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Monetary Approach to Balance of Payments: The Evidence on Reserve Flow from Pakistan

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The monetary approach to balance-of-payments theory suggests that balance of payments defecits are related to disequilibrium in the international money market and, as such, involve a flow of international reserves. A cross-section study of 39 LDCs, including Pakistan, validates the MABOPs theory for the analysis of balance of payments of these countries despite the absence of underlying assumptions in these countries. It is contended that while it may be possible to obtain significant results on a cross-section basis, the individual country data for many of these LDCs may not validate the MABOPs theory, mainly due to the absence of underlying assumptions, due to significantly heterogenous economic structures in many of these countries, and due to the common prevalence of restrictive financial policies in a large number of LDCs. In this paper the propositions of the MABOPs theory are tested for Pakistan only, using the same model as applied to 39 LDCs on a cross-section basis. The results show that reserves movement in Pakistan cannot be explained by the version of MABOPs theory.

I. INTRODUCTION

The monetary theory of the balance of payments derives its essential features from Hume's (1752) specie flow mechanism, where an exogenous increase in the money stock in a country causes the price level to rise. The increase in price level diverts the demand abroad, leading to a deficit in the balance of trade. The trade deficits is financed through net monetary outflows, leading to a fall in the money stock, and hence prices, until international competitiveness is restored. As the prices return to their original level, the money stock also returns to its original level, implying that the increases in the money supply have flowed out abroad. In its simplest form, as described above, the specie flow mechanism seems to depend on two rather

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restrictive assumptions. First, in identifying a trade deficit with an outflow of money, it assumes no international capital mobility. Second, the assumption that an outflow of money will lead to a fall in the domestic money stock implies that the same currency is used for both domestic and international transactions.

These shortcomings are overcome by the modern theory of balance of payments [Johnson (1972); Frenkel and Johnson (1976)], first, by focusing on disequilibrium in the money market (rather than in trade balances); and second, by defining the domestic money stock as the sum of international reserves and domestic credit. Under the new theory, an exogenous increase in the money stock would increase the money supply in excess of the demand for it. People reduce their holdings of excess money by net purchases of goods or net acquisition of assets from abroad, which implies a balance of payments deficit and an outflow of international reserves. With a given quantity of domestically created credit, a loss of reserves means a reduction in money supply. This process continues until all the newly created credit has flowed out abroad and the domestic money supply is again equal to the demand for it.

Aghevli and Khan (1977) have tested the monetary approach to a balance-of-payments model for 39 LDCs and, drawing their highly significant results on a cross-section basis, they maintain that the mechanism underlying the monetary approach to the balance-of-payments theory holds equally strongly for both the developed and less developed countries. The objective of this study is to test this model for a single LDC–Pakistan–to see if the significant results on a cross-section basis obtained by Aghevli and Khan are also applicable to the LDCs. It needs to be noted that not all LDCs have similar economic systems, and that such systems are also different from the economic systems of the industrialized economies.

The plan of the paper is as follows. Section II describes the specific assumptions underlying the monetary approach to the balance-of-payments theory. This is followed by a brief discussion with regard to the effect of various exchange and capital controls, employed widely in most of the LDCs, on some important aspects of the smooth market-clearing process as postulated by the monetary approach to the balance-of-payments theory. Section III describes the monetary approach to the balance-of-payments model to be tested. Data sources are described in Section IV. The results of the model are discussed in Section V. And, finally, Section VI presents the major conclusions of the study.

II. ASSUMPTIONS UNDERLYING THE MONETARY APPROACH TO THE BALANCE-OF-PAYMENTS THEORY AND THE OPERATION OF CONTROLS

The monetary approach views balance-of-payments problems as essentially

transitory and self-correcting, provided the authorities do not sterilize the effects of the changes in reserves by means of compensating the changes in domestic credit. It assumes a completely liberalized system of trade and payments. Specifically, it assumes that: (a) the domestic money supply is backed by only two components, i.e., international reserves and domestic credit; (b) the demand for money is a conventional function of prices, real income or output, and interest rates, and it is always stable; (c) the price level is determined in the world market according to the law of one price; (d) the interest rate is determined in the international capital market by the requirement that, with international capital mobility, rates of return on assets denominated in different currencies must be equalized; (e) a 'small country' by its own actions cannot influence world prices or interest rates; and (f) real output is determined by real forces independent of the monetary factors or the balance of payments.

