THE KEYNESIAN-MONETARIST CONTROVERSY IN INTERNATIONAL ECONOMICS: DISCRIMINATORY POWER OF SHORT-RUN EMPIRICAL TESTS

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ABSTRACT

Two major theories in the area of balance of payments are the Keynesian and monetarist theories. There have been many short-run tests of the monetary approach to the balance of payments and the evidence has been used to support the monetary approach. This paper argues that most of the existing empirical work does not have any discriminatory power because it assumes equilibrium in the money market. This paper recommends that Keynesian and monetarist views about the transmission mechanism and the homeostatic mechanism are fundamentally different and provide bases for discriminatory tests.

INTRODUCTION

Keynesian and monetarist theories dominate macro-economics in general and balance of payments theories in particular. There have been many short-run tests of the monetary approach to the balance of payments and the evidence has been used to support the monetary approach. This paper argues that most of the existing empirical work does not have any discriminatory power.

Ardalan (2003, 2005a, 2005b) has reviewed three alternative theories of balance of payments adjustments. They are the elasticity and absorption approaches (associated with Keynesian theory), and the monetary approach. In the elasticities and absorption approaches the focus of attention is on the trade balance with unemployed resources. The elasticities approach emphasizes the role of the relative prices (or exchange rate) in balance of payments adjustments by considering imports and exports as being dependent on relative prices (through the exchange rate). The absorption approach emphasizes the role of income (or expenditure) in balance of payments adjustments by considering the change in expenditure relative to income resulting from a change in exports and/or imports. In the monetary approach, on the other hand, the focus of attention is on the balance of payments (or the money account) with full employment. The monetary approach emphasizes the role of the demand for and supply of money in the economy.

Ardalan (2003, 2005a) has comprehensively reviewed the relevant empirical work dealing with the monetary approach. Empirical work on the monetary approach to the balance of payments can be divided into two different approaches; one tests the theory in long-run equilibrium, the other considers the adjustment mechanism and the channels through which equilibrium is reached. The first approach is based on the reserve flow equation developed by Johnson (1972). Testing was undertaken by Zecher (1976) and others (See Ardalan, 2005a). The second approach is based on theoretical work of Prais (1977), with corresponding empirical work undertaken by Rhomberg (1977) and others (See Ardalan, 2003).

This paper is based on Ardalan (2003, 2005a, 2005b) and it argues that most of the existing empirical work in the short-run framework has no discriminatory power (Ardalan, 2007, has made the same argument with respect to the long-run models). Theoretical models explicitly differentiate between the two types of adjustment mechanisms, but most short-run empirical models have no discriminatory power because they assume equilibrium in the money market.

The next section explores the existing empirical work on the short-run monetary approach to the balance of payments to see if it can discriminate between the differing views of Keynesian and monetarist economists.

QUESTION OF DISCRIMINATORY POWER

The main goal of this section is to show that existing empirical work on the short-run monetary approach to balance of payments does not discriminate between Keynesian and monetarist theories of the balance of payments. This is because the evidence is consistent with both Keynesian and monetarist models, as specified.

Ardalan (2003) noted that Prais (1977) proposed a test of the short-run monetary approach to the balance of payments. Ardalan (2003) also reviewed examples (They are: Khan, 1977, 1976; Rhomberg, 1977; and Schotta, 1966) of the numerous applications (See the list of references in Appendix 1) of that idea to various countries. The major conclusion of this line of research has been that the evidence strongly favors the monetary approach.

This section argues that most of the short-run evidence is unable to discriminate between the two theories. Monetarist short-run models consider the adjustment process to take place by excess money balances spilling over into commodity and financial markets. When this basic idea has been translated into empirical form, it has lost its discriminatory power because, with one notable exception (For an important exception see Jonson, 1976), the estimated equations do not explicitly recognize monetary disequilibrium. Therefore, the evidence has no discriminatory power because it is consistent with both Keynesian and monetarist models, as specified. In order to demonstrate this, first the theoretical monetarist model of Prais (1977) and the Keynesian model of Mundell (1963) are analyzed and compared, and then three empirical studies that are based on Prais' (1977) formulation are reviewed. These three consist of one by Rhomberg (1977) and two by Khan (1977, 1976). The examination of the short-run empirical formulations illustrates that the evidence is consistent with both models, as specified.

