THE KEYNESIAN-MONETARIST CONTROVERSY IN INTERNATIONAL ECONOMICS: DISCRIMINATORY POWER OF LONG-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 long-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. Long-run empirical models can discriminate between a simple Keynesian cross and a monetarist approach, but they cannot discriminate between a monetarist and a standard IS-LM model because the monetary equation is the LM schedule in an IS-LM model. 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 long-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 long-run framework has no discriminatory power because Keynesian and monetarist approaches yield similar implications when Keynesian models contain a monetary sector. The standard monetary equation may be used to discriminate between the monetary approach and simple Keynesian multiplier theory, but it cannot discriminate between the monetary approach and the Keynesian IS-LM models because the monetary equation is the LM schedule in an IS-LM model.

The next section explores the existing empirical work on the long-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 long-run monetary approach to balance of payments does not discriminate between Keynesian (IS-LM) and monetarist theories of the balance of payments. This is because the evidence is consistent with both Keynesian (IS-LM) and monetarist models, as specified.

Ardalan (2005a) noted that Johnson (1972) proposed a test of the monetary approach to the balance of payments for a small open economy under fixed exchange rates. Ardalan (2005a) also reviewed examples (Aghevli and Khan 1977, Wilford and Wilford 1978, and Zecher 1976) of the numerous applications (see the list of references in both Appendix 1 and Appendix 2) of that idea to various small countries (either developed or under-developed). The major conclusion of this line of research was that the evidence strongly favors the monetary approach over the traditional Keynesian one.

This section argues that Johnson's (1972) equation discriminates between the monetarist theory and a simple Keynesian multiplier theory in which there is no monetary sector. It does not discriminate between the monetarist theory and a Keynesian model with a monetary sector (i.e., IS-LM). In order to show this, the monetarist model of Johnson (1972) and the Keynesian models of Mundell (1963, 1964) (See Dornbusch 2000, Fleming 1962, Frenkel and Razin 1987, Mundell 1963, 1964, Prasch 2001, and Salvatore 2000) are analyzed and compared. First, small-country comparisons are shown, and then two-country comparisons are examined.

SMALL-COUNTRY COMPARISON

In this subsection, for the case of a small country, first the monetarist model of Johnson (1972) is reviewed. Then, the Keynesian Model of Mundell (1963) is analyzed. Finally, the implications of the monetarist and Keynesian models are compared.

Johnson's (1972) Model: The reserve flow equation is associated with Johnson (1972). For a small country with a fixed exchange rate, the equation can be derived by the following system: The demand for money, equation (1), is dependent on the foreign and domestic price level, P, real income, Y, and the nominal interest rate, i. The supply of money, equation (2), is dependent on the magnitude of the money multiplier, m, and the sum of international, R, and domestic, D, assets of the central bank. Equation (3) specifies equilibrium in the money market.

$$M^d = P.L(Y,i) \quad (1)$$
$$M^s = m.(R+D) \quad (2)$$
$$M^d = m.(R+D) \quad (3)$$

In stationary steady state, this model implies that the balance of payments is zero. In order to obtain non-zero reserve flows, the model is reformulated in terms

of steady state "growth." Letting "g" denote the percentage growth rate of a variable, i.e., $g_x = (1/x)(dx/dt)$, equation (3) implies the following equations:

$$g_{Md} = g_m + g_{(R+D)} \quad (4)$$
$$g_{Md} = g_m + [R/(R+D)].g_R + [D/(R+D)].g_D \quad (5)$$

Letting e_x signify elasticity of money demand with respect to x, the demand for money in growth terms is:

$$g_{Md} = g_P + e_Y.g_Y + e_i.g_i \quad (6)$$

Combining equations (5) and (6) with the equilibrium condition yields equations (7) and (8):

$$g_P + e_Y.g_Y + e_i.g_i = g_m + [R/(R+D)].g_R + [D/(R+D)].g_D \quad (7)$$
$$[R/(R+D)].g_R = g_P + e_Y.g_Y + e_i.g_i - g_m - [D/(R+D)].g_D \quad (8)$$

Equation (8) is the reserve flow equation developed by Johnson (1972). It is the foundation for almost all long-run analysis.

