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I am submitting herewith a dissertation written by Chaitram Jivaram Talele entitled "An Empirical Test of the Monetary Theory of the Balance of Payments: India, 1950 to 1965." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Economics.

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AN EMPIRICAL TEST OF THE MONETARY THEORY OF THE

BALANCE OF PAYMENTS: INDIA, 1950 TO 1965

A Dissertation

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Degree

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ABSTRACT

The purpose of this study was to examine the theoretical and empirical aspects of the monetary theory of the balance of payments. The empirical part of the study is concerned with the balance of payments of India for the period of 1950 to 1965. The initial discussion of Chapter 1 deals with the doctrinal evolution of the monetary theory of the balance of payments. In the discussion of the doctrinal development of the theory, an endeavor has been made to show that the origin of the monetary theory of the balance of payments antedates the contribution of David Hume. After this, the theoretical and empirical aspects of the traditional approach (a combination of elasticities-absorption) to the balance of payments is discussed. In this respect, the criticism leveled at the Meadean synthesis by Kuska has been briefly reviewed. The promulgators of the monetary approach aver that the balance of payments is essentially determined by the monetary forces, and the elasticities-factor stressed by the traditional approach as a determinant of the balance of payments is insignificant.

An aggregated monetary model of the balance of payments along with the assumptions specified is discussed in Chapter 2. The real-balance effect plays the key role in the adjustment process. It is indicated that whenever actual money balances in peoples' possession exceed that desired, a deficit occurs in the balance of payments. Chapter 3 presents a critique of the monetary theory of the balance of payments. Empirical and theoretical criticism of the assumption of a stable demand for

money function has been dealt with. It is shown that Keynes thought of the balance of payments as essentially a monetary phenomenon.

In Chapter 4, an empirical test is made of the monetary theory of the balance of payments in the case of India. The mathematical model deployed for the empirical investigation is more disaggregated than the one presented in Chapter 2. Because of this, it has been possible to compute the income elasticity of demand for money, the price elasticity of demand for money, the interest elasticity of demand for money, the value of the money multiplier, and the value of the domestic component of the monetary base. The results obtained from the regression analysis do not permit support of the theory under investigation. Subsequently, the factors have been analyzed that prevented the support of the monetary theory in India's case: the availability of foreign aid and free food imports, and the existence of extensive and comprehensive controls over domestic economic activity by the Indian government.

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CHAPTER 1

EVALUATION OF THE TRADITIONAL APPROACH TO THE BALANCE OF PAYMENTS

Antecedents of the Monetary Approach

A new approach to the balance of payments has been forged. The approach in its roots is not entirely new, but it uses a new analytical technique and concepts to illuminate the old truths. The pedigree of the new approach, called "the monetary approach to the balance of payments," goes back to the classical tradition. This was the dominant international monetary theory until the 1930s. The pervading influence of Hume's comparative static analysis was so great that Viner (1937, p. 291) after two centuries could unequivocally say:

The "classical" theory of the mechanism of international trade, as developed from Hume to J. S. Mill, is still in its general lines, the predominant theory. No strikingly different mechanism has yet been convincingly suggested.

In fairness it must be recorded that, along with Hume, credit for discovering the same mechanism should be given to Cantillon, Gervasie, Ricardo, and Thornton.

Richard Cantillon's (Newman, Gayer, and Spencer, 1954, pp. 74-80) contribution in this respect is of high calibre. Cantillon was conversant with Locke's quantity theory of money; he accepted the fundamental maxim of the quantity theory of money propounded by Locke but also pointed out that Locke did not give the process of adjustment. Briefly, from another point of view, it could be said that Cantillon

also arrived at the concept of international price level on the basis of his clumsy knowledge of the quantity theory of money. About the international price level, Cantillon wrote: "I have also remarked that an increase or decrease in prices of distant markets, whether in the state or abroad, has an influence upon current prices on the market." The author, besides Hume, who comes closest to the present monetary approach to the balance of payments is Isaac Gervaise (Letiche, 1959). The basic propositions he laid down mesh with the new approach. These propositions are that balance of payments disequilibrium is temporary and that nations attract their natural proportion of wealth.

Ricardo (Sraffa, 1951) in his High Price of Bullion subscribed to the idea of an equilibrium distribution of money and precious metals. Ricardo also described the process by which the precious metals get distributed among the different trading nations (p. 52):

The precious metals were divided into certain proportions among the different civilized nations of the earth, according to the state of their commerce and wealth, and therefore according to the number and frequency of payments they had to perform. While so divided, they preserved everywhere the same value, and as each country has an equal necessity for the quantity actually in use there could be no temptation offered either for their importation or exportation.

Ricardo, Malthus, and supporters of the Bullion Report thought adjustment came via channels of the quantity of money and its effects on price; Thornton and Wheatley thought that the adjustment came through individuals adjusting their expenditures to their incomes. As Thornton (Hayek, 1939, p. 142) stated,

There is in the mass of people, of all countries, a disposition to adapt their individual expenditure to their income
And this equality between private expenditures and private

incomes tends ultimately to produce equality between commercial exports and imports.

Thornton generally accepted the adjustment through the price mechanism but also thought that adjustment in the balance of payments could take place through income and expenditures, independently of changes in prices.

In an earlier quote from Viner, one gets the impression that Mill exclusively supported the Ricardian position on the adjustment process. In this version — and it is with this version that he is mostly identified — Mill's theory comes out as the quintessence of the classical Ricardian tradition. According to Mill (Principles of Political Economy, 1848), the money supply consists mainly of precious metals and is automatically managed. But in his Some Unsettled Questions, as Hicks (1967, pp. 155-73) pointed out, Mill seemed to have realized the fact that the credit economy was the vital center of the money supply. In this work, Mill stated that during short periods monetary causes can have real effects, but in a credit economy the possibility of the reverse happening exists, that is, real causes can have monetary effects. Mill's position from the Unsettled Questions was not in agreement with Ricardo.

The object here is to demonstrate that the origins of the monetary approach to the balance of payments go beyond the times of David Hume, who is given exclusive credit for discovering it.

Criticism of the Keynes-Meade Approach
to the Balance of Payments

The proponents of the new approach claim that both on theoretical as well as empirical grounds the old theories and policies based on them have completely failed to explain and remedy the balance of payments and inflation problems that beset the world. In contrast to this, both on theoretical and empirical grounds, the monetary approach to the balance of payments gives satisfactory answers according to its proponents. The following discussion deals with the theoretical attacks launched on the prevailing (Keynesian) theory of balance of payments.

Kuska (1978) leveled a strong criticism of the Keynesian theory of the balance of payments. He stated the purpose of his paper as follows (p. 659):

It is to argue that almost all of the models in Keynesian balance-of-payments literature suffer from internal contradictions and deficiencies which make them unsuitable for balance-of-payments theory. Doubling the Keynesian closed-economy equations does not provide an appropriate description of the international economy. More careful attention needs to be given to portraying the money markets than usually is the case, and assets must be included in various demand functions in any acceptable analysis.

According to Kuska, the Meade model, which is Keynesian, is contradictory on the basis of Walras' Law. Meade made his balance of payments equation vanish in each period, implying equilibrium in the balance of payments. This is legitimate according to Kuska if gold flows are allowed, which Meade did. But Meade assumed two-bond markets in his model which he eliminated from the model and that makes the Meade system indeterminate. There can be no general equilibrium if two markets are out of equilibrium. A further contradiction pointed out in the Meade (1951) model by Kuska

is significant. Meade assumed a world demand equal to its supply and the balance of payments is cleared in every succeeding postdisturbance period. Then he introduced compensatory and adjusting transactions in the same model, which is contradictory. Kuska substantiated his basic argument by giving adequate and appropriate examples from the Keynesian literature on the balance of payments.

Johnson (1972) viewed the Meade model as a synthesis of two paradigms in economic theory. One of the two paradigms is the Keynesian and the second is that of imperfect competition. Three points are worth noting about the Meade synthesis. First, it visualizes the determination of employment and aggregate demand through the multiplier as is the case in Keynesian theory. Second, it treats the trading nations of the world like firms under imperfect competition which act as price fixers setting prices on the basis of rigid downward money wages and fixed exchange rates. Third, it grafts the partial equilibrium elasticities approach onto the economic system to obtain the stability conditions.

The Keynes-Meade approach, Johnson said, is a real approach, not a monetary one. The difference was crucial to Johnson (1972, p. 84):

The new monetarist approach differs radically from the standard Keynesian approach to international monetary economics in placing its emphasis fully on application of monetary theory and taking it off relative national price levels and interest rates as determinants of international flows of goods and capital.

The conventional model of the balance of payments can be formally stated in terms of export and import supply and demand functions in which quantity supplied or demanded is a function of relative prices and real income. Leamer and Stern (1970, p. 17) applied the following notation which has become standard.

$$M = f\left(\frac{Y}{P_Y}, \frac{P_m}{P_Y}\right)$$

where M is the quantity of imports, Y/P_Y is real income, and P_m/P_Y is the relative price of imports. From an empirical point of view, Leamer and Stern also showed that a variety of devices could be used to allow for lagged adjustment — from the elementary stock adjustment model to entirely general models in which a wide variety of lag shapes could be deployed. With the use of a completely general model and with a wide variety of time lags, it is clearly possible to show that the time path of the various price elasticities and of the adjustment of traded and nontraded goods prices could be such that devaluation ab initio worsens a trade balance. In the long run the balance of trade remarkably improves. This is the famous J-curve that has come into prominence. It is theoretically possible to show an occurrence of a J-curve if the time dependent elasticities are assumed to behave in a particular way over time. The acceptance of a J-curve became common in the post-World War II period. Haberler (1961, p. 38) emphatically stated:

Harberger, Machlup, and Orcutt have shown convincingly that the statistical methods used in these researches are biased and result in a strong and systematic underestimation of the actual elasticities. Indeed, as some of the errors have been gradually eliminated, the statistical estimates of elasticities have tended to increase steadily. Today most economists are convinced that the actual elasticities are in practice always sufficiently large to guarantee stable equilibrium in the balance of payments, except perhaps in the very short run and under very unusual circumstances, which may exist in highly specialized raw material producing countries during depression periods.

There are, however, numerous problems that crop up with the J-curve phenomenon. First, the proponents of the J-curve have not shown how rational behavior by consumers and firms produces an initial

worsening of the trade balance. Second, there is little cognizance of the influence of devaluation of nontraded goods prices, and it is generally assumed that devaluation brings about a permanent change in relative prices. Third, the relevant empirical investigation undertaken so far seems to be mixed and inconclusive. Scott's (1963) estimates of import elasticities of demand for the United Kingdom were inelastic. On the contrary, the same estimates for the United Kingdom by Ball, Eaton, and Steuer (1966) were substantially elastic.

Two studies, one of the vintage of 1950 and one of 1969, are of particular interest from the empirical point of view. In his 1950 classic article, Orcutt set out to defend the elasticity and stability argument, stating that devaluation would be highly effective (in absence of retaliation) for improving balance of payments of the devaluing countries. Orcutt (1950, p. 125) emphatically stated:

However it cannot be emphasized too strongly that there are no estimates of elasticities of supply of exports, and that the statistical techniques used in estimating elasticities of demand could very well have indicated demand too inelastic even in cases in which it was almost infinitely elastic.

After critically examining the relationship between shifts in demand and supply schedules, errors of observation, aggregation problems, failure to distinguish between short-run and long-run price elasticities, and small and large price changes, Orcutt arrived at the conclusion that the then estimated low elasticities were probably misleading.

Orcutt gave unmistakable support to the J-curve, saying that (p. 125):

Since it is evident that industries do not grow up or fade away in six months or a year, it has been widely recognized that on the supply side short-run price elasticities are likely to be much smaller than long-run price elasticities and that a fairly full adjustment to a price change may take

several years. However, as has already been pointed out elsewhere a number of times in this paper, the demand for imports depends upon supply schedules of domestic competitors as well as on the demand schedules of consumers. It follows from this that long-run price elasticities of imports and exports are probably substantially larger than short-run price elasticities.

An argument similar to Orcutt's, though in spirit rather than word, can be found in Marshall's Money, Credit and Commerce (1923, p. 171).

Empirical Estimates of Elasticities

In an important article Houthakker and Magee (1969) studied price and income elasticities of demand for exports and imports for fifteen countries. The most relevant part of the Houthakker-Magee study for the present discussion was the one that dealt with estimates of the price elasticities of exports and imports of the United Kingdom, France, and Germany. Houthakker and Magee could not distinguish between short- and long-run elasticities because only the annual data from 1951 to 1966 was available to them. Some results of this study certainly do not support the J-curve hypothesis. For instance, for the United Kingdom their study found a positive although insignificant import price elasticity of demand and an export elasticity of only $-.44$, a result that would apparently suggest instability in the British goods market and utmost elasticity pessimism. Impact as well as permanent effect of devaluation on the basis of the above findings imply an ever deteriorating balance of trade. The estimated price elasticities for the United Kingdom suggest that the price effect of devaluation is to produce an immediate and permanent worsening of the trade balance.

According to Houthakker and Magee's study, the estimated price elasticities for German exports and imports are, respectively, +1.70 and -.24. The results are not in consonance with the conventional relative price explanation (elasticities theory of the balance of payments) of the effect of German revaluation of 1961. After the adjustment for autocorrelation, the German export demand price elasticity was estimated to be 1.25, the value more in consonance with relative price explanation of the German trade balance performance following the 1961 revaluation of the mark. On the basis of the J-curve hypothesis, one would expect an inverse J-curve in the case of the German revaluations of 1961 and 1969, that is, an initial augmentation of the trade surplus, followed by a delayed deficit. The increased trade surplus in 1961 supports the J-curve hypothesis. On the contrary, the 1969 revaluation of the mark did result in a sizable deficit in the trade balance. This means the performance of the German trade balance immediately after the 1969 revaluation does not support the J-curve hypothesis. The French experience is in consonance with the theory of elasticities. The Franc was devalued in 1957 and 1958. Michael's study (1971, p. 115) showed that the 1957 devaluation of the franc arrested the fall in reserves and the 1958 devaluation, at the end of that year, was followed by a considerable rise in reserves. For the majority of the countries included in the Houthakker-Magee study, the estimated price elasticities are not very large, and are frequently insignificant. Houthakker and Magee attributed this outcome to simultaneous equation bias and inadequacies of the data. The estimated values of the import and export elasticities of demand for the United

States, according to the Houthakker-Magee study, were, respectively, -.54 and 1.51. This suggests elasticity optimism for the United States.

The revaluation of the German mark on Wednesday, September 24, 1969, started a period of greater flexibility in exchange rates. The Smithsonian conference of 1972 also resulted in the agreement on a new structure of exchange rates. It was expected by academic researchers and government officials that it would take for most of the effects of the Smithsonian realignment to materialize about two years. Junz and Rhomberg (1973) thought that the adjustment would take longer than eighteen months to two years. According to Junz and Rhomberg there are delays involved in the process of adjustment and these delays can be decomposed into five lags. First, there is a recognition lag: it requires time for buyers and sellers to recognize the changes in competitive conditions. Second, there is a decision lag: it requires time for new business connections to be formed and new orders to be placed. Third, there is a delivery lag: it takes time for the trade flows to materialize after the order is placed. For certain consumer goods it takes a few months but for certain heavy equipment, for example, electrical generating equipment, it may take a few years. Fourth, there may be a replacement lag: in the case of some products, inventories of materials must be used up before any new materials or equipment can be bought. Fifth, there is a production lag: producers have to become convinced of prospective profit opportunities in relation to the size of the market before initiating a new product line.

Validity of some of the lags could be challenged on a priori grounds in case of devaluation. As there are lags there could also be leads. Anticipations of an impending devaluation might trigger adjustments prior to devaluation. According to Junz and Rhomberg, the adjustment process takes four to five years. In the words of Junz and Rhomberg (p. 418):

The response of trade flows to relative price changes quite clearly seems to stretch out over a rather larger period than has generally been assumed, perhaps around four to five years. Almost 50 percent of the full effect appears to work through during the first three years, and about 90 percent during the first five years, following a price change. Separation of the exchange-rate change component from the price change in local currency shows in general, after an initial "perverse" effect, the response to exchange-rate changes is similar to the response to price changes measured in local currency.

The Junz and Rhomberg study does seem to suggest the existence of the J-curve phenomenon. But Magee (1974), in a study of the currency contract period, suggested a different reason for existence of the downward sloping part of the J-curve in the first month after devaluation. This meticulously done study of the institutional facts seems to cast some doubts on Junz and Rhomberg's results.

In summary, the existing empirical information about the trade account is quite mixed and incomplete. On the basis of such evidence it is certainly inappropriate to think of the J-curve as empirically established.

The treatment of the capital account in the conventional theory of the balance of payments leaves much to be desired. Leamer and Stern (1970, p. 76) appropriately expressed this problem:

The present state of econometric inquiry into capital account is in sharp contrast with the current account. The theoretical

aspects of the current account are comparatively well developed and import/export demand relations involved are highly standardized. Moreover, there are numerous studies of the current account that provide generally good statistical results. In contrast, the theory of capital-account relationships is not well formalized and there exists a considerable leeway in the choice of explanatory variables.

As the alternative model, the monetary theory of the balance of payments is concerned with the balance of payments as a whole rather than with its components.

Balance of Payments Problem of Less Developed Countries and the Monetary Approach

As the less developed countries (LDCs) are the exporters mainly of primary products for which price elasticities are known to be lower, elasticity pessimists seemed to have ruled the roost during the fifties and the early sixties. Devaluation was ruled out as a viable policy alternative during this particular period of time. Probably, because of the rapid shift in international market conditions during the 1952-1954 period or because of the memories of the Great Depression, most policy makers were unduly pessimistic about the prospects for growth through rapid industrialization propelled by export growth and diversification. The optimal resource allocation theorem — that the marginal cost of earning foreign exchange should be equated with the marginal cost of saving foreign exchange — was generally bypassed in preference to the saving of foreign exchange at all cost.

Elasticity optimists vigorously argued that the elasticities involved are high enough to render stability to the exchange equilibrium. These are the same arguments for the existence of the J-curve that were

discussed before at length. Advocates of devaluation effectively argued that increasing use of export subsidies, tariffs, surcharges and import entitlement schemes is tantamount to partial devaluation. Bhagwati and Krueger (1973, p. 422) put it succinctly:

Moreover, the increasing resort to changes in surcharges and export subsidies and to alterations in effective exchange rates means that, even without a formal devaluation, there are many degrees of partial devaluation, in QR regimes.

In order to maintain an overvalued exchange rate, the usual policy of the LDCs has been to restrict imports with quantitative controls, tariffs, and intricate licensing schemes. Equilibrium in the balance of payments has been brought about by the above measures.

An approximate measure of the magnitude of overvaluation has been calculated by Little, Scitovsky, and Scott (1970, p. 417). Healey (1972, p. 780) calculated the free market estimates on the basis of overvaluation suggested by Little, Scitovsky, and Scott.

During the sixties strong arguments emerged for the correction of the overvalued exchange rates of some of the LDCs. A general move towards liberal trade regimes for the LDCs gained momentum. International institutions did thrust devaluation upon some reluctant countries.

According to Bhagwati and Krueger, most of the devaluations undertaken were only nominal changes in exchange rates as opposed to effective devaluation. Effective devaluation would set the price of foreign exchange by market forces or, in the absence of quantitative and other direct interventions, by the government. In such a situation,

the price of foreign exchange determined by free market forces allocates resources in the economy.

At this point, it is interesting to note that the revival of the monetary approach to the balance of payments seems to make the entire debate quite inconsequential. For, according to the new approach, the balance of payments is basically determined by money supply.

When the money supply is rigidly linked to the external balance, as is the case in the monetary approach, it is clear that this adjustment process must ultimately lead to the right money stock so that external payments stay in balance. According to the new approach, the central bank merely sells foreign exchange for high-powered money. This mechanism automatically leads to a decline in the stock of money in deficit countries and an increase in the stock of money in surplus countries. The central bank of a deficit country that is selling foreign exchange and correspondingly reducing its money supply may offset this reduction by open market purchases of bonds that restore the money supply. If and when such a practice is followed by a central bank, the automatic mechanism is suspended. Persistent balance of payments deficits are possible because the link between the payments imbalance and the equilibrating changes in the money stock is broken. The persistent disequilibrium in the external balance in this sense is a monetary phenomenon: the central bank creates a stock of money too high for external balance.

CHAPTER 2

THE MONETARY APPROACH: THEORETICAL FOUNDATION

Introduction

The new approach to the theory of the balance of payments is akin in spirit to the classical international monetary theory. But the proponents of the revival of the classical international monetary theory have deployed with commendable virtuosity and acumen, newer developments in economic theory — namely, the Hicks-Walras general equilibrium theory and the Patinkin and Archibald-Lipsey contributions to monetary theory. This development has added a keener edge to the analytical content of this area. This chapter deals with the theoretical essentials of the monetary theory of the balance of payments.