THEORETICAL MODELS

In this subsection the theoretical monetarist model of Prais (1977) and the Keynesian model of Mundell (1963) are analyzed and compared.

Prais' (1977) Model: Prais' (1977) model formulated the adjustment process in terms of continuous time, which allows precise specification of the relation between stock and flow variables. Prais (1977) specifies a domestic expenditure function which emphasizes the role of deviations of actual from desired money holdings as the link between the real and monetary sectors of the economy. This particular specification has been widely used (See the list of references in Appendix 1) in the literature (Dornbush, 1976).

The model, which is in differential equation form, may be set out with a system of six equations given by equations (1) through (6):

$$LD = k.Y \tag{1}$$
$$dL/dt = X - IM \tag{2}$$
$$E = Y + a.(L - LD) \tag{3}$$
$$IM = b.Y \quad \text{or} \quad IM = b.E \tag{4}$$
$$X = X(t) \tag{5}$$
$$Y = E + X - IM \tag{6}$$

In these equations LD is the desired level of liquidity as distinguished from the actual liquidity, L. The first equation is the familiar Cambridge equation relating a desired level of liquidity, LD, to the level of income. The second equation relates the change in actual liquidity to the balance of payments, which is represented in differential form. An additive term to represent any given rate of credit creation can be introduced on the right-hand side of (2) without altering the basic mathematics. Equation (3) indicates that domestic expenditure, E, equals income plus the excess of actual over desired liquidity. Imports, equation (4), are taken as a constant fraction of income. As an alternative, imports may be taken as a fraction of expenditure, E, so as to be proportionately influenced by the liquidity situation. However, this and other variations lead to rather similar results, apart from changes in the constants. Exports are assumed exogenous and given by equation (5). Finally, national income, in equation (6), is defined as domestic expenditure plus exports less imports.

In this system, a disequilibrium – for example a deficit in the balance of payments due to an exogenous reduction in exports – is corrected by a fall in the money supply via (2), followed by a fall in domestic expenditure via (3), a fall in income via (6), and a fall in imports via (4). This process continues until the deficit in (2) is eliminated.

Mundell's (1963) Model: Mundell's (1963) model can be expressed in the following three equations:

$$I(i) + I^* - S(Y) + BT(Y) = 0 \quad (7)$$

$$M = L(Y, i) \quad (8)$$

$$M = D^* + R \quad (9)$$

Where:

I	=	investment
I*	=	autonomous investment
S	=	saving
BT	=	balance of trade
M	=	money supply
L	=	demand for money
D*	=	domestic assets of the central bank
R	=	foreign assets of the central bank

Government spending and taxes are included under "investment" and "saving" (a simplification which entails no significant loss).

Equation (7) specifies that the flow market for goods and services is in equilibrium. This condition ensures that the current supply of goods and services equals the current demand. Due to unemployed resources, output can change with no change in domestic prices. Like monetarists, Mundell (1963) assumes perfect capital mobility, i.e., domestic and foreign interest rates are equal. Autonomous investment, I^*, is a parameter representing an autonomous element in the investment schedule, separated for purposes of analysis. It should be noted that: $dBT/dY<0$, $dS/dY>0$, $dI/di<0$, $I(i) + I^* - S(Y)$ is the balance on capital account, and $BT(Y)$ is the balance on current account. Equation (7), therefore, shows both the equilibrium in the commodity market, i.e., the IS curve, and the balance of payments equilibrium. The demand for money, L, is assumed to depend upon the interest rate and domestic income.

The money stock, described by equation (9), equals the assets of the central bank. Commercial banks are ignored. D^* is taken as a policy-determined parameter. In effect, Mundell (1963) assumes the money multiplier is unity.

In this model an autonomous increase in exports has a multiplier effect on income, and increases savings, taxes, and imports. After the new equilibrium is established, both the goods and capital markets must be in balance. In the goods market, the budget surplus and excess of private saving over investment have their counterpart in the balance of trade surplus. In the capital market, the private and public sectors must be willing to accumulate foreign securities. Capital market equilibrium requires that the current account surplus be exactly balanced by a capital outflow, so that there is balance of payments equilibrium after all adjustments have taken place.

