Monetary and Exchange Rate Policies in a Small Open Economy

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I. Introduction

Keynesian theory is basically a theory of the short-run determination of income and the interest rate in a closed economy (Hicks, 1937). The money supply is assumed to be exogenously given and is the monetary policy instrument. How this monetary instrument should be used is still a matter of dispute, with some advocates assigning to it a major role in dealing with cyclical fluctuations said to be inherent in the free enterprise economy (Ritter, 1963), while others blame its inappropriate manipulation for many of the cyclical fluctuations that are actually observed (Friedman, 1960). It is generally agreed, however, that the effects of monetary policy on income are powerful.[1] Friedman and others would add the proviso that these effects are also highly unpredictable because they tend to work with a long and variable lag.

The effects of monetary policy actions on income are far more complicated and uncertain in an open economy. For one thing, in such an economy the policymakers are faced with the additional task of stabilizing the balance of payments and/or ensuring that movements in the foreign exchange rate are not detrimental to the stability of income. Mundell (1962) addressed himself to this question, deriving the classic

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[1] An exception is Keynesians who believe in a literal interpretation of the "liquidity trap," which renders monetary policy ineffective provided that there are no wealth effects.

proposition that monetary policy should be better addressed to problems of external stability while fiscal policy should play a larger role in domestic stabilization (see also Fleming, 1962). Thus he showed that monetary policy lacked independence as an instrument of income stabilization in an open economy.

Subsequent developments on the theory of stabilization policies in an open economy distinguished sharply between such policies under fixed and floating exchange rate systems (Mundell, 1968; Sohmen, 1969).[2] By means of a simple extension of Keynesian analysis allowing for international capital movements, these contributions further deflated the importance of monetary policy as an instrument of income stabilization in an open economy with a fixed exchange rate, but they also showed that this policy could regain full leverage under a floating exchange rate system. An opposite set of conclusions was found with regard to fiscal policy.

Other theoretical developments have further demonstrated that even the concept of monetary policy in an open economy is not well defined, since it is not generally possible to control the money supply. Thus net credit of the central bank, not money supply, is a more true instrument of control (Guitián, 1973). But even the credit instrument is hampered as a means of stabilizing income under a fixed exchange rate; its main or exclusive effect is on capital flows and the balance of payments.

This paper has a twofold purpose. First, it presents succinctly the basic theory of monetary and exchange rate policies in the context of a small open economy under both fixed and flexible exchange rates; this theory has been developed by Mundell (1962; 1968) and others (see Whitman, 1970). An open economy is defined here as one that carries on trade in goods and services with other countries and, more importantly, participates in international capital movements. Furthermore, the simplifying assumption is made, representing a strictly *polar* case, that capital mobility is perfect in the absence of direct government controls.[3] The economy is small in the sense that its influence on incomes and

[2] This literature has been surveyed and reinterpreted by Whitman (1970). However, a note of caution must be added on its interpretation, as it develops the theory on the "assumption that the monetary authority sterilizes the impact of balance-of-payments surpluses or deficits on the money supply" (p. 15). This assumption involves a fundamental error because sterilization operations are essentially nonviable. See Mundell (1962, pp. 256–57).

[3] This is the case analyzed by Mundell (1962; 1968). A more general case, based on the assumption that the international mobility of capital is not necessarily perfect, even in the absence of government controls, is analyzed by Sohmen (1969).

interest rates in other countries is negligible.[4] Second, this paper attempts to expound further on some neglected aspects of the theory of monetary and exchange rate policies in a small open economy under a floating exchange rate system and on the effects of capital controls under both fixed and flexible exchange rate systems.[5]

The assumptions are framed in terms of a simple Keynesian-type model which can be adapted easily to the operations of the external sector, whether under a fixed or floating exchange rate system and with or without capital controls (Section II). The assumptions are kept as simple as possible for the macroeconomic conditions not directly related to the characteristics of the small open economy, as distinct from a closed economy, without sacrificing the introduction of all relevant constraints and policy instruments—especially with regard to monetary policy specified in terms of the net domestic credit policy of the central bank and the reserve requirement ratio of the banks. Thus, the theoretical results are slightly more general than those previously derived in the literature. The principal limitations of the model are that it is based on a flow theory, rather than on a stock adjustment theory, of capital movements; that it does not contain a government budget constraint, so that no restrictions or interconnections between fiscal and monetary policies are recognized; and finally, that it implicitly assumes that prices and wage rates are sticky. However, this last assumption is of no immediate relevance to the discussion because it is phrased in terms of movements in nominal income rather than in terms of real income and employment.

Section III deals with a fixed exchange rate situation and shows that the theory and the conclusions with regard to the effects of monetary policy are rather different from those that have been applied to a relatively large and closed economy such as that of the United States. Thus, inferences drawn from the literature based primarily on the U.S. experience have been frequently and erroneously applied to the small open economy such as that of Canada. Section IV adjusts the model to a floating exchange rate situation and asserts that monetary policy regains much of its freedom to cope with domestic income problems. However, it is also shown that freeing the exchange rate cannot automatically solve the dilemma of the monetary authorities on whether to address

[4] Because of this assumption—admittedly also an extreme one—this paper is not addressed to discussing retaliatory measures that might be undertaken by foreign countries against the domestic policies of the home country that raise its income through improvements in the current account balance.

[5] Two exceptions to that neglect are the papers by Dernburg (1970) and Laursen and Metzler (1950).

themselves to domestic or foreign considerations, because actions taken with a view as to domestic considerations also induce developments in the foreign exchange, capital flows, and external real sector. The "dirty float" case, in which the float is not entirely accompanied by a policy of nonintervention in the foreign exchange market, is also considered. The model is subsequently modified to explore the consequences of applying foreign capital controls under both fixed and floating exchange rate systems (Section V). Finally, Section VI summarizes the main conclusions of the paper and focuses on some of the major qualifications for their empirical validity.

II. Structure of a Small Open Economy

Equations (1) through (9) are assumed to describe succinctly the general structure of a small open economy. They are specified in sequence. A brief discussion is then followed by a summary and restatement of the basic structure so as to highlight the point that all cases covered in this study can be derived from this general structure by appropriate choice of additional restrictions on the equations and/or the variables.

$$Y = C(Y - T) + I(r) + G + B(Y, Y^f, e); \quad (1)$$

$$C_1 > 0, C_2 < 0, I_1 < 0, B_1 < 0, B_2 > 0, B_3 < 0$$

$$M^d = m(Y, r); m_1 > 0, m_2 < 0 \quad (2)$$

$$M^s = H \cdot MULT \quad (3)$$

$$H = A^f + NDA \quad (4)$$

$$A^f = A^f_{-1} + B(Y, Y^f, e) + K \quad (5)$$

$$MULT = (CD + 1)/(CD + RE + RQ) \quad (6)$$

$$CD = g(r); g_1 < 0 \quad (7)$$

$$RE = h(r); h_1 < 0 \quad (8)$$

$$M^d = M^s = M \quad (9)$$

where

A^f = net foreign assets of the central bank

A^f_{-1} = net foreign assets of the central bank, lagged one period

B = current account balance of the international balance of payments, a function of national income, foreign income, and the foreign exchange rate

C = private consumption expenditure, a function of disposable income

CD = ratio of currency to deposits held by the private nonbank sector with the banks

e = foreign exchange rate defined as the number of units of foreign currency per unit of national currency, so that an increase (decrease) in e means an appreciation (depreciation) of the national currency in terms of the foreign currency

G = total government expenditures

H = high-powered money or monetary base

I = private investment, a function of the interest rate

K = net international capital flows

M = money stock

M^d = money demand

M^s = money supply

$MULT$ = money multiplier

NDA = net domestic credit provided by the central bank

r = domestic interest rate

r^f = foreign interest rate

RE = ratio of excess reserves of the banks to their deposit liabilities

RQ = ratio of required reserves of the banks to their deposit liabilities

T = taxes

Y = national income

Y^f = foreign income

and m, g, and h are used to represent functions, of which the partial derivatives are denoted by the respective symbols followed by subscripts 1, 2, and so on (for instance, B_1 means $\delta B/\delta Y$).

