Chapter IX

BARTER THEORY AND THE MONETARY MECHANISM OF ADJUSTMENT

The distinction between the short run mechanism of balance of payments adjustment and the static theory of barter was an important dimension of the classical dichotomy between monetary theory and value theory. This dichotomy was a powerful tool of analytical abstraction that enabled a separation of long run static analysis from short run dynamics. In dynamical, short run, disequilibrium theory monetary elements assume a role of first-order importance in the adjustment process. But after the adjustment process is completed money turns out to be a mere veil, with no influence upon the nature or position of long run equilibrium. The task of exposition in classical theory, therefore, was to demonstrate the automaticity of equilibrium through examination of the adjustment process, and through this demonstration, the unimportance, in the long run, of monetary phenomena.

The demonstration of the automaticity of balance-of-payments adjustment in the field of international trade theory was a companion to, although it antecedes, the demonstration of a different kind of automaticity in value theory. In a closed economy the system tended automatically toward a full employment equilibrium, on the premise that money wages were flexible, and it was an equilibrium not affected, in any fundamental way, by the amount of money in the system. Whatever the temporary effects of a change in central
bank policy, the money supply had no influence upon the equilibrium rate of interest or the real wage. Instead, money exerted its influence merely upon the price level and the level of money wages. Since money could not alter either the level of real wages or the rate of interest, it could not affect the equilibrium level of any real magnitude in the economic system, and the path was cleared for long run analysis and abstraction from purely monetary phenomena.

In an open economy linked to the rest of the world by international trade and the gold standard, on the other hand, the central bank could not even affect the quantity of money in the system unless the country was large enough to influence, by itself, the world price level. Whereas in a closed economy the central bank could determine the nominal quantity of money, and the public, through spending or hoarding it, could determine its real value, in an open economy any excess of new money creation over desired hoarding would escape down the foreign drain. An overissue of money by the banking system would quickly bring its own corrective, as specie flowed out and forced the banks to take back the redundant currency, or else suffer a depreciation of the gold value of bank notes. The nominal quantity of money was thus determined in a single economy by international considerations and the barter terms of trade could not be affected permanently by purely monetary disturbances.

To have perceived the essential truth of these propositions, which even today exhibit a fundamental truth, was the supreme intellectual achievement of classical economic analysis. Through this theory mercantilist fallacies could be refuted and the way paved for the emphasis on the doctrine
of free trade and other real phenomena, the only considerations that mattered in the long run. Ricardo's love was not the short run dynamic mechanism which he exposted so brilliantly but the long run theory of international barter.

The success of the dichotomy proved too overwhelming — epistemologically. In the hands of the successors of Ricardo — Mill, Marshall, Taussig, Viner, Meade, Johnson and others — the long run barter theory of trade developed into a carefully tooled and highly sophisticated engine of analysis. But there was no comparable theoretical development of the short run monetary theory of the adjustment process. Whereas the barter theory of trade exploited the powerful geometric and algebraic tools that became prominent in value theory, permitting analytical developments surpassing the possible achievements of unaided intuition, international monetary economics analysis never received precise mathematical formulation. Restrained by limited techniques international monetary analysis could not and did not develop the rigorous base necessary for an orderly accumulation of scientific knowledge.

This has meant that even today we have a double standard: We demand rigorous logic from practitioners of the fine art of offer curve analysis, in striking contrast to much looser standards exacted in international monetary economics. Attacking the real world from a lower level of abstraction, international monetary economics offers the semblance of realism more than does barter theory, but it is achieved at the sacrifice of precision and rigor.

My purpose is not to denigrate the important developments in international monetary economics in the last two decades, but only to emphasize that these developments have not succeeded in integrating, or even coordinating classical monetary theory with classical barter theory. Innovations since the
1930's have concentrated on the application of Keynesian economic concepts to the international sphere, rather than on the integration of Keynesian international economics with either classical barter theory or classical international monetary economics.

To a certain extent this characteristic of the discipline has been a natural one. The 1930's simultaneously witnessed two important revolutions: one in macroeconomics, led by Keynes, Hayek and others, and one in technique led by Tinbergen, Frisch, Leontief, Samuelson and others. What used to be called the "new economics" took over the tools of the mathematicians, so that Keynesian economics applied to international trade inevitably assumed a mathematical garb. In this respect the sophistication of the Keynesian theory in international monetary economics far surpassed the theoretical accomplishments of writers brought up on the older classical tradition, while the original dichotomy between monetary and barter models yet enabled the mathematicians to explore further implications of the barter model.

Bridges are necessary between the barter and the monetary models, on the one hand, and between the classical and Keynesian traditions in international economics, on the other. This need is, I think, obvious and needs no further elaboration. But, how should money be "added" to barter models of trade, and how can classical analysis be united with Keynesian concepts?

