BALANCE OF PAYMENTS, REAL Vs MONETARY PHENOMENON
IN CASE OF PAKISTAN

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Dedicated to my parents, my brothers
and my sweat little sister

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Abstract

The balance of payments account is a key account as it depicts the resource endowments, financial health and economic worthiness of a country. According to the definition, balance of payments is always balance due to its double accounting entry but in actual the composition of its various components does matter.

There are mainly two arguments regarding the balance of payments adjustment mechanism that defines balance of payments a real or monetary phenomenon. According to the former, bop is a real phenomenon, focusing on goods and real sectors of the economy. Disequilibrium in the balance of payments is the consequences of disparities in expenditure decision by the economic agents, arises when imports payments exceed the export receipts. To address this disequilibrium expenditure reducing and expenditure switching policies has been prescribed. So here, in the Keynesian analysis the main focus is on the relative prices, relative income and exchange rate devaluations.

The main shortcoming in the Keynesian analysis is it totally excludes the role of money however this market is the mirror image of the transactions that has been taken place in the goods and services market. Secondly the main focus is on only trade balance and current account balance i.e.," above the line transactions", but no attention has been paid to the overall foreign exchange reserves i.e.," below the line transactions" treated them as a residual accounts.

Monetarist argue that balance of payments is a purely monetary phenomenon; accordingly balance of payments problem is a result of the disequilibrium in the money market. This approach specifically deals with the money market and totally exclude the real accounts and their composition, or we can say it takes into account that side of the picture which is absent in the Keynesian analysis. According to this approach balance of payments is a self-correcting that require no policy action and inherently temporary in that when desired portfolio balance is attained; the deficit or disequilibrium will cease.

It is observed that both analyses are relevant one represents the goods and services market while the other takes the money market as a key account. Since both analysis focuses on different aspects; and should be treated as complementary rather than substitutes. Hence both analyses are very necessary and worthwhile to be taken together from the policy perspective.

The present study approaches the balance of payments problem under both Keynesian and Monetary approaches separately as well as to address this issue under the synthesis framework of balance of payments. The beauty of synthesis framework is that it takes into account both

transmission mechanism devised under Keynesian and monetary analyses alternatively, in a unified framework that presents both money and real goods market together.

The study finds that balance of payments is a monetary phenomenon in the long run, but inconsistencies have been found in the short run dynamics. Keynesian analysis helps in understanding the adjustment mechanism of the two accounts :trade balance and the current account balance. The exchange rate, relative prices and relative income are the main determinants of trade balance and the current account balance. The exchange rate devaluation can be used as a policy tool as it has a positive impact on both the accounts in the long run as well as in the short run. the relative price level has a negative impact on both accounts, thus implying that to improve the balance of payments increase in the price level must be less than the increase in the foreign price level. Therefore while taking any policy action to deal with the trade deficit and current account deficit in case of Pakistan, real factors (relative prices and exchange rate) need to be addressed. However for the overall international liquidity position the money market equilibrium should resorted first. The synthesis framework also highlights the validity of monetary approach in the long run and in contrast in the short run it follows that path as described by the Keynesian school of thought. Therefore, it is concluded that synthesis model has the capability to address both markets together and captures the market forces at work.

The study concludes that "*Balance of Payments is both a real and monetary phenomenon in Pakistan*".

1. Introduction.

A country's balance of payments is a summary statement of all economic transactions between residents of a country and residents of the rest of the world that have taken place during a given period of time. It covers exchange of visible merchandise, invisible services, transfers and short and long term capital inflows. Deficit in balance of payments means that payments exceed the receipts, and if it persists over a long period of time, we say the balance of payments is in disequilibrium.

Balance of payments deficit, especially over longer periods presents a variety of problems, some obvious and others more subtle. First, the inadequacy of foreign exchange reserves. A payments deficit without adequate foreign inflows implies decline in reserves and may approach zero. The country would be unable to make payments for imports, and deliveries would cease. If vital imports, such as petroleum, spare parts, or raw materials are not available, the domestic economy would slow down dramatically.

Countries that face inadequate foreign exchange reserves have to seek the foreign capital inflows and therefore depend upon donors and lending institutions including International Monetary Fund. The typical result is emergency loans extended under rather stringent conditionalties. The country's ability to manage its own economic and financial affairs are compromised by such conditions, a situation that is politically embarrassing in the short run and serious has implications for growth in the long run.

In addition to the budgetary constraint implied by the finite foreign exchange reserves and a limited ability to borrow, there is the problem of trade deficit as a recessionary factor in the Keynesian view of a macro economy. The current account deficit resulting from a reduction in exports result in lower levels of total output and income through the multiplier process whereas the reduction is much higher if the economy is an inflationary state at the time of the export decline. A reduction in total demand might be desirable, but if the economy is already weak or in recessionary state it would be harmful.

Unanticipated balance of payments deficit affects the domestic money supply and that may not match the desires of the central bank, thus complicating the management of monetary policy. A balance of payments deficit requires the central bank to sell foreign

currency in the exchange market against the domestic currency leading to a reduction in money base. The reduction in the stock of base money works through the coefficient of monetary expansion or money multiplier (the reciprocal of the reserve ratio) to further reduce the domestic money supply and the availability of credit. The money supply falls and the central banks will either accept decline in money supply or take necessary actions which otherwise might not have taken place.

Balance of payments surplus presents fewer and less pressing problems than deficit, but even surplus is not without disadvantages. First, a trade surplus is a source of increase in aggregate demand, and the emergence of a surplus can be inflationary. Second, surplus can also increase the domestic money supply, and sterilization in this case is relatively difficult and costly particularly when the surplus is large.

1.1 Significance of the Study.

Pakistan has been caught in vicious deficit balance of payments trap since 1956-57. During the pre-plan period (1948-49 to 1954-55), Pakistan's performance in the foreign trade sector was reasonably good. Its exports exceeded the imports by 79.5 percent and trade surplus touched the highest peak of 165.5 million dollars during 1956-57. Since then Pakistan had been facing serious problem of deficit in her balance of trade and balance of payments with one or two exceptions, despite the fact that every government employed a set of policies to address it.

There are two renowned schools of thought that explain and suggest remedies for balance of payments disequilibrium: the Keynesian and the Monetarists. According to the Keynesian school of thought the balance of payments disequilibrium is a result of expenditure decision, and the deficit occurs when imports payments exceed exports receipts. To correct this policies that influence the consumer's consumption patterns expenditure reducing and expenditure switching policies are proposed. Expenditure reducing policies such as monetary restriction and budgetary policy are not desirable if the economy has unemployed resources as it will have a negative impact on output. Expenditure switching policies are appropriate in the case as these reduce the expenditure on imports by switching demand from imported goods to domestically produced goods as well as result in output expansion by utilizing the unemployed resources. The Keynesian

approach appropriately discusses the goods and services accounts, and the relative price level, relative income and the exchange rate are the main determinants of the balance of payments. The main shortcoming of the Keynesian analysis is that it does not take into account the money market.

The monetary approach deals with the money market. It postulates that the balance of payments disequilibrium is a monetary phenomenon and attributes it to a reflection of the mismatch between money demand and money supply. Accordingly, balance of payments is a temporary and a self-correcting phenomenon. When the desired portfolio balance is achieved balance of payments equilibrium will be restored. However the monetarist analysis neglects the real factors that determine the international trade. Besides, it fails to distinguish between various accounts like trade, current and capital accounts; and there is scant concern regarding their composition.

Since both goods and services and money market are relevant and play a role in determining the balance of payments equilibrium, these cannot be taken separately and just one is not enough to resolve the issue. Therefore, a unified model is needed that encompasses all these elements that have the capability to describe both markets simultaneously. This study synthesizes both the approaches in a unified more general framework that depicts the whole story.

In Pakistan where balance of payments disequilibrium arises not only because of deficit in trade balance and current account but also due to excessive deficit financing and heavy and sudden flow of remittances that actually have disequiliberating impact in the money market. It is also important to analyze balance of payments under both partial approaches and to take the desired policy action. This study deals with the balance of payments under both Keynesian and Monetary approaches separately as well as under the synthesis model of both approaches in a unified framework.

The past studies on this subject have used the conventional estimation techniques e.g. the least square and simultaneous equation models based on the assumption that data series are stationary. However if economic aggregate series are non-stationary at levels, it leads to biased and inconsistent estimated coefficients. Moreover, the assumptions on which monetary model is built hold only in the long run; while the conventional models provide short run insights, therefore, there is a need for a model that address both short

and long run issues. To investigate the long run relationship, we have used the time series econometric method of cointegration by Johansen and Juselius (1992). To investigate the short run adjustment dynamism, error correction model has been estimated by using the "general to specific" approach proposed by Hendry (1994).

This study provides a detailed analysis of the balance of payments under the Keynesian view treating it as a real phenomenon and the role of real and monetary variables on its individual accounts i.e. trade balance account and current account. It also investigates the balance of payments as proposed by the monetary approach to balance of payments. Both the views are important and have been taken separately. Furthermore we have integrated them together in a unified framework known as a "Synthesis of Keynesian and Monetary approaches to balance of payments". This approach gives a more comprehensive picture of the balance of payments representing both the markets goods and services as well as the money market simultaneously.

1.2 Objectives of the Study.

The main objectivesof the study are to address the following questions.

- Whether balance of payments is a real phenomenon, as postulated by the Keynesian school of thought? Under Keynesian framework we specifically address the following questions;
    - How the nominal exchange rate impacts the trade balance and current account balance situation in the long run and short run?
    - How does the relative prices (domestic to foreign) impact the trade balance and current account balance in the long run and short run?
    - How does relative income impacts trade balance and current account balance in the long run and short run?

- Whether balance of payments is a monetary phenomenon-the balance of payments disequilibrium is the consequence of the disequilibrium in the money market, as illustrated under the Monetary approach to balance of payments.

- What will be the impact of the domestic credit on reserve balances in the short and long run?
- How income, price level and interest rate impact the reserve balances in the short and long run?

- What would be the implications if we synthesize two schools of thought in a unified framework i.e. Synthesis of Monetary and Keynesian approaches to balance of payments as presented by Frankel, Gylfasone and Helliwell (1980).
    - Does the synthesis model have the capability of explaining balance of payments as described by the two partial approaches both in short and long run?
    - What will be the impact of exchange rate changes on the reserve balance in long and short run?
    - How reserve balances will behave in the long run and short run in response to expansionary fiscal policy?
    - How the income level impacts the reserve balances?
    - Which approach is better in explaining the balance of payments phenomenon?

1.3 Plan of the study.

To achieve the above stated objectives this study is organized and divided into eight chapters. Chapter 2, briefly discusses the balance of payments under Keynesian, Monetary and Synthesis approaches. It presents a critical analysis of these approaches and highlights the basic foundations of the two approaches. In chapter 3, a survey of the existing literature concerning empirical evidence and its shortcomings is presented in order to provide a rationale and motivation to pursue this study. Chapter 4 is related to the theoretical construction of the model, data variables and the econometric methodology. Chapters 5, 6 and 7 provide the empirical evidence on balance of payments under Keynesian, Monetary and Synthesis approaches for the period 1972Q1 to 2005Q4. Finally, chapter 8 summarizes the results and suggests policy implications in the light of empirical evidence discussed.

2. Theoretical Foundations.

2.1 Introduction

Balance of payments disequilibrium is a persistent matter of concern for both developed as well as developing countries. Economists differ regarding the balance of payments adjustment mechanism and its corrective policies, and their views are broadly classified into two approaches: Keynesian Vs Monetary.

According to the former, the balance of payments (BOP) is a real phenomenon focusing on goods and real sectors of the economy. Disequilibrium develops due to disparities in export revenues and import expenditures, and equilibrium can be restored with the help of expenditure reducing and expenditure switching policies. Thus nominal as well as real variables both impact the balance of payments in the short run as well as in the long run.

The latter on the other hand postulates that BOP is a monetary phenomenon, focusing on only money and capital markets. Disequilibrium in the BOP is a reflection of mismatch between stocks of money demand and money supply, and is inherently temporary and self-correcting in that when desired portfolio balance is attained, the deficit or disequilibrium will disappear.

In this chapter we discuss the two approaches to highlight the differences in the adjustment mechanisms and policy actions deviseds. Then we try to synthesize both views in a unified general framework.

2.2 The Keynesian Approach to Balance of Payments.

The Keynesian theory of external adjustment and payments has its roots in the second half of 20th century with the seminal contributions of Robinson (1947), Harberger (1950), Laursen and Metzler (1950), Alexander (1952) and Meade (1970). The Keynesian theory is also referred to as the traditional approach in the literature and is essentially a composite theory, which includes the elasticities, absorption, and multiplier models of international adjustment and payments.

2.2.1 The Elasticity Approach.

The *elasticities approach* associated with Robinson (1947) is the first one in the Keynesian tradition that involves a straightforward application of Marshallian partial equilibrium analysis to the exports and imports markets separately. It assumes that capital movements are excluded (or fixed exogenously) so that an excess or deficiency of the value of exports in relation to the value of imports gives rise to a balance of payments surplus or deficit (reserve inflow or outflow). The Elasticity approach proposes that devaluation would improve the trade balance if the Marshal-Lerner condition holds. The elasticity approach to devaluation is subject to following criticisms. First it ignores cross-relations among relative goods prices, demand and supply[1]. Second, from a specifically Keynesian point of view, it ignores the net multiplier effects of changes both in export proceeds and in spending on home and exportable goods associated with changes in import expenditure (Meade, 1951; Negishi, 1968; and Dornbush, 1975).