Before going to the heart of the theoretical content of the new approach, it is relevant to bring out two points that are due to the new approach. First, the new approach has reinstated rather forcefully the marriage between monetary theory and the theory of the balance of payments. Until the 1930s, the two were in unison, but the application of the Keynesian paradigm to international economics temporarily separated the two. Corden (1977, p. 35) appropriately questioned the expulsion of money from the theory of the balance of payments: "How can one talk about devaluation and balance of payments problems without bringing in the quantity of money? Has it been Hamlet without the Prince?" The reply to Corden's last question by the advocates of the new theory would definitely be positive.

Second, following Keynes, the general assumption of the post-Keynesian macroeconomic models has been one of a closed economy. The continuation of this stubborn but undesirable practice has been to relegate the problems of exchange rates and balance of payments to secondary importance or no importance at all. Appropriate warning against this practice was sounded in 1949 by Henderson (p. 9):

Nothing has done more in my opinion to lead modern economists astray than the practice which Lord Keynes brought into fashion in the 1930s of reasoning on the hypothesis of a "closed economy" It is paradoxical that the British economists should have led this intellectual fashion, at which Adam Smith, Ricardo, John Stuart Mill, Bagehot and Alfred Marshall would certainly have knit their brows.

Keynes, who wanted to strike at some of the foundations of the classical theory (for example, Say's Law), might have been justified in assuming a closed economy, but the perpetuation of the practice in theory until the appearance of Meade's work on internal equilibrium fully justify Henderson's criticism.

A paradoxical proof of Keynes' greatness is that the powerful theoretical techniques employed by the protagonists of the monetary approach to the balance of payments to prove the significance of money in the theory of the balance of payments are actually germinated from Keynes' own suggestion of integrating value and monetary theory in his General Theory. Keynes (1936, p. 293) expressed the idea with a considerable emphasis:

One of the objects of the foregoing chapters has been to escape from this double life and to bring the theory of prices as a whole back to close contact with the theory of value.

The division of economics between the Theory of Value and Distribution on the one hand and the Theory of Money on the other hand is, I think, a false division.

Hicks (1967, pp. 16-82) makes the same suggestion in his article, "A Suggestion for Simplifying the Theory of Money." What was wanted in economics in 1935, Hicks thought, was a "marginal revolution." According to Hicks, Keynes made a significant stride in this direction in his Treatise when he talked about the price level of investment goods, indicating that this price level depended upon the relative preference of the investor for bank deposits as opposed to securities.

The Assumptions of the Monetary Approach

Vital to the theoretic core of the monetary approach are the following assumptions: (1) a stable demand for money function exists; (2) full employment of resources exists; (3) a country in question is small enough to be a price-taker in the world economy; and (4) the exchange rate is fixed for the period under consideration.

Existence of the stable demand for money function is of extreme importance to the monetary approach. It implies that the demand for money function is more stable than the Keynesian multiplier and plays a pivotal role in determining the level of money income and the general price level. It also implies that there are important factors affecting the supply of money that do not affect the demand for money. Laidler and Nobay (1976, p. 297) expressed this with clarity:

A major contribution of modern monetary literature is the demonstration that stable demand for money function postulated by Hume and his successors (though not in these terms) does

indeed exist for a wide variety of different countries and historical periods, and its characteristics are independent of the means whereby the nominal money supply is generated.

The assumption of full employment is justified according to Johnson because from the historical point of view the periods of severe unemployment like the 1930s are a rarity rather than a general phenomenon.

Frenkel and Johnson (1976, p. 25) said:

More fundamentally, the assumption of normally full employment reflects a passage of time and accumulation of experience of reasonable full employment as the historical norm rather than historical rarity that Keynes' theory and left-wing Keynesian mythology made it out to be.

Since the end of the Second World War, the industrialized world has not experienced mass unemployment as it did in the 1930s. This fact makes the assumption of full employment palatable to the proponents of the monetary approach.

The import of the small country assumption is to show that a country under consideration is so small that domestic goods can be neglected and that the prices of its exports and imports and consequently its terms of trade and interest rates, can be considered as given independently of a country's volume of trade, capital movements, and monetary policy.

The concept of the overall balance is most relevant for the monetary approach according to its proponents. In the overall concept of the balance of payments the term "balance of payments" refers to items that are below the line. When there was a gradual increase in the volume of United States liabilities to foreigners, the Department of Commerce, under the direction of Walter Lederer, devised a new accounting measure which has been called the overall balance. The purpose was to

show changes in the liquidity position of the United States. The overall balance places exports of goods and services, unilateral transfers, long-term capital movements, errors and omissions, and changes in United States claims against foreigners above the line. It places changes in United States liquid liabilities to all foreigners (both private and official) and changes in United States monetary reserves below the line.

The items placed below the line constitute the money account. Surpluses on the balance of trade and the capital account respectively represent excess flow supplies of goods and securities, and a surplus in money accounts represents an excess domestic flow demand for money. The money account ought to be analyzed by the techniques of the monetary theory according to the advocates of the monetary approach. To Frenkel and Johnson (1976, p. 22) the monetary approach was a preferred alternative to the traditional scheme of the balance of payments:

The main reason for preferring the monetary approach is that less direct alternative approaches have almost invariably attempted to explain the behavior of the markets they concern themselves with, by analytical constructs in which the role of money in influencing the behavior and connection between these other markets and the money markets, are neglected as being "of second order of smalls," which may be a legitimate procedure for many economic problems, but cannot be so for an analysis which aims to explain or predict behavior in the money market.

A Monetary Model of Balance of Payments

Since its inception, many schools of thought have sprung up in the monetary approach to the balance of payments. There is the British model that focuses on the terms of trade, effects of changes in trade

volume, and the trade balance. The Australian-Latin American model (Johnson, 1972), on the other hand, focuses on the relative prices of international tradeable and domestic nontradeable goods. And, finally, the Nordic model (Johnson, 1972) which is a blend of Hume's price-specie-flow mechanism and Koopmans-Holtrop's (Johnson, 1972) work on monetary equilibrium.

In the exposition of the analytical core of the monetary theory of the balance of payments, the post-Keynesian developments in the monetary theory are used as analytical devices. In particular, the intent was to use the basic Patinkin-Archibald and Lipsey theory to indicate the role of monetary disequilibrium in payments adjustment. The analysis in the beginning was applied to the one good case and then to the dependent economy model involving traded and nontraded goods. The analysis of devaluation was woven in by introducing discrete exchange rate changes that supply the ideal example of a case in which both relative price of traded and nontraded goods and the general price level change.

A Monetary Model

A convenient launching point is the recognition of the fact that when a country experiences a payments deficit or surplus its money stock will, all other things remaining the same, change. With the persistence of a deficit or surplus, the stock of money will decrease or increase and sooner or later this is bound to change spending behavior in a way that will establish equilibrium in the balance of payments.

But if the domestic residents want to hold the existing stock of money, then they will have to determine their expenditures to make the value of all imports equal to the value of total exports.

Two implications can be drawn from the foregoing discussion. First, balance of payments disequilibrium is transitory in a stationary economy; second, disequilibrium in the balance of payments is a reflection of a disequilibrium in the money market. In this research, the role of stock disequilibrium in the money market has been examined at full length, deploying the real balance effect. The use of the real balance effect has the benefit of providing a clear and rigorous underpinning to the analysis of disequilibrium. The discussion starts with a simple case of a country producing a single tradeable good in which devaluation creates a disequilibrium in the money market by increasing all prices in an equiproportional manner at the stroke of a pen or by an administrative fiat. In the absence of augmentation of the domestic money supply the public will obtain cash balances by creating a temporary surplus. That is, if desired balances are greater actual balances, the propensity to add to cash balances will reduce domestic spending and, consequently, the decrease in the price level will have the effect of increasing exports. The comparative price level of the country in question will be lower than the rest of the world, which will have the effect of reducing imports and augmenting exports. Hence, a surplus will be recorded in the balance of payments.

Devaluation has the effect of raising prices of importables and exportables in terms of domestic currency. The prices of nontraded

goods also increase because of interproduct substitution. But the rise in the prices of nontraded goods may be smaller than the rise in the prices of importables and exportables. The increase in the general price level boosts the demand for nominal money balances, which is a stable function of nominal income. If the increase in the stock demand for nominal money balances is not satisfied by domestic credit expansion, inflow of money from the rest of the world will occur, creating a surplus in the balance of payments and an increase in international reserves. The increase in the general price level brought about by the devaluation reduces real domestic balances of residents and compels them to restore real money balances through international credit or commodity markets. The resulting surplus in the balance of payments is transitory. It lasts only until the stock demand for money equilibrium is restored.

The adjustment process, instead of being instantaneous, would be expected to be distributed over time. This can be adequately illustrated by adapting the diagram constructed by Archibald and Lipsey (1958), in their effective demonstration of the Patinkin real balance effect as a transient phenomenon. The horizontal axis in Figure 1 represents the quantity of an internationally traded good which is like Hick's composite commodity consisting of exportables and importables. This is the only good produced in the economy. The vertical axis in Figure 1 represents real balances. The country in question is assumed to be small and its budget line, ab , has a 45° slope. The economic significance of the 45° slope of the budget line is that the exchange ratio between real

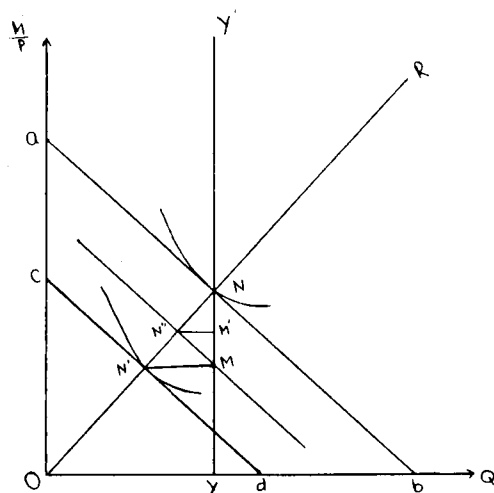


Figure 1. Devaluation and adjustment in the balance of payments.

balances (M/P) and goods (Q) is always one to one. Paraphrasing Patinkin (1965), one might state that the unitary negative slope of the budget lines reflects the fact that, by definition, one unit of liquid command over commodities-in-general (real balance) can always be exchanged for one unit of commodities-in-general.

It is convenient to be able to treat a group of consumers' goods as a single composite one. The goods that are for technical reasons to be consumed in fixed proportions can always be treated as a composite good. The second case — though less obvious, but of more importance in economic theory — is the one in which relative prices of the group of goods remain fixed. Hicks (1946, p. 33) expressed it in this way:

Similarly, so long as the terms on which money can be converted into other commodities are given, there is no reason why we should not draw up a determinate indifference system between any commodity "X" and money (that is to say, purchasing power in general). The distribution of purchasing power among other commodities is exactly similar to the distribution of a commodity among various uses, which may take place even if there is only one other commodity in a physical sense.

In Figure 1, it is assumed that the economy is in a stationary state and produces OY of traded goods each period. A further assumption, which is stipulated only for expositional simplicity, is that prior to devaluation actual and desired money balances were equal as denoted by point N on the budget line ab. The ray OR traces out points of tangency between homothetic indifference curves and successive budget lines. Ray OR is an increasing homothetic function; for example, it is any increasing transformation of a linear homogeneous function. This implies that, for given relative prices, the shares of expenditures on M/P and Q are constant. Devaluation creates a shift in the budget line towards the origin by reducing real balances. Hence the post-devaluation budget line is cd. Like Archibald and Lipsey (1958), it is assumed that the economy adjusts every period to its desired short-run equilibrium point for that period. The desired position for the budget line cd is denoted by point N'. At that point only partial consumption of income takes place while the remaining sum is spent on accumulation of money balances. The distance between YY' and N' indicates the impact effect of devaluation. N'M represents the size of the balance of payments surplus.

During the initial phases of the subsequent period, beginning real money balances will be equal to YM and the corresponding budget line

will go through point M. N'' represents an equilibrium point at that period and the distance between $N''M'$ denotes a smaller surplus in the balance of payments than that of the previous period — namely, $N'M$. And the process will continue until full equilibrium is reinstated at N. At N, actual and desired money balances are equal. The balance of payments is in equilibrium, and the country consumes its income in its entirety.

The Archibald and Lipsey diagram can also be utilized to analyze the effect of domestic monetary expansion on the balance of payments. Assumptions regarding the budget lines, indifference curves, composite commodity theorems and homothetic utility function are the same as they are in the case of Figure 1. Our initial full equilibrium in Figure 2 is at J. Because of the increase in the stock of money, the budget

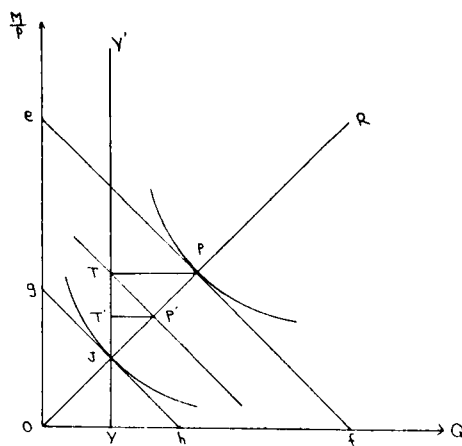


Figure 2. Domestic credit expansion and the balance of payments.

lines shift outward. The original budget line is gh . The new budget line is indicated by ef . The country in question now has the excess supply of money which will have the effect of procuring a temporary deficit in the balance of payments by virtue of people consuming above the level of their permanent income. Excess supply of money automatically implies excess demand for goods in an economy with full employment. During the first two periods, the deficit will be of the magnitude of $T'P'$ and TP , respectively, shifting the budget line nearer and nearer the origin. Eventually, the deficit will disappear. The adjustment process is therefore as follows: the excess supply of money generates excess demand for goods, which causes a rise in the price level that continues through the process of *tatonnement*, until supply of and demand for goods are brought back to equality. The rising price level during the *tatonnement* dampens real balances and, consequently, pulls the budget line inward in Figure 2. With a rising price level, the *tatonnement* will continue until the excess demand for goods is eliminated. When this materializes, desired and actual real cash balances will be restored to equality, and the price level will have risen until the cash balances are restored to their original worth. The economy returns to the original position of J and the volume of traded goods Y .

The essence of the discussion can now be summarized:

1. Inferences from Figures 1 and 2 suggest that devaluation has only a temporary impact on the balance of payments.
2. Figures 1 and 2 also suggest that contraction (expansion) of domestic credit leads to a temporary balance of payments

surplus (deficit) and therefore is analytically equivalent to devaluation (revaluation).

3. Devaluation coupled with domestic credit expansion may create a balance of payments deficit if domestic credit expansion assumes vigorous proportions.

Another significant analytical element that partakes in and complements the development of monetary theory of the balance of payments is the integration of the role of relative prices and money in the devaluation theory. The basic ideas involved can be explained with the help of the often used diagram in the pure theory of international trade as depicted in Figure 3.

The vertical axis denotes quantities of exports and imports jointly as a Hicksian composite commodity termed here T , the traded good.

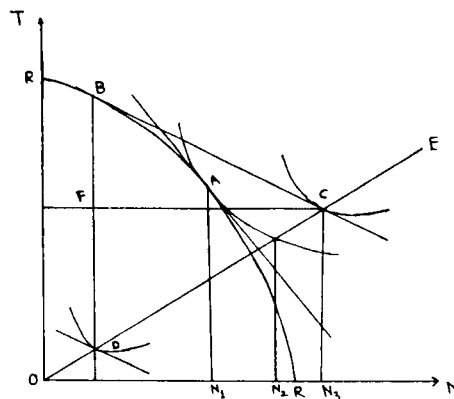


Figure 3. The role of relative prices and money in devaluation.

The magnitude of production of a nontraded commodity is represented on the horizontal axis. The transformation curve is represented by RR and its concavity to the origin indicates the assumption of increasing costs. The transformation function RR represents the locus of possible output combinations when the entire system is in equilibrium and its slope at any point denotes the marginal rate of technical transformation of traded for nontraded goods. That is, the marginal MRT opportunity cost of an additional unit of traded good is the necessary reduction in the output of the nontraded good. Straight line tangents at points A and B indicate the ratio of market prices of the traded and nontraded goods. The condition of tangency represents equilibrium in production, that is, equality between the price ratio and the marginal rate of technical transformation. Domestic demand conditions are manifested by the community indifference curves.

The tangency of a line representing the equilibrium price ratio to both the transformation function and the community indifference curves indicates equilibrium in the exchange and in production of traded and nontraded goods. That implies equality between the marginal rate of substitution in consumption and the marginal rate of transformation in the production of traded and nontraded goods.

It is assumed that initially equilibrium is attained at A on RR. This equilibrium, as the preceding discussion suggests, can be identified in terms of general equilibrium analysis since the optimal conditions in production and consumption are fulfilled simultaneously while all markets are cleared. The economy in question has attained external

and internal balance. For analytical convenience, it is also assumed that the country under consideration is too small to affect world prices and that this country devalues its currency. Thus the relative price of traded goods increases as shown in Figure 3 by the rotation of the terms of the trade line now passing through B and C. In production, the substitution effect is established in favor of tradeables. As can be seen, relatively more tradeables are produced at B. If the community prefers to consume all its income, a new consumption is obtained at C. At C income and substitution effects in consumption favor nontraded goods. Total demand for N increases from ON_1 to ON_3 . After the decomposition, the substitution effect is $ON_2 - ON_1$ and the income effect is $ON_3 - ON_2$. The excess demand for nontradeables is indicated by FC while the trade balance surplus of FB is obtained.

The increase in the price of traded goods has two effects. First, relative prices change as nontraded goods prices rise less than those of traded goods. Second, real balances are decreased because of the rise in the general price level. In order to replenish their real balances, private sector consumption is reduced. Short-run equilibrium is established in the sense that the nontradeable market clears while a trade balance surplus is obtained. Judging from the results of the substitution effect in production and the income and substitution effects in consumption shown in Figure 3, it follows that devaluation improves the trade balance. It is claimed by the proponents of the new approach that these results are only transitory. The argument marshalled in support of the proposition is as follows:

The trade surplus leads to an increase in the nominal quantity of money in the domestic economy; expenditures rise, the price level rises, and the economy returns to the original equilibrium. The final outcome, according to the monetary approach to the balance of payments, is that exchange rate variations have no long-term effects. According to Dornbusch (1974) the only long-run effects are an increase in the nominal quantity of money and money prices proportional to the amount of devaluation.

The traditional theory, which is sometimes referred to as the real theory of the balance of payments, maintains that the surplus on the trade account, FB in Figure 3, must be supported by expenditure reducing policies. In terms of Figure 3, the excess demand for nontradeables is decreased along the Engel curve OE to reach point D, where the trade surplus is augmented by DF and the excess demand for the nontradeables has plummeted to zero. According to the real theory, it is evident that the expenditure reducing policies not only increase the trade balance surplus but they also reduce excess demand pressures, while the inflationary effect of the devaluation has been eliminated.

As pointed out above, according to the logic of the monetary theory, a relative increase in the price of tradeable goods takes place due to devaluation, which leads to an increase in the demand for nontradeables which produces a surplus on the trade account. The effectiveness of exchange rate alignment to obtain the surplus in the trade account depends largely on price behavior in the nontradeable sector. The feasibility of the surplus depends on prices in the nontradeable sector

either declining or at least remaining constant. The decline in the price of nontradeable goods, according to the monetary approach, is due to a liquidity effect, that is, the increase in the relative price of tradeables creates an increase in the price level which in turn reduces the value of money balances. This scenario is portrayed in Figure 4.

Point A represents the original equilibrium where optimum conditions of production and consumption are satisfied. OE is the Engel curve.

During the postdevaluation period the prices of traded goods increase in comparison with the nontraded goods shown by the tangent at B. But the decrease in the value of real balances puts a damper on consumption, and in terms of comparative statics, the first short-run postdevaluation equilibrium occurs at A'. The tangents at B and A' are parallel to indicate the identical relative prices of tradeables and nontradeables.

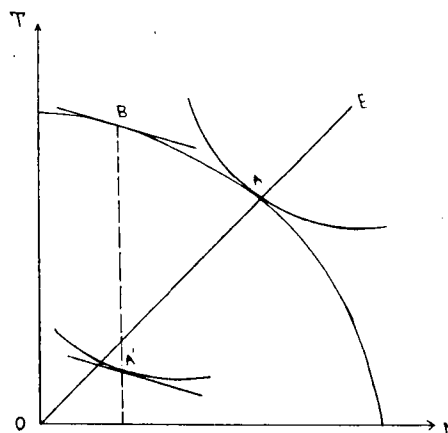


Figure 4. Liquidity effect and the price of nontradeable goods.