Equation (1) represents in summary form a simple Keynesian process of national income determination. Income is broken down by expenditure components into private consumption, which is a positive function of disposable income (income minus taxes); private investment, which is a negative function of the interest rate; exogenously given government expenditures; and the foreign current account balance, which is a negative function of both national income and the level of the exchange rate and a positive function of foreign income.

Equation (2) is a typical Keynesian demand for money function; the demand for money is positively related to income and negatively related to the interest rate. Equation (3) defines the supply of money as the product of the monetary base or high-powered money and the money multiplier. Equation (4) is an identity which breaks down the monetary base into domestic credit and foreign asset components. Equation (5) summarizes the process of determination of the net foreign assets component of the monetary base in any given period; this is determined by foreign assets in the previous period plus the net surplus or deficit in the current account balance, which is endogenously determined, as explained earlier, plus the net capital balance, which is also endogenous to the model in the absence of capital controls. In equation (6) the money multiplier is expressed in terms of the currency-deposit ratio of the banks and their required reserve ratio.[6] Equations (7) and (8) express, respectively, the currency-deposit and the excess reserve-deposit ratios as negative functions of the interest rate, which is taken as the relevant measure of the opportunity cost of holding currency and reserves. Finally, equation (9) is an equilibrium condition of the model equating the money supply and the demand for money.

Classification of the variables as endogenous or exogenous and then as policy or nonpolicy variables within the exogenous group requires specification of further conditions. However, since there are several suitable sets of alternatives leading to the variety of situations studied in this paper, a unique classification of all the variables is inappropriate, although some play a fixed role: G and T are fiscal policy instruments; NDA and RQ are monetary policy instruments; Y^f and r^f are nonpolicy exogenous variables (by the small economy assumption). Other variables, such as r, K, A^f, and e, are susceptible to direct manipulation as policy instruments but may also be endogenous to the system. Finally, Y and M must be viewed as essentially endogenous.

[6] This expression for the money multiplier is derived from the identity for the uses of high-powered money and the definition of money as currency plus deposits, namely:

$$H = CU + R^e + R^q \tag{1}$$

$$M = CU + D \tag{2}$$

where CU = currency outside the banks; R^e = level of excess reserves; R^q = level of required reserves.

Divide (2) by (1):

$$MULT = M/H = (CU + D)/(CU + R^e + R^q) \tag{3}$$

and divide the numerator and denominator by D to obtain equation (6).

The general structure of the small open economy may be summarized in these four equations:

$$Y = y(r, e, Y^f, G, T); y_1 < 0; y_2 < 0; y_3 > 0, y_4 > 0; y_5 < 0 \quad (10)$$

$$M = m^d(Y, r); m_1^d > 0; m_2^d < 0 \quad (11)$$

$$M = m^s(A^f, r, NDA, RQ); m_1^s > 0; m_2^s > 0; m_3^s > 0; m_4^s < 0 \quad (12)$$

$$A^f = f(Y, e, K, Y^f); f_1 < 0; f_2 < 0; f_3 > 0; f_4 > 0. \quad (13)$$

All the cases covered in this paper can readily be derived from this general structure by appropriately selecting four of the variables as the unknowns under a given situation and analyzing the reaction of these unknowns to the policy variables available under that situation. The cases studied are:

Case 1. Perfect capital mobility (Sections III and IV). The domestic interest rate is equal to, and determined by, the foreign interest rate.[7]

Case 1a. Fixed exchange rate case (Section III). The exchange rate is fixed and therefore exogenous as a result of direct intervention by the authorities in the foreign exchange market. The model determines *Y, M, K, and* A^f, given the exogenous variables *r,* Y^f and the policy variables *e, G, T, NDA,* and *RQ*.

Case 1b. Floating exchange rate case (Section IV). Absence of intervention in the foreign exchange market makes *e* endogenous, but A^f becomes constant and therefore exogenous. The model determines *Y, M, K,* and *e,* given the exogenous variables *r,* Y^f, A^f and the policy variables *G, T, NDA,* and *RQ*.

Case 1b–1. Floating with a view as to the appropriate exchange rate (Section IV). Absence of intervention in the foreign exchange market (A^f is constant), coupled with the desire to have a constant exchange rate, calls for fiscal and monetary policies to be coordinated in a unique way if a desired income goal is to be achieved. The model for this case is not different from that of the freely floating exchange rate. Simply, the analysis is reversed so that, instead of studying the effects of instruments on targets, two targets are now specified (income maintenance and exchange rate constancy) and appropriate levels of the instruments are derived.

[7] This condition of interest rate equalization follows from the small open economy assumptions and the further assumption of perfect capital mobility. It should be noted that this condition in no way contradicts the standard behavioral proposition regarding the relation of capital movements to interest rate differentials; on the contrary, it is obtained as a special case of that proposition. Thus, if $K = f(r-r^f)$, $f_1 > 0$, r^f is exogenous and $E = dlnf/dln(r-r^f) \to \infty$, then it follows that $r = r^f$.

Case 1b–2. Dirty float (Section IV). The authorities make use of limited intervention in the foreign exchange market to help break "excessive" movements in the foreign exchange rate while letting the rate drift in any direction in the long run. The model determines Y, M, K, e, and A^f, given the exogenous variables r, Y^f and the policy variables G, T, NDA, and RQ. It should be noted that five rather than four endogenous variables are determined in this case as a result of the specification of an independent intervention policy reaction function on the part of the monetary authorities, relating movements of A^f to e. This is therefore a more general case and is perhaps more realistic.

Case 2. Capital controls (Section V). Introduction of capital controls makes K an exogenous variable and forces r to be endogenous.

Case 2a. Fixed exchange rate (Section V). The model determines Y, M, r, *and* A^f, given the exogenous variable Y^f and the policy variables K, e, G, T, NDA, and RQ.

Case 2b. Floating exchange rate (Section V). The model determines Y, M, r, and e, given the exogenous variable Y^f and the policy variables A^f, K, G, T, NDA, and RQ.