2.2.2 The Keynesian Multiplier Approach

The above mentioned shortcomings of the elasticities approach were addressed by the development of more sophisticated models employing a Hicksian IS-LM framework to the analysis of demand relations with *Keynesian income multiplier analysis*, a development due in particular to Harberger (1950), Laursen and Metzler (1950) and Meade (1951). It simplifies the 'elasticities approach' by assuming a two-good international economy (exportable and importable goods only) and production of export goods at constant domestic money cost, and implies an equal deterioration of the terms of trade as a result of devaluation. The multiplier model entails similar results as in the case of elasticity approach, since it also depends on the Marshal-Lerner condition (also referred to as a simple version of the exchange stability criterion). This condition implies that devaluation has a positive impact on trade balance only in the presence of unemployed resources which can be used to satisfy the excess demand for domestic

[1] Note that there must be a third, non-traded good present for exports and imports to have independent prices.

output and the multiplier effect reduces the magnitude but does not change the sign of the impact effect, as long as both countries have positive marginal propensity to save (acquire foreign exchange).

While the Keynesian multiplier approach is a vast improvement on the elasticities approach by assuming conditions of mass unemployment and a money wage rigidity—it fails to provide any guidance for the analysis of devaluation under full employment or inflationary conditions.

2.2.3 The Absorption Approach.

The '*absorption approach'* of Alexander (1952), presented a novel idea over the likely magnitudes of the elasticities of the 'elasticities approach' and 'multiplier approach' by switching the focus of analysis from the trade balance the difference between the value of exports and of imports, to the trade balance as the difference between aggregate domestic income and aggregate domestic absorption. It utilizes the aggregate demand identity that consists of domestic expenditures (consumption, investment and government expenditures), and exports and imports.

According to absorption approach country's balance of payments situation can be improved if and only if domestic income level can be increased relative to domestic absorption level. This can be done by employing two types of policies; those aimed at increasing output and reducing expenditure. To achieve this dual objective, expenditure switching and expenditure reducing policies have been proposed.

Expenditure reduction policies may involve monetary restrictions, budgetary cuts, or even a wide array of direct controls. Since any such policy will tend to reduce income and employment, thus would be more suitable if the country is suffering from inflationary pressure as well as a balance of payments deficit. But a corresponding disadvantage of such a policy is that if the country is suffering from unemployment, it would not be desirable in case of developing countries with unemployed resources. While expenditure switching policies consist of devaluation and trade controls including tariffs, subsidies and quantitative restrictions. Devaluation aims at switching both domestic and foreign expenditures towards domestic output; resulting in output expansion as well as reducing the domestic absorption level. So an expenditure switching policy seeks to correct a

deficit by switching demand away from foreign towards domestic goods; and the success of such a policy depends not only on switching demand in the right direction, but also on the capacity of the economy to make available the extra output required to satisfy the additional demand. Hence devaluation has a favorable impact on the balance of payments situation only if the export import demand is elastic and unemployment prevails in the economy. In the case of full employment expenditure-switching policies are inappropriate, except when used in conjunction with expenditure reducing policies as a means of correcting the employment reducing effects of the latter.

2.2.4 Synthesis of Elasticity and Absorption Approaches.

Initially it was believed that the absorption approach was an alternative to the elasticities approach; the latter concentrating on price effect, while the former focusing on income effects. However, authors such as Tsiang (1961) and Alexander (1959) synthesize the elasticity and absorption approaches and show that the two models are not substitutes, rather they are complementary. To understand this complementarity consider the effects of devaluation on income. Exports will increase more than imports, thus raising income only if the Marshall-Lerner condition is fulfilled. If the Marshall Lerner condition is not fulfilled then exports will rise by less than imports, implying that income will fall. Hence the Marshall-Lerner condition is clearly relevant to the absorption approach.

To summarize, the above three approaches together constitute "the Keynesian approach' which rests on the following assumptions.

1. Perfect inputs and product markets.
2. Economy is at below full employment level.
3. The price elasticities of exports and imports supply are infinite.

Krueger (1969) pointed out that this theoretical school was well established by the late 1950s as the dominant theory of international financial adjustment.

2.2.5 Adjustment Mechanism under the Keynesian Approach to Balance of Payments.

Keynesian view of balance of payments is effectively a view of trade balance. There are two fundamental effects; price effect and income effect. Price effect includes the relative price levels and the exchange rate of the domestic country versus the world. If the price level of domestic country rises faster than that of the foreign country, domestic country's exports decrease and imports increase resulting in trade balance deterioration. Similarly, if the country's currency revalues, exports become less competitive than imports, and trade balance will decline, and if it devalues, exports will rise and imports will decline, leading to an improvement in the balance of payments. As far as price effect is concerned, there are three important factors to consider; *(i) size and sign of the price elasticity of demand; (ii) stability of the coefficient of the price elasticity of demand; and (iii) speed of the adjustment of quantity responses to changes in price*. The combination of these two factors is real exchange rate and is also called international competitiveness.

The second fundamental determinant of the trade balance is the relative income level of the domestic country relative to the rest of the world. The domestic country's trade balance is negatively related to its income, as income goes up, absorption also increases which further increase imports and the trade balance deteriorates. On the other hand, if the world income expands more rapidly than that of domestic economy, the exports will rise, trade balance will improve and vice versa. There are also three important aspects to be considered regarding the effect of the relative income level on trade balance (i) *Size and sign of income elasticity of demand; (ii) stability of income elasticity of demand; and (iii) speed of adjustment of quantity responses to changes in income*. Hence, it is concluded that the price of one country's products relative to the foreign price level, exchange rate and the relative income of the domestic and foreign economies are the main determinants of the trade balance.

2.2.6 A Critique of the Keynesian Approach to International Finance.

The Keynesian approach embodies the premise that a flexible exchange rate regime will restore a country to external equilibrium. For this to occur, several conditions

must hold: Marshall-Lerner condition[2] must be satisfied; domestic prices are assumed to change by the equal percentage change in a country's currency; the domestic cost structure is not affected by a change in a currency's international value; the coefficients of the elasticities of supply for imports and exports are essentially infinite; and expectation of product quality, both by domestic and foreign residents, are stable. All these assumptions are often empirically tenuous to defend. Secondly the Keynesian approach essentially ignores all other adjustments that are "below-the-line" (i.e., the capital accounts), and simply accommodating to the trade account. The contemporary world, however, is one in which autonomous capital flows, both short and long term, play an increasingly important role; and there is no a priori reason for one exchange rate to be able to clear both current and capital accounts simultaneously, for the parameters that effect each account may differ.

Laffer (1972) pointed out that the Keynesian approach assumes that in the pursuit of external adjustment, all countries are approximately equal in size. This view of the relative resource endowment and production capacity of countries of observably different economic magnitudes is unrealistic. Specifically, there are different implications for balance of payments adjustments from initiating monetary, fiscal, and exchange-rate policies depending on if a country is a small open economy or a large one

The Keynesian approach does not place theoretical weight to an economy's monetary parameters and this non-relevance of monetary factors is a significant shortcoming in it. Despite the fact that both the current account and capital account reflects the net exchange of goods and service and exchange of securities for money, the Keynesian approach discards the notion that the balance of payments can be a monetary phenomenon.

Another option is the use of fiscal policy. If a country has a trade deficit, it may impose a tariff, *ceteris paribus,* on imported goods and services. This will result in tariff revenues as well as an improvement in the country's balance of payments. How will the government use the tariff revenue? It may distribute it to the general population by reducing income taxes. However, if residents spend some or all of this incremental income on foreign tradable goods, the trade balance will again deteriorate. Thus,

[2] The sum of the price elasticities of demand for imports and exports must be greater than unity;

depending on the disposition of funds generated from a trade policy like export tax, financing of export subsidy, quota and tariff, may not unequivocally achieve its anticipated policy goals.

The adjustment mechanism under the Keynesian approach does not introduce a discussion of supply-side economics; the theory implicitly assumes that income expansions are demand induced. This conceptual framework excludes the possibility of export led growth, which is a supply-side phenomenon. It is empirically observable that export-led growth policies have resulted in income expansions concomitant with an improved international accounts position. This is the recent experience for the newly industrialized countries of Asia, known as Asia's Four Little Dragons. These countries have focused on exports to richer industrialized nations and maintained trade surplus with aforementioned countries.

Kindleberger (1970) emphasized that the Keynesian approach to international finance is exclusionary in its treatment of several accounts in the balance of payments. The Keynesian theory emphasizes the trade balance to the exclusion of other international financial accounts; these accounts however have significant historical and contemporary relevance e.g. Transfer Account[3] and the Interest and Dividends Components[4] of the Services Account. To summarize, a country may be facing disequilibrium in the balance of payments that can be attributed to unilateral transfers as well as payments of dividends and interest to the rest of the world.

To address this deficiency an attempt has been made by incorporating the current account balance analysis in our empirical work discussed in chapter 5. The dependent variable is the current account balance, while independent variables include relative income domestic to foreign, relative price domestic to foreign and nominal exchange rate.

Roosa (1970) noted that the Keynesian approach to international finance does not integrate the capital account into its core theory, although for the contemporary integrated

[3] The transfer account can enhance external equilibrium for countries receiving substantial amounts of development aid, war reparations and private remittances from its citizens abroad.

[4] Machlup (1950) and Cooper (1966); dividend and interest inflows can be of significant positive importance for external equilibrium for countries with large present and past portfolio and direct foreign investments abroad. However, for a host country with an open-door policy toward foreign investment, large repatriations of dividend and interest payments will negatively affect the external position.

global economy the status of this account can be instrumental for a country to achieve external balance[5].

Finally, Keynesian theory does not include the official reserves transactions balance (i.e. the money account) as an integral part of the international financial accounts. The Keynesian approach has considered the official reserves transactions balance as a residual balance resulting from "above-the-line," transactions. This perspective is, prima facie, not appropriate in the contemporary open-economy world, for the official reserves transactions account balance is not necessarily a result of accommodating transactions; in fact, the account's balance may be a reflection of explicit policy actions and consequently must be treated as an autonomous account.

2.2.7 Conclusion.

So concluded that the Keynesian approach appropriately discusses trade flows in goods and services but it lacks theoretical insights into the trade in money and securities. Indeed, monetary factors can, and often are, the source of an external disturbance to an economy. Thus the main shortcomings in the Keynesian approach about which policy makers are more concerned are: the inability of a flexible exchange rate regime to achieve external balance, the absence of the importance of monetary variables in external adjustment, and the lack of integration of components of the current, capital, and official reserves accounts into the general theory. In such a case the Keynesian approach's analytical tools are insufficient to effectively resolve the external disequilibrium.

The Monetary approach to the balance of payments as popularized by Frenkel and Johnson (1976), addresses many of the deficiencies of the Keynesian approach in the area of the money account. It rigorously analyzes the international financial flows and their causes by giving pre-eminence to the money account under a fixed, flexible, or mixed exchange-rate regime. Even though the monetary approach is based on strong assumptions in many of its theoretical and policy implications, it is a more comprehensive theory of international financial flows and adjustment. It is concluded that

[5] Recently, for example, the net flow on the capital account of the United States roughly equaled the U.S. trade balance deficit. Similarly, the experience of Mexico in 1995 indicates how international portfolio adjustments by private investors can quickly affect a country' external position.

Keynesian approach – which is essentially a theory of trade balance adjustments – needs to be complemented by the monetary approach via a theory of official reserves transactions balance determination as discussed below.

2.3 The Monetary Approach to Balance of Payments.

The role of money in the balance of payments adjustment process has been ignored by the Keynesian approach to balance of payments adjustments. The various approaches in the Keynesian tradition, i.e., "elasticities approach," "income multiplier approach," "absorption approach," have concentrated exclusively on real variables and ignored the monetary variables. Significant elements such as capital flows, government transfers and debt servicing have been treated as residuals to the trade accounts.

The Monetary approach to the balance of'-payments, which was developed at the University of Chicago by economists R. A. Mundell, H. G. Johnson, A. B. Laffer and J. A. Frenkel and advanced by the work of International Monetary Fund (IMF) economists, seeks to restore the role of money and money balances in the adjustment process. The balance of payments is viewed as essentially a monetary phenomenon, and the imbalances are rooted in the relationship between the demand and the supply of money.

Some of the economists have suggested that the Monetary-approach is indeed the intellectual grandchild of the "specie flow"[6] mechanism developed by David Hume in the last century. The Monetary approach thus revolves around the basic premise that over the long run, there is a stable demand for money as a stock. Surpluses or deficits in balance of payments reflect stock disequilibria between the demand and supply of money. The specific composition of these inflows and outflows is secondary to the monetary theory. The disequilibria are thus temporary and self-correcting over time, provided that the monetary authority remains neutral.

[6] Monetary flows are cornerstones to both theories. Moreover, both treat extena1 imbalances as self-correcting, but they differ in the way monetary flows are thought to correct external disequilibria. The specie flow mechanism seeks adjustment through relative changes in commodity prices, while the Monetary approach seeks adjustment through a stable demand for money.

2.3.1 Assumptions.

The Monetary approach to international adjustment mechanism relies on four basic assumptions:

1. Small open economy.
2. Full employment.
3. Purchasing power parity i.e. the law of one price.
4. Stable money demand function.
5. All markets are clear.

The Monetary approach assumes that the economy is, in the long run, at full employment equilibrium (the classicals view of employment). Any deviation from the natural level of unemployment will be a short-term, self-correcting situation. According to the monetarists, full employment is ubiquitous for three reasons (i) the existence of general equilibrium, (ii) perfect substitution in consumption in both the product and capital markets, including Money market (iii) wage and price flexibility in both the product and capital markets.