Next, a likely adjustment path for the economy is analyzed. Figure 5 indicates that prices of nontradeable goods climb during the adjustment process until the predevaluation price ratio between the tradeable and nontradeable is established. In equilibrium, both prices and money stock have risen by the amount of devaluation. Line $A'A''A$ indicates the consumption expansion both constructed on the assumption that the market for nontraded goods is continuously in equilibrium. This is denoted by points like A' which lie directly below the points B on the transformation curve. The slope of the indifference curve passing through A' is equal to the slope of the transformation curve at B , where B represents a relative price ratio. The indifference curves are homothetic and will lie below the ray OE . As one travels along the curve toward point A on the transformation curve, the relative

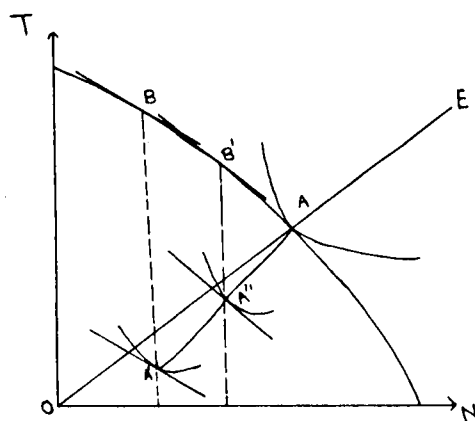


Figure 5. An adjustment path with the changing prices of nontradeable goods.

price of nontraded goods rises. The vertical area between the transformation curve and the consumption expansion path denotes the surpluses in the balance of trade.

The forthcoming discussion deals with the effects of different policy actions on the basis of the monetary theory of the balance of payments. The effects of increasing the money supply, which is augmented by dropping money from a helicopter, are analyzed. This policy action triggers an increase in expenditures above the earned income during the transition period. The system will move off and a temporary equilibrium will be attained near the northeast of point A, for instance, at A''' on the consumption expansion path. The effect of this policy action is diametrically opposite of devaluation and A''' will be above the ray OE in Figure 6. This is due to the increase in the money supply.

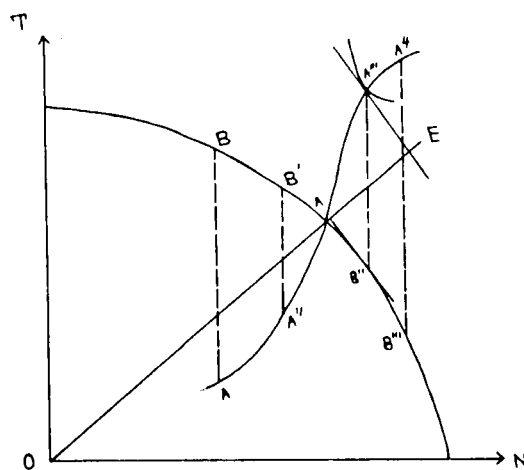


Figure 6. Various policy actions and the balance of payments.

A single individual, after the increase in the money, finds his cash balances above the desired level, and consequently his expenditures will rise. Even though a single individual can reduce his cash balances, the community as a whole cannot, and prices have to rise. A fraction of the excessive money holdings will be spent on domestic goods and this will have the effect of a temporary increase in the price of nontraded goods. The vertical distance between B'' and A''' denotes a temporary deficit in the balance of trade. This effect is symmetrical to the devaluation wherein a surplus of the magnitude of $A'B$ is obtained in Figure 6. It can be discerned from the above analysis that devaluation is a transitory phenomenon according to the monetary theory of the balance of payments.

CHAPTER 3

A CRITIQUE OF THE MONETARY APPROACH

This chapter presents a balanced critique of the monetary theory of the balance of payments. This inevitably leads one into a comparative study of the elasticities-absorption and the monetary approach. Since the new approach blends its discussion and conclusion in the garb of the newer developments in economic theory, it is intended to enrich the discussion by a relevant and adequate critique of these developments.

One of the pillars of the edifice of the monetary approach is the stable demand for money function. The assumption of the stable demand for money function is the linchpin of the domestic monetarism and the monetary approach. Frenkel and Johnson (1976, p. 24) adequately expressed this idea:

The fact that the essential foundation of the monetary approach is the assumption that demand for money is a stable function of a few macroeconomic variables incidentally disposes of a criticism that has been brought against it, as it has been against the restated quantity theory of money before it, and also the old quantity theory of money, namely that this is not a theory but merely a tautology.

In his restatement of the quantity theory of money, Friedman (1956) unequivocally stated that the quantity theory of money is a theory of demand for money and not of output, or of the price level. Friedman's approach viewed money as an asset and regarded it as simply one way of holding wealth. He envisioned the demand for money, therefore, as being determined basically by two factors — total wealth and the return on various forms of wealth. The relevant budget constraint in

Friedman's formulation is wealth instead of income. To solve the problem of finding an acceptable measure of wealth to include in the demand for money function Friedman made use of a basic principle of capital theory — that is, that wealth is simply a capitalized value of income.

Founding the analysis on capital-theory concepts, Friedman (1957) refused the use of current income as a proxy for wealth because during the short period current income fluctuates erratically. Instead, Friedman brought into monetary theory a longer period concept of income: the theory he developed in his work on the consumption function (permanent income). Permanent income is an average of past, present, and future incomes that is in consonance with the individual's expected or normal income. By this modus operandi Friedman chiseled the income concept until it resembles a wealth concept and then he included permanent income in the demand for money function as proxy for wealth.

Wealth is not only important in supplying the appropriate budget constraint but it also has important effects on the demand for money through various forms in which wealth can be held. Wealth could also be embodied in human or nonhuman form and could exert influence on the demand for money. Some forms of wealth are more liquid than others and for this reason it is necessary to take into account the ratio of human wealth to nonhuman wealth. This is important because human wealth is very illiquid; for example, it is sometimes difficult to turn human wealth into income when there is little demand for labor. Therefore, the larger the proportion of human wealth in total wealth, the greater

will be the demand for money in order to be prepared for those times when marketability of human wealth is low. The decision regarding the diversification of one's holdings of nonhuman wealth will be based on obtainable rates of return. For this reason the bond rate, the return on equities, and the expected rate of inflation are also included in the demand function for money.

The monetarists do not regard money as a close substitute for a narrow range of financial assets. They view the uniqueness of money as an asset in the sense that it is a substitute for all assets whether they be financial or real. According to Friedman the most fruitful approach is to regard money as one of the sequence of assets, on a par with bonds, equities, houses, consumer durables, and so forth. According to the monetarists an excess demand for money will be eliminated by individuals by selling a wide range of assets such as equities and consumer durables, and an excess supply of money will be dissipated by individuals purchasing a similar range of assets. In spite of the existence of substitutes for money, the income effect dominates the substitution effect in Friedman's demand for money function. Consequently income elasticity of demand for money is unity or above and interest elasticity of demand for money is a small negative number.

Tsiang (1977) raised some serious objections to the monetary theory of the balance of payments. Tsiang's criticism needs to be sorted out carefully. He did not object to the basic proposition of the monetary approach that the balance of payments is essentially a monetary phenomenon. Tsiang's criticism was directed particularly at

the monetary theory employed by the promulgators of the new approach.

Tsiang (1977, p. 320) stated his position as follows:

My criticism, therefore, is not directed at the monetary approach to the balance of payments in a broad sense that balance of payments is essentially a monetary phenomenon, but only at the monetary theory that the modern exponents of this approach employ in their elaboration and application of this theory.

The second part of Tsiang's criticism was directed at the empirical aspect. He, from an empirical study on Taiwan, found that changes in the total volume of trade do affect the demand for money even when the balance of payments remain in balance.

First, Tsiang's objections to the monetary theory that is used in the new approach are discussed. Tsiang vehemently objected to the use of Walras's Law in monetary theory in general and in the monetary approach in particular. The proponents of the new approach claim that Walras's Law is the theoretical foundation of the monetary approach to the balance of payments. Johnson (1977a, p. 259) explained this position:

The essence of the "monetary" approach is most easily understood by the reference to Walras's Law as used in contemporary theory, according to which the sum of the excess demands for goods, securities and money is identically zero, and an excess demand for or a supply of money must be matched by an excess supply or demand somewhere else in the market system.

Mundell (1968, pp. 155-56) also made the same point:

The community also holds money and goods, so that if they have an excess demand for money they must also have an excess supply of goods, just as an excess supply of money means that they have an excess demand for goods; this follows from Walras's Law that the sum of the values of excess demands for every economic object (including money) is zero for any individual economic agent.

These two quotations from the major contributors to the revival of the monetary approach are more than adequate to establish that Walras's Law occupies a crucial position in the new approach.

Tsiang attempted to revive the battle of the late fifties between him and Patinkin. To Tsiang, the marriage of Walras's Law with monetary theory elaborated by Lange and Patinkin was the biggest red herring ever perpetrated in economic theory. At this point, it may be helpful to express a definitive statement of Walras's Law. It is assumed that there are n goods in the economy: $n - 1$ commodities and paper money. In this case money serves as a medium of exchange and a store of value but not as a unit of account. Corresponding to these n goods there are n market excess-demand equations. Of the total equations, however, only $n - 1$ (at most) are independent. This means only $n - 1$ of these equations impose independent restrictions on the unknown equilibrium prices. For any set of prices that provides solutions for $n - 1$ excess demand equations must also necessarily provide a solution for the n th equation.

Tsiang objected to treating money as the n th good. If asset demand for money is the only demand for money, then such a treatment will pass. But, according to Tsiang, money is also a necessary medium of exchange, and money is also demanded to carry out planned transactions that are yet to be carried out. Tsiang (1977, p. 334) stated:

More fundamentally, the demand for money as a behavioral function of other macroeconomic variables is particularly unsuitable to be fitted into the Walras's Law relation. Under the Walrasian scheme, it is the money balance which is left after all the transactions have been concluded and settled

that is counted as one's "demand" for money. However, money being by definition the generally accepted medium of exchange and sometimes the legal tender which one is legally obliged to accept, such temporary acceptance of money in exchange for other things pending rational disposition later, are quite passive and irregular, and certainly do not conform to any stable behavioral function.

Responding to the same criticism by Tsiang, Patinkin (1958) showed that the excess demand for money as a flow is identical with the excess demand for money as a stock. And since, for the determination of the rate of interest or any one of the prices, it is only the system of excess demand equations which is relevant, the difference between the demand functions is completely immaterial. In his generalization of the issue Patinkin stated that any set of prices and interest which equilibrates the money market when viewed as consisting of flows must also equilibrate it when viewed as stocks, and vice versa. Johnson (1962) indicated that problems raised by Tsiang (1956) were of his own making and Patinkin successfully refuted them. Another aspect of Tsiang's criticism to which Patinkin also replied was Patinkin's treatment of money as an n th good and thus eliminating the n th equation when $n - 1$ equations are solved. Patinkin showed that any good including money can be the n th good. Patinkin made it clear that, no matter what equation is eliminated, the solution for the equilibrium set of prices obtained from the remaining equations is always the same. Tsiang later raised the same issue as he did then. From this it is clear that Tsiang did not accept Patinkin's explanation. It can be safely said that a substantial number of mainstream monetary theorists accept the Patinkinian paradigm.

The assumption of the stable demand for money function in the monetary approach has ignited the blaze of controversy. Critics like Hahn (1977) would like to deny its theoretical and empirical relevance. Hahn even went to the extent of saying that the assumption of the stable demand for money function coupled with Walras's Law of market clearing is dangerous. Hahn, who would no doubt die in a last ditch effort for general equilibrium, believed along with Schackle (1961) that in an economy where money exists as a link between past and present, general equilibrium envisaged by the proponents of the monetary approach, is close to fiction. Hahn would prefer to deny the very tour-de-force of the monetary approach, namely, that the balance of payments is a monetary phenomenon.

Contrary to Hahn, Tsiang believed that monetary forces play a crucial role in the determination of the balance of payments, even though he did not agree with the monetary theory used or the stable demand for money function assumed in the monetary approach. In Tsiang's (1977) view, when rapid expansion of trade in relation to income takes place, the stable demand for money function does not hold. Especially, it did not hold in the case of Taiwan. He put it this way (p. 325):

For instance in the case of the rapidly developing economy of Taiwan, with which I can claim some familiarity, the rate of increase in money supply during the past two decades has far exceeded the rate of increase of the real income of the island economy, the former being on the average 20 percent per annum and the latter on the average of 8-9 percent per annum. Yet the rate of price inflation was quite moderate (averaging 3-4 percent per annum) until 1973, when the rate of increase of money supply was speeded up to 47 percent by a big trade surplus plus a substantial capital inflow.

In his reply to the criticism of the stable demand for money function, Johnson (1977b, p. 226) pointedly said that the new quantity theorists have skillfully integrated and elaborated Keynes' insight in supporting their contention that there is a stable demand function for money, once expectations are properly incorporated in the function. The old quantity theorists were concerned about the cyclical instability of velocity, as manifested in credit booms and liquidity crises. According to Johnson, Keynes provided a pointer to the solution, in the concept of "liquidity preference," or more generally, of demand for money as being influenced by expectations about future prices and interest rates. According to Johnson, the integration of the post-Keynesian monetary theory with the balance of payments theory was overdue. The post-Keynesian monetary theory Johnson referred to was the Patinkinian general equilibrium system in which the real-balance effect plays the key role. In Johnson's view, the monetary approach essentially does this. Johnson, in defending the use of the stable demand for money function in the monetary approach, also said that as long as perfect substitutes for money cannot be created without limit and cost, money as a unique asset can have a stable demand.

Turning now to the second part of Tsiang's criticism of the monetary approach, it can be said that Tsiang did not give us enough of the details to scrutinize closely the results which are used as evidence against the empirical validity of the monetary approach in the case of Taiwan. Without the availability of such details, it is difficult to evaluate the results adequately. It is possible that

(as in the case of India, as shown in Chapter 4 of this study) violation of one or more of the crucial assumptions prevents the empirical validation of the monetary approach in the case of Taiwan.

Credit must be given to Tsiang (1953) on the other hand, for not being as oblivious to the role of money in the balance of payments adjustment as the Keynesians have been. In this well-reasoned study of the 1951 improvements in the Danish balance payments, Tsiang took full cognizance of the role of money. Tsiang showed with documentation in his study that the monetary and credit condition of Denmark played an important role in ensuring the net addition to the unspent margin of the national income for the year 1951. The increase in the money supply caused by the government of Denmark was more than offset by the blocking of kroner proceeds of aid, which in 1951 led to DKr 405 million reduction in the money supply. The National Bank of Denmark raised the discount rate and private banks were forced to credit rationing due to the shortage of reserves. To balance the presentation, it is fair to point out that stringent fiscal measures of the same degree were also applied. It is important to notice Tsiang's emphasis on the role of monetary policy in 1953 when Keynesianism reigned high and monetary policy was thought to be written off. It is equally significant to realize that monetary policy did contribute to the improvement in the Danish balance of payments. In the same vein Tsiang (1959) also analyzed the balance of payments experiences of the United Kingdom, Norway, and France and convincingly showed the important role played by the monetary forces in each of the situations.

In reply to Hahn, who is a staunch Keynesian, it can be pointed out that Keynes (1946) in his last contribution, used the classical theory of the balance of payments in the analysis and prediction of the postwar United States balance of payments. On the basis of the above-mentioned contribution of Keynes, one could safely conclude that Keynes never did shade his belief in the efficacy of the classical balance of payments mechanism. In this very last work of his, Keynes, as the evidence will show, regarded the balance of payments as basically a monetary phenomenon. In this article Keynes clearly reasoned as a believer in the monetary theory of the balance of payments is likely to.

Keynes, with his unusual gift of cutting through the unimportant tangles of details, hewed to the heart of the problem of the then perceived postwar shortage of the United States dollar. Keynes stated that supply of dollars to the rest of the world depended on American imports of goods and services from the rest of the world. On the basis of the then available statistics, Keynes arrived at the conclusion that the shortage of the dollar was not going to be of as large a magnitude as experts thought it would be.

Keynes (1946, p. 183) stated his conclusion:

I am content to leave the reader to reach his own tentative conclusion in the light of the above. Very broadly, however, it looks as if the invisible balance of United States on current account including interest, is more likely to be adverse than favorable.

Keynes substantiated his conclusion on the grounds given below. Keynes said that the dollar prices of goods entering into foreign markets were running higher than the sterling prices of the goods entering into

foreign markets. This simply meant the absolute level of United States prices was increasing at a higher rate than that absolute price level in the rest of the world. United States exports to the rest of the world would not increase as much as they were expected. But imports to the United States from the rest of the world would increase more than expected. Consequently, the United States was likely to have an adverse rather than a favorable balance on current account. This is as much a monetarist argument as one can get. Capital inflows into the United States would likely add to the money supply which in turn would lead to the increases in the price level. Moreover, the prices of American agricultural products and raw materials were, then, the highest in the world which, Keynes thought, would have the effect of dampening the agricultural exports and inviting some raw material imports.

All in all, Keynes thought that inflation in the United States ought to, or would, help the rest of the world and the chances of the dollar scarcity during the postwar period were not very high. But Keynes went beyond and firmly and categorically supported the fundamental classical position on the balance of payments, which ought to give considerable comfort to the hearts of the proponents of the monetary approach. As Keynes (1946, p. 185) stated,

In the long run more fundamental forces may be at work, if all goes well, tending towards equilibrium, the significance of which may ultimately transcend ephemeral statics. I find myself moved, not for the first time, to remind contemporary economists that the classical teaching embodied some permanent truths of great significance which we are liable to-day to overlook because we associate them with other doctrines which we cannot accept without much qualification. There are in these matters deep undercurrents at work, natural forces, one can call them, or even invisible hands, which are operating towards equilibrium.

Keynes, as can be perceived, was bending backward to reinstate his belief in the classical wisdom.

It can be discerned from Keynes' last contribution that his analysis of the postwar United States balance of payments is akin to the monetary theory of the balance of payments. Hicks (1968, p. 451) agreed with this assessment: "Thus at this stage it was quite right to think of the problem in monetary terms — to analyze it as Keynes did in fact analyze it at the time." But Keynes certainly was not the only one who saw fit to use the classical monetary theory in analysis of the balance of payments. Authorities no less important than Tinbergen and Polak in 1949 in their The Dynamics of Business Cycles: A Study in Economic Fluctuations, expounded the theory of the balance of payments that is essentially monetary. They stated that if the central bank kept increasing the monetary base to maintain the fixed exchange rate that would have the effect of creating inflation, which would consequently lead to a deficit in the balance of payments. Haberler, in his 1963 edition of Prosperity and Depression, expressed very strongly his objection to the neglect of the monetary factors in economic theory in general and in the balance of payments in particular. He then laid down the basic proposition of the monetary approach (p. 478):

There is to-day much more agreement than there was a few years ago on the proposition that the basic reason for the chronic (continuous or intermittent) balance of payments deficit, alias "Dollarshortage," from which many countries are suffering is to be found in the fact that the deficit countries have, for a variety of reasons, a higher "propensity to inflate" than the surplus countries.

It can now be firmly expressed that a small but strong stream of thinking on the balance of payments along the classical lines has been continuously flowing along with the oceanic tides of Keynesianism. A proposition can also be advanced with considerable force stating that Keynes himself either reversed his own thinking or never did really abandon belief in classical economics. Evidence on this has been presented in preceding pages from Keynes' posthumously published article. Keynes told Hayek that the ideas contained in the General Theory needed to be stated in the context of the times it was written, but he could swing around the public opinion again. Hayek (1969, p. 348) expressed this:

Later a turn in conversation made me ask him whether he was not concerned about what some of his disciples were making of his theories. After not a very complimentary remark about the persons concerned he proceeded to reassure me: those ideas had been badly needed at the time he had launched them. But I need not be alarmed if they should ever be dangerous, I could rely upon him that he would again quickly swing around public opinion — indicating by a quick movement of his hand how rapidly that would be done.

One of the significant implications of the monetary theory of the balance of payments, which is unlike the Keynesian theory of the balance of payments, is that economic growth need not be accompanied by a worsening in the balance of payments. In terms of the Keynesian national income analysis, exports plus domestic investment are equal in equilibrium to domestic saving plus imports (exclusive of the government). The cause of disequilibrium in the balance of payments in the Keynesian system is that the forces operating behind savings and investment are different, and both are relatively inelastic with respect to the rate of interest. In terms of the Keynesian theory, if the rise in exports has a strong

stimulating effect on domestic investment, its net effect might be, through the multiplier effect, a worsening in the balance of trade. Absorption in this case, then, will be greater than income, which will have the effect of creating imbalance.

The monetary theory of the balance of payments, on this count, emerges with the exactly opposite conclusion. According to the logic of the monetary theory, if real income increases with a constant money supply, the price level will decrease and the demand for real cash balances will increase, which in turn will have the effect of reducing imports. And the decrease in prices will lead to an increase in exports. In summary, economic growth with the appropriate money supply according to the monetary approach, unlike the Keynesian approach, will lead to a surplus in the balance of payments. Frenkel and Johnson (1976, p. 158) aptly expressed this point:

These results are to be contrasted with various Keynesian theories about the relation between economic growth and the balance of payments. According to one such theory derived from the multiplier analysis, economic growth must worsen the balance of payments through increasing imports relative to exports. This theory neglects the influence of demand for money on export supply and import demand and on international flow of securities.

Theories of the balance of payments in the Keynesian tradition have been completely oblivious of the crucial role monetary forces play in the balance of payments.

