An Exposition of the Modern Monetary Approach to the Determination of the Balance of Payments*

Sung Keun Ha**

1. Introduction

The purpose of this paper is to expose the popular modern monetary approach to the balance of payments theory[1] in the context of the Keynsian system and the Walrasian system. The construction of the existing monetary theoretical frameworks for the balance of payments has been explicitly-implicitly at times-based upon only a simple Walrasian system (Mundell, 1968; Johnson, 1972, 1977; Mussa, 1976; Frenkel, 1976; Dornbusch, 1976b). As a result, it seems that they have had some difficulties in clarifying their assumptions as well as theories. The present analysis overcomes such difficulties, integrating Keynesian macroeconomic system

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1) The modern monetary view for the balance of payments has been pioneered by Hahn (1959), Johnson (1958), Michaely (1960), Tsiang (1961), and Mundell (1968) and recently forcefully emphasized by Johnson (1972, 1977). The modern montary approach to the exchange rates which may be viewed as the counterpart to the monetary approach to the balance of payments has been developed by Mundell (1968), Frenkel and Rodriguez (1975), Johnson (1975), Mussa (1974, 1976), and Dornbusch (1975, 1976a, b). For a survey of historical origins of the monetary approach to the balance of payments and the exchange rates, refer to Frenkel and Johnson (1976), and Frenkel (1976). The theoretical difference between monetary approach and preceding alternative approaches including the traditional elasticities analysis and the absorption approach has been brilliantly discussed by Johnson (1977), Kyle (1976), Krueger (1969), and Tsiang (1961).

and Walrasian general equilbrium system.

In our analytic framework for the determination of the balance of payment, it is emphasized that money is a stock variable, not a flow variable, and that monetary disequilibrium and equilibrium require analysis of stock adjustment processes and stock equilibrium conditions. The analysis of monetary stock adjustment processes leads us to monetary stock adjustment model for the balance of payments. The analysis of monetary stock equilibrium conditions generates monetary stock equilibrium model for balance of payments.

Before developing monetary models of the balance of payments, we at first lay out their basic Walrasian theoretical framework, which incorporates the Keynesian aggregate demand and income analysis.

2. Walrasian Theoretical Framework of the Balance of Payments

It is assumed that there exist two economies in the world: the home country's economy and the rest of the world's economy. We regard the rest of the world as a single country called the foreign country. Values of all variables used here are in terms of the home country's currency unit.

Total value of demand for home-country-produced goods (D_{gh}) may be split into total value of the home country's demand for home-country-produced goods (D_{hgh}) and total value of the foreign country's demand for home-country-produced goods (D_{fgh}):

$$D_{gh}=D_{hgh}+D_{fgh} \qquad (2-1)$$

Meanwhile, total value of the home country's demand for home-country-produced goods (D_{hgh}) may be written as:

$$D_{hgh}=D_{hg}-D_{hgf} \qquad (2-2)$$

where D_{hg} is total value of the home country's demand for goods and D_{hgf} is total value of the home country's demand for foreign-country-produced goods.

Substituting equation (2—1) into equation (2—2) leads to

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constraints to all dometic economic units leads to

$$D_{hg}-S_{gh}+\sum_{i=1}^{n}D_i^e=0, \qquad (2\text{-}6)$$

where D_i^e is total value of excess demand for the ith financial asset.[3]

Now combining equation (2—6) with equation (2—5) yields

$$B_T=\sum_{i=1}^{n}D_i^e+D_{gh}-S_{gh}. \qquad (2—7)$$

Equation (2—7) represents a basic Walrasian framework which is capable of generating two kinds of the monetary models of the balance of payments.

To obtain the earlier version of the monetary hypothesis of the balance of payments, we assume that there exists no excess demand for the home-country-produced goods and the home country's economy has only one financial asset, money, which is internationally non-tradeable. Under these assumptions, equation (2—7) reduces to

$$B_T=D_1^e, \qquad (2—8)$$

where D_1^e is excess demand for money.

Equation (2—8) says that total value of the trade balance is equivalent to total value of excess demand for money. The key hypothesis of the earlier versions of the monetary approach to the balance of payments (Mundell, 1968, p. 67; Frenkel and Johnson, 1976, p. 28) which placed emphasis entirely on the trade balance seems to be based upon equation (2—8).