There will nevertheless be a change in foreign exchange reserves. Before the flow equilibrium is established the demand for money will increase at a constant rate in proportion to the increase in income. To acquire the needed liquidity the private sector sells securities and this puts upward pressure on the interest rate and attracts foreign capital. This improves the balance of payments temporarily, forcing the central bank to intervene by buying foreign reserves and increasing the money supply. The money supply is therefore increased directly through the back door of foreign exchange rate policy. Foreign exchange reserves accumulate by the full amount of the increased cash reserves needed by the banking system to supply the increased money demanded by the public as a consequence of the increase in income.

Comparison: When the adjustment processes in these short-run models are compared, the essential points are seen to be captured by the expenditure and import functions. Behavioral relations (equation 6) in Prais' (1977) model indicate that excess money balances spill over to the commodity market in general, and imports in particular, while the disequilibrium interpretation of Mundell's (1963) model suggests that the increase in money balances results in downward pressure on interest rates and, therefore, a capital outflow. These models reflect the theoretical difference that exists between Keynesian and monetarist views of the transmission mechanism and the international adjustment process. Monetarists tend to assume that some excess balances spill over directly in to commodity markets while Keneysians tend to assume that all excess balances spill over in to financial markets.

EMPIRICAL MODELS

In this subsection it is shown that existing short-run empirical models have no discriminatory power. In order to do this, first three typical empirical studies that are based on Prais' (1977) formulation are reviewed. These three consist of one by Rhomberg (1977) and two by Khan (1977, 1976). Then empirical forms of their expenditure and import functions are analyzed. This is because the role of excess money balances in these equations is crucial in discriminating between the theories.

Three Typical Empirical Models: Now three typical empirical studies that are based on Prais' (1977) formulation are reviewed (This part is taken from Ardalan, 2003). These three consist of one by Rhomberg (1977) and two by Khan (1977, 1976).

Rhomberg's (1977) Model: Rhomberg (1977) also focuses attention on the relation between money and expenditure and estimates the entire structure of the model by multiple regression technique. The basic equations of his model are given by equations (15) through (20):

$$LD(t) = k.Y(t) \tag{10}$$

$$E(t) = a_0 + a_1.Y(t) + a_2.Y(t\text{-}1) + a_3.\{[L(t\text{-}1)+L(t\text{-}2)]/2 - k.Y(t)\} \tag{11}$$

$$IM(t) = b_0 + b_1.E(t) \tag{12}$$

$$G(t) = g_0 + g_1.Y(t) \tag{13}$$

$$Y(t) = E(t) + G(t) + X(t) - IM(t) \quad (14)$$
$$L(t) = L(t\text{-}1) + X(t) + DK(t) - IM(t) + DD(t) \quad (15)$$

where *D*K is the net capital inflow, and D is the domestic component of the monetary base. The long-run desired demand for money, LD, is expressed by equation (11). Private expenditure is linearly dependent on current and last year's income, and on the excess of actual over desired cash balances. Since the stock of money, L(t), is measured at a moment of time (at the end of year t), while Y(t) is the flow of income during year t, Rhomberg (1977) expresses cash balances during year t as {[L(t) + L(t-1)]/2} and the deviation of actual from desired cash balances as {[L(t) + L(t-1)]/2 – [k.Y(t)]}. His private expenditure function is thus given by equation (11) because he assumes there is a one year lag in expenditure with respect to a change in the excess of desired over actual cash balances. Additionally, Rhomberg's (1977) model contains an import function specified by equation (12). Imports are assumed to depend on expenditures. In equation (13), Rhomberg (1977) argues that government expenditures on goods and services, G, are related to income, while, recognizing the fact that they (G) depend to a considerable extent on tax revenue, which is itself a function of income. The model is completed by the two identities defining income and the money supply.

The estimated behavioral equations (11), (12), (13) and their reduced forms for five countries of Norway, Costa Rica, Ecuador, Japan, and the Netherlands and for the period 1949-60 are then reported.

Khan's (1977) Model: Like Prais (1977), Khan (1977) expresses the model in continuous time. This allows him to estimate the time pattern of adjustment to the final equilibrium values via a system of linear differential equations. Khan (1977) specifies six equations containing three behavioral relationships – for imports, exports, and aggregate expenditure – and three identities – for nominal income, the balance of payments, and the money supply.