The general purpose of this paper is to start building the bridges: specifically, to build connecting links between classical international monetary economics and the theory of barter, and between classical and Keynesian concepts and methods of analysis. The first bridge requires the development of an explicit theoretical model of the classical balance of
payments adjustment process which can be shown to be reducible, under not implausible assumptions, to a barter model; the second requires that the model can be expressed either in the classical language of the Quantity Theory of Money, or in the Keynesian language of income-expenditure equalities. I shall make two assumptions that in subsequent work/should be generalized: one is that the country under consideration is a small economy looking outward on a large world, the other is that it lacks a credit market. These simplifications are not damaging to the logical structure of the model, though they do limit the direct applicability of the conclusions to a small country that is underdeveloped in the sense that it lacks an important capital market.

Despite the simplicity of the model, I would maintain that it is of direct use in analyzing simple open economies, and in that spirit I have discussed the effects of devaluation, income transfers, budget deficits and reserve accumulation, and not made any attempt to conceal what I believe to be the implications for purposes of economic policy.

INCOME, EXPENDITURE AND THE QUANTITY OF MONEY

The model I shall develop owes its origin to David Hume. Based on a very simple open economy, it assumes that wealth is held in the form of money and goods. The key assumptions that greatly simplify the analysis is that there is no market for securities and that the world price of imports is given by considerations outside the model. For the richer countries we would need to take explicit account of...
of capital markets, and for the larger countries we would need to consider changes in the foreign price of imports. For the bulk of the underdeveloped world however these complications would be unnecessary in an analysis the prime goal of which is to elucidate the balance of payments adjustment process.

Consider such a simple economy. The demand for money depends on money income or, assuming output is given, the price level, in accordance with the Quantity Theory of Money. The supply of money is determined by the balance of payments, either because international reserves and domestic money are the same, as under a gold specie standard, or because domestic money is rigidly linked to the stock of international reserves through the banking system.

Three conditions must be met before the system can be said to be in equilibrium. First, the supply of money must be equal to the demand for money; second, the balance of payments must be in equilibrium; and third, the demand for domestic output must equal the supply of domestic output. If the first condition were not met there would be a tendency for spending to exceed or fall short of income; if the second were not met the money supply would be increasing or decreasing; and if the third were not met the domestic price level would be rising or falling.

The significance of the equilibrium conditions can be seen diagramatically. First let us represent the Quantity Theory of Money by placing on one axis the quantity of money, $M$, and on the other axis, the domestic price of goods, $P$. The line $LL$ portrays the amount of money that would be demanded at each price level. Thus at a price level equal to $OP_1$, the demand for money is $OM_1$; and at a price level equal to $OP_2$, the demand for money is $OM_2$. Normally $LL$ will have an elasticity exceeding unity on the assumption of the
"homogeneity postulate" of economic theory, because a proportionate change in the price level implies a less than proportionate increase in the demand for money when the price of all imported goods remains constant; for this reason LL should have an elasticity greater than unity.

Every point in Figure 1 corresponds to a particular combination of money and price level. For example, at the point G, the price level is OP₁, and the actual quantity of money is OM₂. G is not equilibrium point for it implies inequality between the demand for money and the supply of money. At G there is an excess supply of money equal to M₂M. Only if the supply of money were reduced to OM₁ would the demand for money be equal to the supply of money at the price level OP₁; or only if the price level were at OP₂ would the demand for money be equal to the supply of money OM₂.

Only points on LL are equilibrium points. Above and to the left of LL the supply of money is greater than the demand for money, and below and to the right of LL the demand for money is greater than the supply of money. The area above and left of LL is an area of excess liquidity, and the area below and right of LL is a zone of liquidity scarcity. I shall refer to the first zone as "liquid" and to the second zone as "illiquid."

From the characterization of the two zones we may now ask what happens when there is an excess or deficient level of liquidity. This is a question in economic dynamics, and can only be answered by reference to observable behaviour. The community holds money and goods, so that if they have an excess demand for money they must also have an excess supply of goods, just as an excess supply of money means that they have an excess demand for goods;
Figure 1. The State of Liquidity

\[ L = L(M, P) \]

\[ \frac{dM}{dP} = -\frac{LP}{LM} \]

\[ M > 0 \]

\[ L > 0 \]
this follows from Walras' Law that the sum of the values of excess demands for every economic object (including money) is zero for any individual economic agent.

We have not yet stated what happens in a position of excess or deficient liquidity, although we have found a clue. When there is an excess supply of money there is an excess demand for goods, and this will mean that, unless increased supplies are forthcoming, prices will rise. And similarly, when there is an excess demand for money there also is an excess supply of goods so prices will tend to fall if no additional supplies are available.

It is important to notice at this point, however, that it would not be valid to assert that the price level tends to rise depending on whether there is excess or deficient liquidity. However valid this dynamic postulate may be in a closed economy, it is incorrect in an open economy. An excess supply of money implies an excess demand for goods in general and an excess of expenditure over income, but the domestic price level would only be pushed up insofar as the excess of expenditure reflected an excess demand for domestic goods. Insofar as an excess demand for goods can be reflected in an excess demand for imports the price level will have no tendency to rise. Indeed, as the subsequent analysis will show, an excess of liquidity is entirely consistent with deflationary pressure in the market for home goods and services. 