In order to derive the monetary model for the overall balance of payments from equation (2—7), one may need the following assumptions: First, there exist tradeable financial assets, bonds, in the home country's economy and the world prices of these assets, world interest rates, are fixed or unaffected by the level of home country's demands for the

3) One may obtain the basic theoretical foundation of Harry Johnson's model for the balance of payments (Johnson, 1977, p. 224), imposing on equation (2—6) the assumption that the sum of excess demands for all other assets except money and bonds is zero. Since his model disregards the macro-economic relationship described in equation (2—5,) it fails to clarify the full employment assumption which it fundamentally relies upon.

foreign bonds.[4] Second, the market for the home-country-produced goods is in equilibrium.[5] Third, the sum of excess demands for all other financial assets except money and bonds is zero.[6]

Under the assumption of fixed world prices of bonds, excess demand for bonds manifests itself entirely in a net international flow in the capital account under a fixed exchange rate regime. The negative value of excess demand for bonds may be equal to the total value of the balance of the capital account. According to the conventional definition that the overall balance of payments is identically equal to the sum of the balance on the current and the capital accounts, one may write

$$B_P \equiv B_T + (-D_2'), \qquad (2-9)$$

where B_P is total value of the overall balance of payments and D_2' total value of excess demand for bonds.

Equation (2—7) may be rewritten as:

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4) The base for the justification of the assumption of fixed world prices can be viewed as that for the justification of the fixed interest rates assumption.

5) The monetarist justification of the full employment assumption is provided as follows: "That the monetary approach largely assumes a fully employed economy is partly the result of the fact that in the context of a growing world economy in the long run the assumption of wage rigidity and variable employment becomes uninteresting; either employment expands into the full employment range and quantity adjustments yield to money price and wage adjustments, or it contracts and people either starve to death and go back to full employment numbers, or there is a revolution on Marxist lines, or more likely the public simply votes for the other political party than the one in power, since all of them promise to maintain full employment and the public expects them to do it. More fundamentally, the assumption of normally full employment reflects the passage of time and the accumulation of experience of reasonable full employment as the historical norm rather than the historical rarity that Keynes' theory and the left-wing Keynesian mythology made it out to be" (Frenkel and Johnson, 1976, p. 25).

6) The justification of this assumption can be drawn from the fact that total excess demand for each non-tradeable asset, $-D_i'$, for $i=3, 4, \cdots, n$-may be always zero, since the excess demand for this kind of asset—for example, houses, office buildings, and the human capital, etc.—leads to a higher price (or a lower yield) on the asset which in turn results in zero excess demand for the asset. However, one may argue that a rise or a fall in the excess demands for the nontradeable assets may generate the short run variations in the balance of payments. Therefore, within this short-run perspective, the monetary model seems to fail to explain the movements of the balance of payments which are caused by the short-run fluctuations of excess demands for the non-tradeable assets (see similar arguments by Hahn, 1977, pp. 241~242).

$$B_T+(-D_2^e)=D_1^e+\sum_{i=3}^{n}D_i^e+D_{gh}-S_{gh}. \qquad (2-10)$$

Substituting equation (2—9) into equation (2—10) yields

$$B_P=D_1^e+\sum_{i=3}^{n}D_i^e+D_{gh}-S_{gh}. \qquad (2-11)$$

According to the assumption that the market for the home-country-produced goods is in equilibrium,—*i.e.*, $D_{gh}-S_{gh}=0$—and the assumption that the sum of excess demands for all other financial assets except money and bonds is zero—*i.e.*, $\sum_{i=3}^{n}D_i^e=0$ equation (2—11) reduces to

$$B_P=D_1^e \qquad (2-12)$$

Equation (2—12) expresses that the home country's overall balance of payments is equal to total value of the home country's excess demand for money. The crucial monetary proposition that "a balance of payments deficit implies either dishoarding by residents or credit creation by monetary authorities" (Frenkel and Johnson, 1976, p. 51) is seemed to be basically relied upon our equation (2—12).

By applying an important economic concept of stock-flow distinction to equation (2—12), we are able to analyze the useful monetary stock adjustment process of the balance of payments. The analysis of the stock adjustment process will be dealt with in the next section.

3. Monetary Models for the Determination of the Balance of Payments

In the concept of stock-flow distinction, excess demands for financial assets should be interpreted as excess flow demands for them. (Note that all variables introduced in the preceding analysis are flow ones.) Meanwhile, one may presuppose that the excess flow demand is generated by stock disequilibrium in the relevant market. For example, excess flow demand for money is caused by stock disequilibrium between the demand for and the supply of money.

Based upon the notion that monetary stock disequilibrium generates a money flow, one may write

$$D_1^e = m(M^d - M_{dc}^s), \qquad (2-13)$$

where M^d is total value of stock demand for money, M_{dc}^s is total value of the domestic credit and m is a general function form relating current flows to stock disequilibrium in a stock adjustment relationship.[7] Here, for simplicity, it is assumed that the total amount of the initial accomulation of foreign assets is zero-*i.e.*, foreign assets backing of the total money supply is zero. Therefore in this case M_{dc}^s is equal to the total money supply.