The assumption of purchasing power parity (PPP), also called the law of one price, treats the world as consisting of a single, integrated market for all traded goods and capital. The law of one price does not allow for changes in relative prices, rejects the elasticities approach, and renders inoperative the various policies aimed at changes in relative prices. The Monetary approach postulates that nominal variables affect only nominal variables and real variables affect only real variables. Thus, nominal variables such as prices and exchange rates cannot influence the real variables such as relative price and trade balance. There are distinct differences between the Keynesian approach and the Monetary approach in terms of policy implications especially those relating to exchange rate changes and commercial policy.

The Monetary approach argues that changes in the exchange rate and commercial policies do not affect the trade balance or any other real variable, However they impact the balance of payments through possible effects on the demand for, and supply of money balances and the resulting changes in domestic prices. Exchange rate changes have no effect on country's terms of trade, distribution of income, real wealth, real spending and expectations.

Similarly commercial policies (import tariff, quota, non-tariff barriers, export subsidy, and export tax) increase the domestic price of imports through substitutability, as well as the prices of domestically produced goods. The result will be an increase in the demand for money, which, if not satisfied through domestic sources will lead to a transitory balance of payments surplus until money market equilibrium is restored.

The most basic postulate of the monetary approach to the balance of payments is that there is a stable money demand function that is made up of only few variables. The demand for money is positively related to real domestic income, a rise in real income will ceteris paribus lead to an increase in the transaction demand for money. The demand for money is a positive function of the domestic price level because it is a demand for real money balances. A rise in the domestic price will reduce real money balances and accordingly lead to an equiproportionate increase in the demand for money

The fourth assumption regarding general equilibrium in this case is the simultaneous clearing of all goods and services markets, money markets and factor markets. Equilibrium is brought about through price and quantity adjustments that eliminate either excess demand or supply.

2.3.2 Adjustment Mechanism under Monetary Approach to Balance of Payments.

The monetarists view of balance of payments surpluses and deficits arisees due to stock disequilibrium in the money market. A deficit in the balance of payments is a consequence of an excess of the stock of money in relation to money demand, while a surplus is a monetary flow resulting from an excess demand for money in relation to the stock money supply. Thus balance of payments disequilibrium is merely a reflection of disequilibrium in the money market. Authorities can restore equilibrium in the external balance by ensuring equilibrium in money market. So the determinants of money demand and money supply are the key variables.

The real money demand is described as a function of real income, and the interest rate (as the opportunity cost of holding money).

$$\frac{M^d}{p} = f(y,i) \qquad (2.1)$$

Under a constant velocity an increase in the price level will have one to one positive impact on the demand for money as the public seeks to maintain the same real balances as before the price increase, leading to money inflows from abroad and an improvement in the balance of payments. Similarly if the price level declines it will cause a fall in money demand, and excess money will flow abroad, reserves will go down and balance of payment will deteriorate. Increase in real income leads to an increase in the demand for money and results in reserve inflow which results in an improvement in balance of payments situation, while decreases in real income have the opposite effect. The interest rate and the demand for money have a negative relationship. If the rate of interest falls the quantity of money demanded would increase as the opportunity cost of holding money has fall, so there will be a reserve inflow and the balance of payments will improve[7], as the demand for money can be satisfied either from domestic or international sources.

Money supply consists of foreign reserve (R) and domestic credit (D):

$$M^s = m(D + R) \qquad (2.2)$$

Any increase in the domestic component (D) with an unchanged money demand will create disequilibrium in the money market and the excess money supply will flow abroad, reserves will go down and balance of payments situation will deteriorate. A contraction in the domestic credit on the other hand will cause the inflow of reserves and the balance of payments will improve. In general, any change in the domestic component of the money is ultimately offset by an equal and opposite change in the international reserve component through the balance of payments. The monetary authority could attempt to "offset" or "sterilize" the flows of funds, but in the absence of any government involvement, the imbalances between the demand for money and the money stock will be temporary and self-correcting. The self-correction is based on the stable demand function for money as a stock rather than a flow[8].

[7] This result is completely contradictory to the results stipulated in the Keynesian approach concerning how changes in the interest rate affect the balance of payments.

[8] Under a flow concept formulation, continuous surpluses can occur under conditions of continuous increase in the demand for money over rises in the domestic components (D) of the money supply. A continuous increase in the level of income in excess of the rate of increase in domestic credit will result in disequilibria in the money market and persistent surpluses in the balance of payments. In a flow

2.3.3 The Monetary Approach to International Finance: Some Qualifications

In this section some theoretical advancements and qualifications regarding currency devaluation, speed of adjustment, and exchange rate regimes are discussed.

Currency devaluation raises the domestic price level and reduces real money balances. The pursuant adjustment via the foreign markets will lead to an improvement in the official reserves transactions balance (ORTB). The impact of devaluation on ORTB depends on the percentage change in the price level, the speed of the price level adjustment and the public's perception about the true value of these real balance holdings. With respect to size, devaluations in small countries lead to increases in the price level equal to the percentage of devaluation; in larger countries, the price level increase will be close to zero. The balance of payments will improve according to the percentage increase in the price level.

The speed of adjustment in the money market following a disturbance in the equilibrium position depends on capital mobility and the existence of non-traded goods. The higher the degree of capital mobility the faster the speed of adjustment in the balance of payments. The presence of non-traded goods reduces the speed of adjustment.

In addition to the fixed exchange rate regime there are two other regimes: flexible (or freely floating) and managed (or "dirty float"). Flexible exchange rates maintain continuous equilibrium in the balance of payments. The exchange rate which is defined as the price of one currency in terms of another, is determined by the relationship between the price level of the two countries, which in turn depends on the relationship between the desired and actual stocks of money in each country. In this formulation, money is an asset with stable demand and its price is determined by the interaction of the supply and demand for money. Since the demand for money depends on real income, interest rates, expectations, and so on, such factors will also affect the exchange rate. The implication is that the exchange rate is determined by all the accounts: current, capital and money. It may be noted that under fixed exchange rates these valuations are gradual,

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formulation, continuous deficits can occur through recurrent increases in the growth rate of the domestic money supply component (D) in excess of the growth in real income.

resulting in gradual adjustments in the balance of payments; while under flexible rates they are instantaneous.

The adjustment process in the case of quasi-fixed, quasi-flexible exchange rates is gradual and self-correcting. The implications of the Monetary approach are very important, especially as they pertain to the coordination of international policy to affect the exchange rate. The Keynesian approach calls for the coordinating effort of central banks in intervening in foreign exchange markets, and not for the coordination of their monetary policy. However, such intervention will be nullified by the private sector and therefore will be ineffective requiring additional intervention. A sustained, permanent, and consistent monetary policy as called for by the Monetary approach, will generate better and more sustainable results.

Unlike the Keynesian approach the monetary approach clearly delineates real and monetary variables and asserts the fundamentality and superiority of monetary variables over real variables. Monetary variables like the money supply, exchange rate, interest rate, and nominal price level, are considered superior to the relative price level and real income. Superiority in this case is defined by the monetarists as the ability of variables to act as initiators of disturbances and transmission channels. Monetary variables are both initiators and transmitters, while real variables are neither.

The Monetary approach does not differentiate among the various accounts nor attempts to explain their individual behavior. Accounts such as goods and services, long-term capital, and short-term capital are lumped together into one, "above-the-line" category. The official reserve transaction balance is the "below-the-line" category, and it represents, for the monetarists, the preeminent account. Therefore, it has been described as analyzing the problem "from the bottom up." An ORTB surplus may be associated with either surpluses in the capital or the current accounts, and the reverse also holds true.

2.3.4 A Criticisms of the Monetary Approach.

Although the monetary model of the balance of payments has empirical support and is widely used in analyzing the balance of payments problems it is beset with a number of limitations. First, some critics argue that an increase in the domestic money supply might not be reflected exclusively in an equivalent fall in the reserves under fixed

exchange rates as proposed by the monetary approach. For instance, if there is unemployment an expansionary monetary policy may lead to some increase in output (reflected in the positive- sloping aggregate demand function), which by raising money demand will reduce the devaluation pressure on the home currency. In this instance reserves do not need to decline in exact proportion to the initial rise in the money supply, as some of the expansion would be willingly held as transaction balances.

Second, to regard the balance of payments as a monetary phenomenon is only true in the sense that the balance of payments measures monetary flows between domestic and foreign residents. But it is quite wrong to regard the balance of payments deficits and surpluses as exclusively due to monetary decisions because the question of causation is an open issue. For example, if suddenly economic agents decide to spend more on foreign goods/services and foreign investments, there will be a transitory deficit in the balance of payments. The deficit then forces the authorities to buy the domestic money base in the foreign exchange market. The cause of the deficit is the expenditure decision not a decrease in money demand, which then leads to excess real money balances and a balance of payments deficit. This implies a two way causations: it can easily lead from expenditure decision to changes in money demand, rather than changes in money demand inducing changes in expenditure behavior.

Thirdly, the monetary approach is criticized on the grounds that no attention is paid to the composition of a deficit and surplus. If there is a large deficit in the current account that is financed by an offsetting surplus in the capital account, the monetarists argue that this means there is no need for policy concern with regard to the balance of payments. Indeed, because any surplus or deficit is necessarily a transitory feature representing a stock disequilibrium in the money market, which is necessarily self-correcting, a policy with regard to the balance of payments is unnecessary. Such an approach ignores the dangers of increasing indebtedness due to current account deficits being financed by capital inflows. In the real world it is the increase in such indebtedness[9] that causes much concern. So it is important to analyze the real factors as well as monetary factors causing the balance of payments disequilibrium.

[9] Two examples are the third world crises in the 1980s and Asian financial crises in 1997/98

Fourth, the MABOP holds the country's central bank responsible for the payments deficits without due consideration to the fact that whether the central bank is actually an independent decision making agency or not. Monetarists tend to assume that other countries have central banks that are similar to the Federal Reserve System (FRS) or the European Central Union (ECU) in their independence from the executive branch of the government. It is far more common, particularly in developing countries, for the governor of the central bank to report to the minister of finance, and hence is unable to take independent decisions. The overriding concern of the finance ministry is the financing of budget deficits, and the central bank is the obvious lender. If the finance ministry needs vast sums to cover a budget deficit, it is extremely tempting to order the central bank to purchase the required bonds and issue new money in exchange. When the government spends these funds, these enter into the domestic banking system, resulting in rapid monetary expansion. The money supply expands often at an inappropriate rate, not because the central bank decides on such a policy, but because it is forced to monetize large government deficits. Hence the resulting balance of payments deficits should not be blamed on the central banks which are not independent, rather on the fiscal authorities that permit excessive budget deficits ultimately to be financed by the central banks.

On the expenditure side, many developing countries have state-owned enterprises with large deficits which are financed from the public exchequer. Furthermore subsidies for consumer goods such as a food and fuel often result into large public expenditures. When the costs of sizable military establishments and large civilian bureaucracy are added, the resulting total government. expenditures cannot be financed with the limited revenues generated by the regressive tax systems of the developing countries. The resulting deficit is often monetized, causing an excessively rapid rate of growth of the money supply, which in turn leads to large balance of payments deficits. This suggests why balance of payments adjustment programmes for developing countries usually contain requirements for reducing government budget deficits as well as for limiting the growth of money supply.

Finally, on the basis of a survey of the monetary approach Boughton (1988) it is argued that nearly every assumption made by the proponents is empirically open to

question. There is ample evidence that money demand functions can be highly unstable[10], economies are rarely at full employment, and purchasing power parity may not hold. Although these assumptions hold reasonably well in the long run, they are rarely fulfilled in the short run. The empirical violation of these key assumptions must bring into question the policy relevance of the monetary approach.

The proponents of the monetary approach argue that it provides an insight into the short run disequilibrium in the balance of payments. Yet its assumptions of full employment, purchasing power parity and a stable money demand function are highly questionable in the short run. There is clearly something wrong with using assumptions that may be valid in the long run to explain what is happening in the short run. In this sense the conclusions of the Monetarist model about the long run consequences of changes in economic policy are probably more insightful than its postulates about the short run consequences.

This criticism on the relevance of the assumptions of the monetary approach to the short run analysis leads us to adopt the cointegration methodology to estimate the long run relationship under the monetary model of the balance of payments. The assumptions underlying the model hold in the long run so we must be interested in finding out the long run relationship rather than the short run. Thus the theory itself provides us the rationale to use the method of cointegration in our analysis which is an important contribution over the past studies on this phenomenon.

2.3.5 Conclusion

The Monetary approach relies on the four assumptions of a general equilibrium, full employment, purchasing power parity, and stable money demand function. The distinctive feature of the monetary approach to the balance of payments is that money market disequilibrium is seen as a crucial factor in creating balance of payments disequilibrium. It is maintained that the crucial decision of private agents concerns the level of their real money balances and adjustments have to take place through the money markets and the portfolio adjustments of residents following a disturbance. With real

[10] In case of Pakistan, empirical evidence supports the stability of money demand in the long run as well as in the short run. [See Qayyum (2002)]

output fixed, aggregate expenditure is viewed as a function of real money balances rather than income. Therefore in the monetary model agents decide firstly upon the amount of real balances they wish to hold and then spend accordingly, and not the other way round. According to this it is money decisions that matter and not the expenditure ones.

Furthermore, the official reserve transaction balance is the key balance; both the capital account and the current account are of secondary importance. Finally it deals only with the long-term adjustments and monetary disturbances.