In what follows I assume that an excess demand for foreign goods (imports) is automatically satisfied in order to avoid complicating the analysis with
the otherwise necessary distinction between the "ex ante" and "ex post" balance of payments; this assumption would be realistic enough if importers kept sufficient stocks on hand to satisfy any incipient excess demand, and were willing to accumulate stocks (and reduce orders correspondingly) in the event of any excess supply.

Domestic expenditure (expenditure by domestic residents on both home and foreign-produced goods) is assumed to depend on income (defined as domestic output times its price) and liquidity. Specifically, I assume that expenditure equals income if the community is satisfied to hold the existing stock of money, and that any excess of expenditure over income is proportionate to the excess supply of money. Thus, an excess supply of money means that expenditure exceeds income, as the community tries to rid itself of excess cash holdings; and similarly, an excess demand for money means that expenditure falls short of income, as the community tries to build up its cash holdings.

According to this assumption, expenditure equals income only when the demand for money is equal to the supply of money, so we can describe the condition of balance between the two by the LL line in Figure 1, except that we now have an additional interpretation of it. Not only is LL the line along
which the demand for money is equal to the supply of money, it is also the
line along which money expenditure is equal to money income.

We next place in the diagram (Figure 2) a line BB expressing the locus
of combinations of the price level and the money supply resulting in a zero
balance of payments; assuming for now no capital imports BB is also the line
along which the trade balance is zero. I assume that the balance of trade
depends both on domestic expenditure and the price level. As we shall see
this means that the slope of BB will normally be negative.

To see why the slope is negative consider the point Q, where income
equals expenditure (because Q is on LL) and where the balance of payments is
in equilibrium (because Q is on BB); and suppose from Q the money supply is
increased by QW. At W there is an excess supply of money so that expenditure
increases and exceeds income. Part of the increase in expenditure falls on
imports so that at W there is a balance of payments deficit.

To correct the deficit the domestic price level can be lowered to shift
both domestic and foreign demand away from foreign products onto domestic
products. There must be some lower price level at which the balance of trade
will again be in equilibrium if the system is stable. In the diagram this
point is taken to be the point Z.

We now have two schedules which intersect at an equilibrium point, Q,
at which the system will rest if it is stable. We could now proceed to an
examination of the dynamics. However, we lack one of the basic ingredients
for it. We know that the money supply will increase or decrease according to
whether the balance of payments is positive or negative, but we do not yet
know the conditions under which the price level will rise or fall. We need
Figure 2. The Balance of Trade and Liquidity
also to find the locus of combinations of money and prices at which there is no excess demand for domestic goods.

Can we derive this additional line independently of the LL and BB lines? Definitely not, for there can be only one point in the diagram that is an equilibrium point. Q is already established as the equilibrium so that the line along which there is no excess demand for domestic goods (which we shall denote as the XX line) must pass through the point Q. The XX line is not independent of the other two lines and can in fact be derived from them.

The excess demand for domestic goods is the difference between the sum of foreign and domestic demands for domestic goods and the level of output, and this is equivalent to domestic expenditure minus imports plus exports minus output when these variables are all expressed in units of home goods. In other words the excess demand for domestic goods is equal to the difference between the sum of domestic expenditure plus the balance of trade, and income. Thus, by "adding" the BB and LL curves we get the XX curve, the locus of money and price levels along which there is no excess demand for domestic goods.

It is easy to determine the position of XX in Figure 3. It must have a positive slope that is steeper than LL. To demonstrate this fact let \( E = \) expenditure, \( Y = \) income, and \( B = \) the balance of trade.

Then consider, in Figure 3, the point V on LL. At V, \( E = Y \), so the excess demand for domestic goods \( (X = E + B - Y) \) is equal to the balance of trade surplus \( (B) \). But \( B \) is negative since V is in the deficit zone above and right of BB. Hence, there is excess supply of domestic goods that can be corrected only by a decrease in the domestic price level or a liquidity-induced increase in expenditure. Thus, in Figure 3, an increase in the money supply of VW would
Figure 3. Liquidity, the Balance of Trade and Excess Demand

\[ L = \text{elastic demand for money} \]

\[ \text{LM}^- \]

\[ B^7 \rightarrow \text{Surplus} \]
eliminate the excess supply of domestic goods as would a decrease in the price level by the amount UV.

THE ANATOMY OF DISEQUILIBRIUM AND DYNAMICS

Having established the new line XX, as derived from the BB and LL lines, we can note that we could have begun with any two of the lines in order to get the third line. Knowing XX and BB we can deduce LL; knowing LL and XX we can deduce BB; and knowing BB and LL we can deduce XX (as we did in fact). No one of the lines has any priority over the other.