During the 1960s and 1970s, Germany, Japan, and the Scandinavian countries experienced high rates of economic growth with increasing surpluses in their balance of payments. The miraculous economic growth

of Japan was accompanied by a phenomenal surplus in its balance of payments. This is contrary to the analytical predictions founded on the Keynesian theory. This variance of the reality with the analytical predictions based on the Keynesian paradigm spurred the reexamination of the theory of the balance of payments and a search for a new paradigm. The persistent efforts of Mundell, initially, and later Johnson adding his Herculean analytical talents, culminated in the revival of the classical approach to the balance of payments. It must, however, be pointed out that inklings regarding economic growth leading to the surpluses in the balance of payments antedate the vogue of the monetary approach in the mid-1970s. Komiya, in 1969, pointed out that the miraculous Japanese rates of economic growth created not deficits, as the Keynesian theory would predict, but surpluses of extraordinary magnitudes.

The relationship between growth and the balance of payments is the same for the developed and the less developed countries. Growth, according to the logic of the monetary approach, would create a surplus in the balance of payments. Johnson believed all structural reasons given for the less developed countries always having deficits in their balance of payments are not true. According to Johnson, the reliance of the governments in less developed countries on inflationary finance is the true cause of deficits in their balance of payments. Johnson (1977b, p. 227) expressed himself forcefully:

All the balance of payments disequilibria are monetary in essence. So-called "structural" deficits or surpluses, such as the deficits described as "inevitable" for "underdeveloped"

economies, simply cannot exist, unless one includes in the concept of "structure" an unalterable propensity of governments to rely on inflationary finance of development programs that should be accepted and paid for by contributions of aid from more developed countries.

In Johnson's view there was one and only one reason for the deficit in the balance of payments irrespective of whether a country is developed or less developed. That reason was an excessive supply of money in relation to a country's economic growth.

Structural factors which Johnson denied as the reasons for the deficit in the balance of payments of the less developed countries are amply discussed in the literature on economic development. First, less developed countries faced adverse terms of trade in their commodity trade. Second was the adverse elasticities of exports for the products exported by the less developed countries. Substitution of synthetic products for the exports of the less developed countries was the third structural factor. Reliance on one or two products for export earnings, coupled with instability in prices, has the effect of creating instability in their export earnings, and this was the fourth structural factor. Johnson rejected all these factors as the genuine factors producing a deficit in the balance of payments of the less developed countries.

CHAPTER 4

AN EMPIRICAL TEST OF THE MONETARY THEORY OF THE BALANCE OF PAYMENTS: INDIA

Introduction

The purpose of this chapter is to report the results of the empirical tests of the monetary theory of the balance of payments for India for the period of 1950 to 1965. According to the monetary theory of the balance of payments, monetary variables play a dominant role in the (international) adjustment process. The monetary model predicts that the accumulation of international reserves of a country is positively correlated with the rate of growth of real domestic income and negatively correlated with the rate of domestic credit expansion.

It is appropriate at this time to note that the model that is employed in the empirical tests of the monetary theory of the balance of payments in this chapter is similar in essence to the model presented in Chapter 2. In both the models, the demand for real money balances plays a key role. The empirical model that is presented and tested in this chapter is more disaggregated than the one presented in Chapter 2. The empirical model tested is disaggregated in the sense that income, price, and interest elasticities of the demand for money in India are estimated. In addition to income, price, and interest elasticities, the values of the money multiplier, and the domestic component of the base, are also estimated.

The Model

Central to the interpretation of the model tested is the basic assumption that the money market is always in equilibrium. The model uses the following notation:

M = money multiplier,

H = high-powered money (=...),

IR = international reserves (=...),

DB = domestic credit (=...),

R = interest rate,

P = price level, and

Y = real national product.

Equation (1) represents the demand for money, Eq. (2) represents the supply of money, and Eqs. (3) and (4) represent money market equilibrium.

$$MD = P \cdot F(Y, R) , \quad (1)$$

$$MS = M(IR + DB) , \quad (2)$$

$$MD = MS , \quad (3)$$

$$P \cdot F(Y, R) = M(IR + DB) . \quad (4)$$

Taking logs of Eq. 4 and differentiating,

$$\begin{aligned} d \log P + b_1 d \log Y + b_2 d \log R = \\ d \log M + [IR/(IR + DB)] d \log IR + [DB/(IR + DB)] d \log DB \end{aligned} \quad (5)$$

where b_1 and b_2 are, respectively, the elasticity of demand for real

cash balances with respect to income and the rate of interest. Solve Eq. (5) for $[IR/(IR + DB)] d \log IR$ to derive Eq. (6).

$$\begin{aligned} [IR/(IR + DB)] d \log IR = \\ b_1 d \log Y + b_2 d \log R + d \log P - d \log M - [DB/(IR + DB)] \\ d \log DB . \end{aligned} \quad (6)$$

Equation (6) is estimated in the following form:

$$\begin{aligned} [IR/(IR + DB)] d \log IR = \\ b_1 d \log Y + b_2 d \log R + b_3 d \log P + b_4 d \log M \\ + b_5 [DB/(IR + DB) d \log DB] + e , \end{aligned} \quad (6A)$$

where e is an error term. If $k = IR/(IR + DB)$, then $DB/IR = (1 - k)/k$.

Equation (6) can then be expressed as follows:

$$\begin{aligned} d \log IR = 1/k (b_1 d \log Y + b_2 d \log R + d \log P - d \log M) \\ - [(1 - k)/k] d \log DB , \end{aligned} \quad (7)$$

Equation (7) is estimated in the following form:

$$\begin{aligned} d \log IR = b_1 d \log Y + b_2 d \log R + b_3 d \log P + b_4 d \log M \\ + b_5 [(1 - k)/k d \log DB] + e . \end{aligned} \quad (7A)$$

Justification for the Period

In order to examine the monetary character of the balance of payments of India, the period chosen in this study is from 1950 to 1965 for the following reason. For the Indian economy, 1950 to 1965 was a

period between the two devaluations. The rupee was devalued in 1949 and 1966. Because of the 1949 devaluation, the international reserves were revalued at the new rate of exchange established in 1949. The terminal date of 1965 does not involve the 1966 devaluation. Selection of the period eliminates the shift factor in parameters.

Price and Interest Variables

This study uses four price variables: (1) the Consumer Price Index (CPI), (2) the Wholesale Price Index (WPI), (3) the Adjusted Consumer Price Index (ACPI), and (4) the Adjusted Wholesale Price Index (AWPI). The CPI and WPI are adjusted to the base of 1960. The AWPI and ACPI are obtained by multiplying the CPI and WPI by a black market exchange rate factor. That is, the differences between the black market exchange rate and the official exchange rate were multiplied by the CPI and WPI for the respective years.

Four interest rate variables are used in this study: (1) the discount rate charged by the Reserve Bank of India (RBI) to the commercial banks (IB), (2) the call money rate existing in the Bombay money market (CR), (3) the yield on long term government bonds (LR), and (4) the bazaar rate (BR), which is a geometric average of the rates in Bombay, Calcutta, and Madras.

In order to capture the full effect of the price level changes, four price levels are used for the price variable for the empirical estimation of Eq. (6A). Again, to capture the full effect of changes in the interest rates on the demand for money four interest rates are

used for the interest variable. There are four ways to select an interest rate and four ways to select a price level. The total number of permutations in this case is sixteen. These are permutations because the order in which an interest variable is used with a particular price variable is not important. The sixteen permutations are arranged below. They match the arrangement of Table 1 in the Appendix.

<u>Price Variable</u>	<u>Interest Variable</u>
1. CPI	IB
2. CPI	CR
3. CPI	LR
4. CPI	BR
--- 5. WPI ---	IB ---
6. WPI	CR
7. WPI	LR
8. WPI	BR
--- 9. ACPI ---	IB ---
10. ACPI	CR
11. ACPI	LR
12. ACPI	BR
--- 13. AWPI ---	IB ---
14. AWPI	CR
15. AWPI	LR
16. AWPI	BR

As can be seen, the first regression of Eq. (6A) uses the CPI as the price variable and IB as the interest variable. The second regression uses the CPI as the price variable and CR as the interest variable. In the third, the CPI and LR are respectively used as price and interest variables. In the fourth regression, the price variable is the CPI and the interest variable is BR. Regressions five through eight use the WPI as the price variable and IB, CR, LR, and BR, respectively (for example, the fifth regression uses IB, the sixth regression uses CR, the seventh regression uses LR, and the eighth regression uses BR), as the interest

variables. The regressions of Eq. (6A) from nine through twelve use the ACPI as the price variable and IB, CR, LR, and BR, respectively (for example, the ninth regression uses IB, the tenth regression uses CR, the eleventh regression uses LR, and the twelfth regression uses BR), as the interest variable. The regressions of Eq. (6A) from thirteen through sixteen use the AWPI as the price variable and IB, CR, LR, and BR, respectively (for example, the thirteenth regression uses IB, the fourteenth regression uses CR, the fifteenth regression uses LR, and the sixteenth regression uses BR), as the interest variable.

The use of the Adjusted Consumer Price Index (ACPI) and the Adjusted Wholesale Price Index (AWPI) is necessary because the Indian rupee is overvalued in terms of the United States dollar. Pick's Currency Yearbook (see Data Sources, Appendix, p. 143) gives the black-market rates of the rupee in terms of the United States dollar for the period under consideration. In order to align the Indian price level with the world price level, the Indian price levels (CPI and WPI) are multiplied by the difference between the black-market rate of exchange and the official rate of exchange. The preceding adjustment is necessary because according to the monetary theory of the balance of payments, as Frenkel and Johnson (1976, p. 156) pointed out, the domestic and the world price level are the same.

The same sequence of price variables and interest variables is followed for the sixteen regressions of Eq. (7A).

Data on price and interest variables were obtained from International Financial Statistics and the RBI Bulletins (see Data Sources, Appendix, p. 143).

Theoretical Underpinning of the Parameters

In Eq. (6A), the coefficient of the price variable (b_3) should be 1. The theoretical underpinning for this premise is that the nominal quantity of money demanded varies directly with the price level. The demand for money in Eq. (1) is specified as

$$MD = P \cdot F(Y, R)$$

where MD is the nominal quantity of domestic money demanded, Y is real national product, R is the rate of interest or alternative opportunity cost of holding money, P is the foreign and therefore domestic price level. Multiplication of the demand for real balances $F(Y, R)$ by P assumes the standard homogeneity postulate of monetary theory. The above specification of the demand for money is identical with the one given by Frenkel and Johnson (1976, p. 156) in their theoretical discussion of the monetary theory of the balance of payments. The homogeneity postulate is explained with the help of panels (a) and (b) in Figure 7 where P is plotted on the axes of panels (a) and (b), M is the nominal quantity of money, M/P is the real quantity of money, MD/P is the real demand for money, and MD is the nominal demand for money. Panel (a) shows that changes in the general price level do not affect the real demand for money. Panel (b) shows that the nominal demand for money MD increases in proportion to the increase in the price level P. At $P = 1$, the nominal and the real quantity of money demanded are equal. The equilibrium price level is determined by the interaction of the

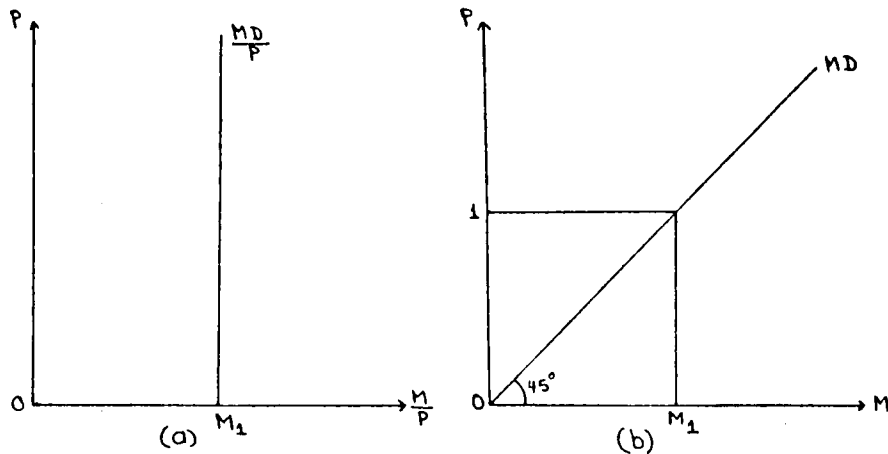


Figure 7. The real and nominal demand for money.

demand for and the supply of money. In equilibrium, a 10 percent increase in the amount of money causes a 10 percent increase in the price level. Patinkin (1965, p. 29) expressed this idea: "Hence, since a doubling of all prices and initial money balances leaves the demand for real balances unaffected, it must cause a doubling of the demand for nominal balances." The equiproportional change in the price level and the nominal money supply gives the theoretical value of the price coefficient in Eq. (6A) equal to 1. An important implication of the above discussion is that there is no money illusion, in other words, the demand for money is a demand for real balances. Goldfeld (1973) found strong evidence that an increase in prices raises nominal money demand equiproportionally.

The expected value of the income elasticity of demand for real money (that is, b_1) is 1. This means that an increase in real income

of 1 percent increases the demand for real money balances by 1 percent. The theory of the demand for money predicts that the demand for money depends on the level of income. One significant outgrowth of the monetary theory of Keynes is the formulation of the demand for money as an asset (Friedman, 1969, p. 73). This theoretical development treats the demand for money along the same lines as the theory of the demand for other assets and for commodities and services. One of the key variables included in the theory of the demand for goods and services is income. In the same way income is also a variable in the demand for money. Income is one of the constraints in the demand for money function, just as it is one of the constraints in the demand for goods and services. Money, as an asset, yields important services to the holder. In equilibrium, marginal rates of return on all assets in a portfolio including money must be equalized.

At the empirical level, there are substantial differences in the value of the income elasticity of demand for money. Goldfeld's (1973) estimate of the income elasticity of demand for money from United States post-World War II data yielded a short-run value of .19 and a long-run value of .68. The inference drawn on the empirical and theoretical grounds is that there may be economies of scale in the demand for real cash balances (McCulloch, 1975, p. 25). The expected value of the income elasticity of demand for money from the empirical results of the model tested for India is 1.

The second independent variable in Eq. (6A) is $d \log R$. Its coefficient, b_2 , is the interest elasticity of demand for money.

According to the monetary theory of the balance of payments, b_2 is expected to be a small negative number. The interest elasticity of demand for money is expected to be low according to the monetary theory of the balance of payments. Income and price are much more significant as the determinants of the demand for money than the rate of interest.

Friedman (1969, p. 142) stated:

Neither in that article, nor, to the best of my knowledge, elsewhere, have I ever asserted that interest rates have no effects on the quantity of money demanded or on velocity, only that (a) they appear to be less important as a determinant of quantity demanded than real per capita income and as a determinant of measured velocity than the ratio of measured to permanent income; and (b) that the interest elasticity is not very high.

The fourth independent variable in Eq. (6A) is $d \log M$. Its coefficient is b_4 . The expected value of b_4 is -1. Other things remaining equal, an increase in the money supply causes the balance of payments to deteriorate. The value of b_4 would be -1 when complete offsetting of an increase in the money supply through the outflow of reserves took place. An important implication of the preceding discussion is that a tightening of monetary policy through changes in reserve requirements, or any other money multiplier control variable by the central bank, other things remaining the same, leads to reserve inflows.

Empirical estimates in most cases show that b_4 is negative and statistically significant. Kreinin and Officer (1978, p. 60) stated:

The estimated coefficient is usually negative and statistically significant, but distinctly below unity in absolute value. Some authors point out that the coefficient is not significantly different from -1, but this result is caused by the imprecision of the estimate.

The coefficient of the last independent variable in Eq. (6A) is b_5 . The hypothesized value of b_5 according to the monetary theory of the balance of payments is -1. Kreinin and Officer pointed out that, according to the monetary approach, under a fixed exchange rate the change in international reserves induced by a change in the domestic component of the monetary base is equal in magnitude but opposite in sign. The negative sign of b_5 results because of the inverse relationship between international reserves and the domestic component of the monetary base. A change in international reserves induced by a change in the domestic component of the base is equiproportional. This means a 1 percent increase in domestically created money, ceteris paribus, engenders a 1 percent reduction in international reserves.

The preceding discussion of the theoretically expected values of the coefficients of the independent variables is summarized below.

<u>Coefficients</u>	<u>Theoretically Expected Values</u>
Income elasticity	+1
Interest elasticity	$-1 < \text{interest elasticity} < 0$
Price elasticity of nominal balances	+1
Money multiplier	-1
Domestic component of the base	-1

The statistical analysis of the results of the regressions of Eq. (6A) are presented below. The level of significance used to test the estimated regression parameters is 5 percent. The critical value of the t distribution associated with a probability of .025 in each tail (a two-tail test is used) for the 11 degrees of freedom (there

are sixteen observations and five estimated parameters) is 2.201. If the computed t ratios of the estimated coefficients individually are greater than 2.202, then the coefficient is said to be statistically significant. After reporting and analyzing the regression results of Eq. (6A), the Durbin-Watson (DW) statistic is discussed.^a

Of the sixteen regression results of Eq. (6A), only in two regressions do all the coefficients of the independent variables have the theoretically expected signs. It must be emphasized here that it is only the signs of the coefficients that are as expected. The magnitudes of the coefficients having the right (theoretically expected) signs are either smaller or larger than their hypothesized values. The regression coefficients having the right signs are the ones in which IB is used as the interest variable. These two cases are given below.

Equation (6A) — Regressions 1 and 9

<u>Price Variable</u>	<u>Interest Variable</u>
CPI	IB
ACPI	IB

Since the coefficients of the two regressions above have theoretically consistent signs, they are reported and analyzed first. The values of the coefficient of the income variable are .667 and .73. The theoretically expected value of the coefficient of the income variable is 1. The estimated values reported above are below the

^aExamination of the first-order correlation matrices indicates that there is no problem of multicollinearity.

expected value of the coefficient of the income variable. However, none of the coefficients of the income variable are significant at the 5 percent level since the t statistics are smaller (.952 and 1.07) than 2.201.

The values of the coefficient of the interest variable of the two cases under consideration are -.308 and -.29. As can be seen, the preceding values of the coefficient of the interest variable are within the range suggested by the monetary theory of the balance of payments. Again, like the coefficients of the income variable, none of the coefficients of the interest variable are significant at the 5 percent level since the t statistics are smaller than 2.201 (.97 and 1.10).

The coefficients of the price variable or the price elasticity of the demand for money of the results of the two regressions under consideration are .0751 and .0212. The coefficients of the price variable given above are of the correct sign but the estimated values of the coefficients are much below the expected value. The two coefficients of the price variable are not significant at the 5 percent level because the t statistics are smaller (.43 and .31) than 2.201. The estimated values of the coefficients of the money multiplier in both the cases are larger (-.0173 and -.01412) than the expected -1. The coefficients of the multiplier are not significant at the 5 percent level. The t statistics in both the cases are smaller ($|.136|$ and $|.111|$) than 2.201. The estimated coefficients of the domestic component of the base in both the cases under discussion are larger (-.248 and -.21) than the expected value -1. The coefficients in both cases are not statistically significant. The $\bar{R}^2$ in both cases is .45.

In the two cases analyzed above, all the estimated coefficients of all the independent variables except of the money multiplier and the domestic component of the base are smaller in magnitude than their expected values. And, as is shown above, none of the coefficients are statistically significant at the 5 percent level. In econometric research the DW statistic having a value near 2 is taken as an indication of no first order serial correlation (Pindyck and Rubinfeld, 1976, p. 114). In the two regression results discussed above the DW statistic is near 2 (1.91 and 1.96). Consequently, positive serial correlation is ruled out.

Next, the results of the four regressions reported and analyzed are given below.

Equation (6A) — Regressions 2, 6, 10, and 14

<u>Price Variable</u>	<u>Interest Variable</u>
CPI	CR
WPI	CR
ACPI	CR
AWPI	CR

The results of the regressions above indicate that the estimated coefficients of all independent variables, except the estimated coefficients of the price variable, are of the expected sign. The estimated coefficients of the price variable in the case of these four regressions are negative. The values of the estimated coefficients of the price variable range from $-.564$ to $-.0145$. None of the estimated coefficients of the price variables are significant at the 5 percent

level, because the obtained t ratios are smaller ($-.390$, $-.484$, $-.328$, and $-.437$) than 2.201 .

The values of the estimated coefficients of the income variable in the four cases range from $.0684$ to $.124$. The values of the estimated coefficients are far below their expected value. The t ratios of the estimated four coefficients of the income variable obtained are smaller ($.357$, $.304$, $.242$, and $.236$) than 2.201 . Consequently, the coefficients of the income variable are not significant at the 5 percent level. The estimated coefficients of the interest variables have the expected negative sign. The interest elasticity of the demand for money (estimated value of the coefficient of the interest variable) ranges from $-.379$ to $-.392$. The estimated values of the interest elasticity of the demand for money are consistent with the monetary theory of the balance of payments. All the coefficients of the interest variable are statistically significant at the 5 percent level because the t statistics are larger (-3.97 , -3.79 , -3.90 , and -4.04) than 2.201 .