Thus the monetary approach is largely based on the assumptions relating to the market-clearing process. It focuses on the interaction between assets and money markets in the determination of the exchange rate. Aspects such as substitution of currencies and financial assets, interest rate differentials, speculation, arbitrage, expected forward exchange rates, and rational expectations form the focus in the monetarist approach. However, an extensive use of exchange and capital controls exercised by a majority of the LDCs to deal with their balance-of-payments difficulties would render the assumptions underlying the market-clearing process as postulated by this theory implausible.

In a regime where exchange and capital controls are extensive, foreign capital mobility is extremely limited. It is usually restricted due to the non-existence of integrated capital and foreign exchange markets and the presence of restrictions on trade and capital flows. Exchange controls render the currencies of many of these countries less than readily convertible and specifically hinder private capital flows. The assumption of perfect capital mobility is far from realistic for the analysis of balance of payments in these countries. Capital flows from and to LDCs largely take place in the form of official transactions.

With regard to the trade sector, the mechanism suggested by the monetary approach to the balance-of-payments theory – to reduce the balance-of-payments disequilibrium through a reduction in imports and an increase in exports – tends to ignore the fundamental difference between the determinants of levels of imports and exports in the LDCs and the industrialized countries (on whose structure the assumptions of the monetary approach to the balance-of-payments theory are based). Whereas in developed industrialized countries there usually exists substantial scope for substitution between export goods, import goods and non-traded goods and the level of imports will be responsive to relative prices, in the LDCs the demand for imports is generally held to be inelastic because a significant proportion of imports

consists of the development imports for which there are no domestic substitutes. Secondly, tariff and non-tariff barriers to foreign trade are applied extensively, and they are not always governed by purely economic considerations, as socio-political considerations may be more important in determining the trends in foreign trade.

Finally, the structure of foreign trade in the LDCs (particularly the heavy dependence on imported technology and spare parts and the exports of raw materials mainly) implies that these countries simply cannot be categorized along with developed countries within the purview of the monetary approach to the balance-of-payments theory, which deals with the overall balance, while the balance-of-payments problems of the LDCs mainly originate in the current account or trade balance.

Therefore, keeping in view the pervasive market distortions in the LDCs, affecting labour, foreign exchange, capital, and commodity markets, it seems quite obvious that the market-clearing process as postulated in the monetary theory cannot be generalized to hold equally for the less developed economies.

III. THE MONETARY APPROACH TO THE BALANCE-OF-PAYMENTS MODEL

The monetarist approach to the balance-of-payments model has been tested in a number of developed economies [Genberg (1976); Zecher (1973); Guitian (1976); and Bean (1976)]. Aghevli and Khan (1977) have tested the model for 39 LDCs including Pakistan using cross-section data. They obtain highly significant coefficients for the model tested.

Since the results of the model are highly significant even in the absence of the underlying assumptions of the model for these countries, the authors maintain that the monetarist approach to balance of payments is equally valid for the long-run analysis of the balance of payments of all the LDCs. It is contested, however, that although it is possible to obtain significant results on a cross-section basis, these results cannot be generalized to hold true for all the LDCs for all times. Since the LDCs are considerably heterogenous amongst themselves (and to the advanced industrialized economies), the outcome of the model will differ considerably among these countries, depending on their economic policies based on their given economic structures. Therefore, in this paper, we test the Aghevli and Khan version of the monetary approach to the balance-of-payments model for Pakistan only.

Specification of the Model

The MABOPs model has two main components: the demand for money and the money supply process, which are described below.