The very short assumptions of the monetary approach to balance of payments regarding full employment; purchasing power parity; stable money demand function and the central bank independence are heavily criticized. However despite these criticisms and problems, the monetarist model is widely used in analyzing the balance of payments problems and in designing adjustment programs. It is particularly useful in developing countries that are suffering from serious inflation since its emphasis is on controlling the rate of growth of the money supply that usually requires the controlling of the government budget deficits. Countries that are designing a payments adjustment program typically include a target for reduced growth in the money supply- that target may have been of their own choosing, or it may have originated with the International Monetary Fund. In either case, limiting the rate of growth of the domestic assets of the central bank is crucial in avoiding the balance of payments deficits under the monetary approach.

2.4 Comparison of Keynesian and Monetary Approach to Balance of Payments.

The two approaches analyze and explain the balance of payments in different contents. The Keynesian approach focuses on goods & services in their analysis of the balance of payments while the monetary approach treats the official reserves transactions balance as the main components of the balance of payments. The main difference between the two approaches revolves around the underlying assumptions and the role of money.

The Keynesian approach to the balance of payments to a large extent is an extension of the income expenditure model, and consists of three sub theories: (1) the elasticities approach is a short-run explanation of the balance of payments; (2) the multiplier approach, is a medium-term view of the balance of payments; and (3) the

absorption approach is a general analysis of the balance of payments. The multiplier model incorporates both the elasticities and the absorption views. The focus of the Keynesian approach is the trade balance or the current account, and how it is determined (Krueger, 1969). In the early 1960s, the capital account i.e., the inflows or outflows of capital was integrated into the mainstream Keynesian approach.

The monetary approach to the balance of payments is a long-run theory, its main emphasis is on the official reserve transactions balance, which is an equilibrating account between the current account and the capital account. The following section presents a brief comparison of both the theories with reference to the balance of payments.

2.4.1 Full Employment.

One of the basic assumptions of the monetary approach is that in the long run economies tend towards full employment. This assumption is based on Walrus's Law, which states that in the long run there are no excesses of supply or demand for goods and services; hence, full employment is an inevitable outcome. In Keynes's world, Walras's Law does not hold because an excess supply of labor (unemployment) can exist, primarily due to the downward rigidity of wages and prices and unique characteristics of money (i.e., its zero substitutability and productivity) [Davidson, 1974].

2.4.2 Purchasing Power Parity.

The monetary approach assumes that the purchasing power parity (PPP) condition holds. According to PPP price differences of goods and services between countries are eliminated, and in the long run, uniform prices will prevail. Keynesian's on the other hand do not accept the PPP condition; they maintain that perfect competition does not exist in the world markets and the elasticity of substitution in production is limited (Whitman; 1975) So according to the Keynesian perspective, differences in the prices of goods and services between countries are likely to exist.

2.4.3 Money and capital accounts

Money and capital accounts are the centerpiece of the monetary approach to the balance of payments. According to the monetary approach the domestic money market determines the balance of payments in a country, an assumption with which both Keynes

and the Keynesians disagree. According to this approach, appropriate price and output movements in the goods and services market would eventually restore equilibrium following a disturbance in the money market (Kemp, 1975). In Keynes's world, money and capital accounts are not part of the balance of payments analysis. However the Keynesian approach does incorporate the capital account as part of its balance of payments theory at a later stage.

2.4.4 The Money Supply and the Balance of Payments

In case of monetary approach, when there is expansion in domestic money supply, it flows abroad resulting in balance of payments deficit. This is primarily due to the assumption of full employment and gross substitutability in the monetary approach. In contrast, this need not be the case with the Keynesians since they do not assume full employment. From the perspective of the Keynesians, the most likely outcome of an expansion of the money supply is to move the economy a step closer to full employment. The excess supply of money need not be exported. With an initial expansion of the money supply, the residents of a country will 'import money from abroad in order to meet the increase in money demand. This will result in an increase in the capital account surplus, which may more than offset the deficit in the trade account. The Keynesian prediction would result in a better outcome for the balance of payments. Clearly, this approach predicts a different outcome resulting from a disturbance in the money market. These differences in predicted outcomes lead to different policy recommendations.

2.4.5 The Balance of Payments: A Monetary or Real Phenomenon?

The main point of contention for the two approaches is whether the balance of payments in general is a “monetary” or a “real” phenomenon. The monetary approach stresses that the balance of payments is essentially (but not exclusively) a monetary phenomenon [Mussa; 1976]. In this proposition, the term ‘balance of payments’ refers specifically to the official settlement balance, that is to the money account. The official settlement balance is in surplus (deficit) when the monetary authorities of a country are purchasing (selling) foreign exchange assets in order to prevent their own money from appreciating (depreciating) relative to other monies. Thus, analysis of the balance of

payments only makes sense in an explicitly monetary model. More specifically, it claims that money plays a vital role in determining the balance of payments. This approach does not deny the importance of non-monetary factors such as productivity changes, tariffs, government spending and taxation on the balance of payments. Indeed, it stresses the links between these factors and the money market [Rivera-Batiz and Rivera-Batiz;(1994)].

The Keynesian approach focuses mainly on the merchandise trade account, with the capital account incorporated in the analysis at a later date. Dis-equilibrium in the balance of payments is caused by both the current account and the capital account. The current account, however, is considered to be more important than the capital account for the balance of payments disequilibrium. The relative prices and relative income levels of domestic and foreign countries are responsible for the balance of payments disequilibrium condition [Malindretos;1984]. The relative prices and exchange rate of a country, vis-à-vis its trading partners will determine the competitiveness of that country's goods and services. An adverse movement in the relative price structure of a country, ceteris paribus, would decrease its competitiveness relative to its trading partners. Keynesians argue that a devaluation of a country's currency will improve the trade account and enhance competitiveness, and equilibrium will be restored in the trade account. In summary, under the monetary approach the money market is the principal vehicle, if not the only one, that is responsible for balance of payments disequilibrium. For the Keynesians, it is the differences in relative prices, domestic absorption rates and exchange rates that determine the balance of payments outcome.

2.4.6 Short Run versus Long Run

The monetary approach states that in the long run monetary variables cannot affect real variables such as output, employment and, in the case of the balance of payments, the trade account. In the short run, monetary variables will affect real variables [Friedman;1975]. This is true in the case of money supply, money demand, exchange rates, and interest rates. However the Keynesian approach considers the balance of payments a real phenomenon. Factors such as relative prices, devaluations, and aggregate demand affect the real variables in the short as well as the long run. The exchange rate

has a dynamic effect on the trade balance as in the short run exchange rate devaluation affects the trade balances negatively, as the adjustments take time in export and import markets. Later it improves the trade balance, named as J-curve phenomenon. It is also seen that very lag effect of devaluation turns out to be negative because the other countries also adopt the devaluation policy and this action will erode the comparative advantage gained through the devaluation. In addition, capital flows are also divided into short and long term and the short-term capital flows and long-term portfolio investments respond to monetary factors [Gray; 1976].

2.4.7 Distinction among various accounts

The Keynesian approach focuses mainly on the merchandise trade account. Disequilibrium in the balance of payments is caused by both the current account and the capital account. The current account, however, is considered to be more important than the capital account for the balance of payments disequilibrium. While the monetary approach does not specifically identify whether it is the current account or the capital account that is responsible for a balance of payments deficit or surplus. However, it may be important to be able to clearly attribute the deficit or surplus to either the current account or the capital account. This would have an implication for the determination of the net worth of a country. For example, a change in the net worth of country will occur if the capital account is in deficit, ceteris paribus. However, net worth declines if the deficit is in the current account.

2.4.8 Asymmetry in Money Supply Changes

The Monetary approach argues that the response of wages to a change in the money supply is not symmetric [Gray, 1976]. This is due to resistance from workers and unions to wage reductions following a decrease in the money supply. Conversely, with an increase in the money supply, wages rise following an increase in prices caused by the money supply expansion. Strong resistance to a drop in wages may be due to contractual agreements and institutional rigidities.

According to the monetary approach, a given change in the money supply is similar to a change in exchange rates in terms of percentage changes. For the Keynesians,

however, this is not the case. They believe that in the real world, exchange rates are motivated in part by political reasons as well as economic and monetary factors. A decrease in the money supply will reduce nominal wages, and such a reduction is unacceptable to labor and labor unions. On the other hand, all other things remaining equal, devaluation lowers the real wage rate by increasing domestic prices, and devaluation normally does not bring forth resistance from labor unions, despite the fact that an outcome similar to a decrease in the money supply is produced.

2.4.9 Exchange Rate as a Relative Price

The Keynesian approach regards the exchange rate as a relative price of domestic and foreign goods [Humphrey and Lawler; 1978]. In case of devaluation, domestic prices of the devaluating country will decline in terms of foreign (goods) prices by the amount of the devaluation in percentage terms. In a regime of flexible exchange rates, the outcome of the current and capital accounts determines the exchange rate. According to the Keynesians, it is the capital account that exerts a more significant influence on exchange rates. This view is different from the monetary approach, which argues that it is the money market outcome as money supply and money demand determine the exchange rate. The factors that influence the money supply and money demand will indirectly influence the exchange rate.

2.4.10 Stock Vs Flow Perspective.

The Monetary approach analyzes the balance of payments under a stock perspective, in contrast to the Keynesian approach, that utilizes a flow perspective. Stock deficits occur when individuals attempt to substitute foreign assets for domestic money; so when the desired portfolio balance is attained, the deficit will cease. A flow deficit can be corrected by expenditure reducing or expenditure switching policies. The stock versus flow framework presents problems in the formulation of policy between the monetary and the Keynesian approaches. Consider devaluation under the Keynesian approach; the trade balance will improve every year in the future due to the increased competitiveness of the domestic producers, with the exception of an adjustment path described by the “J” curve. The monetary approach rejects this scenario and argues, instead, that the effect of

the devaluation will be temporary. The higher import prices increase the price level in the devaluing country and create an excess demand for money to restore real balances. This excess demand for money is satisfied through the export of additional goods and/or securities, leading to equilibrium in the trade balance. Following this adjustment, prices return to their original level – PPP holds, and the source of the disturbance disappears. Similar adjustments will prevail in the presence of an import tax, export subsidy, or export tax. Disturbances are, for the monetary approach, self-correcting; while for the Keynesian approach, because of its flow nature, they can perpetually disturb and disequilibriate the balance of payments.

2.4.11 Summary.

It is observed that each of the approaches emphasizes or addresses different issues. The Keynesian approach assumes that there is unemployment in the economy, while the monetary approach contradicts it by stating that there is full employment, perhaps at the natural level of unemployment. Second, the Keynesian approach argues that there are significant discontinuities in the world to have different prices at different locations which are not due only to transaction costs. The monetary approach asserts that the real goods and services markets are important; it also gives much weight to the financial assets market and even more weight to the money market. The Keynesian analysis helps us in understanding the role of real variables treating it as real phenomenon and analyzing it in terms of its components. In contrast the monetary approach, treats it as a monetary phenomenon and emphasizes the role of money and financial markets in balance of payment adjustment mechanism. Fourth, the Keynesian approach assumes the disequilibrium of markets, while monetary approach asserts a general equilibrium framework where all markets clear. Finally, the Keynesian approach is set in a short term environment where politicians undertake policy to influence the economy on their behalf. The monetary approach, in contrast, believes on the long term, and self-correcting mechanism.

Now the question arises, that is there a need to have both analyses in a unified framework which on the one hand depicts trade in goods and services (Keynesian

phenomenon), and takes into account the money and financial market (monetary phenomenon) as well.

Proponents of monetary approach say that

"*Balance of payment is essentially a monetary phenomenon",*

(Frenkel and Johnson, 1976, p. 21, and Mussa, 1976, p.189).

Does it mean that the balance of payments is not a real phenomenon, dependent as keynesians have argued on trade and capital flows? [Frankel A Jacob, Gylfason and Helliwell (1980)].

In this context, Mundell (1968, chap.10, pp150-1) wrote that,

> *It is not meaningful to question the validity of the three approaches (elasticity[11], absorption[12] and monetary[13])---- they are all correct and assert identical propositions.* Similarly, according to Frenkel and Johnson (1976.p22). "*The monetary approach should in principle give an answer no different from that provided a correct analysis in terms of the other accounts (i.e. the trade balance and the capital account",*

Yet the view that monetary approach is an alternative rather than a complementary to the balance of payments components (i.e. here referred as Keynesian approach) is prevails.

On this issue Harry Johnson wrote (1972, p.14).

> "*But the real practical problem-with which theorists and empirical workers have been struggling for some years in the area of domestic monetary theory –is how to marry the Monetarist and Keynesians analysis in a way relevant to the short run context (albeit a run of several calendar years) with which the policy makers are concerned, and which is characterized both by variations in production and employment as well as in money prices, and by variations in the*

[11] The improvement in the nation's trade balance depends on the price elasticity of demand for its exports and imports; this method of correcting the balance of payments is called elasticity approach. The improvement in the deficit nation's trade balance arises because a depreciation or devaluation stimulates the nation's exports and discourage its imports (thus encouraging the domestic production of import substitutes).

[12] Absorption approach examines and integrates the effect of induced income changes in the process of correcting balance of payments disequilibrium by a change in the exchange rate.

[13] The monetary approach that views the balance of payments as an essentially monetary phenomenon with money playing the key role in the long run as both the cause and cure of balance of payments disequilibrium.

relations among export, import, and non-traded goods prices which are assumed away in the long run equilibrium analysis of the monetary approach.-----the achievement of such a synthesis is , to my mind, the really challenging task, facing international monetary theory in its next stage of development".