The interdependence of the three curves does not mean, however, that it is not useful to keep all three of the curves in mind. Instead of the four zones of Figure 2 we now have six zones in Figure 3 -- repeated in Figure 4. The elaboration of the meaning of these zones can help us to determine exactly the nature of the disequilibrium. The six zones are characterized by the state of

\[ \text{Demand for Money} \]

\[ \text{EXCESS LIQUIDITY} \quad (L) \]

\[ \text{THE BALANCE OF PAYMENTS} \quad (B) \]

\[ \text{INFLATIONARY PRESSURE} \quad (X) \]

which are denoted positive or negative by the inequality signs in Figure 4.

The separation of the zones is useful for policy purposes because it helps to determine the direction in which the money supply or price level should be adjusted to reach equilibrium. Thus, if we observe a situation in which \( B < 0 \) and \( X > 0 \), we know that the money supply must be reduced; if \( B < 0 \) and \( X < 0 \), the price level must be reduced; if \( B > 0 \) and \( X < 0 \) the money supply must be increased; and if \( B > 0 \) and \( X > 0 \) the price level must be
Figure 4. Anatomy of Disequilibrium

\[ \frac{dM}{dP} = \frac{-LP}{LM} = \frac{BP}{Bm} = \frac{-LP}{\delta m} \]

- \( LP > 0 \)
- \( Lm < 0 \)
- \( BP > 0 \)
- \( Bm < 0 \)
- \( LP < 0 \)
- \( M < 0 \)
increased. We can observe the disequilibrium situation, and, even though we be ignorant of the exact shapes of the curves, deduce the direction in which the money supply and the domestic price level have to move to restore equilibri-rium.

The development of the XX line along with the anatomy of disequilibrium zones allow greater precision in formulating the dynamics of the system. It can be postulated that the money supply increases or decreases according to whether the balance of payments is in surplus or deficit, and that the price level rises or falls according to whether there is inflationary or deflationary pressure (excess demand or supply of domestic goods). In other words the

/ More refined dynamic analysis would take account of all markets in the formulation of dynamic hypotheses, as suggested in the appendix.

line demarcating price level increases from price level decreases over time is the XX line and that distinguishing increases from decreases in the money supply is the BB line. The dynamic forces are indicated by the arrows in Figure 5.

From a disequilibrium point like W, which could ensue from an "annihilation" of part of the money supply, following the famous experiment first considered by Hume, the reduction in the money supply would instantly reduce expenditure and hence imports. This would immediately improve the balance of payments and induce a replenishment of the money supply. (Unlike Hume's analysis, the present model shows that money can have a direct effect on the balance of payments through its immediate impact on expenditure, part of
Figure 5. The Dynamics of Disequilibrium
which inevitably falls on imported goods. From W deflationary pressure

I consider this immediate effect of a reduction in the money supply on the balance of payments as of the utmost importance in the adjustment mechanism, the empirical significance of which was amply illustrated by credit restraint in Italy in 1964.

forces the price level down and the balance of payments surplus stimulates a monetary expansion, both forces moving the path of money and prices to a point like S on the XX line. After S the system travels to the equilibrium Q either directly or in a spiral, as indicated in the diagram.

Strictly speaking Q would no longer be the equilibrium if (a) the initial disturbance implied a change in the real wealth position of the country (as it would if foreign exchange reserves were "annihilated" with no quid pro quo); (b) the process of restoring equilibrium itself influenced capital formation and real wealth (so-called "hysteresis" effects); or (c) the domestic disequilibrium caused a permanent change in foreign wealth positions. In this paper, where emphasis is placed on elementary mechanisms alone, it seems entirely legitimate to abstract from these considerations.

THE CLASSICAL CASE AND DEVALUATION

In developing the model we began with the Quantity Theory of Money; but in the dynamic computation it was shunted into the background. To be sure, it is implicit in the XX and BB schedules, since these curves depend on expenditure which in turn depends on the excess demand or supply of money.
But does it not deserve more explicit prominence? Does LL not have direct relevance?

Its importance asserts itself in another form than in stability analysis: in the solution of all those comparative statics questions that involve shifts of demand between domestic and foreign goods without any alteration in the demand for money, and it preserves its importance even for dynamic analysis in the special case where the community maintains equality of expenditure and income, a case that can be identified most closely with classical analysis.

To investigate this interesting dynamic phenomenon first, consider Figure 6, where it is assumed that spending is always equal to income. Equality of E and Y automatically implies that the excess demand for domestic goods (the degree of inflationary pressure) equals the balance of payments surplus. The dynamic path therefore always remains on the LL line and adjustment consists solely of moving up or down the LL line. Under these conditions we should observe a strict conformity of money and the price level (or money income if allowance were made for output changes) to the quantity theory equation.