Imports: Khan (1977) relates imports to aggregate domestic expenditure. In order to take account of quantitative restrictions and controls on imports, he also introduces the level of net foreign assets, R, of the country. His assumption behind the use of such a variable is the implied existence of a government policy reaction function in which controls are inversely related to reserves. The authorities are assumed to ease or tighten restrictions on imports as their international reserves increase or decrease. The import demand function is thus specified as:

$$IM^d(t) = a_0 + a_1.R(t) + a_2.E(t) + u_1(t) \quad a_1>0,\ a_2>0 \quad (16)$$

where IM^d is demand for nominal imports, and u_1 is a random error term with "white noise" properties. Actual imports in period t are assumed to adjust to the excess demand for imports:

$$D[IM(t)] = A.[IM^d(t) - IM^s(t)] \qquad A>0 \quad (17)$$

where D(x) is the time derivative of x, i.e., D(x) = dx/dt. A further assumption is that import supply is equal to actual imports:

$$IM(t) = IM^s(t) \tag{18}$$

Substituting (16) into (17), the estimating equation becomes:

$$D[IM(t)] = A.a_0 + A.a_1.R(t) + A.a_2.E(t) - A.IM(t) + A.u_1(t) \tag{19}$$

Exports: Small countries are generally price takers in the world market and can sell whatever they produce. The volume of exports is therefore determined by domestic supply conditions. An increase in the capacity to produce in the export sector should lead to an increase in exports. Capacity to produce in the export sector is related directly to the capacity to produce in the entire economy. Khan (1977) considers permanent income to be a suitable indicator of capacity to produce, and specifies exports as a positive function of the permanent domestic income:

$$X(t) = b_0 + b_1.Y_P(t) + u_2(t) \qquad b_1>0 \tag{20}$$

where X is the nominal value of exports, and Y_P is the permanent nominal income in time period t; u_2 is a random error term. Permanent income is generated in the following way:

$$D[Y_P(t)] = B.[Y_P(t) - Y(t)] \qquad B<0 \tag{21}$$

Permanent income in time period t adjusts to the difference between permanent income and actual income, Y, in period t. Equation (21) is re-written as:

$$Y_P(t) = [- B/(D\text{-}B)].Y(t) \tag{22}$$

Substituting (22) into (20):

$$X(t) = b_0 + [(- B.b_1)/(D\text{-}B)].Y(t) + u_2(t) \tag{23}$$

and solving for D[X(t)], equation (24) is obtained:

$$D[X(t)] = b_0.(D\text{-}B) - B.b_1.Y(t) + B.X(t) + u_3(t) \tag{24}$$

where $u_2(t) = (D\text{-}B).u_3(t)$. Relation (24) is Khan's export estimating equation.

Aggregate Expenditure: Khan's (1977) equation for desired expenditure is specified as follows:

$$ED(t) = c_0 + c_1.M^s(t) + c_2.Y(t) + u_4(t) \qquad c_1>0,\ c_2>0 \qquad (25)$$

where ED is desired aggregate nominal expenditure, and Y is nominal income, and u_4 is a random error term. The stock of money, M^s, is included because, given the stock of money that the public desires to hold, an increase in the money supply raises actual money balances above the desired level. This increases the demand for goods and services as the public attempts to reduce its excess cash balances. Moreover, the actual value of expenditure is assumed to adjust to the difference between desired expenditure and actual expenditure:

$$D[E(t)] = \&.[ED(t) - E(t)] \qquad \&>0 \qquad (26)$$

By substituting (25) into (26), the differential equation in D[E(t)] is obtained:

$$D[E(t)] = \&.c_0 + \&.c_1.M^s(t) + \&.c_2.Y(t) - \&.E(t) + \&.u_4(t) \qquad (27)$$

this is the equation that is estimated.

Nominal Income: The ex-post nominal income identity is:

$$Y(t) = E(t) + X(t) - IM(t) \qquad (28)$$

The Balance of Payments (BP): It is specified as:

$$BP(t) = D[R(t)] = X(t) - IM(t) + SK(t) \qquad (29)$$

where SK represents the non-trade variable that contains services, short-term and long-term capital flows, and all types of foreign aid receipts or repayments. For the purposes of the model, this item (SK) is assumed to be determined outside the system.