III. The Model with a Fixed Exchange Rate

As indicated earlier, the assumption in this paper of an open economy means that it carries on trade in goods and services with other countries and that its capital market is perfectly integrated with the world capital market in the absence of government controls. This assumption implies that arbitrage operations in the international capital market prevent the domestic interest rate from departing systematically from that of the world capital market.[8] Furthermore, the assumption of a small economy means that the world interest rate is exogenous or, in other words, that the domestic interest rate adjusts and is equal to the foreign interest rate.

$$r = r^f \text{ [9]} \tag{14}$$

[8] It is assumed that the domestic structure of interest rates is represented by a single rate and, likewise, that the structure of foreign rates is represented by a "world" interest rate or perhaps the interest rate in a dominant country.

[9] Other more general arbitrage conditions could be assumed without affecting the basic conclusions derived in this paper. For instance, assume that the behavior

The model in equations (1) through (9), together with condition (14) and the further assumption that the economy operates under a fixed exchange rate system,[10] simultaneously determines the interest rate, national income, the balance of payments, and the stock of money, given the values of the policy and nonpolicy exogenous variables. Superficially, this appears to be a mere extension of the Keynesian model of the simultaneous determination of the interest rate and income. However, as the analysis below reveals, in a small open economy the determination of the money stock, income, and the rate of interest is strikingly different from that in a closed economy. It will be shown that monetary policy is rendered ineffective in controlling the interest rate, income, and even the money stock. Monetary policy can show a powerful effect, however, in determining capital flows and, therefore, the balance of payments.

Basically, the working of the model is as follows. The domestic interest rate is determined by the foreign interest rate as a result of direct arbitrage operations in the integrated capital market (equation (14)). Given the interest rate, the exchange rate, and the level of foreign income—together with exogenously determined government expenditures and taxes—the level of income, private consumption, and the current account balance of the international balance of payments are determined (equation (1)). It follows, therefore, that income determination is independent of monetary policy; this is a consequence both of the openness of the economy (which causes the domestic interest

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of arbitrageurs is such that desired adjustments in the domestic interest rate are only partially achieved within any given period, so that

$$\Delta r = \gamma(r^* - r); 0 < \gamma < 1. \tag{1}$$

The desired level of the domestic interest rate (r^*) is a positive function of the foreign interest rate:

$$r^* = h(r^f); h_1 > 0. \tag{2}$$

Equations (1) and (2) may be solved explicitly for r as follows:

$$r = h(r^f) - \gamma^{-1}\Delta r = f(r^f, \Delta r) \tag{1a}$$

with $f_1 > 0$ and $f_2 < 0$.

The effect of an increase in the exogenous foreign interest rate is to increase the domestic interest rate, but full adjustment is not achieved in any given period; the larger and more sudden the change in the foreign interest rate the more out of line will be the domestic interest rate temporarily in relation to the foreign interest rate. Equation (1a) is essentially similar to the typical term structure equation within the domestic structure of interest rates.

[10] Under this system the monetary authorities are required to buy or sell foreign exchange in the foreign exchange market in order to preserve the official exchange rate parity agreed on with the international financial community.

rate to be determined by the foreign interest rate rather than the domestic money supply and the demand for money, as would be the case in a closed economy) and of the fixed exchange rate regime. Furthermore, given income and the interest rate, the effective demand for money is also determined independently of monetary policy (equation (2)). Finally, given equilibrium condition (9), it also follows that the effective money supply is determined by, and adjusts to, the demand for money. The nature of this adjustment is implicit in the interest rate equalization, condition, which requires capital to flow freely so as to equate the money supply and the demand for money at the given interest rate.

The endogenous determination of the net amount of capital flows needs to be spelled out in some detail, as this alone bears the brunt of the adjustment of the supply to the effective demand for money. Such adjustment cannot take place through endogenous changes in the money multiplier, since this is fixed for any given level of the interest rate and the required reserve ratio. Neither can the adjustment take place through movements in the current balance, which are independent of money supply.

Substitution of equations (4) and (5) in equation (3) and the use of the equilibrium condition (9) yield

$$M = (NDA + A^f_{-1} + B + K)\, MULT$$

which can be solved for K as

$$K = M/MULT - A^f_{-1} - B - NDA$$

and expressed in terms of its underlying determinants in equations (6) through (8) as follows:

$$K = \{M[g(r) + h(r) + RQ]/[1 + g(r)]\} - A^f_{-1} - NDA - B(Y, Y^f, e). \tag{15}$$

Equations (1), (2), and (15), with conditions (9) and (14), constitute the reduced form of the model and can be used to trace the effects of monetary, fiscal, and exchange rate policies on the economic targets (see Table 1). As already noted, neither of the two monetary policy instruments (NDA nor RQ) has any effect on the stock of money, the interest rate, or income; their only effect is on the net capital flows. Thus a tightening of monetary policy either by a reduction in the net domestic credit of the central bank or by an increase in the required reserve ratio has the effect of *increasing* the volume of net capital *inflows* (or *decreasing* the volume of net capital *outflows*). Since the current balance is unaffected, net foreign assets of the central bank will increase.

TABLE 1. EFFECTS OF POLICY INSTRUMENTS IN A SMALL OPEN ECONOMY WITH A FIXED EXCHANGE RATE [1]

Policy Instruments	Policy Targets				
	Y	M	K	B	A'
Monetary policy					
NDA	0	0	-1	0	-1
RQ	0	0	$M/(1 - g(r)) > 0$	0	$M/(1 - g(r)) > 0$
Exchange rate					
e	$\frac{B_3}{(1 - C_1 - B_1)} < 0$	$\frac{m_1 B_3}{(1 - C_1 - B_1)} < 0$	$\frac{\{(1/MULT)m_1 + (1 - C_1)\}B_3}{(1 - C_1 - B_1)} < 0$	$\frac{B_3(1 - C_1)}{(1 - C_1 - B_1)} < 0$	$\frac{\{(1/MULT)m_1 + 2(1 - C_1)\}B_3}{(1 - C_1 - B_1)} < 0$
Fiscal policy					
G	$\frac{1}{(1 - C_1 - B_1)} > 0$	$\frac{m_1}{(1 - C_1 - B_1)} > 0$	$\frac{(1/MULT)m_1 - B_1}{(1 - C_1 - B_1)} > 0$	$\frac{B_1}{(1 - C_1 - B_1)} < 0$	$\frac{(1/MULT)m_1}{(1 - C_1 - B_1)} > 0$
T	$\frac{C_2}{(1 - C_1 - B_1)} < 0$	$\frac{m_1 C_2}{(1 - C_1 - B_1)} < 0$	$\frac{\{(1/MULT)m_1 - B_1\}C_2}{(1 - C_1 - B_1)} < 0$	$\frac{B_1 C_2}{(1 - C_1 - B_1)} > 0$	$\frac{(1/MULT)m_1 C_2}{(1 - C_1 - B_1)} < 0$

[1] See text for explanation of symbols. The expressions in this table represent the total derivatives of each endogenous variable with respect to each policy variable, holding the other policy variables constant. For example, the expression in column 1, row 3 represents the effect of e on Y when *NDA*, *RQ*, G, and T are held constant; its negative sign indicates that currency revaluation reduces income.