The special case in which spending is always equal to income, and in which the demand for money is always equal to the supply of money, may properly be designated the classical case: it amounts to the assumption of Say's Law and is the case in which the separation of real from monetary phenomenon is exact. An excess demand for domestic goods is equal to the balance of trade deficit, the one case in which direct one-to-one correspondence between monetary analysis and pure barter analysis can be established.

The Quantity Theory and the LL line has further uses in comparative statics analysis involving the shifts of demand between foreign and domestic
Figure 6. The Classical Approach and the Quantity Theory
goods. These shifts may be induced by artificial trade impediments such as tariffs or exchange restrictions, or by exchange rate adjustments. Let us consider the case of a devaluation, from an initial position of equilibrium of, say, 50 percent. What new equilibrium will be established?

We may find the new equilibrium by conducting a hypothetical experiment. What would happen if the domestic price level were doubled, the money supply were doubled, and the exchange rate (the price of domestic currency in terms of foreign currency) were halved. Clearly there would be no change in any real variable since market participants would have the same real money balances and incomes as before, and there would have been no change in relative prices.

Devaluation from a position of equilibrium will in fact induce a proportionate increase in the price level and the money supply. Again the relation between money and prices will be unaltered as predicted by the Quantity Theory. For example, a devaluation, in Figure 6, in the proportion of \( \frac{P_0 P_1}{OPO} \) would induce a rise in the price level and the money supply to the levels indicated by \( S \), a point on \( LL \).

It is hardly necessary to point out, of course, that no country would need to devalue if it were already in equilibrium (unless it needed to accumulate exchange reserves). The usefulness of the analysis is rather in showing what disequilibria can be corrected by changes in the exchange rate. We may reverse the procedure and suppose that equilibrium levels of money and prices are at \( Q \), but that the price level and the money supply are actually at levels indicated by \( S \). Obviously a deflationary process would reduce the price level and the money supply to \( Q \) under the automatic fixed exchange rate adjustment process. But the deflation involved would be a painful process,
and if rigidity of factor prices meant that deflation would create unemployment. This can be avoided by a multiplication of the proportion $P_0 P_1 / \bar{O} P_0$ (without any accompanying change in the money supply or the price level).

**BUDGETARY POLICY**

Still another reason why the LL line is of great importance is in the analysis of disequilibrium policies. Suppose the government runs a budget deficit annually, which it finances by money creation. What new "equilibrium" will be established?

To analyze this question we have to go back to the basic equilibrium conditions implicit in the system and introduce government spending, supposing this to be financed solely by money creation, and a central bank equation

It could be assumed that government spending is partially financed by taxes, but there is no need to introduce even this minor complication to establish the theoretical conclusion.

determining the money supply. First we have the condition of equilibrium in the home goods market, namely:

\[
(1) \quad Y = E + B + G
\]

where $E$ (domestic expenditure) is defined exclusive of $G$ (government expenditure). Next we have a definition of the relation between exchange reserves and the balance of trade, namely,

\[
(2) \quad B = \frac{dR}{dt}
\]
where \( R \) represents international reserves. And finally we have the banking condition stating that the increase in banking assets is equal to the increase in banking liabilities (the money supply), noting that in this system of no lending and, for simplicity assuming no taxes, the banking authorities, merged with the government, can only hold goods or foreign reserves. Thus

\[
\frac{dR}{dt} = \frac{dM}{dt}
\]

remembering that \( G \) represents both the value of government spending and the budget deficit. Now if the domestic goods market is in balance (i.e., if equation (1) is satisfied), the price level must be constant, which in turn implies, along with the condition that total expenditure equals income, that \( B+G=0 \). Hence, from equations (2) and (3) we have the result that the money supply is constant, i.e.,

\[
\frac{dM}{dt} = 0.
\]

This in turn implies, taking account of equation (2) that \( G+B=0 \) so that the balance of payments deficit is exactly equal to the deficit in the government budget.

Consider the point \( V \) in Figure 6. This precisely describes the nature of the quasi-equilibrium that would result from a budget deficit financed by money creation. The money supply is constant, but this is because the increase in domestic assets of the banking and government sector is exactly matched by a decrease in the foreign assets of that sector. The government, which may initially try to finance its deficit by creating more money, finds that its deficit is really being financed out of foreign exchange reserves; in every other respect the system is in equilibrium. Of course the process cannot go on forever, because exchange reserves are not inexhaustible, and in that sense the position \( V \) is only a quasi-equilibrium.
By a similar analysis it can be shown that, by means of a budget surplus, a country can attract reserves at a rate equal to a budget surplus of the government, after equilibrium has been reestablished in all other markets and sectors.