Then, equation (2—13) may be rewritten as:

$$B_P = m(M^d - M_{dc}^s), \qquad (2-14)$$

since

$$B_P = D_1^e.$$

Here it is supposed that the stock adjustment function m is a continuous and increasing one which has zero as its intercept. In this stock adjustment relationship, therefore, the balance of payments is positively related

7) It is usually understood that this kind of monetary formulation relies upon two fundamental assumptions: There exist a stable demand function for money and the supply of money is subject to policy control (Johnson, 1977, pp. 225~226). Controversy over the existence of a stable money demand has a long history and has not been completely settled down until now. Criticism of the existence of the function is one of the longstanding objections to the monetary approach to economics. Critics deny the existence of an aggregate demand function for money that is a function of a relatively small number of aggregate economic variables (Kaldor, 1970, pp. 6~10). They maintain that money velocity is highly variable under the influence of changes in business confidence and that perfect substitutes for money, however, defined, can and will be created without limit and cost. In response to these contentions, Harry Johnson, one of the leading proponents of the monetary approach to the balance of payments, provides the new quantity theorists' proposition that there is a stable demand function for money, once expectations are properly incorporated in the function (Johnson, 1977, p. 226).

The new quantity theory revises the traditional quantity theory by postulating that money velocity is a stable function of a few key variables including expectation variables. It does so in order to counter the argument that perfect substitutes for money can always be found, and used costlessly. The controversy over the assumption of a stable money demand function rests eventually on whether stability of the function, which is supposed to incorporate properly expected variables, is supported by the empirical evidence. Empirical work on the demand for money stock has been subjected to a very extensive professional literature (Goldfeld, 1973; Barro and Fischer, 1976; Boughton, 1979). The general conclusion drawn from empirical estimation of the demand function for money seems to be that the monetary assumption is positively supported by empirical evidence.

to the stock demand for money and at the same time it is negatively related to the total amount of domestic credits. Accordingly it may be argued that the home country's overall balance of payments will decline if there is an increase in domestic bank credit and if the stock demand for money is not changed. Equation (2—14) also expressed that there is no balance-of-payments problem if the total supply of domestic bank credits is equal to total demand for money.

In the long run the initial monetary disequilibrium is completely eliminated through changes in B_P—*i.e.*, changes in foreign reserve component of the total money supply-under a regime of fixed exchange rates. In this situation, the total value of the "long run" balance of payments ($\tilde{B}_P$) can be expressed as follows:

$$\tilde{B}_p=\frac{1}{\alpha}(M^d-M^s_{dc}) \qquad (2—15)$$

where α is the money multiplier. Note that in this equilibrium case the total money supply (M^s_T) should be written as:

$$M^s_T=\alpha\cdot\tilde{B}_p+M^s_{dc}. \qquad (2—16)$$

The equation (2—15) may be called the monetary stock equilibrium model for the balance of payments, since it is based upon the equilibrium condition for the money market-*i.e.*, $M^d=M^T_s$.[8]

In order to fully expose theoretical properties of our basic monetary equation (2—14), one may examine basic theoretical difference between monetary approach and major previous approaches in the context of our theoretical framework. This examination is presented in Appendix I.

4. Concluding Remarks

In the theoretical context of Keynesian and Walrasian system, we have derived the monetary models for the balance of payments. As a result, we are able to clarify their key assumptions: First, world prices and

8) Most monetary models—especially emplrical ones—are directly derived from the monetary equilibrium condition. See Bean (1976), Zechner (1976), Genberg (1976), Guitian (1976) and Magee (1976) etc.

interest rates are invariable. Second, the home country is fully employed. Third, the sum of excess demands for all other financial assets except money and bonds is zero. The second and third assumption have not been clearly identified by the existing monetarist theoretical frameworks.

In our presentation of the monetary approach to the balance of payments, the monetary stock disequilibrium processes and the monetary stock equilibrium are seperately treated. Consequently, we are able to present two basic monetary models: monetary stock adjustment model (equation 2—14) and monetary stock equilibrium model (equation 2—15)[9].

Finally, it is noted that our basic theoretical framework which attempts to integrate the Walrasan equilibrium scheme and the Keynesian macroeconomic scheme may be utilized as one of useful theoretical tools to relax the monetarist restrictive assumptions and to explore a new theoretical model for the determination of the balance of payments.