As regards fiscal policy, an increase in taxes reduces income and the money stock, and the same effect results from a reduction in government expenditures; these classic Keynesian conclusions are not altered as a result of the openness of the economy when the exchange rate is fixed. The capital balance deteriorates as the effective demand for money decreases, while the improvement [11] in the current balance brings an addition to the money supply. The overall balance of payments also deteriorates as the deterioration in the capital balance more than offsets the current account improvement. Opposite conclusions follow in the case of a reduction in taxes or an increase in government expenditures.

Finally, consider the effects of exchange rate policy. Suppose that the authorities decide to devalue the national currency so that e is reduced. This improves the current account balance and increases income and the money stock. The capital balance also improves as the rise in the effective demand for money more than offsets the rise in money supply derived from the current account improvement; the result is an overall improvement in the balance of payments.

IV. The Model with a Floating Exchange Rate

One of the policy choices open to the policymakers in a small open economy is to allow the level of the exchange rate to be determined by market forces (supply and demand). The rules of a "pure float" require that the monetary authorities abstain completely from intervening in the foreign exchange market, so that the value of A^f is frozen at a given level, thereby allowing the foreign exchange rate to be determined purely by market forces. Nevertheless, this does not mean that the monetary authorities cannot influence the market indirectly through domestic credit and reserve policies. Indeed, they may form a view as to what should be regarded in the country as the "appropriate" level of the exchange rate, given the country's growth goals, and may follow this up with domestic monetary adjustments. Furthermore, in practice the authorities may not relinquish completely their right to intervene directly in the foreign exchange market; in this case the exchange system becomes a cross between the fixed and floating rate systems in the sense that movements both in official reserves and in the exchange rate take place simultaneously (often referred to as dirty float). All these cases are analyzed below.

[11] No welfare connotation should be attached here to the word "improvement"; this should be read as synonymous to "increase in the accounting surplus."

OPEN FLOAT

Consider first the case of a pure float and assume that the authorities do not have a particular view as to the appropriate level of the exchange rate,[12] so that

$$A^f - A^f_{-1} = B(Y, Y^f, e) + K = 0, \tag{16}$$

and e is endogenous.

Freeing the foreign exchange rate has important consequences with regard to the determination of income and the stock of money. It will be shown that monetary policy is no longer powerless, as changes in this policy affect simultaneously the level of the exchange rate, the current account balance, income, and the equilibrium stock of money. On the other hand, fiscal policy becomes powerless as a means of controlling income and the money stock; it affects only the exchange rate and the current account balance. As in the case of an open economy with a fixed exchange rate, these results can best be discussed using the reduced form of the model.

Equations (16) and (3) through (9) imply the following money supply function:

$$M = [(A^f + NDA)][(1 + g(r)]/[g(r) + h(r) + RQ]. \tag{17}$$

This function shows that, given the interest rate as determined by condition (14),[13] the money supply is completely determined by the monetary authorities. Indeed, the money supply function becomes essentially identical to that in a closed economy (where A^f would, of course, be equal to zero). This indicates that in the case of a floating exchange rate regime, the demand for money must adjust to the supply of money through the mechanism of the exchange rate, if the equilibrium condition (9) is to be fulfilled.

Equations (1), (2), and (17), together with conditions (9) and (14), summarize the model with a clean and open floating exchange rate. Its operation may be described as follows. Given the domestic interest rate as determined by arbitrage operations in the integrated capital market and given the stock of money as determined jointly by the behavioral responses of the public and banks and by monetary policy, the foreign exchange rate, the current account balance, and national

[12] This is the typical case in the literature.

[13] As will be explained in Section VI, this involves the simplification that exchange rate expectations do not play a role in determining the domestic interest rate.

income move to that level which adjusts the demand for money to the stock of money.

The effects of monetary and fiscal policies on the economic targets are as follows (see Table 2). A tightening in monetary policy, either by a reduction in the net domestic credit of the central bank or by an increase in the required reserve ratio, has the effect of appreciating the national currency, worsening the current account balance,[14] and reducing the stock of money and the level of income; the effect on the current account balance is negative, since the deterioration in this balance resulting from the appreciation of the national currency is only partially offset by the induced decline in national income. Fiscal policies have no effect on either the stock of money or national income. It has already been noted that the stock of money in a floating rate regime is determined solely by the monetary authorities, given the behavioral relations relating to the nonbank public and banks. Furthermore, with the interest rate given exogenously, national income adjusts to the level at which the demand for money equates the stock of money; its level is therefore determined independently of fiscal policies. Restrictive fiscal policies (either an increase in taxes or a reduction in government expenditures) only depress the level of the exchange rate and improve the current account balance.

FLOATING WITH A VIEW AS TO THE APPROPRIATE EXCHANGE RATE

As has been demonstrated, the freeing of the foreign exchange rate enables the monetary authorities to influence the stock of money and income through the manipulation of the monetary policy instruments. However, monetary actions also disturb the equilibrium level of the foreign exchange rate and the current account balance, so that the monetary authorities are faced with a potential conflict between the country's income and current account goals; this happens, for instance, if they wish to *expand* income and to *reduce* the current account surplus simultaneously.[15] Income may be raised by means of expansionary monetary policies, but not without depreciating the national currency and *improving* the current account balance. This dilemma can only be resolved if fiscal policy is also set in an expansionary direction, which appreciates the exchange rate and *reduces* the current balance.

[14] Equation (16) implies that $B(Y, Y^f, e) = -K$ so that any conclusion about the current account is translatable into the reverse conclusion about the capital account.

[15] This happened in Canada from June 1970 through the beginning of 1972, following the decision of the Canadian authorities to free the Canadian dollar on May 30, 1970.

TABLE 2. EFFECTS OF POLICY INSTRUMENTS IN A SMALL OPEN ECONOMY WITH A FLOATING EXCHANGE RATE [1]

Policy Instruments	Policy Targets			
	Y	M	e	B [2]
Monetary policy				
NDA	$\frac{MULT}{m_1} > 0$	$MULT > 0$	$\frac{MULT(1 - C_1 - B_1)}{B_3 m_1} < 0$	$\frac{MULT(1 - C_1)}{m_1} > 0$
RQ	$-\frac{H \cdot MULT}{(CD + RE + RQ)m_1} < 0$	$-\frac{H \cdot MULT}{(CD + RE + RQ)} < 0$	$-\frac{H \cdot MULT(1 - C_1 - B_1)}{B_3(CD + RE + RQ)m_1} > 0$	$-\frac{H \cdot MULT(1 - C_1)}{(CD + RE + RQ)m_1} < 0$
Fiscal policy				
G	0	0	$-\frac{1}{B_3} > 0$	-1
T	0	0	$-\frac{C_2}{B_3} < 0$	$-C_2 > 0$

[1] See Table 1, footnote 1, for the interpretation of the entries in this table.
[2] Effects on capital flows are exactly the negative of the effects on the current balance, since by assumption there is no change in foreign reserves. For example, $dK/dNDA = -MULT(1 - C_1)/m_1 < 0$, so that $dK/dNDA + dB/dNDA = dA^t/dNDA = 0$.