The results of the four regressions under consideration show that the values of the estimated coefficients of the money multiplier range from $-.285$ to $-.312$. These estimated values of the coefficients of the money multiplier are larger than the expected value. All the estimated coefficients of the money multiplier are statistically significant at the 5 percent level. That is, the t statistics computed are larger than 2.201 . For the results of the four regressions under consideration, the values of the coefficients of the domestic component of the base range from $-.344$ to $-.318$. As can be seen, the estimated values of the

domestic component of the base are larger than their expected value. All the estimated coefficients of the independent variables of the four regressions under consideration are statistically significant at the 5 percent level. That is, the t statistics computed are larger (-3.11, -3.93, -4.09, and -4.19) than 2.201. The values of the $\bar{R}^2$ in the cases of the four regression results under discussion range from .772 to .775. In all the four cases that are being considered, the DW statistic is not far different (2.27, 2.15, 2.21, and 2.20) from 2.

The following reports the results and the analysis of the four regressions which use the price and the interest variables given below.

Equation (6A) — Regressions 4, 8, 12, and 16

<u>Price Variable</u>	<u>Interest Variable</u>
CPI	BR
WPI	BR
ACPI	BR
AWPI	BR

Before proceeding with the reporting and analysis of the results of the regressions above, two points need to be made. First, the estimated coefficients of the money multiplier have the wrong (positive) sign. Second, of the four estimated coefficients of the price variable, one (when CPI is the price variable and BR is the interest variable) has the wrong (negative) sign.

As pointed out before, the estimated coefficients of the money multiplier have the wrong sign. The magnitudes of these coefficients range from .0424 to .0563. Besides having the wrong sign, none of the

coefficients are statistically significant at the 5 percent level. The coefficient of the price variable that has the wrong sign is also not statistically significant at the 5 percent level.

The values of the coefficients of the income variable for the results under discussion range from .1001 to .195. The estimated values of the income elasticity of demand is far below the expected value. Since the t ratios (.380, .279, .232, and .328) are smaller than 2.201, none of the coefficients of the income variable are significant at the 5 percent level. Of the four estimated coefficients of the interest variable, all are consistent with the theory. The values of the coefficients of the interest variable in the preceding cases range from -.0822 to -.095. The results imply that in the preceding three cases, the interest elasticity of the demand for money is consistent with expectation. This prediction is in line with the monetary theory of the balance of payments. Unfortunately, though, none of the coefficients of the interest variable are statistically significant at the 5 percent level. That is, the computed t ratios are smaller (-1.56, -1.397, and -1.71) than 2.201. The estimated coefficient of the interest variable is -.9075 when ACPI is used as the price variable and BR is used as the interest variable. The estimated coefficient of the interest variable in the last case is not statistically significant at the 5 percent level.

The estimated value of the domestic component of the base in the case of the results of the four regressions under consideration ranges from -.277 to -.256. These estimated values of the coefficients of the

domestic component of the base are larger than the expected value. Of the four coefficients of the domestic component of the base, three are statistically significant at the 5 percent level. When BR is used as the interest variable, respectively, with WPI, ACPI, and AWPI as the price variables, the estimated coefficients are statistically significant at the 5 percent level. That is, the computed t ratios are larger (-2.25, -2.351, and -2.239) than 2.202. The computed t ratio of -1.66 is smaller than 2.202 when BR is the interest variable and CPI is the price variable. Since the computed t ratio in the last case is smaller than 2.202 at the 5 percent level of significance, the coefficient of the interest variable is not statistically significant.

The results of the four regressions under consideration show the values of $\bar{R}^2$ ranging from .509 to .531. The above mentioned results also show that the values of the DW statistics range from 1.57 to 1.71.

The results reported and analyzed next are the results of the regressions of Eq. (6A) which use the following price and interest variables.

Equation (6A)—Regressions 3, 7, 11, and 15

<u>Price Variable</u>	<u>Interest Variable</u>
CPI	LR
WPI	LR
ACPI	LR
AWPI	LR

All the four coefficients of the income variable given by the estimates of the four regressions above have the wrong (negative) sign. The

estimated values of the income variable range from $-.0905$ to $-.213$. None of the coefficients of the income variable under consideration are statistically significant at the 5 percent level. The computed t ratios of the four estimated coefficients are below 2.202. The results indicate that negative values of the income elasticity of demand are obtained when LR is used as the interest variable respectively with the four price variables (CPI, WPI, ACPI, and AWPI).

The results of the four regressions under consideration show the coefficients of the interest variable range in value from $-.364$ to $-.482$. The computed t ratios of the four coefficients of the interest variable are -2.01 , 1.94 , -2.28 , and -2.59 . As can be seen the computed t statistics are either around or greater than 2.202. This means all the estimated coefficients of the interest variable are significant at the 5 percent level. This means the interest elasticity of the demand for money is consistent with the monetary theory of the balance of payments.

The results of the regressions under consideration show that the value of the coefficients of the price variable range from $.0669$ to $.145$. The values of the price elasticity (coefficients of the price variable) of the demand for money are much smaller than expected. None of the coefficients of the price variable are significant at the 5 percent level. That is, the computed t statistics ($.941$, 1.153 , 1.38 , and 1.21) are below 2.202.

Of the four estimated coefficients of the money multiplier, one (when WPI is the price variable and LR is the interest variable) has the

wrong (positive) sign. The value of the remaining three estimated coefficients of the money multiplier range from $-.0473$ to $-.0354$. None of the estimated coefficients (including the one with the wrong sign) are statistically significant at the 5 percent level. That is, the computed t statistics ($-.315$, $.175$, $-.473$, and $-.396$) are smaller than 2.202 .

Of the four estimated coefficients of the domestic component of the base, three have the right (negative) sign and one has the wrong (positive) sign. When LR is used as the interest variable and AWPI is used as the price variable, the regression estimates of the coefficient of the domestic component of the base has the wrong (positive) sign. The values of the estimates of the coefficients with the right (negative) sign range from $-.363$ to $-.310$. All the three values of the coefficients of the domestic component of the base with the right sign are larger than the expected value -1 . At the 5 percent level of significance, the three coefficients of the domestic component of the base under consideration are statistically significant. That is, the computed t statistics (-2.5 , -2.80 , and -2.889) are greater than 2.202 . The coefficient of the domestic component of the base with the wrong sign is also statistically significant at the 5 percent level. The value of the $\bar{R}^2$ for the four equations under discussion ranges from $.571$ to $.620$.

The discussion below reports the analysis of the results of the regression that uses the following as the price and the interest variable.

Equation (6A) — Regression 5

<u>Price Variable</u>	<u>Interest Variable</u>
WPI	IB

The results of the previous regression show that, except for the estimated coefficient of the money multiplier, the estimated coefficients of the other independent variables (income, interest, price, and domestic component of the base) have the right (expected) signs. The coefficient of the money multiplier has the wrong (positive) sign as the results of the regression under discussion indicate. The estimated value of the coefficient of the money multiplier for the regression under discussion is .01877. The coefficient of the money multiplier is not statistically significant at the 5 percent level in this case; that is, the computed t ratio (.140) is smaller than 2.202.

The estimated coefficient of the income variable, as the results of the regression under discussion indicate, is .612. The computed value of the income elasticity of the demand for money is smaller than the expected value. The estimated coefficient of the income variable (income elasticity of the demand for money) is not significant at the 5 percent level because the computed t ratio (.887) is smaller than 2.202. The results of the regression under discussion show the estimated value of the coefficient of the interest variable to be -.253. This estimated value of the coefficient of the interest variable is consistent with theory.

The results of the regression under discussion show the estimated coefficient of the price variable to be .0902. The estimated coefficient

of the price variable is not statistically significant at the 5 percent level; that is, the computed t ratio of .61 is smaller than 2.202. The estimated value of the coefficient of the domestic component of the base is -.240. The coefficient of the domestic component of the base is not significant at the 5 percent level; that is, the computed t ratio -1.68 is smaller than 2.202.

Finally, the results of the regression discussed below uses the following price and interest variable.

Equation (6A) — Regression 13

Price Variable

Interest Variable

AWPI

IB

The estimated coefficients of all the independent variables, except the price variable, have the right (expected) signs. The estimated coefficient of the price variable of the regression under discussion has the value of -.015. The computed t ratio, -.21, of the estimated coefficient of the price variable under discussion is not significant at the 5 percent level. That is, the computed t ratio -.21 is smaller than 2.202.

In the case of the regression under discussion, the results indicate that the income elasticity of the demand for money is .88. This estimated value of the income elasticity of the demand for money is not much below the hypothesized value 1. The computed income elasticity of the demand for money under discussion is not significant at the 5 percent level because the computed t ratio, 1.31, is smaller

than 2.202. The estimated coefficient of the interest variable, in the case of the regression under consideration, has the value of $-.34$. The estimated coefficient of the interest variable is not significant at the 5 percent level. That is, its computed t ratio, -1.11 , is smaller than 2.202.

The estimated value of the coefficient of the money multiplier is $-.0116$. As can be seen, the computed value of the coefficient of the money multiplier is larger than its expected value. The coefficient of the money multiplier is not significant at the 5 percent level because the computed t ratio $-.091$ is much smaller than 2.202. The estimated value of the coefficient of the domestic component of the base in the case of the results of the regression under discussion is $-.20$. The obtained value is larger than the expected value of the coefficient of the domestic component of the base. At the 5 percent level, the coefficient of the domestic component of the base is not statistically significant; that is, the computed t ratio -1.51 is smaller than 2.202.

A brief discussion of the Durbin-Watson (DW) statistic is in order. The DW statistic is used for testing hypotheses about autocorrelation or serial correlation in the residuals of a regression equation. If the computed value of the DW statistic is between the lower and upper values then a researcher cannot reject the null hypothesis of zero autocorrelation. For the regression results under discussion, the lower and upper values are respectively $.53$ and 2.03 at the 5 percent level of significance for sixteen observations and five independent variables. It is pointed out earlier that as a rule of thumb researchers take the value

of the DW statistic to be 2 as an indication of no first-order positive or negative autocorrelation. Gujarati (1978, p. 237) agreed:

It is apparent from equation (11.3.10) that if $\hat{\rho} = 0$, $d(DW) = 2$; that is, if there is no serial correlation (of first order), d is expected to be about 2. Therefore, as a rule of thumb, if d is found to be 2 in an application, one may assume that there is no first-order autocorrelation, either positive or negative.

The present empirical study of the monetary theory of the balance of payments of India for 1950 to 1965 uses the above rule of thumb. That is, if the computed value of the DW statistic is near 2, it is taken as an indication of the lack of either positive or negative autocorrelation.

The regression results presented in Table 1 (Appendix) show that, of the sixteen computed values of the DW statistic, nine values are near 2, ranging from 1.71 to 2.27. Of the remaining seven computed values of the DW statistic, five range in value from 1.50 to 1.65. The remaining two values of the DW statistic are 1.26 and 1.246. It is necessary to point out here that the computer program, Cosap; Conversationally Oriented Statistical Analysis Package, employed in the empirical research in this study has provision for a correction for autocorrelation. Since the majority of the computed values of the DW statistic are near 2, the correction for the serial correlation in the case of Eq. (6A) did not result in different values and signs of the estimated coefficients from their original (before correction for the serial correlation) values and signs.

In the appraisal of the results of the regressions of Eq. (6A), the theoretical underpinnings (signs and magnitudes of the coefficients of the independent variables) are important. The science of economics

deals with the relationships between economic variables such as price per unit and the quantity demanded of a commodity and consumption as a function of permanent income. Koopmans (1965, p. 194) emphasized the role of economic theory in measurement:

While much in these theories is incomplete and in need of reformulation and elaboration (Particularly in regard to behavior over time under conditions of uncertainty), such theory as we have is an indispensable element in understanding in a quantitative way the formation of economic variables.

The point that Koopmans made regarding the significance of the economic theory is important in appraising the results of the regressions under consideration. The results show that most of the values and the signs of the coefficients of independent variables are different than they are expected to be.

It is proposed to show next that on the basis of the evidence presented and analyzed, the monetary theory of the balance of payments cannot be supported in the case of India for the period of 1950 to 1965.

Examination of Table 1 (Appendix) shows that there are three problems that plague the results of some or all of the regression results presented. First, most of the estimated coefficients do not have the right (expected) signs. Second, most of the estimated coefficients do not have the expected magnitudes, and third, most of the estimated coefficients are not statistically significant at the 5 percent level.

Of the sixteen regression results presented in Table 1, only two regression results have all estimated coefficients with the right (expected) signs. These two regression results are ones that use the following price and interest variables.

Equation (6A) — Regressions 1 and 9

<u>Price Variable</u>	<u>Interest Variable</u>
CPI	IB
ACPI	IB

In these two regression results even though all the estimated coefficients are rightly signed, the magnitudes of the estimates in some cases are different (higher or lower) than expected and none of the coefficients are statistically significant at the 5 percent level. Consequently, as far as the results of the two equations under discussion are concerned, they do not support the monetary theory of the balance of payments in the case of India for the period of 1950 to 1965.

Next, the results of the regressions that use the following price and interest variables are dealt with.

Equation (6A) — Regressions 2, 6, 10, and 14

<u>Price Variable</u>	<u>Interest Variable</u>
CPI	CR
WPI	CR
ACPI	CR
AWPI	CR

These results have all the three problems stated above. First, the sign of the estimated coefficients of the price variable is wrong (negative). Second, the magnitudes of the estimated coefficients of the income, money multiplier, and domestic component of the base are different from what they are expected to be. The estimated coefficient of the income variable though of the correct sign is much higher than its

expected value. The estimated coefficients of the money multiplier and the domestic component of the base are larger in magnitude than they are expected to be. Third, the coefficient of the income and the price variable are not significant at the 5 percent level.

The wrong sign of the coefficient of the price variable in the case of the results of the four regressions implies that money illusion exists in India. According to Patinkin (1965, p. 22), an individual is said to be suffering from money illusion if his excess demand functions for commodities do not depend solely on relative prices and real wealth, inclusive of initial real balances. The concept of money illusion and real money balances are intertwined. In order to compute real money balances, the nominal money stock is deflated by the price level of the same year. According to the monetary theory of the balance of payments, real money balances play a crucial part in the adjustment process of the balance of payments. It is precisely on this point that Johnson (1977b) took the absorption approach to the balance payments to task. Johnson considered the absorption approach as a halfway house to a correct analysis because of its myopic focus on expenditure flows, which obscured the recognition that a continuing balance of payments deficit will eventually correct itself without devaluation by reducing the economy's real balances. Are the people from India suffering from money illusion as the estimated coefficients of the regression results under consideration seem to indicate? The position taken on this issue is that the people from India do not suffer from money illusion. The next

section of this chapter attempts to explain the reasons for the results that are at variance with the logic of the monetary theory of the balance of payments.

The results of the regressions under examination show interest elasticity of demand for money in India to be consistent with the monetary theory of the balance of payments. The estimated coefficients of the money multiplier and the domestic component of the base are higher in value than their hypothesized magnitudes. The estimated coefficients of the interest variable, money multiplier, and the domestic component of the base, as the results of the regressions under discussion show, are significant at the 5 percent level. These results are, again, at variance with the monetary theory of the balance of payments. The estimated coefficient of the income variable, though of the correct sign (positive), are far below the expected value. All the estimated coefficients of the income variable are not statistically significant at the 5 percent level.

After examining the results of the four regressions under consideration, the conclusion that emerges is that the monetary theory of the balance of payments cannot be supported in the case of India for the period 1950 to 1965.

Next, the problems in the results of the regressions that use the following price and interest variables are dealt with.

Equation (6A) — Regressions 3, 7, 11, and 15

<u>Price Variable</u>	<u>Interest Variable</u>
CPI	LR
WPI	LR
ACPI	LR
AWPI	LR

The results under discussion show that the coefficients of the income variable are of the wrong (negative) sign. The demand for real money balances plays the pivotal role in the adjustment process of the balance of payments. Without the adjustment mechanism of real money balances the monetary theory of the balance of payments is like Hamlet without the Prince. With an increase in real income people are going to demand more real money balances. Theoretically, the income elasticity of the demand for money is never likely to be negative. Here, the role of economic theory in measurement, as emphasized by Koopmans, becomes important. Theoretically it is inconceivable to have a negative income elasticity of the demand for money. None of the coefficients of the income variable, in this case, are statistically significant at the 5 percent level.

The estimated coefficients of the price variable though of the correct sign, are much smaller than their expected value. None of the coefficients are statistically significant at the 5 percent level. The values of the coefficients of the interest variable (interest elasticity) are in consonance with the monetary theory of the balance of payments. All the computed t ratios are near 2 or more in absolute value, which means all the coefficients of the interest variable are

significant at the 5 percent level. All the coefficients of the domestic component of the base in the case of the results under discussion, though of the correct sign, are higher in magnitude than the expected value of -1. All the coefficients are significant at the 5 percent level.

Of the four coefficients of the money multiplier, three are of the correct sign (negative) and one is of the wrong sign (positive). The three coefficients that are of the correct sign are also not far from the hypothesized value -1. The problem with these coefficients of the money multiplier is that none of them are significant at the 5 percent level. One of the coefficients of the money multiplier in the case of the results discussed is wrong in sign and statistically not significant at the 5 percent level.

Upon examination of the results of the regressions under discussion, it is clear that the monetary theory of the balance of payments cannot be supported in the case of India for the period 1950 to 1965.

It is worth recalling here that the results of the regressions of Eq. (6A) are being appraised in relation with the three problems associated with them. The three problems are stated at the beginning of this section. The next appraisal is of those regression results that use the following price and interest variables.

Equation (6A) — Regressions 4, 8, 12, and 16

<u>Price Variable</u>	<u>Interest Variable</u>
CPI	BR
WPI	BR
ACPI	BR
AWPI	BR

The estimated coefficients of the income variable in the case of the results of the above four regressions, though of the correct sign, are far below the expected value of 1. None of the coefficients are statistically significant at the 5 percent level.

In the case of the results of the regressions discussed, of the four coefficients of the interest variable, all are of the correct sign and expected magnitudes (small interest elasticity of the demand for money). None of the estimated coefficients of the interest variable discussed are statistically significant at the 5 percent level.

In the case of the four regression results discussed, the coefficients of the money multiplier are of the wrong (positive) sign. None of these coefficients of the money multiplier are statistically significant at the 5 percent level. For the same regression results, the estimated coefficients of the domestic component of the base are of the correct (negative) sign and are also statistically significant at the 5 percent level. The problem with the preceding coefficients of the domestic component of the base is that their estimated values are significantly larger than the hypothesized value, -1.

The appraisal of the results of the four regressions under discussion clearly indicates that the monetary theory of the balance of payments cannot be supported in the case of India for the period 1950 to 1965.

Last, the results of the two regressions appraised use the following price and interest variables.

Equation (6A) — Regressions 5 and 15

<u>Price Variable</u>	<u>Interest Variable</u>
WPI	IB
AWPI	IB

The results show that the estimated coefficients of the income variable in the case of the above two regressions are of the correct (positive) sign and are substantially close (.88 and .61) to the expected value, 1. The only problem with them is that both are not statistically significant at the 5 percent level. The coefficients of the interest variable of the regression results discussed are of the correct sign and magnitudes. Both the coefficients of the interest variable under discussion are not statistically significant at the 5 percent level. The coefficients of the domestic component of the base in case of the results of the regressions discussed are of the correct (negative) sign but are larger in magnitudes than their expected value -1. Both the coefficients of the domestic component of the base under discussion are not statistically significant at the 5 percent level.

One of the coefficients of the price variable in the case of the regression results under discussion is of the incorrect (negative) sign. It is not statistically significant at the 5 percent level. The coefficient of the price variable that has the right sign is much lower in magnitude than it is expected to be. It also is not statistically significant at the 5 percent level.

One of the two coefficients of the money multiplier in the case of the results under discussion has the wrong (positive) sign and it is not

statistically significant at the 5 percent level. The coefficient of the money multiplier with the right sign is higher than its expected value. The estimated coefficient of the money multiplier with the right sign is not statistically significant at the 5 percent level.

The appraisal of the last two regression results does not support the monetary theory of the balance of payments in the case of India for 1950 to 1965. The results of the sixteen regressions appraised are such that the monetary theory of the balance of payments cannot be supported in the case of India for 1950 to 1965.

Next, the results of the sixteen regressions of Eq. (7A) are analyzed and appraised. The analysis and appraisal of the sixteen regression results of Eq. (7A) is done from these three points of view: (1) expected signs of the coefficients, (2) expected magnitudes of the coefficients and (3) statistical significance of the coefficients on the basis of individual t tests. As shown before, from the above three points of view, the sixteen regression results of Eq. (6A) do not support the monetary theory of the balance of payments in the case of India for 1950 to 1965. From the three points of view (expected sign, expected magnitude, and statistical significance) the regression results of Eq. (7A) are also such that the monetary theory of the balance of payments cannot be supported in the case of India for 1950 to 1965. Since the analysis and appraisal of the results of the regressions of Eq. (6A) is given in detail, the analysis and appraisal of the results of the regressions of Eq. (7A) are briefly dealt with. The mathematical relationship between Eqs. (6A) and (7A) can be seen from the second section, "The Model," of the present chapter.

All the sixteen estimated coefficients of the income variable in the case of the regression results of Eq. (7A) are of the correct (positive) sign. Of the sixteen estimated coefficients of the income variable under examination, two estimated coefficients have a value near the expected value, 1 (.980 and .952). The remaining fourteen estimated coefficients are much higher in value than 1 (the expected value). None of the sixteen estimated coefficients of the income variable under discussion are statistically significant at the 5 percent level; that is, the computed t ratios are smaller than 2.202.