THE TRANSFER PROBLEM

We may consider next how analysis of the transfer problem fits into the model. When there are international transfers the equations of equilibrium have to be supplemented. Before we used three equations:

\[ Y - E = B \]

establishing equilibrium in the market for goods and services:

\[ Y - E = 0 \quad \text{or} \quad M - L = 0 \]

establishing equality of expenditure and income or equality of demand for money \((L)\) and supply of money \((M)\); and

\[ B = 0 \]

specifying balance of payments equilibrium. To take account of international transfers we have instead

\[ (5) \quad Y - E = B \]

as before, for the market for domestic goods and services, but then

\[ (6) \quad Y - E = T \]

for equality of income and expenditure plus transfers abroad \((Y\) being defined as before exclusive of transfers\), where \(T\) represents net outward transfers; and

\[ (7) \quad B - T = 0 \]
establishing balance of payments equilibrium, i.e., equality of the balance of trade surplus and outward transfers (or net capital exports).

To illustrate the transfer process let us consider the effect of an \underline{inward transfer} so that $T$ is negative; the country receives foreign aid or borrows. Following the traditional transfer analysis, \underline{expenditure in the rest of the world falls}, and \underline{expenditure at home rises}, by the full amount of the transfer, directly affecting the balance of trade. Part of the decrease in \underline{expenditure abroad} reduces exports, and part of the increased expenditure at \underline{home increases imports}. The financial transfer gets at least partly \underline{affected in real terms} by the direct impact of the expenditure changes before any effects have been felt on the balance of payments.

Whether the financial transfer is \underline{overeffected} or \underline{undereffected} depends on the size of the \underline{marginal propensities to spend on imports}, as compared to \underline{home goods}, out of \underline{domestic expenditure} inclusive of the transfer. \underline{If the marginal propensity to consume domestic goods in the receiving country exceeds the foreign marginal propensity to import, the result of the transfer will be an excess demand for domestic goods} and a surplus in the balance of payments, which will induce an increase in the \underline{domestic price level} as money flows in. In other words, a position on the \underline{LL line up and to the right of Q} will be the new equilibrium.

\underline{If, on the other hand, the marginal propensity to consume domestic goods in the receiving country is less than the foreign marginal propensity to import the primary effect of the transfer is to shift demand away from domestic goods, worsen the balance of payments, and induce a fall in domestic prices as the money supply declines.}
In the intermediate case where the domestic marginal propensity to consume domestic goods is equal to the foreign marginal propensity to import, there is no change in the price level or the terms of trade. The expenditure changes caused by the direct effects of the transfer are the same as the final effects; the receiving country buys as a result of the transfer, just those goods which the rest of the world gives up.

Thus, even in the case where monetary elements are explicitly introduced into the transfer analysis, the effect of the transfer on the terms of trade is ambiguous. Nothing a priori can be asserted. There is no reason to suppose, unless aid is "tied" or without specific empirical information, that the receiving country gains by more or by less than the normal amount of the transfer. /

This conclusion would have to be altered if it were assumed that the demand for the stock of money in each country were itself dependent, not only on the value of domestic production, but national income, inclusive of the transfer from abroad; the correct assumption is likely to depend on the particular case, and past nature of the transfer, and in particular whether working balances arising from the use to which the capital import is put are held in foreign currency or in domestic currency.

GROWTH AND LIQUIDITY

In a growing economy, the money supply will be rising over time and with it probably the willingness of the monetary authorities to acquire reserves. In this case we can relate the budget deficit or surplus to the rate of growth.
First note that if the non-government sector of the community wants to accumulate money, it must spend less than it earns so that

\[ Y - E = \frac{dL}{dt} \]

where \( \frac{dL}{dt} \) is the desire to accumulate money over time.

Next recall that a balance of trade surplus results in an increase in reserves so that

\[ B = \frac{dR}{dt} \]

Finally, note the condition that increases in official foreign and domestic assets (net public spending) equal increases in monetary liabilities (the money supply) so that, as before,

\[ \frac{dR}{dt} + G = \frac{dM}{dt} \]

Then it follows that when \( \frac{dM}{dt} = \frac{dL}{dt} \), i.e., when the community's desires for additional money are satiated at existing prices, there is also equilibrium in the market for goods and services, since

\[ B + G = \frac{dM}{dt} = \frac{dL}{dt} = Y - E \]

Now suppose as before that \( L = kY \), the demand for money according to the Quantity Theory, so that

\[ \frac{dL}{dt} = k\frac{dY}{dt} \]

We also have from (1) and (10) that

\[ \frac{dM}{dt} = B + G \]

so that growth equilibrium requires

\[ B + G = k\frac{dY}{dt} = k\left( \frac{1}{Y} \frac{dY}{dt} \right) Y = k\dot{Y} \]
where \( \Lambda \) is the rate of growth of output. If the rate of growth is positive the budget deficit will no longer equal the balance of trade surplus. The sum, \( B+G \), must equal the resources sacrificed by the private sector to build up its cash balances over time.