Ordinary least squares can be applied to the reserve flow equation if the following conditions hold; there is no sterilization of reserve changes, and real income, prices, and interest rates are exogenous. Given the earlier assumptions, all of these conditions must hold for a small country with a fixed exchange rate. In this model the domestic monetary authorities have no control over any real or nominal variables in the economy except the domestic component, D, of high-powered money, and, through reserve flows, international reserves (Magee 1976).

Aghevli and Khan (1977) point out that in utilizing the reserve flow equation, one can use basically two methods. One method is to estimate the reserve flow equation directly, and then check the signs and values of the estimated coefficients. The other is to estimate a demand for money function and substitute it into the reserve flow equation. Simulated values from this equation then can be compared with actual values to test the tracking ability of the model.

Using the first method, one has to know what signs and magnitudes to expect for the estimates of coefficients. The coefficient for g_Y is e_Y, the income elasticity of demand for money. It should be positive and in the neighborhood of unity. For given interest rates, price levels, money multiplier, and domestic credit, growth in income generates an increased demand for money, and a reserve inflow

just sufficient to result in an increase in the nominal and real money stock. This result conflicts with the simple Keynesian model in which rising income increases imports and presumably generates a reserve outflow. Some authors (see the list of references in both Appendix 1 and Appendix 2) have used a statistically significant positive relation between income, Y, and international reserves holdings of the central bank, R, as evidence favoring a monetarist view over the Keynesian approach.

The coefficient for g_i is the interest elasticity of the demand for money, which is negative. Increases in the interest rate are associated with reserve outflows in this hypothesis. The interest rate is viewed as a proxy for world interest rates, and changes in this interest rate are taken to reflect similar movements in rates around the world. Given foreign price levels, an increase in interest rates reduces the demand for money and generates reserve losses.

The coefficient for g_P is unity because the elasticity of money demand with respect to the price level is unity. Domestic and world prices are assumed to be equal. As a result, price changes have a positive effect on reserve flows. An increase in prices reduces real money balances (increases demand for nominal balances) and, other things being equal, leads to a reserve inflow just sufficient to restore real money balances to their previous level.

The final two variables reflect domestic influences on the money stock, and both variables are responsive to policy actions by the monetary authorities. An increase in either variable tends to increase the stock of money and, other things being equal, should lead to an outflow of reserves sufficient to restore the real money stock to its previous level (Zecher 1976). As a result, the coefficient for g_m must be unity while the coefficient for g_D depends on the relative importance of domestic assets in the central bank's portfolio, i.e., [D/(R+D)].

Mundell's (1963) Model: Mondell's (1963) typical Keynesian small country model is analyzed here. Using the notation from Mundell's (1964) two-country model, the variables in his (1963) small country model can be expressed as follows:

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).

The following three equations express the system for a small country:

$$I(i) + I^* - S(Y) + BT(Y) = 0 \quad (9)$$

$$M = L(Y, i) \quad (10)$$

$$M = D^* + R \quad (11)$$

Equation (9) 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 (9), 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 (11), 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.

Equating (10) and (11), the LM curve is obtained:

$$L(Y, i) = D^* + R \quad (12)$$

Expressed in growth terms equation (12) is:

$$e_Y.g_Y + e_i.g_i = [R/(R+D)].g_R + [D/(R+D)].g_D \quad (13)$$

Rearranging terms, yields equation (14):

$$[R/(R+D)].g_R = e_Y.g_Y + e_i.g_i - [D/(R+D)].g_D \quad (14)$$

which, except for the absence of the money multiplier and price level, is the reserve flow equation (8) of Johnson (1972). Note that Mundell's (1963) Keynesian model implies the same positive relationship between income and international reserves. The theories yield similar implications because both require monetary equilibrium. The absence of prices and a money multiplier in Mundell's (1963) model are due to the assumptions of a constant price level and unit money multiplier. Neither assumption is crucial for the Keynesian approach. Prices can change in an IS-LM model and fractional reserve banking is consistent with an IS-LM model.