Examination of the estimated coefficients of the interest variable presented in Table 2 (Appendix) reveals that all have the expected negative sign. As can be seen from Table 2, the interest elasticity of the demand for money is within the specified range in all cases except when IB is used as an interest variable with the four price levels. None of the sixteen estimated coefficients of the interest variable in this case are statistically significant at the 5 percent level. That is, the computed t ratios are smaller than 2.202.

Of the sixteen estimated coefficients of the price variable in the case of the regression results of Eq. (7A), nine coefficients have the wrong (negative) sign. The remaining seven coefficients of the price variable under consideration are of the correct (positive) sign. But the values of the seven estimated coefficients with the right sign are much below the expected value 1. The seven estimated coefficients under consideration range in value from .0150 to .222. All the sixteen coefficients of the price variable under discussion are not statistically

significant at the 5 percent level. This means the computed t ratios of the sixteen estimated coefficients of the price variable are smaller than 2.202.

The regression results of Eq. (7A) in Table 2 show that all the estimated coefficients of the money multiplier have the correct (negative) sign. As can be seen from Table 2, of the sixteen coefficients of the money multiplier, when WPI is the price variable and CR is the interest variable, the value of the coefficient of the money multiplier is the closest (-.924) of all to the expected value. But the estimated coefficient of the money multiplier under discussion is not statistically significant at the 5 percent level. That is, the computed t ratio in this case is smaller than 2.202. The remaining fifteen estimated coefficients of the money multiplier in the case of the regression results of Eq. (7A) are larger in magnitude than the expected value -1. None of the fifteen estimated coefficients of the multiplier, as can be seen from Table 2, are statistically significant at the 5 percent level; that is, their (of the fifteen coefficients of the money multiplier being considered) computed values are smaller than 2.202.

The regression results presented in Table 2 show that all the estimated coefficients of the domestic component of the base have the correct (negative) sign. All the sixteen estimated coefficients of the domestic component of the base, presented in Table 2, are higher in value than the expected value -1. The values of the domestic component of the base presented in Table 2 range from -.169 to -.0567. None of the estimated coefficients of the domestic component of the base under

consideration are statistically significant at the 5 percent level because the computed t ratios of the estimated coefficients are smaller than 2.202.

Examination of Table 2 also reveals that the computed values of the DW statistic are not significantly different from 2 (as a rule of thumb, if $DW = 2$, then there is no first order positive or negative correlation).

Upon analysis and appraisal of the regression results of Eq. (7A), it is clear that the monetary theory of the balance of payments cannot be supported in the case of India for 1950 to 1965. The problems that plague the results of Eq. (6A), which are analyzed earlier, are the same problems in the case of Eq. (7A).

Interpretation

Initially, the scope of this study was limited to the empirical testing of the Mundell-Johnson monetary model of the balance of payments in the case of India from 1950 to 1965. It is clear from the results of this empirical investigation that such a model cannot be supported in the case of India for the period under consideration.^a In such an

^aDuring this research in assessing the monetary character of the balance of payments of India for the period 1950 to 1965, a variety of mathematical and theoretical models was employed. The mathematical model used in this empirical investigation, the results of which are reported in this study, was one with logarithmic differences in terms of natural log. Attempts were also made to run the identical model in terms of logarithmic differences of common log, and to run models without logarithmic differences of the natural and the common logs. From the theoretical point of view, regressions were run on the minimum monetary model of the Mundell variety. It is important to note here that none of the mathematical and theoretical variations tried gave substantially different results than the ones presented in this study.

event, then, it is imperative to look for possible reasons that could have prevented the empirical support of the monetary theory of the balance of payments. This is precisely what is intended next.

In Eq. (6A), the dependent variable $[IR/(IR + DB)]d \log IR$ is the rate of change of the monetary base induced by the rate of change in international reserves, while the independent variable $[DB/(IR + DB)]d \log DB$ is the rate of change of the monetary base attendant upon the rate of change of its domestic (autonomous) component. Changes in prices $d \log P$, real income $d \log Y$, the interest rate $d \log R$, and the money multiplier $d \log M$, are the other independent variables. This equation is sometimes called the standard reserve-flow equation in the literature on the monetary theory of the balance of payments.

Essential to the monetary approach is the concept of the offset coefficient. According to the monetary theory of the balance of payments, for a given amount of money demanded and a given money multiplier, changes in the domestic component of the monetary base (DB) will cause opposite and equal changes in international reserves (IR). In Eq. (6A), $d \log IR$ is explained by $d \log DB$ and other variables representing the given factors. The coefficient of $d \log DB$ is called the offset coefficient. It is indicative of the degree to which changes in the domestic component of the monetary base are offset by changes in the international component. According to the monetary approach, under a fixed exchange rate, the change in international reserves induced by a change in the domestic component of the monetary base is of equal magnitude but of opposite sign. If the estimated value of the offset

coefficient is equal to the theoretically expected value, then monetary policy is completely neutralized by the balance of payments. On the contrary, if the balance of payments completely fails to offset monetary policy, the value of the estimated coefficient would be zero.

Examination of the magnitudes on the domestic component of the base in Table 1 (Appendix) shows most of the coefficients to be closer to zero than to the expected value of -1. The values of the offset coefficients in Table 1 range from $-.363$ to $-.20$. Of the sixteen values of the offset coefficients in this study, only one has the wrong (positive) sign. The implication of these results is that the balance of payments provides very little offset to monetary policy conducted by the Reserve Bank of India.

It need not and should not be inferred from the empirical results of this study that the monetary theory of the balance of payments does not hold. It is because of certain special circumstances existing in the case of India that the theory cannot be empirically supported.

According to the logic of the monetary approach, excessive monetary expansion, via expansion of some controllable component of the monetary base, will result in an outflow of international reserves (an uncontrollable part of the monetary base), and a tendency for the money supply to return to its former level. The money supply automatically returning to its former level due to the uncontrollable element in the monetary base may be true of other countries; it certainly did not happen in the case of India. Figures in Table 5 (Appendix) show that IR decreased steadily from 9.52 billions of rupees in 1950 to 2.19

billions of rupees in 1965, while the domestic component of the base increased from 6.06 billions of rupees in 1950 to 29.19 billions of rupees in 1965. The monetary base, or high-powered money, rose from 15.58 billions of rupees in 1950 to 32.90 billions of rupees in 1965. During the entire period under consideration India had a deficit both on current and overall accounts. India has thus experienced a permanent disequilibrium position in its balance of payments.

In terms of the monetary theory of the balance of payments, any balance of payments disequilibrium reflects a disparity between actual and desired money balances, and will automatically correct itself. The logic of the theory is impeccable. Actually, the correction of the balance of payments of India had not occurred because enough external resources were forthcoming to bridge the deficit in the balance of payments on an annual basis.

In the case of India, foreign aid prevented any monetary restraint that otherwise would have been exercised by the RBI. Monetary expansion does take place via the controllable component of the monetary base. But the offsetting contraction that would come from an uncontrollable component of the monetary base (the loss of international reserves) does not occur because of the sustained availability of external resources for the period under consideration. Magnitudes in Table 5 support the preceding assertion. The balance of payments deficit persisted and international reserves decreased, but the decrease in international reserves did not offset the increase in the money supply that came mainly through the expanding domestic base. The sustained availability

of external resources frees the RBI of the balance of payments constraint. The forthcoming discussion deals with the foreign aid factor in the case of India.

Figure 8 illustrates the balance of payments disequilibrium and the mechanism of exchange control in a less developed country such as India. P represents the price of foreign exchange (units of domestic currency per unit of foreign currency). X represents the quantity of foreign exchange demanded and supplied. Under a free market, the equilibrium price of foreign exchange is P_2 with a total of X_2 units of foreign exchange demanded and supplied. If, however, the government pegs the price at P_1 (overvaluation of its domestic currency), the supply of foreign exchange is only OX_1 and the demand for foreign exchange is OX_3 . At P_1 , excess demand of the magnitude of X_1X_3 exists. Some solution has to be devised to ration the available supply of OX_1 .

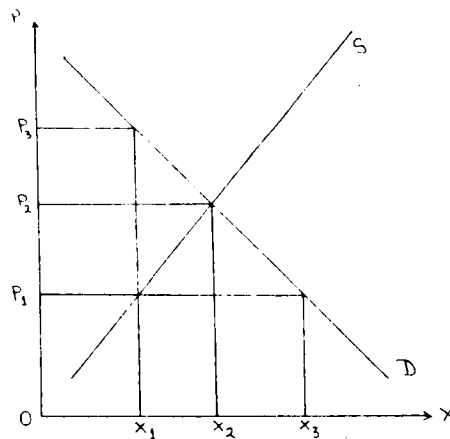


Figure 8. Foreign exchange market disequilibrium.

If the government auctions foreign exchange, importers will be willing to pay the price P_3 for it. Typically, however, the government refrains from such auctions and the available supplies of foreign exchange are allocated through complex administrative quotas and/or licensing devices. The government, then, becomes instrumental in creating opportunities for corruption and evasion and, consequently, the emergence of a black market. Since importers are willing to pay the price P_3 , inevitably this is what occurs.

In this situation, there are two alternate solutions available to the government. The first is to devalue and let the free market decide the price of its currency in terms of other currencies. The second is to reduce the money supply appropriate to the balance of payments equilibrium position. Reduction in money supply raises the nominal interest rate which creates capital inflows. Arguments against devaluation forwarded by the less developed countries are discussed in Chapter 1 of this study. But the point that needs to be emphasized here is that devaluation is only a temporary solution. Devaluation not accompanied by the proper supply of money does not produce equilibrium in the balance of payments. A proper money supply equates actual real balances the public wants to hold with the desired. The lasting equilibrium in the balance of payments can come only by maintaining the proper money supply. This is the heart of the monetary theory of the balance of payments which is discussed in Chapter 2 of this study.

Both solutions suggested in the above analysis are ruled out by the less developed countries, although periodic devaluations have been

undertaken because of outside pressure (donor countries and IMF) and economic inevitability. The question now is, how are these countries able to sustain a continuous deficit in the balance of payments? How are countries such as India able to handle the persistent excess demand for foreign exchange of the amount of X_1X_3 in Figure 8? The answer is the flow of external resources which include commodity aid (PL 480 food aid), grants, and soft loans (loans at a nominal rate of interest), as well as aid and loans from the international financial institutions such as IMF, IBRD, and IFC. This is what has happened in the case of India.

The magnitude of foreign aid to India in the form of gifts and loans was insignificant during the First Five-Year Plan (1951-1956) and the foreign exchange deficit was financed mainly from the substantial reserves accumulated during World War II. The significant flow of aid started during the Second Plan (1956-1961). The magnitude of aid climbed rapidly to a peak at the end of the Third Plan (1961-1966).

The flow of net foreign resources is given in Table 6 (Appendix). It started in 1951-1952 with \$335 million and went down to \$87 million in 1953-1954. In 1954-1955 the magnitude reached \$132 million and went down again in 1955-1956 to \$123 million. In 1956-1957 it increased to \$590 million, and from that magnitude it increased to \$1,267 million in 1965-1966. Because India is a democratic country, the non-Communist powers thought it important to give aid to India at the time of its balance of payments crisis, and the Aid-India Consortium was formed in 1958. The members of the Aid-India Consortium (the United States, the

United Kingdom, Germany, and Japan) applied the theory of foreign aid which had been developed during the postwar period.^a

^aDuring the sixties economists developed two theoretical models of foreign aid. These models attempt to give rationale for giving aid to the less developed countries. The two-gap model is briefly discussed here. The ideas can be fixed by using the basic macroeconomic accounting identity:

$$Y = C + I + (X - M)$$

where Y is gross national product, C is the total (public and private) consumption, I is investment, X represents exports, and M represents imports. The identity can be rearranged and reinterpreted:

$$Y + M = C + I + X$$

where Y + M represents sources of resources utilized in the economy and C + I + X represents uses of resources in the economy. If we subtract C from both sides, and define saving S as that part of income not consumed (that is, define S as Y - C), we obtain an equation that describes the two gaps:

$$\text{Foreign-exchange gap} = \text{domestic saving gap}$$

$$M - X = I - S$$

Like the basic national income accounting identity, this equation must hold in ex post sense. During any given accounting period economic forces will act to equate the foreign-exchange gap and the savings gap. The size of the gaps depends on a variety of factors: (1) planner's target rate of investment, (2) degree of the overvaluation of domestic currency, and (3) monetary and fiscal policies of a country in question.

It is believed that the saving in the less developed countries is less because income is less. Consequently saving falls short of the required rate of investment to achieve a target rate of growth of income to rapidly raise the standard of living of the people in less developed countries. The difference between the required investment (to achieve the target rate of growth of income) and the domestically available saving must be made up by foreign aid. It is also argued that the less developed countries need capital goods for which they cannot pay with their own export earnings because the export earnings are inadequate. Export earnings are believed to be inadequate for the following reasons. First, the sum of elasticities of demand for exports and imports is less than one. Devaluation in this situation will not help. Second, synthetic substitutes invented for their exports by the developed

The immediate concern here is to examine the role of foreign aid in allowing India to incur a deficit in its balance of payments each year without subjecting itself to monetary discipline (contraction of the money supply). The Pearson Commission on International Development (Pearson, 1969, p. 297) stated:

India has been a major recipient of external assistance from the member countries of the Consortium and from East European countries. Annual gross inflows of aid have totaled about \$1.5 billion per annum in recent years, of which one-third has been food aid.

According to Shenoy (1968, p. 267), during the period from 1958-1959 to 1961-1962 India's balance of payment deficits aggregated Rs. 11.8 billion, and about 10 percent (Rs. 1.2 billion) of the deficit was met from currency reserves while the rest was made good by foreign aid. This does not cover the entire period of 1950 to 1965 which is under consideration, but it definitely gives an idea as to how the excess demand for foreign exchange was met. It can be seen from Table 5

countries reduce the market for their exports and price reduction will not help in this situation. Third, the terms of trade are turning against the less developed countries. They have to export more in terms of real goods and services to obtain the same quantity of capital goods from the developed countries. Fourth, the policies of the developed countries are not conducive to accelerate the export earnings of the less developed countries.

The possibility of private foreign investment filling the gap still remains open. But private foreign investments are thought to be exploitative by most of the host countries. Investing countries think the policies of the host countries to be too restrictive (for example, overvaluation of currencies, restrictions on profit repatriation, fear of nationalization, and bureaucratic delays).

Given all the above factors, the theories of foreign aid justify foreign aid according to the proponents of foreign aid. It is important to point out here that some prominent economists (Bauer, 1976; Friedman, 1973) have contended that foreign aid does not help either recipient or donor countries.

(Appendix) that the reserves were virtually halved during 1957 when the balance of payments crisis erupted with the launching of the Second Plan. The decline persisted through the mid-sixties. According to Pick's Currency Yearbook, the Indian rupee was overvalued by 74 percent in terms of the United States dollar in 1965. According to Bhagwati and Srinivasan (1976), India could incur continuous deficits in her balance of payments only because of foreign aid. They stated (p. 20):

The Indian trade balance has been constantly negative for the simple reason that external resources have come as aid and long-term investment and that the balance on invisibles account is both relatively small and again negative.

It is important to note here that some aid to India also has come from the Soviet Union and its satellites. The aid from the Soviet Union amounts to only one-fifth of the American aid to India (Goldman, 1967). India also leads as a recipient of loans from the International Bank for Reconstruction and Development, and the International Finance Corporation for the period of time under consideration.

As pointed out earlier, if the balance of payments completely fails to neutralize the monetary policy, the value of the offset coefficient is zero. The values of the coefficient obtained by the regression analysis are a little less than zero. This implies that a small degree of neutralization does take place. The minor degree of neutralization obtained in the empirical results is attributed to the IMF withdrawals. The interaction of the IMF withdrawals and the money supply is given below.

The monetary theory of the balance of payments states that inflow (outflow) of reserves automatically increases (decreases) the money supply. Under certain conditions, the Central Bank can temporarily borrow from the IMF against its gold tranche and first credit tranche to bridge the deficit in the balance of payments. This is the practice the RBI has followed, according to Mujumdar and Patil (1975). They also described what happens under the existing accounting arrangements. Mujumdar and Patil stated (p. 379):

The foreign assets of RBI increase by the extent of IMF withdrawals and the RBI makes an equivalent credit in rupee terms to the IMF account No. 1 maintained with it — an account which is technically a frozen account.

In this situation, the RBI receives foreign exchange and pays the IMF for it in rupees. When the Government of India wants to buy foreign exchange from the RBI, it has to pay the latter from its domestic rupee balances. Suppose that a deficit occurs in the balance of payments on current account due to the imports of food, fertilizer and fuel — items which the government sells to the public. When the government sells these items to the public, the government receives the money and the public gets the goods. The amount of money the government receives is siphoned out of circulation. The government's balances are restored. The domestic money supply is reduced by the amount of withdrawals. Mujumdar and Patil concluded (p. 382): "This is how IMF withdrawals, in the final analysis, acted as the single largest depressant on domestic money supply." Table 6 (Appendix) gives the amount of credit used by the RBI from the IMF.

The preceding discussion points out that the IMF withdrawals serve as a depressant on the money supply in India. The amount of the withdrawals involved is presented in Table 6. It remained \$72 million per year from 1950 to 1953. In the year 1954 the magnitude of withdrawals decreased to \$26 million. The data on withdrawals is not available for 1955 and 1956. The amount of withdrawals increased from \$173 million to \$287 million from 1957 to 1965, except for 1959 and 1960. In 1959, the quantity of the withdrawal was \$132 million. It decreased to \$63 million in 1960. The IMF withdrawals episode explains why the values of the offset coefficient were empirically obtained ranged from $-.363$ to $-.20$ instead of zero.

Demand on the market for money is the demand for real money balances like all other markets; there is an absence of money illusion on the market for real money balances. It is partly a matter of simple rationality in that behavioral choices are made by individuals, firms, and bankers on the basis of real variables. It also implies that expectations regarding changes in the price level are not static. People holding the real money balances do not take it for granted that the price level will stay unchanged. These decision units are aware that realized changes at some rate of change of the price level have been a tax on their money wealth if the changes were inflationary, or a yield on their money wealth if the changes were deflationary. They are alert to prospective rates of change in the price level.

Demand for real money is a portfolio demand for one form of wealth on which the rate of return is a composite. Obviously, it must include

P. The explicit nominal deposit rate may be involved. It also must include money's yield of services indicated by a real marginal product. The marginal product of real money balances diminishes smoothly, other things being equal, to zero.

The theoretically expected value of the coefficient of $d \log Y$ is unity. It means a 1 percent change in the growth rate of real income induces a change of 1 percent in the growth rate of real money demanded. The estimated value in our regression analysis of Eq. (6A) is far below the expected value in twelve cases out of sixteen. In four out of sixteen, the estimated income elasticity of demand has the wrong (negative) sign. The four cases in which negative values of the coefficient $d \log Y$ were obtained occurred when the long-term interest rate was used as one of the independent variables. Among the positive values of the coefficient $d \log Y$, the highest estimate is .88 and the lowest is .0684.

One of the reasons for the low income elasticity of demand for real balances is the loss in purchasing power of the balances due to sustained periods of inflation. As pointed out earlier, real balances are a form of wealth. The Government of India, hard pressed for revenues, taxes real money wealth by the excessive issue of nominal money in relation to the increase in real output. The inflation tax is a fiscal convenience. Farmers substitute stocks of wheat, rice, gold, or other commodity inventories which are costly to maintain for real balances.

The theoretical underpinning of the inflation as a tax on cash balances is discussed below. Inflation, which results when the supply of money expands at a higher rate than does the rate of increase in

real output, is a tax on holding money. Inflation generates revenue both from its tax yield and from its ability to increase the real yield of other taxes. When tax rates are progressive, inflation increases the real rates of tax. If, for instance, nominal income doubles as a result of inflation, tax collections will more than double under progressive taxation. Goetz and Weber (1971, pp. 51-63) documented the results on this point. Bailey (1956) showed that inflation also directly produces revenue for the government, and the incidence of this tax is borne in proportion to the holding of nominal money balances. This direct yield of revenue occurs in two forms. First, there is the tax on existing money balances that results from a rise in prices. Second, there will be the yield from the provision of additional real balances over time. The total revenue yield to the government from money creation is the sum of these two yields (Friedman, 1971).

Given a stable demand for money function, the rate at which the nominal stock of money expands determines the rate of inflation. The public before long begins to expect the prevailing rate of inflation and adjusts its stock of real balances (or ratio of real balances to real income) to it. To maintain real balances constant during inflation, the public must absorb nominal money balances at a rate equal to the rate of inflation. In order to maintain the value of its real balances intact the public has to sacrifice real consumption. This sacrifice is equivalent to a tax. An individual having \$100 in real balances will have to add \$10 to his money holding if the rate of inflation is 10 percent per year. In case he decides to keep his holding of nominal

money balances constant at \$100 over the year, he loses 10 percent of the purchasing power due to inflation. The 10 percent loss of purchasing power in this situation is in effect a tax on the holding of the money. Assuming that there is no growth in real output in the long run, real balances will be constant. If the 10 percent rate of inflation persists, then each individual will have to add 10 percent to nominal money balances each year to preserve the value of real balances. Hence the inflation tax per annum is 10 percent of the total value of real balances in the economy.