Perhaps a reconciliation of the monetary approach with the Keynesian approach would improve the current explanation of the balance of payments and enhance the policy implications. In the next section an attempt has been made to reconcile both the approaches in a more general framework that allows a synthesis of monetary and Keynesian approaches to balance of payments.

2.5 Synthesis of Keynesian and Monetary Approaches to Balance of Payments.

The desired synthesis developed by Frankel, Gylfason and Helliwell (1980) framework helps us in the determination of output, rate of interest, the price level and the balance of payments in which the Monetary and Keynesian approaches are fully consistent with one another and each model may be handled as a special case. The parameters of the underlying model represent both money market (monetary approach) and goods and capital markets.

2.5.1 Assumptions.

The synthesis framework relies on the following assumptions:

1. Small open economy.
2. Unemployment in the economy.
3. Sticky prices and wages in the short run.
4. Positively sloped aggregate supply curve.
5. Perfect capital mobility[14].

[14] However even if the perfect capital mobility does not hold, the signs are same only adjustment mechanism will be slow.

2.5.2 Adjustment Mechanism under the Synthesis Approach.

The synthesis model, given by Frenkel, Gylfason and Helliwell (1980) consists of the elements of both Monetary and Keynesian approaches and integrates goods market and aggregate supply equation in a unified framework. The Keynesian approach comprises the trade balance account and capital account, by adding the two components, balance of payments identity has been derived below.

Real Trade balance: $T = T(\overset{-}{Y}, \overset{+}{eP^*} / P)$ (4.3.1a)

Net Capital inflow: $F = F(\overset{+}{r})$ (4.31b)

Balance of payments identity:

$$\Delta R = PT + F \quad (4.3.1c)$$

$$\Delta R = PT(\overset{-}{Y}, \overset{+}{eP^*} / P) + F(\overset{+}{r}) \quad (4.3.1)$$

According to equation (4.3.1), trade balance is inversely related to its income and price level, as former causes the imports to increase and latter causes the exports to decrease, hence trade balance deteriorates. Exchange rate devaluation has positive impact on trade balance under the Marshal- Lerner condition.

The Monetary approach to BOP

Money Market: $M^s = M^d$ (4.3.2a)

Money demand function: $M^d = L(\overset{+}{P}, \overset{-}{Y}, \overset{-}{r})$ (4.3.2b)

Money supply: $M^s = R + D$ (4.3.2c)

Balance of payments:

$$R = L(\overset{+}{P}, \overset{+}{Y}, \overset{-}{r}) - D \quad (4.3.2)$$

Monetary approach to balance of payments focuses on the money market equilibrium identity, i.e., money demand is equal to money supply. And any disequilibrium in this identity creates disequilibrium in the external balance. Money supply consists of two components; international reserves and domestic credit component. The money demand function is positively related to real income and price level and negatively related to the interest rate.

Introduce the income and expenditure equation and a simple aggregate supply equation in to the system of IS Equations (Goods market):

$$Y = E(\overset{+}{Y}, \overset{-}{r}) + G + T(\overset{-}{Y}, eP^{*}\overset{+}{} / P) \qquad (4.3.3)$$

the aggregate supply equation is given by:

$$Y = Y(\overset{+}{P}) \qquad (4.3.4)$$

Equation (4.3.3) shows domestic output as the sum of private final expenditure (E), government expenditure (G), and net exports (T), and Equation (4.3.4) is a standard aggregate supply function that can be derived from equilibrium condition in the labor market. To focus the analysis on output and the balance of payments, the model may be solved for Y and R as follows. First, the aggregate supply equation (4.3.4) is solved for P by writing;

$$P = P(\overset{+}{Y}) \qquad \text{Inverse supply function} \qquad (4.3.5)$$

Then using Equation (4.3.5) and the income/expenditure equation (4.3.3) is solved for "r" (interest rate) by writing:(see detaile in appendixA.).

$$r = r(\overset{-}{Y}, \overset{+}{G}, \overset{+}{e}) \qquad (4.3.6)$$

In the equation (4.3.6) which is derived from equation (4.3.3), interest rate is negatively related to Y, and positively related to G and e. When government expenditures increase, IS curve shifts to the right, less money is available to the public, leading to an increase in the interest rate. Similarly with the exchange rate devaluations, IS curve shifts to the right as trade balance improves (under the Marshll-Lerner condition), and interest rate goes up.

Substituting equations (4.3.5) and (4.3.6), into the balance of payments equation (4.3.1) and (4.3.2), gives the following relationships between R and Y.

Keynesian approach (Ka schedule)

$$R = \overset{-}{k}_1 Y + \overset{+}{k}_2 G + \overset{+}{k}_3 e + R_{-1} \qquad (4.3.7)$$

Where $k_1 = \dfrac{\partial PT}{\partial Y} + \dfrac{\partial F}{\partial r}.\dfrac{\partial r}{\partial Y} < 0$, $\quad k_2 = \dfrac{\partial F}{\partial r}.\dfrac{\partial r}{\partial G} > 0;$ $\quad k_3 = \dfrac{\partial PT}{\partial e} + \dfrac{\partial F}{\partial r}.\dfrac{\partial r}{\partial e} > 0;$

Ka-schedule captures the relationship between the variables under the Keynesian approach. Keynesian equation describes the negative relationship between reserves and real income. As a country's income rises, imports will rise and trade balance will deteriorate, so reserves will go down. The exchange rate devaluation has a positive impact on reserves through positive impact on trade balance and interest rate. In case of government expenditure and exchange rate devaluation, both have positive impact on interest rate. The high interest rate will lead to capital inflow and reserves will go up so balance of payments will improve. Thus the expansionary fiscal policy and exchange rate policy both improve the balance of payments.

Monetary approach (Ma-schedule)

$$R = \overset{+}{m}_1 Y + \overset{-}{m}_2 G + \overset{-}{m}_3 e + m_4 D \qquad (4.3.8)$$

Where

$$m_1 = \frac{\partial L}{\partial Y} + . \frac{\partial L}{\partial r} . \frac{\partial r}{\partial Y} > 0; \qquad m_2 = \frac{\partial L}{\partial r} . \frac{\partial r}{\partial G} < 0; \quad m_3 = \frac{\partial L}{\partial r} . \frac{\partial r}{\partial e} < 0;$$

$$m_4 = 1$$

Under monetary view of the balance of payments, the government expenditure and exchange rate devaluation cause the interest rate to rise, that negatively impacts the money demand. As if money demand goes down excess money supply will flow abroad, thus reserves will go down and balance of payments will deteriorate. In case of increase in income, it leads to increase in price level, as well as the money demand, thus there will be inflow of money from abroad, reserves will go up, so under monetary view reserves are positively related to income, and negatively with the government expenditure and exchange rate devaluation.

We can see from the above discussion that the same policies have different effects on the balance of payments. Therefore it is essential for policy makers to clearly understand the structure followed by the country's balance of payment. It may also possible that both approaches apply to some extent, or monetary approach effects dominate the Keynesian approach or Keynesian approach effects dominate the monetary approach. The validity of the approach depends on the sign and coefficient values of the determinants.

The synthesis model, given by Frenkel, Gylfason and Helliwell (1980) is a more suitable model that permits the short-run endogeneity of Y, P and r to be explicitly taken into account to show the consequences of different stabilization policies under both Keynesian as well as monetary approach to balance of payments. These relationships have been derived from a unified model than the earlier partial ones. Hence we can say that it gives a more comprehensive picture of the balance of payments and its determinants.

2.5.3 Conclusion.

We can see that the same policies have different effects on the balance of payments under different approaches. So it is important to analyze a country's balance of payments structure within a unified framework that encompasses the key elements of various theories of the balance of payments. It is possible that either approach is able to characterize the situation somehow, or the monetary approach dominates the Keynesian approach one and vice versa. Hence a synthesis framework will present a more comprehensive picture of the balance of payments and its determinants.

3. Review of Literature:

3.1 The Keynesian approach

The key issues under the Keynesian view of the balance of payment adjustment dominant in the literature are the elasticity pessimism, elasticity optimism (i.e. also named as Marshall- Lerner condition), and J-curve phenomenon.

A number of studies have been conducted on developed as well as on developing countries, using a variety of econometric techniques that includes simple least square, simultaneous equation models and now more recently the time series models.

3.1.1 Elasticity Pessimism Vs Elasticity Optimism.

Economists are divided in two camps popularly known as 'elasticity optimists' who believe that the sum of demand elasticities tends to exceed unity, and 'elasticity pessimists' who believe that these elasticities tended to be less than unity. It is argued that devaluation might work better for industrialized countries than the developing countries. The latter developing countries are heavily dependent upon imports for which the price elasticity of demand is likely to be very low, similarly their exports consist of mainly raw materials and agri-products that are also less elastic, thus Marshell-Lerner condition does not hold. While the industrialized countries have to face competitive export markets, the price elasticity of demand for their exports is quite elastic.

Empirical studies carried out after World War II show that prices do not appropriately affect trade flows. It is thought that since the Marshall-Lerner condition (i.e., the sum of the price elasticities of demand are not greater than one) for trade balance improvement does not hold, moreover ER changes are not important in correcting disequilibrium in the BOP- indicating elasticity pessimism. Orcutt (1975) argues that the elasticity pessimism that occurred after the second world War is due to simultaneous equation bias (Magee,1975) observation errors (Kemp,1962) lag effects (Houthakker and Taylor,1970), quantum effects (Magee,1975), and aggregation problem (Zellner and Montmarquette,1971). However, studies by Ball and Marwah (1962); Houthakker and Magee (1969); Dornbusch and Krugman (1976); Goldstein, Khan, and Officer (1978); indicate elasticity optimism. The details are given below.

Ball and Marwah (1962) estimate the import demand elasticities with respect to relative prices, and income. The results show that Unites States imports are elastic and conclusion falls somewhere between the claims of elasticity optimists and pessimists. One group of which has seemed to imply that income or output alone are significant factors and the other of which suggest that relative price elasticities of very high order, say 4 or 5. Some components of the volume of imports are more sensitive to relative price changes than others, and whether imports as a whole are elastic or not depends on how the overall elasticity is defined.

Houthakker and Magee (1969) estimate the export and import demand function for a number of developed countries and find that price elasticities for import demand lie between + 0.23 and -1.46, and export price elasticities between 0 & -2.27. The researchers also calculate the elasticities between long term and short term. They find that the long-term elasticities are usually larger than the short-term elasticities, i.e., –0.45 in the short run while - 4.05 in the long run, implying that the adjustment of habits is a more important phenomenon than inventory behavior. When consumers experience a rise in price, they do not react by buying more in the short term and less in the long term; instead, they react by buying more in the long term.

Houthakker and Taylor (1970) calculate the short run as well as the long run price elasticities of demand and find that if consumers build up their stocks of goods when price changes, they will react more to the short than in the long term, and thus occasionally inventory behavior is more important than the adjustment of habits.

Rhomberg (1973) presents the estimates of aggregate import price elasticities for eleven industrially advanced nations of Europe and North America. An attempt is made to remove the biases occurred due to (i) specification errors, (ii) measurement errors (iii) aggregation problems (iv) time lag adjustment; as enumerated by Orcutt (1975) in his original paper on this subject. In addition to addressing these issues, the relations are tested for constancy of the parameters and results of these tests indicate that the early postwar years was a period of structural instability. The main conclusion of the paper is that even if the various sources of bias are mitigated by the techniques outlined in this paper, viable estimates of price elasticities are not possible by using data for the period 1946-65. This is due to the structural instability during the immediate postwar period

(1946-51). The price elasticities using data from the remaining (structurally stable) period are significantly different from zero, and generally lie in the range –0.5 to –1.5.

Dornbusch and Krugman (1976) examine the response of trade to change in relative prices for nine countries and find that during the period 1963-1975 nine out of eleven countries are negatively affected in their export shares of manufactured goods by the price changes. For Germany and France, the values vary from -0.10 to -3.38, and having elasticities mostly between -1 and -3. The price elasticity figures for Germany and the United Kingdom have the expected sign but lack the statistical significance.

The primary purpose of the study by Murray and Ginman (1976) is to investigate the price responsiveness of both export demand and export supply for eight developed countries by using quarterly data under the period 1955-1970. They have criticized the traditional models, for instance by Houthakker and Magee (1969), as they failed to include other prices in their specification of trade equation such as prices for domestic tradables and nontradables, and re-specify the import demand function. In contrast to earlier studies, the results show much higher price elasticity (export demand) and a lower income elasticity of demand, and also that consumers respond more to a change in domestic prices than to an equal change in imports prices. In general, the empirical findings suggest that the estimates of demand–price elasticities for exports are substantially different when export supply relationships are explicitly taken into account.

A similar exercise to estimate the price and income elasticities of demand for imports has been carried out by Goldstein, Khan, and Officer (1978) and embodies the price of non-traded goods and total traded goods in addition to the imports prices, to examine the export behavior of eight industrialized countries. Their explanatory variables include: relative prices of domestic exports and world export goods, and domestic capacity. The results suggest that the Marshall-Lerner condition for stability is easily satisfied for almost all of the countries in the sample, and that the price elasticities of demand are in line with Houthakker and Magee (1969). However, Goldstein and et.al., find much higher cyclical income elasticities of demand for most of the ten industrial nations, but the price of non-tradable goods does not appear to be a significant determinant of the demand for imports in most industrial countries.