Comparison: The essential equivalence of equation (8) and (14) implies that the reserve flow equation cannot discriminate between monetarist and Keynesian views of balance of payments adjustment. Both theories imply the same relationships between the variables in the reserve flow equation developed by Johnson (1972). The only substantive difference is what can be taken as exogenous. In the monetarist approach, (real) income is exogenous, while income is endogenous in the Keynesian model.

TWO-COUNTRY COMPARISON

Essentially the same argument applies to a two- or multi-country approach. The reserve flow equation has little discriminatory power.

Johnson's (1972) Model: Johnson's (1972) model considers monetary equilibrium in the world as a whole. The essential change from the small-country version is that the world price level becomes endogenous. It is determined by the world demand for and supply of money. The analysis is simplified by assuming that world interest rates are constant, so that the growth of demand for real balances depends only on the growth of real output. (The growth of demand for nominal money balances also depends, of course, on the rate of change of the price level). This assumption can be justified on the grounds that real rates of return on investment are relatively stable, and that money rates of interest in a longer-run growth context will be equal to real rates of return plus the (actual and expected) rate of world price inflation.

Suppose the world economy possesses an international reserve money, and the residence of the two countries demand national monies, which are based partly on international reserves and partly on domestic credit. For simplicity, the exchange rate is assumed to be unity. The total money supply for the world economy is the sum of the money supplies of the two countries:

$$M^s_1 = R_1 + D_1 \quad (15)$$
$$M^s_2 = R_2 + D_2 \quad (16)$$
$$M^s_1 + M^s_2 = R_1 + R_2 + D_1 + D_2 \quad (17)$$
$$M^s = R_1 + R_2 + D_1 + D_2 \quad (18)$$

where j = 1, 2 refers to the specified country.

For the world economy, the growth rate of demand for money, assuming the homogeneity postulate, is the growth rate of the sum of the demands for money in the two countries:

$$M^d_1 = P.L_1(Y_1) \quad (19)$$
$$M^d_2 = P.L_2(Y_2) \quad (20)$$
$$M^d_1 + M^d_2 = P.[L_1(Y_1) + L_2(Y_2)] \quad (21)$$
$$M^d = P.[L_1(Y_1) + L_2(Y_2)] \quad (22)$$
$$g_{Md} = g_P + g_{[L1(Y1) + L2(Y2)]} \quad (23)$$
$$g_{Md} = g_P + \{L_1(Y_1)/[L_1(Y_1) + L_2(Y_2)]\}.g_{L1(Y1)} + \{L_2(Y_2)/[L_1(Y_1) + L_2(Y_2)]\}.g_{L2(Y2)} \quad (24)$$
$$g_{Md} = g_P + w_1.e_{Y1}.g_{Y1} + w_2.e_{Y2}.g_{Y2} \quad (25)$$
$$g_{Md} = SUM_{j = 1, 2}\ w_j.e_{yj}.g_{yj} + g_P \quad (26)$$

where w_j is country j's share in the total world stock of money.

The rate of growth of the world money supply is:

$$g_{Ms} = (R_1/M^s).g_{R1} + (R_2/M^s).g_{R2} + (D_1/M^s).g_{D1} + (D_2/M^s).g_{D2} \quad (27)$$
$$g_{Ms} = (M^s_1/M^s).(R_1/M^s_1).g_{R1} + (M^s_2/M^s).(R_2/M^s_2).g_{R2} + (M^s_1/M^s).(D_1/M^s_1).g_{D1} + (M^s_2/M^s).(D_2/M^s_2).g_{D2} \quad (28)$$
$$g_{Ms} = (M^s_1/M^s).(R_1/M^s_1).g_{R1} + (M^s_2/M^s).(R_2/M^s_2).g_{R2} + (M^s_1/M^s).[1 - (R_1/M^s_1)].g_{D1} + (M^s_2/M^s).[1 - (R_2/M^s_2)].g_{D2} \quad (29)$$
$$g_{Ms} = SUM_{j = 1, 2}\ w_j.s_j.g_{Rj} + SUM_{j = 1, 2}\ w_j.(1 - s_j).g_{Dj} \quad (30)$$

where s_j is country j's ratio of international reserve money to its domestic money supply.