The idea of an inflation tax is also explained with the help of a diagram (Figure 9). The vertical axis represents the rate of inflation P . The horizontal axis represents the ratio of real balances to real income (or money stock to money income). The demand for real balances is a function of the (actual and expected) rate of inflation.

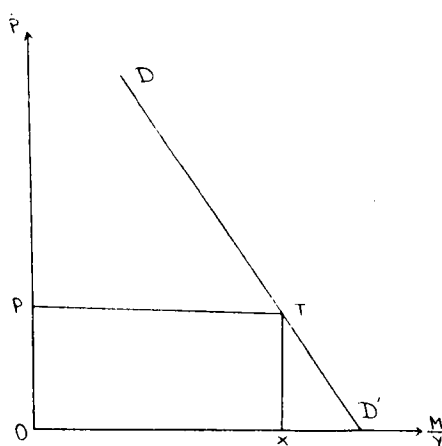


Figure 9. Inflation tax and the demand for real money balances.

D' is the demand for real balances. In the absence of inflation, the ratio of real balances to income is OD' . If the prevailing and expected rate of inflation is OP , the quantity of real balances demanded relative to income decreases to OX . Owing to inflation, the cost of holding real balances increases and consequently the quantity demanded decreases by XD' . The area $OPTX$ is the proportion of real income that the holders of real balances, due to inflation, are required to accumulate in the form of money balances in order to preserve the value of their real balances — the inflation tax expressed as a proportion of real income. The regression results show that income elasticity of demand for money in India is less than unity. This means with a 1 percent increase in real income, the quantity demanded of real money balances increases by less than 1 percent. When inflation exists the demand for real balances decreases due to the inflation tax. In terms of Figure 8, page 90, with the OP the actual and expected rate of inflation the quantity of real cash balances demanded decreases from OD' to OX .

In Table 3 (Appendix) we computed the annual percent changes in India's real money balances for the period under consideration. The figures indicate a decrease in real money balances from 1951 to 1954. The real money stock shows an increase from 1955 to 1962, with the exception of 1956. From 1963 to 1965, again the real money stock shows a decline. Of the fifteen years, eight years indicate decreases and seven years indicate increases in the real money stock. The consumer price index was used to deflate the nominal money stock in India. As the discussion below indicates, the consumer price index understates

the true rate of inflation because of the various government controls of the price level. The recorded (official) rate of inflation is in fact much below the actual rate. Dar's (Mellor, 1968) study corroborates this contention. According to Dar, the predicted (forecasted) rate of inflation is higher for most of the years than the recorded (official) rate. Furthermore, the Dar study also pointed out that excessive increases in the money supply in relation to the increase in real output was the major cause of inflation in India for 1950 to 1965. The actual rate of inflation is expected to be higher than the recorded rate of inflation for the following reasons. First, the existence of price controls distorts the operation of the market system. Moreover, price controls result in a black market and black market prices are invariably higher than legal market prices. In less developed countries like India, as Friedman (1970, p. 433) observed, the black market supersedes the legal market. Second, compulsory procurement from farmers at lower than free market prices creates the same effect. A farmer, in this situation, tries to grow and sell legally as little as he can because the price paid to him by the government is below the free market price. Remaining or undeclared output, then, is sold at higher prices on the black market. The economic analysis of price controls and the evidence on price controls, rationing, and compulsory procurement is presented in the forthcoming discussion. Third, the Government of India's food zones policy has the same effect as the above two (Datta and Sundaram, 1966). Under this law, interstate movement of grains is prohibited. But the arbitrage system works the way it is supposed to according to the logic

of the market system. The flow of grains (illegally) moves to the areas where prices are higher from the areas where they are lower. Those involved in moving grains illegally across the state borders take a higher risk. Black market prices, in this instance, include a risk premium. Consequently, black market prices are higher than the official price. Fourth, as Friedman (1970) pointed out, the government at times has reason to suppress the true rate of inflation because the government is involved in wage negotiations and the granting of subsidies.

Together, the four factors discussed above indicate that the real rate of inflation in India is higher than the one recorded officially. People make their economic decisions on the basis of the real rate of inflation as opposed to the official rate of inflation. Since the real rate (as opposed to the official rate) of inflation is higher, income elasticity of demand for money, as theory indicates, is less than unity.

The Korean and Brazilian experiences bear out the theoretical predictions. Shaw (1973) pointed out that during 1965 to 1968, money holders in Korea ceased their flight from real balances and, at a diminished rate of inflation, accepted a rising rate of nominal money issue. According to Simonsen (Shaw, 1973, pp. 217-18), on the other hand, the lagging demand for real balances was because of the sustained inflation in Brazil.

The factor substantially affecting the demand for real money balances (less than one) income elasticity of demand for real money balances is the demand for gold in India. There exists an insatiable desire for gold in India. Demand for gold (to hoard) is an important

item in the portfolio of an average Indian family. The income elasticity of the demand for gold is in all likelihood greater than one. During a period of inflation, the inflation tax reduces the demand for real money balances. Gold is substituted for money. Gold, in the case of India, besides being a store of value, also renders some economic services to the holder. In the context of India gold as an asset possesses some unique qualities that are highly desirable. Gold is marketable in India. At rural sites the village money lender is always more than happy to cash it. In the long run, the value of gold (in currency) always has gone up.

For gold to figure so importantly in the total picture, it is essential to examine available data on the gold inflow and hoarding in India. Most of the existing data on gold inflows and hoarding is a product of reasoned guess. No reliable data ever did or ever will exist on gold hoarding in India. A researcher has to do the best with the data he has. According to Green (1968, p. 183), the value of the unofficial gold inflow to India per year is \$200 million at international prices. The official estimate of private holding of gold in India done by the RBI in 1958 was 105 million ounces of gold (worth \$3.7 billion at the international price). The private hoard of gold was worth over \$5 billion by 1967, according to Green. Findlay Shirras (Green, 1968), as early as 1919, estimated the private stock of gold to be 88 million ounces in his book Indian Finance and Banking. According to the estimates of the Gold Delegation of the League of Nations (Green, 1968), India took 15 percent of all the new gold mined between 1835 and 1929.

Part of the problem of gold hoarding does come from tradition and custom but part of the problem definitely comes from government policies — extremely high marginal tax rates, limitations on ownership of urban property and land ownership, restrictions on salaries, the denial of entry to private enterprise in some industries and trades, and so forth. Green (1968) has documented these government restrictions.

How does India pay for such huge illegal imports of gold? India pays for the gold imports in four main ways. First, through illegal exports of silver, which has been flowing into Dubai. A second, though relatively minor source of finance, is the black market in India for dollars, traveler's checks, and even personal checks written by American tourists. The third and the most sinister source of revenue for the import of gold is drugs. The main drug involved is hashish, which the smuggling dhows pick up in Pakistan and to a lesser extent in India. The fourth, and the most significant source of foreign exchange, comes from Indians working abroad.

According to Green (1968, p. 237), India absorbs one-sixth of the world's newly mined gold each year. A substantial percent of income must be expended on such substantial quantities of gold. This also implies substitution of gold for real money balances on a significant scale. Consequently, the substitution of gold for real money balances reduces the income elasticity of demand for real money balances.

The following discussion is devoted to the interest elasticity of demand for money. The theoretical underpinnings of the interest elasticity of the demand for money function are briefly discussed below.

The interest-inelastic demand-for-money function of the monetary theory of the balance of payments is akin to the domestic monetarist analysis of the demand for money. The range within which the interest elasticity of the demand for money is expected to lie is specified in the earlier discussion. According to Van Belle (Putnam and Wilford, 1979, p. 245) the monetary approach to international adjustment follows directly from the consistent application of domestic monetarist analysis to the international sphere. It is important to point out here that some basic differences exist between the proponents of the monetary theory of the balance of payments and the domestic monetarists. These differences are pointed out by Akhtar (Putnam and Wilford, 1979, pp. 125-26) and Fand (1975). The differences between international monetarists (proponents of the monetary theory of the balance of payments) and the domestic monetarists are dealt with later on in this chapter. The immediate concern here is interest inelasticity of the demand for money about which both international and domestic monetarists agree. An important policy implication follows from the interest-inelastic demand for money. Whitman (1975, p. 498) pointed out:

The Cambridge form of equation 1 also assumes interest inelastic or "super-stable" demand-for-money function. This particular formulation embodies an additional implication: the impotence of fiscal policy to affect any aspect of the economy, including the price level.

The implication brought out by Whitman refers to the controversy between the Keynesians and the monetarists. This controversy and the role of the rate of interest is dealt with below.

After World War II, the Keynesians believed that the interest elasticity of demand for money was substantially high. This amounts to saying that velocity would adjust to any changes in GNP with a small change in interest rates. Ball (1964, p. 164) stated:

The Keynesian innovation that goes beyond the quantity theory results from introducing an alternative to holding cash, namely bonds, with the result that on typical Keynesian assumptions the income velocity of circulation is no longer a constant but is dependent on the rate of interest or yield on bonds.

If the Keynesian position is true, then there exists no role for monetary policy in the sense that variations in money supply are irrelevant and hence any attempt to control these is fruitless. Empirical studies have shown that the interest elasticity of demand for money was not as high as some Keynesians had thought. Friedman attempted to show that a model in which the demand for money is made to depend on the trend of income (permanent income) could explain much of the cyclical variations in velocity. But later studies showed that even after taking the permanent-income effect into consideration, the demand for money remains sensitive to interest rates. Mayer, Duesenberry, and Aliber (1981, pp. 427-28) summarized the debate:

Monetarists, including Friedman, as well as Keynesians, agree that demand for money is responsive to interest rates. On the other hand, they also agree the short-run interest elasticity of demand for money is fairly low so that changes in the growth rate of money can have substantial effects on aggregate demand. There is still disagreement in this area, but it is no longer the basis for fundamental differences between monetarists and Keynesian.

The data presented in Table 1 (Appendix) indicate that the interest elasticity of the demand for money is of the correct sign (negative).

In all the sixteen cases the interest elasticity of the demand for money is in consonance with the monetary theory of the balance of payments. Of the sixteen coefficients of the interest variable, seven are statistically significant. The remaining nine coefficients of the interest variable, though of the correct sign and magnitude, are not statistically significant. The lack of statistical significance of the preceding nine coefficients can be attributed to the interventions into the money and capital market by the Government of India and the RBI. The correct sign and magnitudes of the sixteen coefficients and the statistical significance of the seven coefficients are indicative of the resilience of the market system. Despite the various controls with which the forthcoming discussion deals, the market system works — at least partially — the way it is supposed to in the case of the interest variable. Bean (Frenkel and Johnson, 1976) in her empirical test of the monetary theory of the balance of payments of Japan found interest elasticity of demand for money to be insignificant (small). Zecher's (Frenkel and Johnson, 1976) results in the case of Australia for the monetary theory of the balance of payments also showed the interest elasticity of demand for money to be small. Likewise, Putnam and Wilford (1979) found interest elasticity of demand for money small for the North European countries. Wilford (Putnam and Wilford, 1979) reported that similar results have been obtained in empirical testing of the monetary model including the interest elasticity of the demand for money in Honduras and Afghanistan. Aghevli (Putnam and Wilford, 1979) obtained very high (2.18 for narrow and 2.29 for broad definitions of money) interest elasticities for Indonesia.

On the free market the rate of interest is determined by the interaction of demand and supply. A negatively sloping demand for loanable funds is VMP (value of the marginal product) of capital and a positively sloping supply curve is based on the community's time preference. In India, the RBI and the Government of India instead of the market forces fix the rate of interest. It is stated in the RBI Bulletin, September 1961, p. 1461:

It may be mentioned that the Reserve Bank's directive of September 21, 1960, designed to keep the structure of short-term rates in alignment with other rates, required scheduled banks to pay not more than 2 percent on notice money and term deposits.

But there is more to controlling the rate of interest by the RBI than the previous sentence indicates. The spread between the lending rate by the banks and the deposit rate given to savers has been allowed to widen. It is stated in the same issue of the RBI Bulletin (p. 1461):

With the slight increase in advance rates and the drop in deposit rates, the spread between the average rates of interest on advances and deposits widened further from 3.709 percentage points in the first half of 1960 to 4.039 percentage points in the second half.

As it is, both the rates are below the free market rate but there is a clear discrimination against the saver. Shaw (1973, p. 93) aptly put it:

Explicit ceilings are put over nominal rates of interest. Explicit ceiling less the expected rate of inflation are the real ceilings. In keeping with the fix-price context of the (Keynes') General Theory, Lord Keynes did not distinguish between nominal and real rates of interest or between explicit and real ceilings. The distinction is clear in the lagging economies, where inflation is commonplace. There real ceiling can be low or negative, sounding out to savers and investors false signals about the scarcity of savings and physical capital. They deal so harshly with liquidity preference that monetization is inhibited and savings are discouraged and misallocated.

The Rural Credit Survey, 1954, of the Government of India documents rates on secured loans at as high as 88 percent per year, the maximum interest permissible under the law being 12 percent. According to Shenoy (1968, p. 76) well over two-thirds of the borrowings by farmers are at or above the legal maximum.

The evidence presented clearly shows that the interest rate in India is not allowed to play its proper role in the saving-investment process.

Next, what follows is a discussion of the price elasticity of the demand for money. The nature and extent of price controls, rationing, and compulsory procurement in India is presented. The objective of the following discussion is to show that the recorded (official CPI and WPI) price levels tend to understate the true rate of inflation in India for 1950 to 1965. It is also intended to show that the Indian official price levels are not in consonance with the world price level.

The evidence on price controls, rationing, and compulsory procurement that has been presented below supports the contention that the officially recorded price indexes understate the rate of increase in the general price level. The Government of India, in the postindependence period (after August 15, 1947), has often responded to failure of the monsoon and rising prices by resorting to market intervention in the form of controls, rationing, and compulsory procurement. The major purpose of these policies is to provide minimum rations at what the Government of India considers normal prices to the poor living in urban areas. The problem that the government faces in such a situation, then,

is how to procure efficiently and distribute equitably the necessary supplies with the scanty resources at its disposal. Mellor (1968, p. 89) described the Government of India's policies:

The usual solution is to institute compulsory procurement from farmers at prices which are low for a year of scarcity but more nearly at the level expected in a normal crop year. Because of the tremendous administrative and enforcement problems of procuring grain on a nationwide basis, restrictions are usually placed on the movement of grain between states, and procurement is concentrated in surplus states. The restrictions on movement depress the price in the surplus states, making compulsory procurement at low prices both financially and administratively easier.

Since 1956, the RBI has used, at various times, selective credit controls in order to curb speculation in food grains, oil seeds, and sugar. In the late fifties the government tried unsuccessfully to take over the trade in food grains (Mellor, 1968, p. 89). Besides the control of food grain prices, the government, according to Johri (1965, p. 80) also tried to stabilize the prices of important raw materials through price controls and by other administrative measures. Mellor in the above cited work also reported the results of Dar's study which are highly relevant to the topic under discussion. Dar^a attempted to find the

^aDar's study shows that for the period 1952 to 1964 both the reported level of food grain prices in India and the predicted level, based on an equation that takes into account real factors determining the supply of and demand for agricultural commodities and the size of the money supply. Taken together, these factors clearly explain year-to-year fluctuations in prices. It is important to note that in the 1960s the major cause of rising food grain prices has been the rapidly expanding money supply. The other references on price controls in India can be found in RBI Bulletins of January 1961, June 1962, August 1963, and can be found also in a study by Singh (1957) titled Inflationary Trends in India.

difference between the reported (official or CPI) and estimated prices of food grains in India for approximately the same period of time. Dar's study showed that estimated (given by the regression results) prices of food grains were higher than the reported prices for eight of the total of thirteen years. The implication of Dar's study is that the reported prices understate the price increase in India. Friedman (1970) said that the less developed countries have sought to suppress price increases, often have legal prices that are honored more in the breach than in observance, and calculate price indexes in ways that understate the actual price rise. Dar's study corroborates Friedman. The evidence presented shows that the pervasive and well-entrenched price controls in India have exerted a decided downward effect on reported prices.

The second factor instrumental in lowering the prices of food items (wheat, rice, maize, corn, sorghum, and milk powder) and other commodities (cotton and tobacco) has been the PL.480 food assistance to India by the United States during the fifties and the sixties. According to Mellor (1976, p. 226), the food aid increased from 10 million dollars in 1956 to 501 million dollars in 1965. The food aid to India by the United States increased steadily over the period of 1956 to 1965. According to Schultz (1968, p. 34), food aid amounted to 6 percent of India's normal yearly production. In order to dispose of the huge farm surpluses on its hands, the United States Congress passed the United States Agricultural Trade Development and Assistance Act in 1954.

Table 6 (Appendix) indicates that India's imports increased from 1.4 million metric tons in 1955-1956 to 10.2 million metric tons in 1965-1966. Of the eleven year period only two years indicate a decline in imports from the previous years. These years are 1957-1958 and 1960-1961.

Due to the assured availability of PL 480, the supply curve of commodities shifts to the right and, ceteris paribus, any shift to the right in the supply curve of a commodity is a factor making for a fall in price.

India is a poor and underfed country. One percent decrease in the price of food is likely to increase the quantity of food demanded by 1 percent or more. This means price elasticity of demand for food in India is greater than one. Given the unitary or price elastic demand for food, according to Schultz PL 480 food imports should have reduced food prices by 6 percent per year. But Schultz modified his estimate of a 6 percent per year decrease in food prices due to PL 480 estimates. To Schultz PL 480 food imports were grants, so no payments are made for them, but they do increase the real income of the Indian population. And with, say, a 1 percent increase in real income less than 1 percent increase in the quantity of food demanded results. This implies that income elasticity of demand for food in India is less than one. As Schultz wrote (1968, p. 34):

A price elasticity in the demand for farm foods of not less than unity implies a reduction of farm food prices of 6 percent (per year), which will be offset somewhat by the income effect associated with receipts of PL 480 grants.

Brahamananda's (1960) study of the price effect of PL 480 corroborated Schultz's generalization. The percentage decrease in the price of wheat shown by Brahamananda is 10 percent from 1956 to 1958 on the base of 1952-1953. Brahamananda stated (p. 322):

The flow of PL 480 assistance visibly succeeded in bringing about a sharp downward effect upon wheat prices. The impact of the change in the supply position is reflected in the (downward) price movements of other commodities too.

Bhagwati (1962, p. 62) emphasized the crucial role played by PL 480 food imports in India's balance of payments policy:

In India's^a case, the government imports consist almost totally of PL 480 U.S. Surplus Food — there is domestic need to maintain a steady price of cereals, primarily due to the existence of a large segment of population on a fixed and sometimes even falling money wage and/or earnings — and of imports of capital goods under varying aid programs.

The WPI also understates the extent of price rise for the period under consideration. An observation made by Dantwala (1957) clearly shows that the official WPI underestimates the price rise. Dantwala (1957, p. 22) pointed out:

For some commodities like cotton, there has been a statutory ceiling on prices, and though in reality the ceiling has never been operative, the office of Economic Adviser which prepares

^aFrom an analytical point of view it must be stated that the effective transfer of resources, valued at international prices, was much below the recorded dollar value. This was mainly due to the fact that United States farm products were produced at subsidized prices much above the international competitive price, and shipped at higher rates, including the higher wages of dock workers. Shenoy (1968, p. 269) stated: "In U.S.A. farm produce is price supported. As a result, the U.S. price of wheat is currently about 26 percent higher than in Australia and of rice about 80 percent higher than in Thailand." Schultz (1968, p. 32) calculated the effective transfer of resources to the recipient country to be 37 cents a nominal dollar.

the index series records only the ceiling prices. Thus for commodities like these, the index number underestimates the rise in prices.

It can be discerned from the above illustration that the officially recorded prices of the commodities involved were below the then existing free market prices. This also indicates that the official WPI used as one of the price variables was not in alignment with the world price level.

It is clear from the above discussion that both the CPI and WPI understated the true rate of inflation. In summary the CPI understated the price rise mainly for two reasons. The first reason was price controls, rationing, and compulsory procurement schemes imposed by the Indian Government. The second reason was the prolonged inflow of foreign food aid that acted as a price depressant. As pointed out above, the official WPI also underestimated the true price rise.

The last of the independent variables for which the rationale has to be supplied for the estimated values in the regression results is the coefficient of $d \log M$. The monetary approach predicts the coefficient of $d \log M$ to be -1. A value of -1 of the coefficient of $d \log M$ denotes complete offsetting of an increase in the money supply through an outflow of reserves. The estimated value of the money multiplier is much greater than the expected value of -1. In the previous analysis of the domestic component of the base, it was shown at length that, due to the sustained availability of external resources, permanent disequilibrium can be incurred in the balance of payments. Since substantially less than complete offsetting of the domestically induced money supply takes

place, the estimated value of the money multiplier is much below the expected value.