A special case occurs when the policymakers form a particular view as to what may be regarded in the country as the *appropriate* level of the exchange rate; such a view might be based on the authorities' long-run expectations concerning the current account balance and ultimately perhaps on its bearing on the country's growth goals. The system of reduced form equations corresponding to this case is formally the same as that constructed under OPEN FLOAT—namely, equations (1), (2), and (17) with conditions (9) and (14). However, e is now to be considered a given datum, while the policymakers are faced with the task of determining which values of the policy instruments are consistent with the exchange rate in mind, given the desired level of income. It will be shown that this situation calls for a unique coordination of fiscal and monetary policies.[16]

Differentiating equations (1), (2), and (17) totally with respect to income, the exchange rate ($d\bar{e} = 0$), and all the policy variables[17] yields the following system of equations:

$$dY = C_1 dY + C_2 dT + dG + B_1 dY$$

$$dM = m_1 dY$$

$$dM = MULT\, dNDA$$

which may be solved for dY as

$$dY = (dG + C_2 dT)/(1 - C_1 - B_1) = MULT\, dNDA/m_1. \qquad (18)$$

Equation (18) sets precisely the condition for an exact fiscal policy counteraction to the exchange rate effect derived from monetary policy if a desired change in income is to be achieved without affecting the exchange rate. Failing this unique coordination, monetary and fiscal policies would either have a destabilizing effect on the level of the exchange rate or a self-defeating effect on achievement of the income goal, or both.

It should be noted that operating a purely floating exchange rate system without fluctuations in the exchange rate is like operating a fixed exchange rate system without changes in net foreign assets of the central bank; the coordination of fiscal and monetary policies called for is the same in the two cases. However, there may be differences between the two situations in the implementation of the policy-coordinating effort. In the fixed exchange rate case, movements in foreign assets resulting from

[16] A similar case was analyzed by Dernburg (1970).

[17] For simplicity it is assumed here that no changes in the required reserve ratio are introduced ($dRQ = 0$).

lack of appropriate coordination between monetary and fiscal policies need not induce corrective action by the policymakers in the short run; thus concentration on the income goal may eventually lead to a balance of payments crisis and to the need to alter the exchange rate. On the other hand, in a pure float, excessive concentration on preserving the stability of the exchange rate may throw the burden of the adjustment on income; but, in practice, since it is unlikely that the policymakers would lose sight of the income goal, it could well be that this system puts maximum pressure on them to find the special combination of monetary and fiscal policies that will result in simultaneous external and internal balance. Nevertheless, this system cannot be expected to work perfectly, since the adjustments in monetary and fiscal policies required to maintain the stability of the exchange rate will generally be known to the policymakers only after observation of the actual exchange rate tendency. For this reason, the monetary authorities will probably seek some degree of flexibility in their commitment not to intervene directly in the foreign exchange market, as intervention will enable them to remove some of the pressure from the system.

DIRTY FLOAT

From the point of view of the small open economy, preference for a dirty float exchange system (in which movements both of the exchange rate and of foreign assets held by the central bank are allowed) is understandable, since such a system permits the authorities to lean in favor of either alternative depending on the circumstances. On the other hand, this pragmatic arrangement has often been criticized by those who think that it gives the national authorities too much discretionary power which may be used to pursue exchange rate policies of a beggar-thy-neighbor nature and detrimental to the world community. Nevertheless, this criticism of the dirty float is not entirely correct since, as will be discussed below, there is no effect from direct intervention policy that could not also have been obtained through the appropriate manipulation of monetary policy under a pure float. The issue is more one of practicality in a world with fast-changing domestic and international conditions.

Assume first that the monetary authorities have unrestrained intervention power, so that A^f becomes a genuine policy instrument.[18] In order to raise the level of income, the authorities may purchase foreign

[18] The system of reduced form equations corresponding to this case involves only a slight generalization of that under OPEN FLOAT above: A^f becomes an exogenous variable, rather than a constant, in equation (17), and equation (5) replaces equation (16), again with A^f as an exogenous variable.

exchange (that is, raise A^f), thereby inducing a depreciation of the national currency and an improvement in the current account balance. Nevertheless, the same result could have been obtained by means of an expansionary monetary policy under a pure float,[19] as shown in Table 2. It follows then that intervention policy cannot be used to neutralize changes in the exchange rate derived from monetary policy without making it self-defeating as a device for stabilization of income. Again, although intervention policy could be used to offset the exchange rate effect arising from fiscal policy so as to make this policy effective under a floating system, the stability of the exchange rate could also be achieved through an expansionary domestic credit policy; the choice is a matter of practicality. Intervention policy might be used, however, as an expeditious means of correcting excesses in the country's own stabilization measures based on monetary policy.[20]

Consider now the special case in which intervention in a floating rate system is limited to softening the destabilizing effects on the exchange rate arising from either domestic stabilization policies or from other exogenous shocks to the economy. This is sometimes known as intervention policy limited to "maintaining orderly market conditions," which means that the authorities are intent on breaking sharp day-to-day fluctuations in the exchange rate while letting it drift in any direction in the longer run. In practice, this policy implies that the central bank stands ready to purchase (sell) foreign reserves whenever the exchange rate tends to appreciate (depreciate). Instead of equation (16), the following equation now applies:

$$A^f - A^f_{-1} = E(e - e_{-1}); E_1 > 0 \tag{19}$$

where E is a functional form. With this change, equation (17) becomes

$$M = [E(e - e_{-1}) + A^f_{-1} + NDA][1 + g(r)]/[g(r) + h(r) + RQ]. \tag{20}$$

Finally, from equation (19) and the balance of payments identity, equation (5), it also follows that

$$B(Y, Y^f, e) + K = E(e - e_{-1}). \tag{21}$$

[19] There is a difference with regard to capital flows: in a pure float the improvement in the current balance is exactly offset by a deterioration in the capital balance; in the case of an increase in A^f the capital balance cannot deteriorate as much and it may even improve.

[20] Yet another advantage of intervention policy is that it permits the authorities to build up a stock of international reserves which may become very useful if it should return to a fixed rate system.

The system of reduced form equations consists of (1), (2), (20), and (21), with the explicit endogenous variables Y, e, K, and M. (B and A^f are also determined endogenously.) Exogenous to the system are the fiscal and monetary policy instruments (r, Y^f) and the lagged values of e and A^f.

The solution to this system for the effects of changes in the policy variables on the endogenous variables always yields results which are between those of the pure floating and fixed exchange rate systems (see Table 3). In this hybrid system, domestic credit policy is still effective as a means of determining income but less so than in the case of the pure float, since part of the effect is leaked through intervention policy, which prevents the exchange rate from changing as much as it does in the pure float and thereby reduces its impact on the current account balance. On the other hand, fiscal policy regains some of its effectiveness as an income-stabilizing device to the extent that the offsetting movements in capital flows, the exchange rate, and the current balance, which are characteristic of the pure float, are counteracted by intervention policy; the money supply is affected in the same direction as the initial change in fiscal policy.