Equations (26) and (30) determine the rate of change of world prices, through the requirement that $g_{Md} = g_{Ms}$:

$$g_P = SUM_{j=1,2}\, w_j.s_j.g_{Rj} + SUM_{j=1,2}\, w_j.(1 - s_j).g_{Dj} - SUM_{j=1,2}\, w_j.e_{Yj}.g_{Yj} \quad (31)$$

The growth rate of an individual country's holdings of reserves, g_{R1}, can be obtained in the same way as in equation (8) in the small country case:

$$g_{R1} = (1/s_1).(g_P + e_{Y1}.g_{Y1}) - [(1 - s_1)/s_1].g_{D1} \quad (32)$$

Substituting for g_P from equation (31):

$$g_{R1} = (1/s_1).SUM_{j=1,2}\, w_j.s_j.g_{Rj} + (1/s_1).SUM_{j=1,2}\, w_j.(1 - s_j).g_{Dj} - (1/s_1).SUM_{j=1,2}\, w_j.e_{Yj}.g_{Yj} + (1/s_1).e_{Y1}.g_{Y1} - [(1 - s_1)/s_1].g_{D1} \quad (33)$$

$$g_{R1} = (1/s_1).\{SUM_{j=1,2}\, w_j.s_j.g_{Rj} + (e_{Y1}.g_{Y1} - e^*_Y.g^*_Y) - [(1 - s).g_{D1} - (1 - s)^*g^*_D]\} \quad (34)$$

where the terms with a "*" indicate the average product of stared terms for the world economy.

This expression indicates that a country's reserves grow faster (through a balance of payments surplus) the lower its initial reserve ratio; the faster the growth of total world reserves, the higher its income elasticity of demand for money and its real growth rate relative to other countries, and the lower its international reserve ratio and rate of domestic credit expansion relative to other countries. Again, emphasis is on the direct relationship between income, Y, and international reserves, R.

Mundell's (1964) Model: Mundell's (1964) two-country model is now reviewed. Seven equations can express the system in a world context. They are represented by equations (35) through (41):

$$I_1(i) + I^* - S_1(Y_1) + B(Y_1, Y_2, r) = 0 \quad (35)$$

$$I_2(i) - S_2(Y_2) - B(Y_1, Y_2, r) = 0 \quad (36)$$

$$M_1 = L_1(Y_1, i) \quad (37)$$

$$M_2 = L_2(Y_2, i) \quad (38)$$

$$M_1 = D_1 + R_1 \quad (39)$$

$$M_2 = D_2 + R_2 \quad (40)$$

$$R_1 + R_2 = W \quad (41)$$

where W is the level of world reserves, assumed to be constant. The first two equations specify that the flow market for goods and services in each country is in equilibrium. The exchange rate, r, is defined as the price of a unit of the home currency in terms of foreign currency, with the exchange rate initially equal to one by appropriate choice of units. Equation (36) is analogous to (35), except that it refers to equilibrium in the market for current production in the rest of the world. The balance of trade in equation (36) equals, but opposite in sign, the balance of trade of the home country. Interest rates at home and abroad are assumed to be equal. The next two equations (37 and 38) ensure that the demand for money is equal to the supply of money in each country. Equations (39) and (40) determine the stock of money in the two countries. The last equation fixes the level of reserves in the world. When the exchange rate, r, is fixed, these seven equations determine seven endogenous variables: i, Y_1, Y_2, R_1, R_2, M_1, and M_2.

Comparison: Under fixed exchange rates, monetary equilibrium in Mundell's (1964) Keynesian model requires the same relation between reserves, income, and domestic assets of the central bank as in the monetarist model. Once again, the only substantive difference between the two approaches is their assumptions about real income. In the monetarist model real income is exogenous and in the Keynesian model it is endogenous.