Demand for Money Function

$$M_d/p = y\alpha \quad \pi^{-b} \quad R^{-\gamma^1} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (1)$$

where M_d is the demand for nominal money balances; p is the domestic price level; y is the level of domestic real income; R is the domestic interest rate and π is the rate of inflation.

Taking logs on both sides

$$\ln M_d/p = \ln (Y^{\alpha} \pi^{-b} R^{-\gamma}) \qquad \ldots \qquad \ldots \qquad \ldots \qquad (2)$$

$$\ln M_d - \ln P = \ln Y^{\alpha} + \ln \pi^{-b} + \ln R\gamma \qquad \ldots \qquad \ldots \qquad (3)$$

Using dots to denote rates of growth, we rewrite Equation (3) as:

$$\dot{M}_d - \dot{P} = \alpha\dot{Y} - b\dot{\pi} - \gamma\dot{R} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (4)$$

and

$$\dot{M}_d = \dot{P} + \alpha\dot{Y} - b\dot{\pi} - \gamma\dot{R} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (5)$$

where the parameters α b and γ, the elasticities of real money balances, inflation, and interest rates are expected to bear the following signs:

$$\alpha > 0; \quad b < 0; \quad \gamma < 0;$$

Supply of Money

Money supply is defined as the product of high-powered money and the money multiplier:

$$M^s = mH \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (6)$$

where m is the money multiplier and H is the volume of high-powered money.

By definition, the stock of high-powered money is equal to the stock of international reserves (R) and domestic assets (net of liabilities) holdings of monetary

[1]It may be pointed out here that although the interest rate embodies inflation, in the case of the LDCs, where the interest rates are generally fixed, the inflation rate is a better measure of opportunity cost. Since one of the main objectives of the present study is to test the Aghevli and Khan model for a country over time rather than across countries, we are keeping the specification used by them. However, for purposes of estimation we test different specifications, using these variables alternatively.

authorities:

$$H = R + D \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (7)$$

Substituting Equation (7) into Equation (6), we obtain:

$$M_s = m(R+D) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (8)$$

Taking logs on both sides:

$$\ln M_s = \ln [m(R+D)] \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (9)$$

$$\ln M_s = \ln m + \ln (R+D) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (10)$$

Denoting rates of growth for the variables in Equation (10) by dots and writing $(R+D) = \eta$

we rewrite Equation (10) as:

$$\dot{M}_s = \dot{m} + \eta \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (11)$$

but $$\eta = \frac{R}{H}\dot{R} + \frac{D}{H}\dot{D} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (12)$$

Therefore $$\dot{M}_s = \dot{m} + \frac{R}{H}\dot{R} + \frac{D}{H}\dot{D} \quad \ldots \quad \ldots \quad \ldots \quad (13)$$

In terms of growth of international reserves, Equation (13) becomes:

$$\dot{R}\,\frac{H}{R} = \dot{M}_s - \dot{m} - \frac{D}{H}\dot{D} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (14)$$

$$\dot{R} = \frac{H}{R}(\dot{M}_s - \dot{m}) - \frac{D}{H} \cdot \frac{H}{R}\dot{D} \quad \ldots \quad \ldots \quad \ldots \quad (15)$$

$$\dot{R} = \frac{H}{R}(\dot{M}_s - \dot{m}) - \frac{D}{R}\dot{D} \quad \ldots \quad \ldots \quad \ldots \quad (16)$$

Assuming $M_d = M_s$ we can substitute Equation (5) into Equation (16) and obtain:

$$\dot{R} = \frac{H}{R}(\dot{P} + \alpha\dot{Y} - b\,\dot{\pi} - \gamma\dot{R} - \dot{m}) - \frac{D}{R}\dot{D} \quad \ldots \quad \ldots \quad (17)$$

Under the assumptions of the MABOPs theory, the increase in the rate of

growth of prices ($\dot{P}$) and real income ($\dot{Y}$) will lead to an improvement in the balance of payments, and the increases in the rates of growth of inflation ($\dot{\pi}$), the interest rate ($\dot{R}$), the money multiplier ($\dot{m}$), and net domestic assets of the Central Bank ($\dot{D}$) will lead to a loss of reserves.