V. Capital Controls and Their Effects on Other Economic Policies

This section analyzes the working of the economy under nonmarket policy restrictions on the international mobility of capital. The immediate consequence of a policy of capital controls is to prevent the functioning of the interest rate arbitrage mechanism, which means that the domestic interest rate will then be affected by decisions regarding the money supply, the exchange rate, and fiscal policy. It is assumed here that capital controls, if instituted, will apply to all sectors of the economy, so that no loopholes in the application of the policy are permitted.

Assume then that the policymakers wish to fix the *net* amount of capital inflows (or outflows) and that they do this by imposing a direct capital control regulation. This is represented by

$$K = \overline{K} \tag{22}$$

where $\overline{K}$ is the net amount of capital flows allowed by the policymakers and condition (14) no longer applies. The consequences for the effectiveness of other policies under fixed and floating exchange rate regimes will first be analyzed and then the effects from the introduction of changes in capital controls themselves will be discussed.

TABLE 3. EFFECTS OF POLICY INSTRUMENTS IN A SMALL OPEN ECONOMY WITH A FLOATING EXCHANGE RATE TEMPERED BY MOVEMENTS OF RESERVES (DIRTY FLOAT) [1]

Policy Instruments	Policy Targets					
	Y	M	e	K	B	A^f
Monetary policy [2]						
NDA	$\frac{-MULT\,B_3}{D} > 0$	$\frac{-MULT\,m_1B_3}{D} > 0$	$\frac{-(1-C_1-B_1)MULT}{D} < 0$	$\frac{MULT\{(1-C_1)B_3-(1-C_1-B_1)E_1\}}{D} < 0$	$\frac{-MULT(1-C_1)B_3}{D} > 0$	$\frac{-(1-C_1-B_1)E_1}{D} < 0$
Fiscal policy [2]						
G	$\frac{MULT\,E_1}{D} > 0$	$\frac{MULT\,m_1E_1}{D} > 0$	$\frac{m_1}{D} > 0$	$\frac{-MULT\,E_1B_1-m_1(B_3-E_1)}{D} > 0$	$\frac{MULT\,B_1E_1+B_3m_1}{D} < 0$	$\frac{m_1E_1}{D} > 0$

[1] See Table 1, footnote 1, for the interpretation of the entries in this table. Note that $D = (1 - C_1 - B_1)\ MULT\ E_1 - m_1B_3 > 0$.

[2] The effects on the economic targets from changes in the alternative monetary and fiscal policy variables (RQ and T, respectively) have been omitted from this table, since they are necessarily opposite to those shown here.

FIXED EXCHANGE RATE CASE

The model of a small open economy with capital controls under a fixed exchange rate system consists of equations (1) through (9), together with condition (22) and the further condition that e is constant. This model simultaneously determines Y, r, M, B, and A^f, given the monetary and fiscal policy instruments, the exchange rate, and foreign income. Its functioning may be summarized as follows. The supply of money is determined by the monetary authorities, given the exogenous amount of permitted capital flows and foreign income and the endogenously determined domestic interest rate and income. The demand for money is also a function of the domestic interest rate and income. Income adjusts to a level consistent with the fixed exchange rate and the domestic interest rate. The latter finds its equilibrium at the level at which the demand for money and the supply of money are equated, given the level of income. In the process, the current account balance is also determined by the level of income, given the exchange rate, and this, together with the amount of permitted capital flows, determines the balance of payments.

Equations (3) through (8) and (22) may be combined to derive the following expression for the money supply:

$$M^s = [A^f_{-1} + B(Y, Y^f, e) + \bar{K} + NDA] \\ [1 + g(r)]/[g(r) + h(r) + RQ]. \tag{23}$$

Equation (23), together with the income determination equation (1), the demand for money equation (2), and the equilibrium condition (9) constitutes the reduced form of the model. The effects of the policy instruments on the endogenous variables are shown in Table 4.

As in the case of a strictly closed economy, expansionary monetary policies (either an increase in NDA or a reduction in RQ) tend to lower the domestic interest rate and to raise the level of income. However, other secondary effects tend to offset this expansion: the increase in income tends to worsen the current balance, thereby reducing the monetary base; the decline in the domestic interest rate reduces the money multiplier. Nevertheless, these secondary effects do not completely offset either the rise in income or the decline in the domestic interest rate; the stock of money rises by more than the rise in income, as required by the demand for money condition.

A devaluation of the national currency in terms of the foreign currency improves the current account balance and thereby raises income and the stock of money, the latter through the increase in the monetary

TABLE 4. EFFECTS OF POLICY INSTRUMENTS IN A SMALL OPEN ECONOMY WITH A FIXED EXCHANGE RATE AND CAPITAL CONTROLS [1]

Policy Instruments	Policy Targets			
	Y	M	B	r
Monetary policy [2]				
NDA	$\frac{MULT\, I_1}{\Delta} > 0$	$\frac{MULT\{m_1 I_1 + m_2(1-C_1-B_1)\}}{\Delta} > 0$	$\frac{B_1\, MULT\, I_1}{\Delta} < 0$	$\frac{MULT(1-C_1-B_1)}{\Delta} < 0$
Exchange rate				
e	$\frac{B_2(MULT\, I_1 - H\cdot Q)}{\Delta} < 0$	$\frac{MULT\, B_2\{m_1 I_1 + (1-C_1)m_2\} - m_1 B_2 H\cdot Q}{\Delta} < 0$	$\frac{B_2\{m_1 I_1 - (1-C_1)H\cdot Q + m_2(1-C_1-B_1)\}}{\Delta} < 0$	$\frac{B_2\{MULT(1-C_1) - m_1\}}{\Delta} \gtrless 0$
Fiscal policy [2]				
G	$\frac{-H\cdot Q + m_2}{\Delta} > 0$	$\frac{MULT\, B_1 m_2 - m_1 H\cdot Q}{\Delta} \gtrless 0$	$\frac{B_1(-H\cdot Q + m_2)}{\Delta} < 0$	$\frac{-m_1 + MULT\, B_1}{\Delta} > 0$

[1] See Table 1, footnote 1, for the interpretation of the entries in this table. Note that $\Delta = -(1 - C_1 - B_1)H\cdot Q + m_1 I_1 - MULT\, B_1 I_1 + m_2(1 - C_1 - B_1) < 0$, where

$$Q = \frac{g_1 - MULT(g_1 + h_1)}{CD + RE + RQ} = dMULT/dr > 0.$$

[2] See Table 3, footnote 2, for the reason for omitting the alternative monetary and fiscal policy variables.

base. The effect on the domestic interest rate is not determinate, since the increase in the money stock tends to lower the interest rate while the increase in income tends to raise it; the outcome depends on various parameters of the model.

The effects of expansionary fiscal policies (either an increase in G or a reduction in T) on income and the current account balance are similar to those derived from expansionary monetary policies. However, the effect on the domestic interest rate is opposite to that of expansionary monetary policies—that is, an increase in G raises the domestic interest rate. Furthermore, as both income and the interest rate are pushed in the same direction, the stock of money can move either way in accordance with the motives for holding money as represented in the demand for money function.