If there is a problem of simultaneity, the single equation models using OLS give biased and inconsistent parameters. Simultaneous equation model seems to be appropriate, because prices and export import quantities are determined by both supply and demand. Magee (1975) used these simultaneous equations to correct for bias and inconsistency and found higher elasticities for total exports and finished goods manufacturers. Many of the demand elasticities turn out to higher when calculated by using instrumental variables technique. In the following paragraphs, other studies that have also used the simultaneous equations models are reviewed.

Hooper (1972) includes a tariff and some non-price rationing variables in examining U.S. trade with other individual countries. He obtains higher import and export elasticities and finds high U.S. import elasticities relative to export elasticities, which he ascribes to the use of simultaneous equations and inclusion of additional variables. Some of his price elasticities exceed ten in absolute value, and a few income elasticities exceed the value of six. The coefficients of determination was too low, and as he himself conceded the data suffered from severe problems of aggregation.

Khan (1974) has used a simultaneous equation approach for estimating elasticities of exports and imports for less-developed countries and find them to be rather high especially for imports, and comparable to those for the more developed countries. The Marshall-Lerner condition is upheld.

Balassa (1979) rejects the idea that the export income elasticitities are different among industrial nations, especially between Japan and United States and calculates income elasticities for a period that covers eighteen years and breaks them up into two groups. He uses the constant-market share model and concludes the following. First, during the time frames (1953-62) and (1963-71), income elasticities vary for each of the thirteen countries included in the analysis. The income elasticities increased for each nation, with the percentage rise in Japan's case being around 74 percent. He finds that both U.K. and U.S. income elasticities are greater than those of Japan. His policy suggestion is a supply-side one and advocates that the United States should attempt to grow faster, because then it will be able to export more and have an export-led growth that will also assist in avoiding deteriorating trade balances. He also indicates that the export income elasticities are very similar in case of all countries. Balassa states that the

very high-income elasticities found in the previous studies are partly due to the non-inclusion of non-price variables like productivity. He also argues that price elasticity of demand is not positive according to the supply elasticity in the disequilibrium model and should be attributed to the abandonment of non-price variables and the productivity gains of Japan during this period.

3.1.2 Devaluation impact on trade balance and J-Curve phenomenon.

Gafar (1981) studies the relationship between devaluation and the balance of payments adjustment in the developing economy, Jamaica for the period 1954-72. The paper finds first that the devaluation turned out to be a useful policy tool for correcting balance of payments deficits especially in case of Jamaica; however it can produce contractionary effects impeding the rate of output and employment. Second, empirical evidence shows that the relative prices and income are important factors influencing the demand for imports and exports. Third, it is found that disaggregation of imports leads to better and more reliable estimates of price and income elasticities of import demand. Fourth, the study confirms that for primary exports the price elasticity of demand in low which provides an explanation for the behavior of the commodity terms of trade. For example, tourism is price elastic which suggests that devaluation can have a positive effect on increased earnings from tourism. Finally the Marshall Lerner condition is satisfied implying that devaluation is an effective adjustment mechanism, but, author concluded consciously as some of the price elasticity estimates were not significant. The discussion and analysis illustrate that while devaluation is an effective adjustment mechanism, in order to achieve internal and external balance, devaluation must be accompanied by other fiscal and monetary policies.

Frenkel et al., (1995) by using the gravity model of Linneman (1966) examine the impact of both nominal and real exchange rate volatility on bilateral trade flows using a sample of 63 countries with separate cross-section equations for the year 1965, 1970, 1975, 1980, 1985, and 1990. The results do not display any systematic effect of exchange rate volatility on bilateral trade. However the coefficients in estimated equations bear the expected signs their magnitude is small.

Samaroo (1997) examines the determinants of the external current accounts of Trinidad, Tobago and Barbados over the period 1967 to 1991. The paper utilizes the cointegration and error correction models to estimate the current account function of a non-oil developing country (Barbados) and two oil dependent economies (Trinidad and Tobago) by time series and pooled data series. For Trinidad and Tobago, both the estimated long run and short run error correction model indicates that the important explanatory variables are exchange rate, budget surplus to GDP ratio, level of foreign incomes and lagged current account. In case of Barbados, terms of trade and the budget surplus to GDP ratio are influential in the long run while long-term capital flows and budgetary variable are important in the short run. The finding that capital flows are significant in the short term but not in the long term seems plausible because in the long term, capital inflows are summed to zero. In terms of policy formulation, these findings suggest that in both countries, the governments can directly control the behavior of the current account by affecting the budget surplus to GDP ratio. In Trinidad and Tobago, the real exchange rate is also directly affected by government policy. A pooled model is also estimated which confirms most of the findings of the error correction model, that is, the budget surplus to GDP ratio, the level of foreign incomes, long term capital flows to GDP ratio, the real interest rate and the terms of trade are important to the determination of the current account behavior in the Caribbean countries.

Shirvani and Wilbratte (1997) present an empirical reassessment of the relationship between the real exchange rate and the trade balance using the Johansen-Juselius multivariate cointegration approach, based on bilateral trade among U.S.A and the six other countries making up the G-7 over the recent floating exchange rate regime. The data covers the period from May 1973 to August 1990 and tests are conducted for the statistical significance, direction, and speed of the trade balance response to exchange rate changes. The study shows that the trade balance is unresponsive to exchange rate in the very short- run but is significantly affected within two years. It also finds evidence supporting the empirical validity of the Marshall-Lerner Condition, that indicates that devaluation does improve the trade balance in the long run, and hence confirms the efficacy of exchange rate as a long-run tool of trade policy.

Baharumshah (2000) investigates the effect of nominal exchange rate and real effective exchange rate (REER on aggregated trade balance of Malaysia and Thailand, over the period 1980:I to 1997:II. The study shows the following important results. First, the depreciation of the Malaysian and Thai currencies causes trade balances to improve implying that devaluation of the ringget and baht increases the competitiveness of the Malaysian (Thai) goods against foreign goods. Second, a clear long-term relationship exists between REER and trade balance. Third, since the analysis shows an improvement in trade balance in the quarter in which devaluation takes place, it is also concluded that data does not discover the J-curve pattern.

Philip (1997) examines the dynamic relationship between Australian exports and imports in both the short and long run by using cointegration and error correction techniques. This analysis has direct implications for the specification and estimation of Australian import and export functions and the resulting elasticity estimates. The paper also addresses the issue of sustainability of persistent current account deficits in the Australian context and provides a test of whether Australia is satisfying its intertemporal (or present value) budget constraint (IBC).

Bahmani-Oskooee and Brooks (1999) perform a cointegration analysis to test the long run relationship among the variables of import and export demand functions on a bilateral basis among U.S.A and each of its big trading partners (Canada, Japan, Germany, U.K, France and Italy). The study finds evidence that the variables included in the U.S import and export demand functions are integrated of the same order which suggests the existence of a long run relationship. Further, the estimates of real exchange rate elasticities reveal that Marshall-Lerner Condition is satisfied in four out of six cases (Japan, U.K, France and Italy). Hence it is concluded that real depreciation of the dollar improves the U.S bilateral trade balance.

A more comprehensive characterization of the current account behavior was performed by Upadhyaya et al., (1999). This study uses annual data from 1963 to 1993 to estimate the effect of devaluation on the trade balance in four South-Asian countries namely, Pakistan, India, Nepal and Srilanka. An empirical model is developed by using absorption, elasticity and monetary approaches to the trade balance. The empirical results

show that the devaluation policy is effective in the short run, but is less effective in the long run.

Zhang (1999) paper aims at assessing China's foreign exchange reform and the impact of its currency devaluation on the balance of trade. Empirical results suggest that China's economic reforms have improved the sensitivity of the economic system and made it responsive to market signals; it allow changes in the exchange rate to influence the trade balance in the long-run. However, the effect of the real effective exchange rate on the real trade balance appears to be moderate. The dual exchange rate system adopted in the mid-1980s, mitigates the impact of exchange rate unification, and facilitates the movement towards an equilibrium level of exchange rate.

Chaudhuri (2000) examines the relationship between nominal devaluation of the Indian-rupee and the real trade balance for India with its ten trading partners for the period of July 1991 to September 1997. Exploiting the recent advances in panel-data time series econometrics, the study documents that the nominal devaluation is not effective in improving real trade balance and the policy makers would have to devalue the currency keeping in mind the price differential among home and foreign countries – in other words "real devaluation is needed to improve the real trade balance".

Yong (2001) focuses on whether real exchange rate (RER) and real effective exchange rate (REER) movements led to fluctuations in the foreign trade of East Asian countries over the period 1980 to 1999. In general, for multilateral trade real effective exchange rate elasticity of exports and imports are low and insignificant. Secondly, for bilateral trade, the cross-country real exchange rate elasticity shows a mixed picture. Thirdly, the magnitude of Pass-through of nominal exchange rates on import and export prices in national currency varies from country to country. An attempt was also made to provide a more comprehensive characterization of the trade balance behavior of real effective exchange rate of Dirham against the European currencies, over the period of 1960 to 2000. It shows that the volatility and misalignment of Dirham affect the trade flows–as an overvaluation will lead to a reduction in Morocco's exports and raise its imports resulting in a deterioration of the trade balance with the European Union.

Rincon and Nelson (2001) by using data from a wide range of developing countries having trade deficit examines the impact of exchange rate on trade balance. The

results support the conventional wisdom that devaluation improves the trade balance. The study finds strong evidence that the exchange rate affects the long run equilibrium value of the trade balance even when money and income effects are accounted for explicitly. However, in the short run, devaluation generally worsens the trade balance, at least at the first lag, and then it start to improve, showing the J-curve pattern.

Antonucci (2003) examines the profile and magnitude of time lags for Italy's trade balance adjustments in response to real exchange changes. In order to check the validity of the J-curve theory an error correction model embedding a polynomial distributed lag structure has been estimated. The major finding is that devaluation improves the Italian trade balance without perverse effects of both in the short run and in the long run. The 1992 devaluation, following the European Monetary System crises confirms the result.

Onafowora (2003) examines the short run and long run effects of real exchange rate changes on the real trade balance of three ASEAN countries in their bilateral trade to the US and Japan within a cointegrating vector error correction model (VECM), and estimates suggest one long-run steady–state cointegrating relationship among real trade balance, real exchange rate, real domestic and foreign income in each country. Generalized impulse response functions have been estimated to investigate the response to shocks. Although considerable variations exist in the results, overall generalized impulse response functions suggest that the Marshall-Lerner condition holds in the long run with varying degree of J-Curve effects in the short run.

Juks (2003) conducts a time-series analysis of the traditional trade (exports and imports demand) equations for the period 1995:Q1 to 2003:Q1, in case of Estonia. The empirical results cast some doubts on the usefulness of the internal-external balance approach to the equilibrium exchange rate. As for various measures of imports, the Johansen as well as Engel-Granger cointegration analysis indicates clear lack of long-run relationships between import flows and the real effective exchange rate. The results from the export demand function suggested existence of cointegration in some of the cases, but estimated wrong sign of price elasticity of demand for exports does not support it. In addition, further extensions and modifications suggested in the literature led to some improvements in the export demand equation, but did not change the main conclusion of

the earlier findings. The Granger causality test finds some support for the presence of the short-run effect of the real effective exchange rate (based on producer price index) on trade flows. Based on this empirical evidence it is concluded that there is a secondary role for REER in achieving a sustainable position of external balance in case of Estonia.

Agbola (2004) examines the hypothesis "Does devaluation improve trade balance of Ghana?" Annual data for the period 1970 and 2002 were employed in the analysis. The Johansen MLE multivariate cointegration procedure reveals that Ghana's trade balance and key determinants are cointegrated, and thus share a long-run equilibrium relationship. The Stock-Watson dynamic OLS model (DOLS), which is superior to a number of alternative estimators, provides empirical evidence of significant long-run relationship between Ghana's trade balance and real domestic and foreign income, domestic and real domestic and foreign income, domestic and foreign interest rates and exchange rates. The empirical results suggest that devaluation does not improve the trade balance of Ghana in the long run. The response in trade balance to movements in the exchange rate appears to be characterized by an M-curve phenomenon.

3.1.3 Empirical evidence on ML condition and J-curve phenomenon in case of Pakistan.

A general consensus accepted by most economists is that elasticities are lower in the short run than in the long run, i.e., the M-L condition may only hold in the medium to long run. Hasan and Khan (1994) by using the simultaneous equation examined the impact of devaluation on the trade balance in Pakistan for the period 1972-1991. By estimating the equations of exports, imports and general price level simultaneously, the study concludes that devaluation will improve the trade balance in Pakistan. Further Marshall-Lerner condition stability is tested and is found to be satisfying the condition for devaluation to be successful in improving the trade balance. These results are important and have crucial policy implications in terms of current recent devaluation policies adopted by the government.

Aftab and Aurengzeb (2002) estimate the trade elasticities for Pakistan to-investigate the long run trade elasticities, existence of Marshal- Lerner condition and J-curve phenomenon. The Johansen's method of cointegration has been utilized to estimate

the long run export and import elasticities and have further investigated the short run exchange rate dynamics by constructing an error correction model for the period 1980:1-2000:4. The results show that ML condition holds in the long run, and confirm that real depreciation of the Pak Rupee may be used as a policy tool to improve the trade balance. However, in the immediate future, the trade balance is expected to deteriorate, and then a steady improvement in the trade balance begain.