APPENDIX I

Theoretical Difference between the Monetary Approach and the Alternative Approaches

As major previous approaches to the balance-of-payments analysis, one may consider elasticities approach, Keynesian approach, and absorption approach. The fundamental theoretical difference between the monetary approach and these approaches rests upon the fact that the former concentrates on the money market behaviors while the latter focus on "real" relationships and explicitly or implicitly treat monetary behavior as a residual of real behavior.

I. The Elasticities Approach

A. Basic Theoretical Framework

9) It has been shown elsewhere that our theoretical framework for the determination of the balance of payments under a system of fixed exchange rates is easily converted into monetary models for the determination of exchange rates under a systemof flexible exchange rates. (See Ha, 1979, pp.16-19).

The basic equation of this approach is

$$B_T = P_x \cdot X(P_x) - P_m \cdot M(P_m),$$

where B_T is the trade balance expressed in domestic currency, P_x and P_m are domestic currency prices in the country of origin of export and import goods respectively, and $X(P_x)$ and $M(P_m)$ are physical quantities of export goods and import goods, respectively, each determined on partial equilibrium line by the intersection of demand and supply functions taken to be functions only of the price of the goods concerned.

B. Theoretical Characteristics.

1) The theoretical tool of this approach is a traditional microeconomic partial equilibrium analysis. Therefore, B_T is shown to be determined by partial equilibria of the markets for traded goods.

2) Demands and supplies of trade goods are functions only of the price of the goods concerned.

3) Incomes or total outputs and prices of all other nontraded goods are disregarded or assumed to be constant.

4) The basic difference between our theoretical framework and the elasticities framework is that according to the former, B_T is determined only by demands for traded goods since supplies of traded goods are assumed to have infinite price elasticities, but according to the latter, B_T is determined by both demands and supplies of traded goods which are functions of the prices. It is noted that our basic theoretical framework cannot be directly applied to decribe the elasticities approach, because of this basic theoretical difference.

5) According to the monetary point of view, this approach completely ignores important budget constraints of all economic agents as well as the monetary stock disequilibrium effects of the trade balance or balance of payments.

Ⅱ. The Keynesian Approach

A. Basic Theoretical Framework

A simplified version of this approach (see Harberger, 1950 and Johnson, 1977) is represented by a three equation system:

$$Y_h = E_h(Y_h) + M_f(Y_f) - M_h(Y_h) \quad \text{(A)}$$

$$Y_f = E_f(Y_f) - M_f(Y_f) + M_h(Y_h) \quad \text{(B)}$$

$$B_T = M_f(Y_f) - M_h(Y_h) \quad \text{(C)}$$

where Y is output, E total national expenditure, M imports, and subscripts h and f denote the home and foreign country.

B. Theoretical Characteristics

1) In the above Keynesian macroeconomic model where variation in output is allowed, B_T, Y_h and Y_f are simultaneously determined.

2) Basic underlying assumptions of this model are:

i. Demands for goods are functions of incomes (or outputs).

ii. Elasticities of supplies of goods are infinite.

3) Let us consider our Equation (2—5):

$$D_{gh} - S_{gh} = D_{hg} - S_{gh} + D_{fgh} - D_{hgf}.$$

Under the condition that $D_{gh} - S_{gh} = 0$, we may write the above equation as

$$S_{gh} = D_{hg} + D_{fgh} - D_{hgf}.$$

If demands for goods are functions of incomes or outputs, the above equation may be written as

$$S_{gh} = D_{hg}(S_{gh}) + D_{fgh}(S_{gf}) - D_{hgf}(S_{gh}).$$

This is equivalent to Equation (A) of Keynesian model. Therefore it is now clear that the Keynesian approach implicitly assumes that both market for domestic goods and market for foreign goods are in equilibrium.

4) The important difference between the monetary model and the Keynesian model is that the former implicitly assumes that outputs are remaining constant, but the latter assumes that they are important endogenous variables.

5) This approach also does not pay any attention to the overall budget constraint and the stock disequilibrium effects of B_T.

Ⅱ. The Absorption Approach

A. Basic Theoretical Framework

The basic equation of the absorption approach may be derived from our equation (2—5). That is, assuming that $D_{gh} - S_{gh} = 0$, one may write

Equation (2—5) as

$$B_T = S_{gh} - D_{hg} = Y - A,$$

Since S_{gh} is viewed as aggregate output (Y) and D_{hg} aggregate expenditure or absorption (A).

B. Theoretical Characteristics

1) The basic equation of the absorption approach is based upon the assumption that prices of goods are fixed and the market for domestic goods is in equilibrium.

2) This approach also disregards the overall budget constraints and the monetary stock adjustment process of B_T or B_T.

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