FLOATING EXCHANGE RATE CASE

A floating exchange rate system ensures domestic control of the monetary base; the money supply is endogenous only to the extent that the money multiplier reacts to changes in the interest rate (as in equation (17) with r endogenous).[21] The simultaneous application of capital controls further means that the current balance is determined at the level, with opposite sign, of the policy-determined capital flows (as in equation (16) with condition (22)); movements in the exchange rate ensure that this equilibrium is reached by moving in the direction of offsetting movements in the other two determinants of the current balance. It follows that the determination of income, of the money stock, and of the interest rate is independent from the determination of the foreign exchange rate; the system of reduced form equations which determines these variables consists of the income determination equation (1)—with $B = -\bar{K}$—the demand for money equation (2), and the supply of money equation (17), together with conditions (9) and (22). It will be noted that this situation brings about the same effects from fiscal and monetary policies on these variables as would a strictly closed economy (see Table 5).

In an economy already subject to capital controls, floating does not essentially alter the consequences derived from monetary and fiscal policy actions, but it tends to increase the intensity of their effects on income, as offsetting endogenous changes in the monetary base through changes in the current balance are washed out by movements in the

[21] Laursen and Metzler (1950) considered the case of flexible exchange rates in the absence of capital mobility.

TABLE 5. EFFECTS OF POLICY INSTRUMENTS IN A SMALL OPEN ECONOMY WITH A FLOATING EXCHANGE RATE AND CAPITAL CONTROLS [1]

Policy Instruments	Policy Targets			
	Y	M	e	r
Monetary policy [2]				
NDA	$\frac{MULT \cdot I_1}{\delta} > 0$	$\frac{MULT\{m_1 I_1 + m_2(1 - C_1)\}}{\delta} > 0$	$\frac{-(B_1/B_3)MULT\, I_1}{\delta} < 0$	$\frac{MULT(1 - C_1)}{\delta} < 0$
Fiscal policy [2]				
G	$\frac{-H \cdot Q + m_2}{\delta} > 0$	$\frac{-H \cdot Q\, m_1}{\delta} > 0$	$\frac{-(B_1/B_3)(-H \cdot Q + m_2)}{\delta} < 0$	$\frac{-m_1}{\delta} > 0$

[1] See Table 1, footnote 1, for the interpretation of the entries in this table. Note that $\delta = (1 - C_1)(m_2 - H \cdot Q) + m_1 I_1 < 0$, where Q is as defined in Table 4, footnote 1.

[2] See Table 3, footnote 2, for the reason for omitting the alternative monetary and fiscal policy variables.

exchange rate. As in the case of a fixed exchange rate, expansionary monetary policies increase the money stock and lower the interest rate, but instead of resulting in a deterioration in the current account balance they now lower the foreign exchange rate. Expansionary fiscal policies raise the interest rate, as in the case of a fixed exchange rate system. However, the sign of the effect on the money stock now becomes determinate and in the same direction as income, as a result of having eliminated the endogeneity of the monetary base.

EFFECTS FROM CHANGES IN CAPITAL FLOW RESTRICTIONS

It remains to point out the direct consequences for the target variables from regulations concerning the amount of capital flows. Assume first that the country is operating under a fixed exchange rate system. From the reduced system of equations (1), (2), and (23) and equilibrium condition (9), it can be seen that a change in policy providing for a larger amount of net capital inflows (or a smaller amount of net capital outflows) will have the same effects as an increase in the net domestic credit of the central bank. This follows immediately from the way K occurs symmetrically with NDA in the money supply equation (23). This observation immediately helps to clarify the effects derived from the introduction of controls themselves. Since a country may advocate policies either to shrink or to augment the amount of net capital inflows, these two cases will be considered separately.

Assume that the underlying structural features of the small open economy are such that, in the absence of capital controls, it has a *net* capital *inflow* ($K > 0$).[22] This net capital inflow results from arbitrage operations in the international capital market which are undertaken whenever there is a disequilibrium between the domestic (higher) and the foreign (lower) interest rates, so that the domestic interest rate adjusts downward toward the level of the foreign rate. If in such an economy the policymakers impose a regulation curtailing the *net* amount of capital *inflows*,[23] the domestic interest rate will rise above the international level, and income and the stock of money will be reduced. An interesting question is whether it would be possible to offset these deflationary effects from introducing capital inflow restrictions by manipulating other policy instruments simultaneously without nullifying the *effectiveness* of the restrictions themselves. It will become apparent

[22] One way to visualize this is by assuming certain values for the exogenous variables and the parameters of the model such that $K > 0$.

[23] The following arguments would also apply to a policy of increase of *net* capital *outflows*.

that this is not possible through the use of monetary policies but could be achieved by means of fiscal policies.

To compensate for the reduction in income and the stock of money as a result of the introduction of capital controls, the monetary authorities could expand *NDA* (or alternatively reduce *RQ*). However, it should be noted that income and the stock of money would not recover to the former level unless the expansionary policy reduced the level of the domestic interest rate to what it would have been without the use of capital controls. This result would occur because, as noted earlier, the effects of changes in capital are symmetrical to those of changes in *NDA*. At this point the capital controls on net inflows would cease to be operative, as a further expansion in *NDA* would lower the capital inflow below the authorized limit. In conclusion, then, capital inflow controls cannot be used to free monetary policy so as to provide it with the power to expand income beyond what the country could achieve without them. Indeed, they invariably lower income (given the stance of fiscal policy) if they are effective. In recognition of this fact, it appears that capital inflow controls are generally used only when income restraint is desired.

Expansionary fiscal policy could effectively be used to avoid income restraint in the short term if reduced capital inflows were desired for reasons other than reducing income. The domestic interest rate would rise as a result of both the capital inflow control and the pressure from expansionary fiscal policy, thereby reducing investment. However, this deflationary effect would be more than offset by the direct effect of fiscal policy on income.

Turning now to a policy designed to increase the *net* amount of capital *inflows* [24] (that is, a policy of control of capital outflows), it is apparent that such a policy lowers the domestic interest rate below the equilibrium rate that would be attained without capital controls and increases income and the stock of money. With a fixed exchange rate the current balance deteriorates. The expansionary effects on income and the stock of money cannot be offset by use of a contractionary monetary policy unless this re-establishes the equilibrium level of the domestic interest rate that would prevail in the absence of capital outflow controls. Therefore, given the stance of fiscal policy, capital outflow controls are invariably expansionary. In addition, they permit further income expansion through the use of expansionary monetary policies. In the case of an open economy with a fixed exchange rate and free capital move-

[24] The following arguments would also apply to a policy of reduction of *net* capital *outflows*.

ments, these policies would merely result in increased capital outflows (or reduced capital inflows); however, when capital outflows are restricted, the domestic interest rate adjusts downward and income and the stock of money tend to rise. Contractionary fiscal policies could be used to offset the expansionary effect of capital outflow controls if reduced capital outflows were desired for reasons other than raising income. The domestic interest rate would be pushed further downward, but this expansionary effect would be offset by the direct effect of the restrictive fiscal policies on income.