The Supply of Money: It equals the international, R, and domestic, D, assets held by the central bank:

$$M^s(t) = R(t) + D(t) \qquad (30)$$

Khan (1977) estimates the monetary model for ten developing countries for the period 1952-70 and reports the results.

Khan's (1976) Model: The second model developed by Khan (1976), which is applied to Venezuela, is also concerned with the short-run implications of the monetary approach. The results are very encouraging for the monetary approach, as the model is able to explain a great deal of the quarterly fluctuations in the balance of payments for Venezuela during the period 1968-73.

The model is concerned with the short-run implications of the monetary approach. In this framework, an excess supply of real money balances leads to an excess demand for goods and financial assets, which in turn changes domestic prices and interest rates; this leads to disequilibrium in the foreign exchange market and the balance of payments. The model decomposes the balance of payments into the trade and capital accounts, which permits a simultaneous study of the behavior of the individual accounts rather than simply the trade account or the overall balance of payments.

The model contains seven stochastic equations determining the following variables: real imports, real expenditures, the rate of inflation, the currency to deposit ratio, the domestic rate of interest, short-term capital flows, and the excess reserves to deposits ratio of the commercial banks. There are also four identities defining real income, the change in international reserves, the stock of money, and the stock of high-powered money. Each of these equations is discussed below.

Real Imports: The real value of imports is specified as a linear function of the level of real expenditures on all goods, E, and the ratio of import prices, PIM, to domestic prices, P:

$$[IM(t)/PIM(t)] = a_0 + a_1.[PIM(t)/P(t)] + a_2.[E(t)/P(t)] + u_1(t) \qquad a_1<0,\ a_2>0 \qquad (31)$$

The variable u_1 is a random error term and has the classic properties. Khan (1976) introduces real expenditures as an explanatory variable rather than the more commonly used demand variable, real income. His reasoning behind this formulation is that demand for foreign goods (imports) should properly be related to domestic demand for all goods rather than to domestic demand for domestic goods plus foreign demand for domestic goods (exports). The use of real income would involve the latter. Import prices are treated as exogenous to the model, since Venezuela is a small country with a fixed exchange rate.

Real Expenditures: Real expenditures are defined as equal to real income less the level of the flow demand for real money balances, F:

$$[E(t)/P(t)] = [Y(t)/P(t)] - F(t) \qquad (32)$$

where Y is the level of nominal income. The flow demand for money is assumed to be a proportional function of the stock excess demand for real money balances:

$$F(t) = a.\{[M^d(t)/P(t)] - [M(t)/P(t)]\} \quad 0<a<1 \qquad (33)$$

where M is the stock of nominal broad money balances and M^d refers to nominal money demand. The stock demand for real money balances is specified as a linear function of real income and rate of interest:

$$[M^d(t)/P(t)] = a_3 + a_4.[Y(t)/P(t)] + a_5.i_{vz}(t) \qquad a_4>0,\ a_5<0 \qquad (34)$$

where i_{vz} is the short-term rate of interest in Venezuela. Substituting equations (33) and (34) into (32), yields the following equation:

$$[E(t)/P(t)] = -a.a_3 + (1-a.a_4).[Y(t)/P(t)] - a.a_5.i_{vz}(t) + a.[M(t)/P(t)] + u_2(t)$$

$$(1-a.a_4)>0,\ a.a_5<0,\ a>0 \qquad (35)$$

where u_2 is a stochastic random error term.

Rate of Inflation: The rate of inflation is assumed to be equal to the "expected" rate of inflation plus a function of the general level of excess demand in the economy and the proportionate rate of change of import prices. Khan (1976) represents this general level of excess demand by the difference between expected, or "permanent" real income and actual real income:

$$[DP(t)/P(t)] = a_6 + a_7.\{Y_P(t) - [Y(t)/P(t)]\} + a_8.EIP(t) + a_9.[DPIM(t)/PIM(t)] + u_3(t) \qquad (36)$$

where Y_P is the level of permanent real income and EIP is the expected rate of inflation, and u_3 is a random error term. The estimated parameters are expected to carry the following signs:

$$a_7<0,\ a_8=1,\ a_9>0$$

Permanent real income and the expected rate of inflation are generated by an adaptive expectation model and then used in estimation.