Multiplying both sides of Equation (17) by $\frac{R}{H}$, we obtain

$$\frac{R}{H}\dot{R} = \gamma_1\dot{p} + \gamma_2\dot{y} + \gamma_3\dot{R} + \gamma_4\,\dot{\pi} + \gamma_5\,\dot{m} + \gamma_6\,\frac{D}{R}.\,\dot{D} + e \qquad \ldots \qquad \ldots \quad (18)$$

Adding an intercept, Equation (18) becomes:

$$\frac{R}{H}\dot{R} = \gamma_0 + \gamma_1\dot{p} + \gamma_2\dot{y} + \gamma_3\dot{R} + \gamma_4\,\dot{\pi} + \gamma_5\dot{m} + \gamma_6\,\frac{D}{R}\,\dot{D} + e \qquad \ldots \qquad \ldots \quad (18a)$$

The expected signs of the coefficients are:

$$\gamma_1 = 1,\ \gamma_2 > 0,\ \gamma_3 < 0,\ \gamma_4 < 0,\ \gamma_5 = \gamma_6 = -1.$$

since $\gamma_5 = \gamma_6$ Equation (18a) may be written as:

$$\frac{R}{H}\,\dot{R} = \lambda_0 + \lambda_1\dot{p} + \lambda_2\dot{Y} + \lambda_3\dot{R} + \lambda_4\dot{\pi} + \lambda_5\,\frac{D}{R}\,\dot{D} - \dot{m} + e \qquad \ldots \quad (19)$$

where $\lambda_5 = \gamma_5 = \gamma_6$

which is estimated in Section V.

IV. DATA SOURCES

The data for national income accounts is taken from the Government of Pakistan (Various Issues). As in the case of many other less developed countries, there are shortcomings in the national accounts estimates. As major limitation of these data is the fact that in the absence of direct estimates, a trend growth is assumed to make estimations for certain sectors. We use the GNP deflator to represent the rate of inflation.

Data on money supply for the period prior to 1971 are taken from Kemal *et al.* (1980).[2] Data on interest rates and balance of payments used in the estimation of this model are taken from the Government of Pakistan (Various Issues a).

The data for the study pertain to the period 1959-60 – 1981-82. Therefore, these may have been influenced by various factors affecting the economy. These

[2] While data for the pre-1971 period has not been published by the statistical agencies of Pakistan, the series has been constructed on the basis of unpublished data and certain plausible assumptions related to the shares of East and West Pakistan during various years.

include devaluation of the currency, international price increases and recession, abrupt changes in economic policies, and continuing political instability.

V. THE RESULTS

The main criteria for selecting the reported estimates are that the relevant coefficients have the expected signs, they are statistically significant, and there is a satisfactory overall level of explanation.

The results of the model estimated through Equation (19), reported in Table 1, show that while the rate of inflation and real income bear correct signs, only the real income variable is significant. The domestic credit and money multiplier variables bear incorrect signs, but are insignificant. The overall explanatory power of the model is low and improves slightly with the inclusion of the short-run rate of interest variable only. However, the interest rate variable itself remains insignificant. It may be pointed out here that both the rate of inflation and the interest rate remain insignificant even when tested alternatively (Equations 1, 2, 7, 8, 9, 10).

That the monetary approach to balance of payments fails to explain the flows of foreign reserves in economies like Pakistan and India, where the monetary policy is restrictive and the foreign exchange and capital markets are controlled, was also found by Sohrab-uddin (1985). However, in the case of Thailand, which maintains a liberal exchange control policy, he found that the model provides very good results.

The results of these two studies, thus, show that the very strong and highly significant coefficients obtained by Aghevli and Khan (1977) may be due to the fact that their cross-country study includes, in general, those countries which are not pursuing restrictive credit and reserve policies. Therefore, their model is not general in explaining the growth in international reserves in all the LDCs.