The effects from the introduction of, or changes in, capital controls are different if the country is operating under a floating exchange rate system. Thus, a capital inflow control improves the current account balance through currency depreciation because the net change in foreign assets must equal zero; as there is no change in the monetary base, the improvement in the current account balance raises income. An opposite income effect is obtained in the fixed exchange rate case because the reduction in the monetary base resulting from the capital inflow control reduces the money stock and income and raises the domestic interest rate.

VI. Summary, Conclusions, and Limitations

This paper has analyzed the working of monetary, exchange, and fiscal policies in a small open economy under fixed and floating exchange rate systems and with and without capital controls. A simple Keynesian-type model, specified in Section II, was shown to comprise all these cases as particular situations of the general structure of the small open economy. A distinctive assumption of the open economy is that, in the absence of government capital controls, interest rate arbitrage operations are efficient in the sense that differences between the domestic and the foreign interest rates are inconsistent with the profit-seeking behavior of arbitrageurs. A substantial amount of evidence in favor of this assumption is provided by the experience of most industrial countries today, mainly economies that are open toward each other and are subject to only limited capital controls. The assumption of a small economy further means that the domestic interest rate adjusts to the foreign interest rate. This interest rate equalization condition fails to represent economic behavior only if government capital controls or some other form of credit rationing are instituted.

Sections III and IV considered the case of perfect capital mobility under fixed and floating exchange rates, respectively. It was shown in Section III that the interest rate equalization equation and the implied

flow of international capital render monetary policy ineffective in a small open economy with a fixed exchange rate. It should be emphasized, however, that this conclusion was based on a polar case. No short-run dynamic departures from the equilibrium situation that could affect the results were considered. Examples of such disequilibria might be instability in the demand for money function or in the response of the domestic to the foreign interest rate. Instability of the demand for money has indeed been cited as one of the main factors for the lack of predictability of monetary policy actions; however, this proposition applies to the closed as well as to the open economy. Instability in the interest rate arbitrage condition would further weaken the basic conclusion that income is not affected by monetary policy actions in a small open economy with a fixed exchange rate. Furthermore, if interest rate disequilibria were predictably related to such policy actions, this factor could provide some leverage to the monetary authorities. It would be difficult, however, to substantiate that this is the case in most open economies today.

Floating of the foreign exchange rate (that is, adopting a policy of nonintervention in the foreign exchange market) provides the monetary authorities with leverage in determining the level of income; monetary policy actions affect simultaneously the level of the exchange rate, the stock of money, and the level of income. However, fiscal policy is now rendered ineffective as a means of controlling income; its only effect is felt on the exchange rate. Nevertheless, a further note of caution should be added in interpreting these results, since they are based on the very rough assumption that the interest rate equalization condition is not affected at all by the float. Mean variance analysis suggests that this assumption would not be strictly true and that there would be some scope for interest rates to vary between the country in question and the rest of the world, depending upon the private sector's net asset position.

The conclusions derived from the floating rate model are negated to the extent that the policymakers form a particular view about the appropriate level of the exchange rate and direct monetary and fiscal policies not only to maintain a target level of income but also to preserve the stability of the exchange rate. In the extreme case that the authorities succeed fully in maintaining the level of the exchange rate that they consider most appropriate for the long run without any intervention in the exchange market, the combination of monetary and fiscal policies that would be called for would be the same as that required to avoid movements of international reserves under a fixed exchange rate regime.

In one important respect, however, a floating system with a view as to the appropriate exchange rate remains different from a fixed exchange rate system. Since the monetary authorities adopt a posture of nonintervention in the foreign exchange market, the only way they can control the exchange rate is by attuning their monetary and fiscal policies to that effect. In this sense it may be said that monetary and fiscal policies under a floating rate system with a view as to the exchange rate are forced to be "right" for external balance; for if they were not, the effect would soon be translated into movements in the exchange rate which would signal the need to change the course of these policies. This situation is in contrast to that under a fixed exchange rate system, or system of parity intervention, in which the policymakers may manipulate monetary and fiscal policies without immediate regard as to effects on the balance of payments and much less as to effects on the exchange rate, since it may be controlled by direct intervention. Therefore, the fixed exchange rate system is more likely to yield policies that will bring about recurrent crises of the exchange rate and the balance of payments—particularly when the monetary authorities are lured into believing that they can use monetary policy to affect income and employment. On the other hand, in a floating rate system with a view as to the appropriate exchange rate, the policymakers run greater risks of applying fiscal and monetary policies that are income destabilizing since much effort will necessarily be concentrated on maintaining the stability of the exchange rate and the balance of payments.

In practice it is very difficult to maintain perfect short-run stability of the exchange rate solely by means of monetary and fiscal policies. For this reason, the monetary authorities may be prompted to adopt a policy of partial intervention in the foreign exchange market. The result is a pragmatic arrangement between the fixed and the floating exchange rate systems, often called the dirty float, which gives the monetary authorities maximum flexibility to lean in favor of either system, depending on the circumstances. Such arrangement appears at first sight to confer on the monetary authorities too much discretionary power to pursue nationalistic policies. However, it must be noted that this view appears somewhat misplaced since there are no special results that can be obtained with this arrangement that could not have also been obtained with a pure float.

Capital controls affect the working of monetary, fiscal, and exchange rate policies (Section V). Effective controls of either capital inflows or outflows in a fixed exchange rate system imply that monetary and fiscal policies will have income effects similar to those of a strictly closed

economy, since capital controls eliminate the endogeneity of the monetary base that derives from capital movements. This conclusion with regard to the effectiveness of monetary and fiscal policies under capital controls is naturally reinforced if the exchange rate is floating, because this eliminates entirely the endogeneity of the monetary base. However, the effects from the introduction of, or changes in, capital controls are different under fixed and floating rate systems. Imposition of a capital inflow control improves the current account balance and raises income under a floating rate system because the net change in foreign assets must equal zero, while it reduces the money stock and income under a fixed exchange rate system because of the decline in foreign assets. It should be noted that in the fixed exchange rate case there is only one way to raise income by means of capital controls: namely, by curtailing the *net* amount of capital outflows (raising the *net* amount of capital inflows) so that the domestic interest rate falls below the equilibrium rate which would prevail in the absence of capital controls. It should also be noted in that case that it is not possible to offset the deflationary (expansionary) effects resulting from capital inflow (outflow) restrictions by means of monetary policy; income and the stock of money would not reach the former level unless monetary policy moved the domestic interest rate back to the level that would have prevailed in the absence of capital controls, at which point capital controls would cease to be operative. In recognition of these facts, it appears that capital inflow (outflow) controls are generally used only when income restraint (expansion) is desired. Fiscal policy, on the other hand, could in principle be used to offset the income effects derived from any desired capital flow restrictions.

In most small open economies today, net inflows of capital are the rule. Interest rates are normally somewhat above interest rates in the United States, and they could be expected to be much higher if capital movements were abolished. This means that investment in those countries would be curtailed from their present levels if the countries decided to eliminate capital movements; income would then be lowered. However, it cannot be sufficiently emphasized here that these considerations do not necessarily extend to the long-run effects of capital flows. For instance, no consideration is given to the danger that excessive capital inflows may in the long run create a serious debt service problem.

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