Currency to Deposit Ratio: The ratio of currency to the deposit liabilities of commercial banks is specified as a negative function of the opportunity cost of holding currency, as measured by the domestic interest rate, and as a negative function of the level of income, since individuals and corporations tend to become more efficient in their management of cash balances as their income rises:

$$CDR(t) = a_{10} + a_{11}.i_{vz}(t) + a_{12}.Y(t) + u_4(t) \qquad a_{11}<0,\ a_{12}<0 \qquad (37)$$

where CDR is the ratio of currency to total private deposits at commercial banks, and u_4 is the error term.

Rate of Interest: Khan's (1976) equation for the determination of the rate of interest is obtained simply by solving the equation for the demand for real money balances, equation (39), for i_{vz}:

$$i_{vz}(t) = a_{13} + a_{14}.[Y(t)/P(t)] + a_{15}.[M(t)/P(t)] + u_5(t) \qquad (38)$$

where $a_{13} = a_3/a_5$, $a_{14} = a_4/a_5$, $a_{15} = 1/a_5$. Since $a_4>0$ and $a_5>0$, then $a_{14}>0$, and $a_{15}<0$.

Short-Term Capital Flows: Khan (1976) assumes private short-term capital flows, *D*K, are a linear function of the change in the rate of interest in Venezuela and the change in the foreign interest rate. He argues that since most capital flows take place between Venezuela and the United States, the foreign rate is taken to be the U.S. rate, i_{us}. As there were substantial speculative inflows to Venezuela in December 1971, there is a dummy variable, DU, for the fourth quarter of 1971:

$$DK(t) = a_{16} + a_{17}.Di_{vz}(t) + a_{18}.Di_{us}(t) + a_{19}.DU + u_6(t) \qquad a_{18}<0,\ a_{19}>0 \qquad (39)$$

where u_6 is a random error term.

Ratio of Excess Reserves to Deposits: The ratio of excess reserves of commercial banks to their total deposits liabilities, ER, is specified as a linear function of the rate of interest. As the rate of interest rises, the opportunity cost of holding reserves in the form of non-income yielding assets rises, and commercial banks can be expected to lower their demand:

$$DER(t) = a_{20} + a_{21}.i_{vz}(t) + u_7(t) \qquad a_{21}<0 \qquad (40)$$

where u_7 is a random error term. As the commercial banks may adjust this ratio to the desired level, DER, with a lag, an adjustment function is assumed:

$$DER(t) = @.[DER(t) – ER(t\text{-}1)] \qquad 0<@<1 \qquad (41)$$

Substituting (40) into (41) and solving for ER, the estimating equation is obtained:

$$ER(t) = @.a_{20} + @.a_{21}.i_{vz}(t) + (1\text{-}@).ER(t\text{-}1) + @.u_7(t) \qquad (42)$$

Real Income: The level of real income is equal to real private expenditure plus the real value of exports less the real value of imports:

$$[Y(t)/P(t)] = [E(t)/P(t)] + [X(t)/PX(t)] – [IM(t)/PIM(t)] \qquad (43)$$

where PX is the price of exports, and both X and PX are assumed to be exogenous to the model.

Balance of Payments: The balance of payments, BP, is equal to the current account balance of the non-petroleum sector plus that of the petroleum sector, plus short-term capital flows, plus a residual item, COB, which includes long-term capital flows, government capital flows, etc.:

$$BP(t) = \mathit{D}R(t) = X(t) - IM(t) + [XOIL(t) - IMOIL(t)] + \mathit{D}K(t) + COB(t) \qquad (44)$$

where (XOIL – IMOIL) is the current account balance of the petroleum sector. The variables (XOIL – IMOIL) and COB are assumed to be exogenously determined.

Money Supply: The nominal stock of money is determined by the following non-linear identity:

$$M(t) = [(1 + CDR)/(CDR + ER + RRR)].H(t) \qquad (45)$$

The expression within the brackets is the money multiplier and H is the stock of high-powered money. RRR is the proportion of total required reserves to total deposit liabilities of commercial banks, and this ratio is assumed to be under the influence of the monetary authorities as it can be altered by manipulating various legal reserve ratios.

High-Powered Money: The stock of high-powered money is equal to the stock of international reserves and the domestic asset holdings of the central bank:

$$H(t) = R(t) + D(t) \qquad (46)$$

D, along with RRR, represents monetary policy variables.