Now assume that the authorities want to keep a fixed proportion of reserves to back domestic money creation so that

\[
R = \alpha M
\]

where \( \alpha \) is a fraction. Then, by differentiation with respect to time,

\[
\frac{dR}{dt} = \alpha \frac{dM}{dt}
\]

so that, if we substitute for \( \frac{dR}{dt} \) making use of (10) we get

\[
G = (1 - \frac{dM}{dt}) \frac{dR}{dt} = \frac{dM}{dt}
\]

or

\[
G = (1 - \alpha)k\alpha Y
\]

If (18) is now put in (14) we get

\[
B = \alpha k\alpha Y \quad \text{or} \quad \frac{B}{Y} = \alpha k \alpha
\]

In other words the balance of trade surplus, expressed as a proportion of income, that is required to satisfy both the community's appetite for money and the authorities' appetite for reserves, is proportionate to the rate of growth, the factor of proportionality being \( \alpha k \), the ratio of foreign reserves to national income.

But we must take account of the fact that interest may be paid on the foreign reserves held by the monetary authorities; let us assume it is paid at the rate \( r \). Then interest becomes a foreign exchange receipt and the balance of payments equation, instead of (9), becomes

\[
B + rR = \frac{dR}{dt}
\]
The increase in the money supply is then determined by the equation

\[ G \frac{dR}{dt} = rR \frac{dM}{dt} \]

since the interest payments now represent a source of government finance additional to money creation. In this case the required balance of trade, expressed as a proportion of national income, turns out to be

\[ \frac{B}{Y} = (\lambda - r) \alpha k \]

while the budget deficit is

\[ \frac{G}{Y} = -(\lambda - r) \alpha k \]

To summarize, the balance of trade must be positive or negative, for monetary growth equilibrium, including growth of exchange reserves, depending on whether the domestic rate of growth exceeds or falls short of the rate of interest paid on foreign exchange reserves. By leaving its reserves on deposit, in a foreign center such as New York or London, a country may well finance the bulk of its additional reserve needs.

CONCLUSIONS

I have attempted to clothe some of the theoretical conclusions of international trade theory in a formal monetary garb by means of a simple model simultaneously classical and Keynesian in spirit. The basic assumption, that there are no securities, means that monetary and fiscal policies are not distinct from one another and that balance of payments problems persist because of the failure of the authorities to balance the budget. While this assumption does not correspond to reality in a country with a highly developed capital market, it is not irrelevant with respect to the position of many of the less developed countries.
Devaluation is a means by which a country, whose prices and costs have
got out of line internationally, can restore equilibrium without the less
attractive alternatives of deflation or trade and exchange controls. **By-gones**
have to be accepted as by-gones. However, looking prospectively rather than
retrospectively, incipient deficits can be prevented by a monetary policy
which is directed at preserving equilibrium in the balance of payments rather
than at financing budget deficits.

International capital movements or foreign aid need not present balance
of payments difficulties for either the receiving or transferring country.
The bulk of the transfer may be effected in real terms by direct expenditure
effects except when propensities to import are low and may even be overeffected
when marginal propensities are high. This leaves only a residual gap to be
corrected by the adjustment process.

A growing country should make some provision for increasing its interna-
tional reserves over time to provide the extra safety, convenience, choice of
adjustment measures and cushioning desirable. But a secular growth of
reserves does not require a balance of trade surplus if reserves are held in
the liquid assets of a deposit center and interest is paid on them. In this
connection, it should be remarked that the attachment to a major currency
area such as the dollar area or a sterling area presents, for a smaller
country, an opportunity that many current plans for international monetary
reform do not provide.

As a rule of thumb for a growing country, provision should be made for
an increase in the money supply every year. But the proper rule is not to
fix attention on a constant rate of growth of the money supply. Instead, the
authorities should keep in mind a rate of central bank credit expansion more or less equal to the rate of growth after making due allowance for income elasticities of credit demand differing from unity. This leaves room for the adjustment process to operate under fixed exchange rates since it implies that the money supply will grow at a slower or faster rate than central bank credit expansion, depending on whether there is a deficit or surplus in the balance of payments.

Fixed exchange rates, coupled with an absence of controls and a monetary policy that pays close attention to the balance of payments, can be a powerful instrument for generating the confidence needed to attract foreign capital. For the smaller countries there is no alternative system better adapted for generating a climate in which rapid growth can take place. It is difficult to see how the policies currently adopted by many of the smaller less developed countries, with the proliferation of controls, inflated budgets and excessive inflation, can be conducive to attracting needed capital.


imports or encouraging private investment to proceed in a stable environment of confidence. A restoration of freer markets, fewer controls over the private sector of the economy, and greater automaticity in the balance of payments adjustment process could lay the foundation for a properly run, efficiently managed country.
THREE MONETARY STANDARDS

The text restricts the analysis to the case of a fixed exchange system. The method of analysis, however, is easily generalized to alternative standards. This appendix is designed to illustrate a method of analyzing these alternative standards, and to show how the results can be generalized.