Rehman and Afzal (2003) estimate a reduced form trade balance model to establish the empirical validity of the J-curve phenomenon using relatively new cointegration technique, ARDL. The J-curve hypothesis is tested for Pakistan using quarterly data over the period 1972 to 2002. The results show that trade balance is negatively related to the domestic real income, but bears a relationship with the world income level. It is seen that the real exchange rate has a negative impact on the trade balance. The evidence of J-curve is found and long run effect of real depreciation of Pak Rupee does not appear to be favorable.

3.1.4 Concluding Remarks.

Most of the studies conducted under Keynesian doctrine of balance of payments revolve around the elasticity optimism and pessimism, Marshall Lerner conditions, devaluation impact on trade balance and current account balance and J-curve phenomenon. Ordinary least square and simultaneous equation models have been used and no final conclusion can be drawn. The conventional estimation techniques give biased results due to the non-stationarity of various economic aggregate series at level. Therefore a number of studies such as Agbola (2004); Juks (2003); Onafowora (2003); Antonucci (2003); Aftab.Z and Aurengzeb (2002) and Rehman and Afzal (2003) have employed modern time series method of cointegration in their analysis and tried to investigate the long run equilibrium path and the short run adjustment dynamics. The studies for Pakistan entirely concentrated on M-L conditions and trade balance and no attempt has been made so far to incorporate other accounts such as current account etc. This provide a thrust to carry out extensive research on this topic that include all the components of the balance of payments i.e. trade balance, current account which will support us in terms of more efficient and consistent results over the past empirical evidences.

3.2 Balance of Payments a Monetary Phenomenon.

Zecher (1976) estimates the reserve flow equation for both annual and quarterly data frequency, for the period of 1950 to1971. The demand for money in Australia has been found to be a stable function yielding the expected results. All estimated coefficients of the reserve flow equation also conform to the values implied by the monetary approach to the balance of payments hypothesis. The evidence supports the hypotheses that both economic growth and inflationary pressures lead to surpluses in balance of payments. The rising domestic interest rates lead to deficits is not in-consistent with the empirical results. Domestic money stock has a negative impact on reserve flows, as proposed under the monetary approach. Zecher concludes that when the growth rate of the demand for money is greater than the growth rate of money supply due to domestic factors, international reserves tend to accumulate to bring actual growth in the money stock closer to the desired growth, and balance of payments will improve and vice versa.

Genberg (1976) uses Sweden as a case study for testing the most crucial hypotheses regarding the nature of a small economy and its relationship with the world. The analysis of variance test reject the hypothesis that inflation rates differ significantly among countries, and supports the view that Sweden is a small part of an integrated world commodities market, and the demand for money will determine the stock of money and the monetary policy had no systematic effect on the flow of income. He also shows that neither commodity prices nor interest rates appear to be sensitive to the domestic monetary forces unless these are in accord with the world market conditions. Following Johnson (1976), Genberg derives a reserve flow equation. The high correlation between the actual and predicted reserve flow series strongly supports the monetary interpretation of balance of payments adjustments. Finally, Genberg simultaneously estimates the reserve flow equation and the government policy reaction function. His estimates show that the sterilization hypothesis offers a very plausible alternative to the explanation of reserve flows. It also indicate that the Monetary approach has passed the tests, both as far as its underlying view of the world is concerned and in its implications with respect to the balance of payments.

Bean (1976) uses post-World War II Japan to test the monetary approach to balance of payments. She derives the reserve flow equation from the money market equilibrium condition by using quarterly, seasonally adjusted data for the period 1959-1970. During this period Japanese authorities were controlling reserve flows using their capacity as domestic credit creators. The monetary approach to the balance of payments has provided a theoretical explanation for the effectiveness of this policy and also supports the price-taking hypothesis of the monetary approach for Japan. Bean estimates two reserves flow equations that have expected signs i.e., the income elasticity is consistently smaller than unity and the interest rate elasticity is larger when the Japanese discount rate is used instead of the U.S. Treasury bill rate, but the difference is not statistically significant. Moreover, the money multiplier is not significantly different from its expected value i.e., -1, while the estimates of the elasticity of the domestic component of the base are smaller than their expected magnitude. Bean's empirical analysis for Japan strongly supports the thesis of the monetary approach and suggests that it is a useful framework for analyzing these phenomena.

Guitian (1976) uses data on the Spanish economy to test the theoretical proposition that “the balance of payments is a monetary phenomenon”. He investigates the relationship between the balance of payments and the rate of domestic credit expansion for the period 1955-1971. In his empirical investigation he tests: (a) the effect of domestic credit expansion on the balance of current account and on the overall balance of payments and (b) the connection among these two external accounts and gross domestic product (GDP), domestic and foreign prices, and the rate of domestic credit expansion. Guitian's results strongly reflect the monetary character of balance of payments disequilibria. They show a statistically significant relationship between the balance of payments and the current account and domestic credit for the economy of Spain during the 1955-1971 period. He suggests that the safest way to cope with external imbalances is to control the rate of domestic credit expansion. Such control is consistent with the balance of payments constraint. If domestic credit expands at a higher rate than that at which the domestic economy wants to hoard cash balances, an external deficit will tend to appear, and the reverse is also true. The relationship between the exchange rate and the balance of payments was considered indirectly by incorporating it into an index

of foreign prices. The empirical results indicate that the exchange rate changes were effective only when they were accompanied by appropriate credit policies.

Wilford and Zecher (1979) examine the balance of payments and monetary policies of Mexico during the fixed exchange rate period of 1955 to 1975, for the annual data. They estimate the real money demand equation, nominal money demand equation, and the reserve flow equation. The money demand equations for Ml and M2, have expected signs. The income and price[15] elasticities are close to their expected value of +1 in all cases. The estimates indicate that the Mexican experience for the period of 1955 to 1975 is consistent with the monetary model of the balance of payments. Both M1 and M2 demand specifications are stable over the estimation period, and the capital reserve flow equation is also consistent with the predictions of the monetary model.

The main purpose of the study by Johannes (1981) is to test formally the exogeneity hypothesis underlying empirical tests of the MABOP specifically, and the theoretical specification of the model in general, using Geweke's method. It is found that all the variables mentioned are in fact exogenous and be rejected for each and every country in the sample. This finding casts doubt on the theoretical validity of the monetary approach and even more doubt on the accuracy of the much of the empirical evidence that has been garnered in its support. The exogeniety assumptions imply (1) the domestic component of the domestic money supply is exogenous, (2) if a country is small and there is perfect mobility of capital and goods- prices and interest rates are determined exogenously, (3) an exogenously given level or rate of growth of real income, and (4) the most crucial assumption is the domestic credit exogeneity; for it implies that countries do not sterilize reserve flows via some appropriate change in domestic credit. The results obtained show that MABOP assumptions regarding exogeneity are incorrect, at least in the short to medium run. The most conservative conclusion to be drawn from these results is that the numerous empirical tests of the MABOP that implicitly or explicitly assume exogeneity even in the short run may be "subject to serious problems of simultaneity as Whitman (1975; pp.523) and others (Magee: 1976) have suspected. A much less conservative conclusion would be that the theoretical specification of the MABOP on at least empirical, if not theoretical, grounds must be carefully considered

[15] Proxied by the Mexican CPI and the U.S. CPI

against the backdrop of the inclusive nature of the empirical findings on the monetary approach (Kreinn and Officer.1978: p.75) in evaluating the balance of payments.

Putman and Wilford (1978) estimate eight reserves flow equations for Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, and United Kingdom for the period 1952-1971. Their article extends the empirical analysis of international reserve flows in two ways. *First*, they incorporate the interrelationship of the eight european countries and estimate the reserve-flow equations by applying the seemingly unrelated regressions technique. Their intention is to empirically show that the international reserve flows for the eight countries under investigation are related through world trade in goods, capital markets, and by institutional arrangements (Bretton Woods), and any economic shock to the world system could impact the group of countries simultaneously. *Second,* Putnam and Wilford have integrated the purchasing power parity and interest rate parity assumptions directly into the reduced form tests. In addition to estimating equations specified solely with the domestic price level and interest rate as proxies for the world price level and interest rate, they have substituted U. S. prices and interest rates for the domestic variables to serve as alternative proxies for the world variables. The income elasticity of money demand has expected and significant value in all cases except for Denmark, and then only when the U.S. price level and interest rate are used as proxy for the world. The interest elasticity is negative and relatively small in all cases except for Denmark, conforming to a priori expectations of integrated world capital markets. The coefficient on prices was also close to + 1 for all countries except for France and England. The sign of the money multiplier variable coefficient is negative in all cases and different from –1 with the exception of Denmark and Belgium, where they are very close to minus unity. The relative stability of this coefficient supports the hypothesis that a tightening of monetary policy in country j, ceteris paribus, will lead to reserve inflows. The coefficient on growth in domestic credit is very close to –1; and statistically significant in all cases. The stability of the money demand coefficients and the money supply coefficients over the three separate specifications, as well as the relative size and the significance of these coefficients strongly support the assumption of integrated world goods, services, and capital markets, as espoused in the Monetary approach to the balance of payments.

Aghevli and Khan (1977) examine the balance of payments and the monetary policies in 39 developing countries during the period of 1955 to 1975, by using cross-sectional data. They first estimate the money demand function by assuming the homogeneity in prices. Both the income and the inflation elasticities are correct and significant at 1 percent, however the R^2 is low (that is not unusual for cross-sectional data). The coefficient of the rate of growth in prices is significantly less than unity, so the assumption of homogeneity in prices has been rejected. Their second test is to estimate an unrestricted, reduced-form equation for reserve flow. All coefficients has the expected and significant signs, except for the coefficient of the rate of growth in the money multiplier. The coefficient of the rate of inflation is substantially less than unity, suggesting a high degree of money illusion in the demand for money balances. The positive signs of inflation and income confirm that an increase in inflation and in the rate of growth in income leads to an improvement in the balance of payments. Aghevli and Khan argue that the results are biased because they have included countries, such as Argentina, Brazil, Chile, Colombia, and Uruguay, with a very high rate of domestic inflation in comparison to the world rate. The estimates obtained are used to simulate the rate of growth in international reserves, and the simulated values are compared with the actual values to test the model tracking ability. The results gave a strong indication of the usefulness of the monetary approach in explaining the rate of growth in the international reserves for the developing countries.

Kamas (1986) derives monetary specification for the balance of payments under the assumption of exogenous Y, P and I, as justified by the assumptions of flexible wages, PPP and perfect capital markets. The estimates for Venezuela have provided some support for the monetarist prediction as the signs of all the coefficients are expected and significant. However, the monetarist estimates of the offset are significantly different from minus one. Kamas's estimates for Mexico do not provide much support for the monetarist model as both ΔD and ΔY bear wrong signs. The price coefficient is positive and significant in both cases, while the interest rate is significant at 90 percent level in the 2SLS estimation. The estimated positive offset coefficient (0.046) is particularly troubling as it indicates that monetary expansion results in higher foreign reserves. All the models have predicted a negative relationship; the disagreement occurs over the size

of the offset. The results are surprising in the light of other empirical studies for Mexico. Annual estimates for the offset are -0.46 in Blejer (1977) for the period of 1950 to 1973; -0.61 in Gomez-Oliver (1976) for 1956-1973; and -1.02 in Wilford and Zecher (1979) for 1955-1974. Kamas concludes that structural change in the Mexican economy and policy in the 1970s is responsible for the difference in offsets. During the 1970s, the Mexican government played a large role in the economy through its involvement in production, trade, and finance. Foreign borrowing was utilized extensively to finance current account and government deficits. This may explain the absence of a large offset to monetary policy as government borrowing has made up for reserve losses. The evidence appears to support the existence of short or medium-term autonomy for monetary policy in the presence of an active central government. On the other hand in 1982 an economic crisis forced Mexico to devalue the peso and impose an austerity program. Thus, in the long run, the policies were unsustainable. Venezuela represents the case of a more open economy with a smaller role of the government and the estimated offsets are in accordance with the predictions of the theory.

Sohrab-uddin (1985) tests the propositions of the monetary approach by way of analyzing the data of three less developed countries namely India, Pakistan and Thailand. The study has used the simultaneous equation model and estimates the reserve flow and sterilization equations. It is shown that India and Pakistan's international reserve movement are not explained by the model based on the monetary approach to balance of payments and these results are attributed to the strict exchange and capital control policy. While in case of Thailand, that is comparatively more liberalized in its regulating exchange and capital account policies, international reserve flows are consistent with the pattern implied by the monetary approach to balance of payments.

Kannen (1989) has attempted to test the hypothesis whether disequilibrium in the domestic money market exerts any influence on the balance of payments (BoP). The reserve flow and sterilization equation has been estimated, and the direction of causation between domestic credit and foreign exchange reserves has been identified with Granger and Sims causality tests.

Table.3.1 Summary Results on Monetary Approach to Balance of Payments.