Expenditure and Import Functions: After reviewing the three typical empirical studies that are based on Prais' (1977) formulation, i.e., Rhomberg (1977) and Khan (1977, 1976), it is time to analyze the empirical forms of their expenditure and import functions. This is because the role of excess money balances in these equations is crucial in discriminating between the monetarist and Keynesian theories.

Expenditure Function: As noted previously, in the short-run monetary models, (real) expenditure is made a positive function of (real) money balances, (real) income, and the interest rate. Rohmberg's (1977) expenditure function (equation (11) from above) is:

$$E(t) = a_0 + (a_1 - a_3.k).Y(t) + a_2.Y(t-1) + a_3.\{[L(t-1) + L(t-2)]/2\}$$

Khan's (1977) expenditure equations in his first model (equations (25) and (27) from above) are:

$$ED(t) = c_0 + c_1.M^s(t) + c_2.Y(t) + u_4(t) \qquad c_1>0,\ c_2>0$$

$$D[E(t)] = \&.c_0 + \&.c_1.M^s(t) + \&.c_2.Y(t) - \&.E(t) + \&.u_4(t)$$

Khan's (1976) expenditure equation in his second model (equation (35) from above) is:

$$[E(t)/P(t)] = -a.a_3 + (1 - a.a_4).[Y(t)/P(t)] - a.a_5.i_{vz}(t) + a.[M(t)/P(t)] + u_2(t)$$

$$(1 - a.a_4)>0,\ a.a_5<0,\ a>0$$

But, these empirical forms are also consistent with the Keynesian theory. To show this, each explanatory variable is considered in turn.

Real Income: Consider the effect of (real) income on (real) expenditure. According to the Keynesian theory, an increase in (real) income causes an increase in (real) consumption and (real) investment and therefore, in total (real) expenditure.

Real Money Balances: Consider the effect of (real) money balances on (real) expenditure. According to the Keynesian theory, an increase in (real) money balances causes a reduction in interest rate and results in an increase in (real) investment and therefore (real) expenditure. Moreover, the effect of (real) money balances on the level of consumption is also consistent with a Keynesian approach. So, as a result of the increase in (real) money balances, both investment and consumption can increase.

Interest Rates: The same negative relationship between interest rates and (real) expenditure is implied by the Keynesian theory. An increase in the interest rate causes (real) investment to decrease and, other things being equal, causes total (real) expenditure to decrease.

Import Function: Rhomberg's (1977) import equation (equation (12) from above) is:

$$IM(t) = b_0 + b_1.E(t)$$

Khan (1977), in his first model, specifies import function to be (equations (16) and (19) from above):

$$IM^d(t) = a_0 + a_1.R(t) + a_2.E(t) + u_1(t) \quad a_1>0,\ a_2>0$$

$$D[IM(t)] = A.a_0 + A.a_1.R(t) + A.a_2.E(t) - A.IM(t) + A.u_1(t)$$

In his second model, Khan (1976) uses the following equation as the import equation (equation (31) from above):

$$[IM(t)/PIM(t)] = a_0 + a_1.[PIM(t)/P(t)] + a_2.[E(t)/P(t)] + u_1(t) \qquad a_1<0,\ a_2>0$$

Again, these empirical forms are consistent with Keynesian theory. The effects of (real) income, reserves, and relative prices on imports are the same as implied by Keynesian theory.

(Real) Expenditure: According to Keynesian theory, imports, like other expenditures, are positively dependent on income. If variations in the trade balance are relatively small, income and expenditure are highly correlated through the income identity, i.e., $Y = C + I + G + X - IM = E + X - IM$. In this way, expenditure is a good proxy for income, and whether the import function includes income or expenditure as the explanatory variable, a positive relation is expected. Moreover, since expenditure, E, includes imports, regressing (real) imports on (real) expenditures, especially when the variance of expenditure on domestic goods is low relative to the variance of expenditure on foreign (imported) goods, yields biased estimates.

Reserves: The stock of reserves is used as an indicator of the extent of import controls. In the short-run context, this is consistent with both theories and does not involve any difference between the two.

Relative Prices: According to the Keynesian theory, an increase in the price of imports is, in effect, a deterioration in the terms of trade and results in reduced imports. That is, Keynesian theory implies the same negative relationship between import prices and (real) imports.