Equations like those developed by Johnson (1972) and used by others can discriminate between monetary and simple Keynesian approaches to balance of payments adjustment. However, they cannot discriminate between the monetary approach and a standard IS-LM model.

The monetary equation may be used as a test to discriminate the monetary approach from Keynesian multiplier theory because the Keynesian multiplier theory implies an inverse relationship between income and international reserves held by the central bank. Imports depend on income, and exports are exogenous. An increase in income increases imports, and, given the level of exports, the balance of trade deteriorates. Since the capital account is not considered, the balance of payments will be the same as balance of trade under fixed exchange rates, and there will be a loss of international reserves. That is to say, an inverse relationship between income and international reserves exists.

The monetary equation, however, cannot discriminate between the monetary approach and a Keynesian IS-LM model. In effect, the monetarist equations are simply LM schedules. The only difference is in what is assumed to be exogenous. In the monetary interpretation, real income is always exogenous and prices and interest rates are exogenous for a small country. In the Keynesian interpretation, real

income is endogenous and prices and interest rates can be endogenous or exogenous (Takayama 1969).

This comparison suggests that homeostasis is a fundamental issue separating monetarist and Keynesian views about balance of payments adjustments. If market forces tending to reestablish equilibrium are strong and effective, the monetarist assumption that income can be treated as exogenous is reasonable. If these forces are weak and there is persistent under-employment, then income becomes endogenous as the positive feedback of multiplier analysis dominates the negative feedback assumed by monetarists (For a discussion of the ideas separating Keynesians and monetarists, see Mayor (1978), Chapter 1, pp. 1-46).

CONCLUSION

Two major theories in the area of balance of payments are the Keynesian and monetarist theories. Most of the existing empirical work on the monetary approach to the balance of payments has very little discriminatory power. Long-run empirical models can discriminate between a simple Keynesian cross and a monetarist approach, but they cannot discriminate between a monetarist and a standard IS-LM model because the monetary equation is the LM schedule in an IS-LM model.

The need still exists to discriminate between Keynesian and monetarist theories of international economics. Most of the extant empirical work does not meet that objective because it cannot discriminate between monetarist and Keynesian IS-LM 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.

APPENDIX 1

Ardalan's (2005a) Appendix 5 provides "… a comprehensive list of references which have estimated either the 'reserve flow equation' or the 'exchange market pressure equation' and have not only discussed signs and values of the coefficients in the context of the monetary approach to balance of payments but also contrasted them with those as expected by the Keynesian approach."
The list of the references is as follows: "Aghevli and Khan (1977), Akhtar, Putnam, and Wilford (1979), Bean (1976), Beladi, Biswas, and Tribedy (1986), Bhatia (1982), Dornbusch (1971), Frenkel, Gylfason, and Helliwell (1980), Kamas (1986), Kenneally and Finn (1985), Lee and Wohar (1991), Looney (1991), McNown and Wallace (1977), Miller (1978), Purviz (1972), Putnam and Wilford (1986), Reid (1973), Taylor, M.P. (1987), Tullio (1979), Wein (1974), Wilford (1977), Wilford and Wilford (1977, 1978), Wilford and Zecher (1979), and Wohar and Lee (1992)."

APPENDIX 2

Ardalan's (2005a) Appendix 6 provides "… a comprehensive list of references which have estimated either the 'reserve flow equation' or the 'exchange market pressure equation' and have not only discussed signs and values of the coefficients in the context of the monetary approach to balance of payments and contrasted them with those as expected by the Keynesian approach but also explicitly decided in favor of one theory or the other." The list of the references is as follows: "Kenneally and Finn (1985), Lee and Wohar (1991), Putnam and Wilford (1986), Taylor, M.P. (1987), Tullio (1979), Wilford (1977), Wilford and Wilford (1977, 1978), Wilford and Zecher (1979), and Wohar and Lee (1992)."

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