It needs to be underscored, therefore, that in a large majority of LDCs the financial and commodity markets are very different from the developed economies. Strict exchange controls render the currencies of most of these countries almost inconvertible. Capital mobility is extremely limited, and is governed by factors such as political stability and approval of the economic and financial programmes of the countries by the IMF. Similarly, non-tariff barriers to trade, especially imports, distort the effects of devaluation and other corrective policies. Keeping in view these and many other distortions, mainly due to the agrarian structure prevalent in most of the LDCs, and the limitations of the assumptions of the MABOPs model, which are based on the homogenous economic structures of the developed economies, it appears that the market clearing as postulated in the monetary approach cannot be readily assumed in all the LDCs.

Table 1

Results of the Monetarist's Approach to Balance-of-payments Model for Pakistan

Constant	$\dot{P}$	$\dot{Y}$	$\dot{\pi}$	$\dot{D}$	$\dot{m}$	$\dot{Sr}$	$\dot{Lr}$	R^2
–0.036	0.0002	0.006	–0.0003	0.054	0.158			0.314
(1.259)	(0.154)	(1.759)	(0.191)	(1.257)	(1.305)			
–0.038	0.0005	0.006	–0.0003	0.070				0.276
(1.289)	(0.363)	(1.739)	(0.158)	(1.915)				
–0.036	0.0002	0.006*	–0.0004	0.054	0.161		–0.009	0.315
(1.209)	(0.144)	(1.691)	(0.213)	(1.200)	(1.256)		(0.106)	
–0.042	0.001	0.006*	–0.0004	0.054	0.142	–0.091		0.434
(1.525)	(0.684)	(2.055)	(0.224)	(1.338)	(1.238)	(1.659)		
–0.038	0.0005	0.006	–0.0001	0.070			0.009	0.277
(1.250)	(0.552)	(1.652)	(0.081)	(1.850)			(0.109)	
–0.045	0.001	0.007*	–0.0005	0.068*		0.094		0.406
(1.570)	(0.911)	(2.059)	(0.207)	(1.969)		(1.749)		

Continued –

Table 1 – (*Continued*)

Constant	$\dot{P}$	$\dot{Y}$	$\dot{\pi}$	$\dot{D}$	$\dot{m}$	$\dot{Sr}$	$\dot{Lr}$	R^2
–0.039	0.0004	0.009*		0.069	0.159	0.011		0.413
(1.132)	(0.159)	(1.781)		(1.262)	(1.296)	(0.127)		
–0.036	0.0003	0.006*		0.035	0.147		0.009	0.300
(1.150)	(0.251)	(2.001)		(1.311)	(1.300)		(1.016)	
–0.042	0.003	0.008*		0.061	0.143	–0.088		0.400
(1.483)	(0.719)	(1.986)		(1.256)	(1.320)	(1.617)		
–0.039	0.001	0.006		0.056	0.159		0.008	0.271
(1.254)	(0.893)	(1.522)		(1.301)	(1.331)		(0.106)	

Source: All the variables are the same as in Equation (25) except that for $\dot{Sr}$ and $\dot{Lr}$, $\dot{R}$ the rate of interest variable has been disaggregated into short-run interest rate ($\dot{Sr}$) and long-run interest rate ($\dot{Lr}$).

Figures in the parentheses are *t*-ratios.

*Denotes significance at 5 percent level.

VI. CONCLUSIONS

The results of this study show that the applicability of the MABOPs theory to a LDC depends, to a large extent, on the basic underlying economic structure of the country concerned. These economic structures determine the degree of successful application of the theory because the strong assumptions of the theory based on the fairly homogenous and liberalized economic systems of advanced industrialized countries do not hold for most of the LDCs, which are fairly heterogeneous amongst themselves also. The background discussion and the results of this study strongly suggest the need to evaluate the theory on an individual-country basis for as many LDCs as possible. Such an exercise would help identify such groups of countries as can successfully adopt the MABOPs model directly with some modifications, and also those which require a significantly different treatment due to the peculiarities of their respective economic systems.

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