For purposes of analysis let us identify three markets -- goods, foreign exchange and money -- in the economic system and let X, F, and L denote, respectively, the flow excess demands in these markets. Assume that the conditions of market equilibrium depend on the domestic price level, the price of foreign exchange and the stock of money. Then we have three conditions of equilibrium as follows:

1. \[ X(P, \Pi, M) = 0 \]
2. \[ F(P, \Pi, M) = 0 \]
3. \[ L(P, \Pi, M) = 0 \]

Under suitable assumptions we can identify \( X = 0 \) with \( Y = E + B \), \( F = 0 \) with \( B = T \) and \( L = 0 \) with \( Y = E + T \) where \( Y \), \( E \), \( B \) and \( T \) are now all interpreted in a behavioral sense. On the basis of this identification it can be seen that the three equations are interdependent since \( X = 0 = F \) implies \( Y = E + T \); \( X = 0 = L \) implies \( B = T \); and \( F = 0 = L \) implies \( Y = E + B \). The equations are homogeneous of the first degree if \( X \), \( F \) and \( L \) are interpreted in value terms, and homogeneous of zero degree if they are expressed in real terms.

There are three cases of special interest worth isolating:
(a) $M$ is constant and $\Pi$ and $P$ are variable.
(b) $\Pi$ is constant and $M$ and $P$ are variable.
(c) $P$ is constant and $M$ and $\Pi$ are variable.

The first case may be referred to as the monetary standard (the stock of money is fixed); the second are the fixed exchange standard (as are analyzed in the text) and the third as the commodity price standard.

The three standards are illustrated by Figures 7-a, 7-b and 7-c on the assumption that goods, money and foreign exchange are all substitutes. This information is sufficient to establish the condition of disequilibrium true for each diagram indicated in Table IX-1:

<table>
<thead>
<tr>
<th>Market Zone</th>
<th>Excess Demand for Goods ($X$)</th>
<th>Excess Demand for Foreign Exchange ($F$)</th>
<th>Excess Demand for Money ($L$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>II</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>III</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>IV</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>V</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VI</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

The arrows in the zones indicate the movement of the (two) variables for each of the three standards under the most plausible dynamic assumptions. Thus, if the supply of money is fixed (Figure 7-a), the exchange rate will appreciate (depreciate) when there is an excess demand for (supply of) both goods and money; the price level will rise (fall) when there is an excess supply of both money and foreign exchange; and both the price level and the price of foreign exchange will rise (fall) when there is an excess demand for (supply of) both domestic goods and foreign exchange. A similar analysis...
applies when the money supply is variable and either the price of domestic goods or the exchange rate is stabilized once it is recognized that stabilization policy implies that the authorities are purchasing or selling the stabilized object and thus increasing or decreasing the money supply whenever there is, respectively, and excess demand or supply of the stabilized object.

This development provides a general framework within which balance of payments problems can be studied under various exchange systems. In each of the diagrams the balance of payments is in disequilibrium whenever the domestic price level, the exchange rate or the money supply does not generate a point on the FF lines in any of the graphs. Cases of disequilibrium in the balance of payments imply disequilibrium in other markets, and after the counterparts are identified the direction of the equilibrium points, and therefore the required movements of the other variables in the system, can be ascertained.

The analysis, moreover, is readily generalized to any number of commodities following traditional general equilibrium lines. In the foregoing, for example, it is implicitly assumed that wages and domestic prices move together. Suppose, however, that there are excess demands for the \( l \) types of goods, \( X_1, \ldots, X_l \); \( m \) types of labor, \( N_1, \ldots, N_m \); \( n \) types of foreign exchange, \( F_1, \ldots, F_n \); and domestic money. Then the homogeneity and interdependent properties of the above system are retained in the following generalized case:

Goods

\[
\begin{align*}
x_1(p_1, \ldots, p_l; w_1, \ldots, w_m; \pi_1, \ldots, \pi_n; m) &= 0 \\
x_1(p_1, \ldots, p_l; w_1, \ldots, w_m; \pi_1, \ldots, \pi_n; M) &= 0
\end{align*}
\]

Labor

\[
\begin{align*}
n_1(p_1, \ldots, p_l; w_1, \ldots, w_m; \pi_1, \ldots, \pi_n; M) &= 0 \\
n_m(p_1, \ldots, p_l; w_1, \ldots, w_m; \pi_1, \ldots, \pi_n; M) &= 0
\end{align*}
\]
\[ \begin{align*}
\text{Foreign Exchange} & \quad \left\{ \begin{array}{l}
F_1(P_1, \ldots, P_n; W_1, \ldots, W_m; \pi_1, \ldots, \pi_n; M) = 0 \\
F_n(P_1, \ldots, P_n; W_1, \ldots, W_m; \pi_1, \ldots, \pi_n; M) = 0
\end{array} \right. \\
\text{Money} & \quad \left\{ \begin{array}{l}
L(P_1, \ldots, P_n; W_1, \ldots, W_m; \pi_1, \ldots, \pi_n; M) = 0
\end{array} \right.
\end{align*} \]

where \( P \)'s denote prices, the \( W \)'s denote wages, and the \( \pi \)'s exchange rates.