At this point in the discussion it is probably appropriate to discuss the interaction of the external deficit, foreign exchange market intervention, and the money supply. According to the monetary theory of the balance of payments, the supply of money is determined by the balance of payments, either because international reserves and domestic money are the same, as under a gold specie standard, or because domestic money is rigidly linked to the stock of international reserves through the banking system. The preceding statement implies that under a convertible currency regime overissuance of money and subsequent inflation is not possible. An inconvertible currency regime exists in India. Fixing the value of the rupee in dollars above the free market, or equilibrium rate of exchange, generates excess demand for dollars and precipitates a deficit in the balance of payments. It induces excess offers of rupee payments from domestic money balances. An excess supply of domestic money might be cleared by reducing the rate of growth in the nominal money supply. Under a regime of convertibility the money supply is automatically adjusted to the balance of payments through the banking system. In the case of India under the regime of inconvertibility, the excess supply of domestic money is never cleared. With reserves meager and domestic monetary policy ruled out as an instrument of control over the foreign exchange market, India was compelled to devalue the rupee in 1966.

As pointed out earlier, there are some basic differences between the international monetarists and the domestic monetarists. One of the differences concerns the significance of the assumptions underlying a theory. The validity of a hypothesis, Friedman contended, has to be judged solely by its predictive powers. Conversely, if a prediction were not contradicted by subsequent events, the initial hypothesis was fully acceptable. That is, direct verification was not essential. Thus, a consideration of the realism of one's assumptions in economic theory becomes irrelevant. Friedman (1953, pp. 8-9) expressed: "The only relevant test of the validity of a hypothesis is comparison of its prediction with experience." A theory, Friedman argued, could never be tested by its assumptions. According to the international monetarists realism of assumptions is necessary and they attempt to test assumptions as well as predictions of their theory. Akhtar (Putnam and Wilford, 1979, p. 126) wrote:

Finally, an important methodological difference between the monetary approach and the monetarists' theory is evident in the treatment of assumptions. Following Friedman, the monetarists regard the realism of their assumptions as unnecessary to the "correctness" of their models and instead emphasize the predictions the models yield. By contrast the proponents of the monetary approach attempt to test, as noted above, the assumptions as well as the predictions of their models.

It is argued in the last part of this chapter that the empirical verification of the monetary theory of the balance of payments in the case of India for 1950 to 1965 has not occurred because of the violation of the assumptions of the theory under investigation. The assumptions of the monetary theory of the balance of payments are discussed in

Chapter 2 of this study. Since the argument of the lack of support hinges on the violation of the assumptions, it is worth restating some of the assumptions here. The theory under investigation relies on the assumption of an efficient world market for goods, services, and securities. Like a firm under perfect competition, a country in question is a price and interest taker. The world price level and the rate of interest are identical with a country's price level and the rate of interest. But if and when a country's price level and interest rate are different from the world price level and interest rate, due allowance must be made for the economic conditions (policies) that make them so. Johnson (Frenkel and Johnson, 1976, p. 156) stated:

I begin with a single country, maintaining a fixed exchange rate with the rest of the world, assumed to be growing over time, and small enough, and diversified enough in relation to the world economy for its price level to be the world price level, and its interest rate the world interest rate. (Differentials between domestic and foreign price indices, or between domestic and foreign interest rates, could readily be allowed for provided they are assumed fixed by economic conditions.

As Akhtar (Putnam and Wilford, 1979) pointed out to the proponents of the monetary theory of the balance of payments, realism and empirical validation of underlying assumptions of a theory are important. This implies that the violation of the assumptions may not permit the empirical validation of the theory under discussion. It can be discerned from Johnson's statements that when the domestic price level and interest rate are different from the world price level and interest rate due allowance must be made for the economic conditions (policies) that make them differ. In the case of India, the equality of the Indian price

level with the world price level just does not exist because of government (Indian) intervention.

As pointed out earlier in this chapter, all the sixteen estimated coefficients of the interest variable are of the theoretically expected sign and magnitudes. Unfortunately, though, the majority (nine out of sixteen) of the coefficients of the interest variable are not statistically significant. The lack of statistical significance is attributed to the intervention into the money and capital market by the Government of India and the RBI. On the basis of the empirical evidence presented it can be stated that at least partially the interest rate in India is not aligned with the world interest rate due to the intervention into the money and capital market.

The essential point to be made is that the massive government intervention has not allowed the Indian price level and interest rate to be in alignment with the world price and interest rate. For the prediction of the monetary theory of the balance of payments to come true, the assumption of the equality of a country's price level and interest rate with the world price level and interest rate must hold. Violation of the above assumption prevents the empirical validation of the monetary theory of the balance of payments in the case of India. The Government of India's control of prices and RBI's control of interest has been documented before. It is also documented that the official indexes used in this study understate the rise in prices. A previously cited empirical study by Dar substantiates the above statement. An important observation by Dantwala (1957) helps in explaining the discrepancy between the estimated and official price levels.

Next, financial implications of the distortions created by the commercial policy of the Government of India are dealt with. Bhagwati (1973) neatly summarized the government's policy regarding the external sector under planning. According to Bhagwati, the policy with respect to foreign trade was not through exchange rate adjustments (devaluation) and selective tariffs, but by resort to comprehensive exchange control so that use of imported raw materials, capital goods, and other supplies was to be regulated by an elaborate administrative mechanism. This policy resulted in (1) the indiscriminate and automatic protection mindless of the cost of import substitution and elimination of any incentive to be competitive, and (2) an overvalued exchange rate discouraging exports and encouraging capital imports. The following numerical illustration clears the point. If the official rate of exchange is $\$1 = \text{Rs. } 7.50$ (rupees) and the free market rate of exchange is $\$1 = \text{Rs. } 12$, an American importer of an Indian good gets Rs. 750 for $\$100$. At a free market rate, an American importer would have gotten Rs. 1200. That is, when the price of the rupee goes down quantity demanded of rupees increases. Consequently, exports of Indian products increase. Also, an Indian exporter of $\$100$ worth of goods to the United States, at the free market rate of exchange, receives Rs. 1200 instead of Rs. 750 at the official rate. On the contrary, an Indian importer of American capital goods pays only Rs. 750 for $\$100$ worth of capital goods at the official rate of exchange. At the free market rate of exchange, an Indian importer of $\$100$ worth of American capital goods has to pay Rs. 1200.

In a capital-scarce economy like India capital is made artificially cheaper. The Indian saver is discouraged to save. Since capital is cheaper loan rates realized by financial institutions are reduced and deposit rates they can pay to savers are reduced. Because of the policy of maintaining the overvalued exchange rate the Indian interest rate is not arbitrated with the world rate of interest. An overvalued rate of exchange encourages capital-intensive methods of production in a labor-abundant economy such as India. This has the effect of creating distortions in the factor market.

Bhagwati and Chakravarti (1969, p. 64) reported that the effective rates of protection in India for 1961 and 1962 were as high as 10,000 percent. Overvalued exchange rates coupled with high tariff walls encourage the use of capital-intensive methods of production. The combined effect of the above policy is to discourage labor-intensive methods of production. In a labor abundant economy such as India, the above policies have the effect of creating unemployment and a sustained disequilibrium in the factor market. The apparent cheapness of capital lowers the reward (the rate of interest) to savers.

The overvalued exchange rate creates an excess of imports (of capital) over exports. According to the monetary theory of the balance of payments, devaluation is not a lasting solution in this situation.

As Johnson (Frenkel and Johnson, 1976, p. 165) explained:

Second, since devaluation is a one-shot affair, it can be only a transitory factor for improvement in the balance of payments. Lasting improvement can only be achieved via a decrease in the rate of domestic credit expansion.

In the case of India, for the period under consideration, the exchange rate has stayed overvalued, the deficit in the balance of payments has persisted, but, as can be seen from Table 5 (Appendix) there has been no contraction in domestic credit. How has India been able to sustain the deficit without contracting domestic credit? The answer is an inflow of external resources. The inflow of external resources has been made available to India in the forms of soft loans, grants, specific project aid, commodity aid to be paid in rupees, and withdrawals from the IMF. Foreign aid plays a significant role in allowing India to sustain prolonged deficits in the balance of payments. Owing to the accumulated reserves during World War II, up to 1956 India did not experience a balance of payments crisis. After 1962, India started experiencing the pressure to devalue from the Aid-India Consortium and IMF. The devaluation occurred in 1966. Bauer (1974) explained how foreign aid follows the balance of payments deficits. Bauer wrote (p. 354):

Aid is often linked to balance of payments deficits on the recipients, especially when the deficits are considered as the results of laudable official efforts to speed up progress.

Bauer's observation is applicable to India.

The sustained availability of external resources freed India from subjecting itself to monetary discipline. According to Shenoy, India does not need foreign aid, what India needs is monetary discipline and more freedom of enterprise than the government has been willing to give. Mookerjee (1966) pointed out that the less developed countries (India

included), despite long-term Fund collaboration, have made little progress in achieving internal and external balance, taming inflation, and in letting their economies be free.

CHAPTER 5

SUMMARY

Chapter 1 of this study deals with the evaluation of the traditional approach to the balance of payments. In the beginning of the chapter, the chronological development of the monetary theory of the balance of payments is discussed. It has been shown that the roots of the preceding theory antedate the work of David Hume. In this respect, Isaac Gervaise's contribution is significant. In the Keynesian Theory of the balance of payments, the role of money has been minimized. Meade's seminal contribution to the balance of payments theory is a synthesis of two paradigms. The first paradigm is that of Keynesian economics. The second paradigm is that of the theory of imperfect competition. According to Kuska, the Meadean system is indeterminate and inadequate. It is indeterminate because Meade has two bond markets, both of which he eliminates. On the basis of Walras's Law the system is indeterminate. It is inadequate because it fails to integrate internal and external sectors. After World War II, attempts were made to explain a number of statistical pitfalls causing a bias towards low elasticities. Emergence of the monetary theory of the balance of payments during the seventies makes the elasticities debate inconsequential because, according to this theory, the balance of payments of developed as well as of less developed countries is predominantly determined by monetary forces.

Chapter 2 deals with the theoretical essentials of the monetary theory of the balance of payments. The theoretical framework employed

to discuss the preceding theory is the Patinkinian general equilibrium system in which the real-balance effect plays the key role. According to the monetary theory of the balance of payments, the transactions recorded in the balance of payments are essentially a monetary phenomenon. This implies that an excess demand or supply of money necessarily affects the balance of payments. Crucial to the theory are the assumptions of (1) a small open economy, (2) a fixed exchange rate, (3) full employment, and (4) the existence of a stable demand for money function. In terms of the preceding theory, payments imbalance is a reflection of the disparity between actual and desired money balances. If, at any time, the public's actual money balances are in excess of desired money balances, then the country incurs an external deficit by buying more abroad than it sells and thereby channeling excess cash into foreign hands. The process continues till actual and desired real balances are equal. But, during the inflationary process, even the prices of nontraded goods are bid up. Under a fixed exchange rate regime, the nominal money supply adjusts to demand via a payments deficit.

The third chapter presents a critique of the monetary theory of the balance of payments. Tsiang challenged one of the assumptions — a stable demand for money — of the monetary theory of the balance of payments. Tsiang objected to the treatment of money as the n th good in the general equilibrium system and to the elimination of the n th equation thereafter. Patinkin proved in the late fifties to the satisfaction of most economists that besides money any good can be

the nth good in a general equilibrium model. On the basis of the limited evidence of Taiwan, Tsiang raised the possibility of the coexistence of an unstable demand for money and the balance of payments equilibrium. A Keynesian critic like Hahn would like to deny the very tour de force of the new theory that the balance of payments is basically a monetary phenomenon. On the basis of Keynes' last contribution it has been shown that Keynes thought of the balance of payments as a monetary phenomenon. According to the proponents of the new approach, an excessive increase in domestic credit in relation to the rate of increase in the real output is the only reason for the imbalance in payments in the case of both the developed and the less developed countries.

The last chapter of this study deals with the empirical estimation of the monetary model in the case of India over the period of 1950 to 1965. In essence, the model statistically estimated is the same as the one discussed in Chapter 2, except that the empirically tested model is more disaggregated than the one presented in Chapter 2. The results of the regression analysis do not support the monetary theory of the balance of payments in the case of India over the specified period. Lack of support of the theory in the above case does not mean that the monetary theory of the balance of payments is a poor theory. Availability of external resources on an annual basis for the period under consideration has freed the RBI from the necessary monetary discipline. External resources consists of two categories in the case of India. The first category of external resources is the availability of substantial sums

of foreign aid from the industrialized countries and international aid-giving agencies. The second category of external resources is the sumptuous quantities of free or nearly free imports of food from the United States. A plethora of price and interest controls exists in India. According to the monetary theory, a country's price level and interest rates are determined by the international market forces. Due to the extensive government control of price and interest rates the preceding condition is violated in the case of India. Total or near total insulation of the Indian economy from the competitive international market forces due to controls prevents support of the monetary theory of the balance of payments in the case of India.

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APPENDIX

Column	1	12	13	14	15	16
	CP	ACPI	AWPI	AWPI	AWPI	AWPI
	IB	BR	IB	CR	LR	BR
Income	.66 (.95)	.1001 (.232)	.88 (1.31)	.0684 (.236)	-.085 (-.20)	.139 (.328)
Interest rate	-.36 (-1.10)	-.9075 (-1.66)	-.34 (-1.11)	-.376 (-4.04)	-.460 (-2.60)	-.095 (-1.71)
Price	.07 (.43)	.0385 (.638)	-.015 (-.21)	-.0183 (-.437)	.0717 (1.16)	.0279 (.459)
Money multiplier	-.01 (-.13)	.0305 (.261)	-.0116 (-.091)	-.285 (-2.632)	-.028 (-.259)	.0425 (.364)
Domest. comp. of the base	-.24 (-1.50)	-.273 (-2.351)	-.20 (-1.51)	-.344 (-4.19)	.278 (-2.60)	-.257 (-2.239)
R^2	.45	.531	.442	.774	.59	.521
SE^b	.03	.0327	.0357	.0226	.0305	.0330
DW^c	1.91	1.65	2.07	2.20	1.48	1.63

Note: The numbers

^aEquation (6A): [I

^bstandard error of

^cDurbin-Watson stat

Column		12	13	14	15	16
	II	ACPI	AWPI	AWPI	AWPI	AWPI
		BR	IB	CR	LR	BR
Income	30 (15)	1.418 (.660)	3.428 (1.157)	1.364 (.671)	.952 (.428)	1.426 (.671)
Interest rate	-13 (-4)	-.094 (-.337)	-1.152 (-.280)	-.582 (-.821)	-.828 (-.734)	-.116 (-.411)
Price	-7 (-6)	.124 (.390)	.050 (.467)	.0717 (.236)	.222 (.666)	.133 (.431)
Money multiplier	-1 (-2)	-.539 (-.091)	-.0706 (-.786)	-.503 (-.644)	-.127 (-.221)	-.0210 (-.035)
Domest. comp.	-7 (-2)	-.106 (-1.194)	-.169 (-.292)	-.129 (-1.412)	-.109 (-1.28)	.0979 (-1.144)
R^2	2	.206	.250	.250	.239	.209
SE^b	5	.168	.164	.164	.165	.168
DW^c	2.4	2.10	2.30	2.12	1.998	2.11

Note: The number

^aEquation (7A): d

^bStandard error of

^cDurbin-Watson sta

TABLE 3

ANNUAL PERCENT RATES OF GROWTH OF NOMINAL MONEY, PRICE LEVEL
AND REAL MONEY IN INDIA, 1950-1965

Year	Nominal money	(CPI) Price level	Real money
1950	—	—	—
1951	-20.00	-6.34	-13.66
1952	-.70	-9.40	-8.7
1953	+.30	+5.36	-5.06
1954	8.00	-8.4	-.4
1955	13.30	-6.47	6.53
1956	8.16	12.32	-4.16
1957	10.11	3.16	6.95
1958	10.17	5.00	5.17
1959	12.3	4.25	8.05
1960	6.0	1.22	4.78
1961	5.0	4.00	1.00
1962	17.0	8.00	9.00
1963	8.0	13.00	-5.00
1964	12.0	24.00	-12.00
1965	12.0	32.00	-20.00

TABLE 4

INTEREST RATES AND PRICE LEVELS IN INDIA, 1950-1965

Years	BR	CR	LR	IB	CPI	WPI
1950	10.58	1.81	3.11	3.00	99.30	89.40
1951	10.91	2.52	3.28	3.50	92.96	94.30
1952	11.17	3.17	3.69	3.50	83.56	79.90
1953	11.26	3.20	3.64	3.50	88.92	83.46
1954	11.21	3.19	3.65	3.50	80.52	77.90
1955	11.12	3.30	3.72	3.50	74.05	73.90
1956	11.10	3.72	3.93	3.50	86.37	84.20
1957	11.40	3.90	4.14	4.00	89.53	86.70
1958	10.77	3.83	4.18	4.00	94.53	90.30
1959	10.76	3.93	4.08	4.00	98.78	93.60
1960	11.57	4.17	4.06	4.00	100.00	100.00
1961	12.72	4.38	4.11	4.00	104.00	103.80
1962	12.82	4.39	4.36	4.00	108.00	104.50
1963	13.33	4.63	4.73	4.50	113.00	110.40
1964	14.07	4.68	4.73	4.50	124.00	112.50
1965	15.70	5.72	5.31	5.00	132.00	131.90

Abbreviations: BR = Bazaar Rate
 CR = Call Money Rate
 LR = Long-Term Interest Rate
 IB = Reserve Bank Discount Rate
 CPI = Consumer Price Index
 WPI = Wholesale Price Index

Both CPI and WPI are adjusted to the base of 1960.

TABLE 5

MONEY SUPPLY, INTERNATIONAL RESERVES, DOMESTIC BASE AND
HIGH-POWERED MONEY (IN BILLIONS OF RUPEES)
IN INDIA, 1950-1965

Years	MS	m	IR	DB	H = (IR + DB)
1950	27.21	1.75	9.52	6.06	15.58
1951	21.86	1.39	9.06	6.71	15.77
1952	21.71	1.51	7.78	6.57	14.35
1953	21.77	1.54	7.94	6.18	14.12
1954	23.58	1.63	8.25	6.26	14.51
1955	26.60	1.69	8.19	7.58	15.77
1956	28.77	1.65	6.51	10.88	17.39
1957	31.68	1.67	4.17	14.73	19.00
1958	34.90	1.66	3.07	17.00	21.00
1959	39.18	1.81	3.32	18.23	21.55
1960	41.42	1.92	2.70	19.19	21.59
1961	43.31	1.82	2.60	22.48	23.79
1962	50.50	1.96	2.15	24.50	25.81
1963	54.48	1.90	2.23	26.97	28.40
1964	61.25	1.99	2.13	29.48	30.67
1965	68.61	2.08	2.19	29.19	32.90

Source: International Financial Statistics, Vol. 33. Yearbook 1980. International Monetary Fund, Washington, D.C.

TABLE 6

THE INFLOW OF EXTERNAL RESOURCES, INDIA, 1951-1952 TO 1965-1966

Year	Total net foreign resource transfer (million U.S. \$)	Food imports under PL-480 (million metric tons)	IMF withdrawals (million U.S. \$)
1951-52	335		-72
1952-53	193		-72
1953-54	87		-72
1954-55	132		-26
1955-56	123	1.4	NA
1956-57	590	3.6	NA
1957-58	841	3.2	-173
1958-59	692	4.0	-177
1959-60	675	5.2	-132
1960-61	1,007	3.6	-63
1961-62	903	3.7	-188
1962-63	937	4.6	-292
1963-64	903	6.4	-298
1964-65	1,119	7.6	-154
1965-66	1,267	10.2	-287

Sources:

J. Mellor. 1976. The New Economics of Growth, Cornell University Press, Ithaca, p. 219.

Freeman, O. 1968. World without Hunger. Praeger, New York, p. 148.

International Financial Statistics. Yearbook 1980. Vol. 33. International Monetary Fund, Washington, D.C.

DATA SOURCES

Most of the data comes from International Financial Statistics (IFS), Vol. 33, pp. 218-19, Yearbook 1980, published by the International Monetary Fund, Washington, D.C. Part of the data on price and interest variables is obtained from the various issues of The Reserve Bank of India Bulletin and The Report on Currency and Finance, published by the Reserve Bank of India, Bombay. Free market exchange rate are taken from Pick's Currency Yearbook, 1969 and 1976, by Franz Pick, LC55-11013, Pick Publications, New York.

Specification and sources of the variables used in the model are given below:

<u>Item</u>	<u>Specification</u>	<u>Source</u>
International reserves	Comprised of the foreign assets of the Reserve Bank of India (RBI) and its IMF accounts.	Line 11 of IFS
High-powered money	Funds expressly designated by the RBI. H, high-powered money is also a sum of international reserves plus the domestic base ($H = IR + DB$).	Line 14 of IFS
Domestic base	Currency plus bank reserves	Lines 31, 32 of IFS
Money	Includes currency, savings deposits, and time deposits	Lines 24, 25 of IFS
Real GNP	Net national income at 1960 market prices	RBI Bulletin

VITA

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