there are no interest-bearing assets in this model, the capital account is identically equal to zero. Hence, equation (8) says that

[1]Please refer to the Supplement to Handout # 2 for a primer on optimal control techniques.

the money account of the balance of payments equals the trade balance (or current account balance). Using (6) and (7), it follows that

$$\dot{m}_t = y - c_t. \tag{8}$$

4 Dynamic system

Differentiating (3) and using (4), we obtain

$$\dot{c}_t = \frac{1}{u''(c_t)} \left[(\beta + \varepsilon) u'(c_t) - v'(m_t) \right], \tag{9}$$

where it has been assumed that policymakers set a constant rate of devaluation, ε.

Equations (8) and (9) constitute a dynamic system in c_t and m_t for a given value of ε. In the steady-state:

$$\begin{aligned} c_{ss} &= y, \\ v'(m_{ss}) &= u'(y)(\beta + \varepsilon). \end{aligned}$$

Linearizing the system around the steady-state:

$$\begin{bmatrix} \dot{c}_t \\ \dot{m}_t \end{bmatrix} = \begin{bmatrix} \beta + \varepsilon & \frac{-v''(m_{ss})}{u''(y)} \\ -1 & 0 \end{bmatrix} \begin{bmatrix} c_t - y \\ m_t - m_{ss} \end{bmatrix},$$

which implies that, since the determinant of the matrix associated with the linear approximation is

$$\Delta = \frac{-v''(m_{ss})}{u''(y)} < 0,$$

the system has one positive and one negative root and thus exhibits saddle-path stability. Figure 1 illustrates the corresponding phase diagram.

5 Devaluation

Suppose that the economy is initially in the steady state given by point A in Figure 1. There is then an unexpected and permanent increase in the *level* of the exchange rate (i.e., E is increased). As a result, the system jumps to a point like B in Figure 1 and then travels back to the initial steady state along the saddle path. During the adjustment process, the private sector rebuilds real money balances by running a current account surplus.

6 An increase in the level of domestic credit

Note that an analogous reasoning would follow if policymakers increased the stock of domestic credit (i.e., if D were increased). The increase in D leads, on impact, to an increase in M. The system would jump to a point like C and then return to the initial steady state. In this case, the public gets rid of excess real money balances through a current account deficit. In the new steady-state, the *level* of the money supply will be the same but the *composition* will be different (i.e., international reserves will be lower and real domestic credit higher).

7 An increase in the rate of devaluation

Suppose, for graphical convenience, that the initial steady-state is now at point D in Figure 1. There is then an unanticipated and permanent increase in the rate of devaluation (i.e., an increase in ε). Since the inflation rate goes up (and with it the opportunity cost of holding real money balances), the new steady-state will be at a point like A. The system jumps on impact to point C and then travels towards point A. During the adjustment, the economy runs a current account deficit to get rid of excess real money balances.

8 Postcript: Flexible exchange rates

Interestingly enough, under flexible exchange rates, monetary policy continues to be neutral and superneutral as in Chapter 5 (you should prove this as an exercise). The reason is that the absence of an interesting-bearing bond does not affect the adjustment mechanism under flexible exchange rates, which is the nominal exchange rate (i.e., the price level).

Figure 1. Phase diagram