CONCLUSION

Two major theories in the area of balance of payments are the Keynesian and monetarist theories. This paper argued that most short-run "tests" of the monetary approach to balance of payments have no discriminatory power. Short-run (disequilibrium) models specify a monetarist transmission mechanism, i.e., excess money balances spill over to commodity markets and increase expenditures on goods and services in general and imports in particular. This transmission mechanism, however, disappears from most of the empirical work, because actual money balances, not excess balances, appear as an explanatory variable. As a result, these short-run models are indistinguishable from equilibrium models and, therefore, cannot be used to identify the effects of excess money balances. In other words, most of the existing short-run empirical work on the monetary approach to the balance of payments has very little discriminatory power because it assumes equilibrium in the money market.

The need still exists to discriminate between Keynesian and monetarist theories of international economics (For a discussion of the ideas separating Keynesians and monetarists, see Mayor, 1978, Chapter 1, pp. 1-46). Most of the extant empirical work does not meet that objective because it cannot discriminate between monetarist and Keynesian models.

Keynesian and monetarist views about the transmission mechanism and the homeostatic mechanism are fundamentally different and provide bases for discriminatory tests. On the transmission mechanism (which is a short-run phenomenon), the Keynesian view is that excess money balances spill over into the bond market only. In the monetarist view, excess money balances spill over into the bond and money markets. On the homeostatic mechanism (which is a long-run phenomenon), Keynesian theory holds that there is no, or only a very weak, homeostatic mechanism and, in the absence of government intervention, real income tends to remain below the level of full employment. In the monetary interpretation, the homeostatic mechanism is strong, and real income can be treated as though it were exogenous.

For further research in this area some directions may be outlined. One is to develop tests on the basis of differing views of Keynesians and monetarists with respect to the transmission mechanism. One, for example, may estimate Prais' (1977) short-run theoretical model, without assuming equilibrium in the money market, as most existing empirical work does. Given the rapid development of econometric procedures to estimate disequilibrium systems, an effective test based on this approach should be feasible in the near future. The other approach would be to develop tests on the basis of differing views of Keynesians and monetarists with respect to the homeostatic mechanism.

APPENDIX 1

Ardalan's (2003) Appendix 3 provides "… a comprehensive list of references which have estimated a short-run model in the tradition of the monetary approach to balance of payments." The list of the references is as follows: "Agenor (1990), Aghevli (1975, 1977), Aghevli and Khan (1980), Aghelvi and Sassanpour (1982), Akhtar (1986), Ardito Barletta, Blejer, and Landau (1983), Argy (1969), Baker and Falero (1971), Bergstrom and Wymer (1976), Blejer (1977, 1983), Blejer and Fernandez (1975, 1978, 1980), Blejer, Khan, and Masson (1995), Blejer and Leiderman (1981), Bonitsis and Malindretos (2000), Borts and Hanson (1977), Brissimis and Leventakis (1984), Cheng and Sargen (1975), De Silva (1977), Dornbusch (1973), Fleming and Boissonneault (1961), Franco (1979), Guitian (1973), Horne (1979, 1981), International Monetary Fund (1977, 1987, 1996), Jonson (1976), Jonson and Kierzkowski (1975), Kanesathasan (1961), Khan (1974, 1976, 1977), Khan and Knight (1981), Kieran (1970), Knight and Mathieson (1979, 1983), Knight and Wymer (1976, 1978), Knoester and Van Sinderen (1985), Lachman (1975), Laidler (1975), Laidler, Bentley, Johnson, and Johnson (1981), Laidler and O'Shea (1980), Leon and Molana (1987), Leventakis (1984), Levy (1981), Miller (1980), Miller and Askin (1976), Mussa (1974), Myhrman (1976), Otani and Park (1976), Parikh (1993), Parkin (1974a, 1974b), Polak (1957, 1998), Polak and Argy (1971), Polak and Boissonneault (1960), Prais (1961), Rhomberg (1977), Rodriguez (1976), Sassanpour and Sheen (1984), Schotta (1966), Spinelli (1983), Taylor, L. (1972), Taylor, M.P. (1986), Teal and Giwa (1985), Vaez-Zadeh (1989), Wallich (1950), Wilford (1977), and Yusoff (1988)."

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