Authors	Study period	Offset coefficient	Country	Results
Zecher (1976)	1950 -1971	-1.06 -1.23	Australia	Monetary approach holds
Genberg (1976)	1950-1971		Sweden	Strongly supports the monetary interpretation of balance of payments adjustments.
		-0.72	Japan	Strongly supports the thesis of the Monetary approach.
Bean (1976)	1959-1970	-0.55		
			Spain	Controlling domestic credit is the safest way to control the imbalances.
Guitian (1976)	1955-1971	-0.86		
	1955 - 1975	-1.02	Mexico	Mexican experience for the 1955-74 periods is consistent with the monetary model of the balance of payments.
Wilford and Zecher (1979)		0.964 -1.183 -1.134 -1.011 -0.946		
Putman and Wilford (1978)	1952-1971	-1.12 -1.08 -.098 -0.95 -1.08 -0.82 -1.13 -0.82	Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, and United Kingdom	The stability of money demand coefficients and the money supply coefficients over the three separate specifications as well as the relative size and significance of these coefficients strongly supports the assumption of integrated world goods, services and capital markets, as espoused in the monetary approach to balance of payments.
Aghevli and Khan (1977)	39 developing countries	-0.4150	1955 - 1975	Monetary approach holds.
		-0.88(OLS)	Venezuela; Mexico	Monetary approach holds in Venezuela, however does not hold in case of Mexico.
Kamas(1985)	1970Q4-1982Q4 1971Q3-1981Q4	-0.82(2SLS) 0.046(OLS) 0.041(2SLS)		
Sohrab-uddin (1985)			India, Pakistan and Thailand	MABOP does not hold in India and Pakistan, however true in case of Thailand.
Kannen (1989)		little higher than –1,		Confirms the view of monetary approach to balance of payments.
Khan (1990)	1972-1973 1985-1986	-1.133	Pakistan	MABOP holds.

The estimated reserve flow equation shows the coefficient of rate of growth of domestic assets is significant and little higher than –1, which conforms the view of the monetary approach to balance of payments. But in the estimated sterilization equation, the statistically significant coefficient of the rate of growth of net foreign assets is "0.3271" in contrast to "0" proposed by the theory. This shows that the central bank actively sterilized the impact of foreign exchange reserve changes on the domestic money supply or the commercial banks borrowed from the central bank when faced with the outflow of international reserves so as to prevent fluctuations in the domestic credit extended by them.

Khan (1990) first estimates a very standard demand for money function for the period 1972-1973 through 1985-1986. The coefficients values are true and significant, with the long-un income elasticity above unity, as has been found in another study for Pakistan by Hasan, Kadir, and Mahmud (1988). In the second stage, Khan subtracts the fitted values of money balances (M) from the stock of international reserves (in domestic currency terms) and runs it as a function of the domestic credit. The coefficient for domestic credit is not significantly different from unity, thereby verifying the basic hypothesis of the Monetary approach to the balance of payments. The results here thus confirm that there is a close link between changes in the domestic credit; the principal monetary policy instrument and the balance of payments in Pakistan. One interesting implication of these results is that trade and exchange controls are far less effective than one might assume. If such controls have been binding, one would observe a much weaker relationship between the balance of payments and domestic credit expansion. Khan finds that over the period 1972-1973 to 1985-1986, there is a fairly close link between changes in domestic credit and the balance of payments with an expansion in domestic credit being associated with international reserve losses. Consequently, Khan observes that the government did tighten monetary policy when faced with an actual, or potential reserve losses.

Civcir and Parikh (2000) study is innovative in the sense that it uses the concept of economic equilibrium and long run relationship. The study has used the error correction approach for the determination of long-run relationship between the money balances and reserves under the monetary approach to the balance of payments in the Turkish economy, as well as having the advantage of estimating short-run parameters within the same framework. During the period of study Turkey experienced the fixed and managed-flow exchange rate system. For long run relationship, Johansen (1988) method of cointegration has been used to find the cointegrated vector. Further this cointegrated vector has been utilized in estimating the error correction model i.e. the adjustment in short run towards the long run equilibrium. The estimated error correction systems indicate that changes in money demand are significantly influenced by changes in prices, income and gold prices. An increase in domestic credit leads to decline in reserves. The

adjustment coefficient is not statistically different from zero, which casts doubts on the existence of a long run cointegrating relationship for reserves.

3.2.2 Empirical Evidence on "Balance of Payments is a Monetary Phenomenon", in case of Pakistan.

Bilquees (1989) tested the monetary approach to balance of payments for Pakistan. Primarily the study contests the outcome of of Aghveli and Khan's study of 39 developing countries which shows that the MABOP theory holds for these countries using cross-section data. The results for Pakistan show that it is possible to obtain significant results on a cross-section basis, but the the individual country data for many of these LDCs may not validate the Monetary approach, mainly due to the absence of underlying assumptions, due to significantly heterogeneous economic structures in many of these countries, and due to common prevalence of restrictive financial policies in a large number of LDCs. The results show that the reserves movement in Pakistan cannot be explained by the version of the monetary approach to balance of payments theory.

3.2.3 Concluding Remarks.

The empirical studies undertaken to test the hypothesis that balance of payments is a monetary phenomenon yield conflicting results and therefore it is not possible to reach the conclusions regarding the validity of the monetary approach predictions. Nevertheless a number of relevant conclusions have been drawn as given below.

Problems of simultaneity and omitted variables are conspicuous to the monetary theory. Johnson (1977, pp.13) is among the first to acknowledge the presence of a simultaneous-equation bias problem. He claimed that there is a dangerous temptation to test and confirm the monetary approach spuriously, by verifying statistically the tautology that an increase in the domestic money must be provided either by domestic credit creation or reserve acquisition. The use of Ordinary Least Squares (OLS) to estimate either an offset or a sterilization coefficient results into a simultaneous-equation bias. The existence of sterilization biases the OLS estimate of the offset coefficient, both in the capital-flow and the reserve-flow equations in an upward direction with absolute value toward -1 rather than 0. Moreover, the algebraic t value of the offset coefficient is

biased in an upward direction, thereby causing the statistical significance of the offset coefficient to be overstated.

The estimate of the offset coefficient is also biased because of the specification error of omitted variables. The loss of reserves arising from a country's expansionary monetary policy must flow to other countries. Therefore, a country's change in reserves is influenced, not only by its own domestic credit, which has a negative (and presumed unitary) coefficient, but also by the wealth variables of each of its trade and payments partners, with the positive coefficients. Reserve-flow equations invariably omit foreign wealth variables, perhaps in an effort to avoid multicollinearity or the loss of degree of freedom. As a result, the omitted variables of other countries bias the offset coefficient towards 0 rather than 1.

Another source of specification error of omitted variable(s) is the fact that followers of the Monetarist approach emphasized the monetary variables to the virtual exclusion of everything else in an effort to offer their approach as a complete substitute for the Keynesian approaches. For example, the speed of adjustment of the balance of payments to exchange rate changes is crucial, and devaluation can make a significant contribution. The speed of adjustment, though, depends on some degree on product-market elasticities, which are dismissed as irrelevant by the Monetary approach.

The interpretation of the results of the empirical tests of the Monetary approach had been complicated by the controversy over the exogeneity assumptions underlying this approach that were implicit in those studies. These include the exogeneity with respect to reserve flows of the determinants of the demand for nominal money balances as well as the domestic credit component of a country's money supply. If the monetary assumptions regarding exogeneity are not correct, then identifying restrictions imposed on structural equations may not be sufficient to identify those equations, and estimation procedures will be inconsistent. Moreover, the model cannot adequately portray the dynamics of the system it seeks to describe.

The empirical findings for a few studies reviewed here confirm the main propositions of the Monetary approach and support the view that the balance of payments deficits and surpluses in a given country could not be understood without explicit

reference to monetary policy, and money for the developments within the country, and throughout the rest of the world.

In case of Pakistan only two studies have been conducted on the monetary approach for the balance of payments giving contradictory results in late 1980s, despite the fact that we are indulging with IMF reform package related to balance of payments problem situation. Secondly, these studies have used the simple conventional estimation techniques, without incorporating the time series properties of data series, motivate and provide us a room of further research on this phenomenon by utilizing modern analytical framework. The cointegration analysis has (also utilized in our study) introduced the concept of economic equilibrium and long run relationship, and resulting error correction model having the advantage to predict the long run and short run adjustment patterns in a unified model. Thus our study is an attempt to update, improve upon the existing flaws, discrepancies related to the subject matter, estimation techniques, and to provide better rationale for policy implications.

3.3 Synthesis of Monetary and Keynesian Approaches to the Balance of Payments.

We find only one study on synthesis of Monetary and Keynesian approaches to balance of payments. Actually the synthesis is not popular, because Keynesian and monetary approach are contrast to each other in terms of their assumption and emphasis on different components. But Frenkle et al, (1980) have argued that despite the differences, these two approaches can be combined in a unified framework.

Civcir. I, and Parikh. A, (1992) examine whether the fluctuations that had occurred in the Turkish balance of payments during the period 1960-1988 are Monetary or Keynesian in their origin. Historically, Turkey has experienced both fiscal and monetary shocks, and policy as shifted recently to deregulation in the money market and the liberalization of trade, although some controls on interest rates are retained. The time series on most of the variables exhibits unit root non-stationarity and a cointegrating relationship for a Keynesian origin is found. Moreover, a long run relationship supporting the monetary approach to balance of payments can not be established, and did not support the short run adjustment towards long run equilibrium; perhaps Turkish monetary authority did not follow the Keynesian policies in the short run. In the short run, a

monetary relationship explains fluctuations in reserves despite the fact that there exists no plausible long run relationship.

4. Model, Data and Econometrical Methodology.

Part I. Theoretical Construction of the Models, Data and Variables.

4.1 The Keynesian Approach to Balance of Payments.

Keynesian analysis originates from the simple export and import demand function. If the price of exports is higher than the foreign price level, exports will fall, and with the increase in the foreign income exports will rise, and vice-versa.

$$X_d = f(p_x \overset{-}{/} p_f, \overset{+}{y_f}, \overset{+}{e}) \qquad (4.1)$$

Where X_d denotes domestic exports, p_x denotes price of exports, p_y denotes foreign price level, and y_f is used to represent the foreign income level.

The import demand function is defined as the function of relative prices and income of importing country (exchange rate has to be discussed latter). If the price of imports is higher than the domestic price, imports will fall, and vice versa. Similarly if the income level of domestic country rises, it has positive impact on imports level of domestic country.

$$M_d = f(p_m \overset{-}{/} p_d, \overset{+}{y_d}, \overset{-}{e}) \qquad (4.2)$$

Where M_d denotes domestic imports, p_m denotes price of imports, p_d denotes domestic price level, and y_d is used to represent the domestic income level.

For simplicity it has been assumed in the study that price of exports is equal to the domestic price level and price of imports are equal to the foreign price level. The country's exports and imports are the function of relative prices (ratio of domestic price level to foreign price level), domestic income and foreign income.

Since payments have to be made in foreign currency for the imports, the exchange rate variable is introduced in the analysis. Exchange rate devaluation will have positive impact on country's exports demand as it makes them relatively cheaper, and negative impact on country's imports demand as it makes them relatively costly. The net effect on trade balance depends upon how much exports increase and imports decrease due to devaluation.

Here we try to derive the relationship between devaluation and trade balance under Keynesian view that includes elasticity, Keynesian multiplier and absorption approach to balance of payments. According to the elasticity, Keynesian multiplier and absorption approaches to balance of payments, devaluation will have a positive impact on trade balance under the Marshall Lerner condition (i.e. sum of price elasticities of exports and imports is greater than one). In the following section, we derive the conditions under which devaluation has positive impact on trade balance (balance of payments).

4.1.1 The Elasticity Approach.

Elasticity approach defines trade balance as the difference between exports and imports values denominated in domestic currency.

$$TB = pX_v - ep^* M_v \qquad (1.1)$$

Where p is domestic price level, and X is the volume of exports, e is the exchange rate (domestic currency units per unit of foreign currency), p* is foreign price level and Mv is the volume of imports. For simplicity assume p=p*=1 then

$$TB = X - eM \qquad (1.2)$$

In difference form,

$$d(TB) = dX - Mde - edM \qquad (1.3)$$

Dividing both sides by change in exchange rate, we obtain

$$d(TB)/de = dX/de - M(de/de) - e(dM/de) \qquad (1.4)$$

If

$$\eta_x = \frac{dX/X}{de/e} \Rightarrow dX = \eta_x \frac{de}{e} X \qquad (1.5)$$

Similarly import demand elasticity is defined as

$$\eta_m = -\frac{dM/M}{de/e} \Rightarrow dM = -\eta_m \frac{de}{e} M \qquad (1.6)$$

Substituting (1.5) and (1.6) into eq.(1.4)

$$\frac{d(TB)}{de} = \frac{\eta_x X}{e} + \eta_m M - M$$
$$\frac{d(TB)}{de}.\frac{1}{M} = \frac{\eta_x X}{eM} + \eta_m - 1 \qquad (1.7)$$

Assuming initial equilibrium in the trade balance (exports value is equal to imports value) i.e.

$$X = eM \Rightarrow \frac{X}{eM} = 1$$

Putting back this in equation (1.7) gives:

$$\frac{d(TB)}{de}.\frac{1}{M} = \eta_x + \eta_m - 1$$
$$\frac{d(TB)}{de} = M(\eta_x + \eta_m - 1) \qquad (1.8)$$

Equation (1.8) concludes that exchange rate devaluation will improve the trade balance under Marshall- Lerner condition i.e., the sum of export and import demand functions is greater than one.

4.1.2 The Keynesian Multiplier Approach.

Under the Keynesian multiplier approach, the export and import demand functions, are determined within the aggregate model of the economy also incorporating the Keynesian income multiplier models. The system contains three equations; domestic and foreign aggregate demand equations and the trade balance relationship derived from them.

$$y_d = E_d(y_d) + M_f(y_f, e) - M_d(y_d, e)$$
$$y_f = E_f(y_f) - \frac{M_f}{e}(y_f, e) + M_d(y_d, e) \qquad (2.1)$$
$$\frac{B_d}{e} = \frac{M_f}{e}(y_f, e) - M_d(y_d, e)$$

Where goods are measured at unit values in their countries of origin, Y is output, E total national expenditure, M imports, e is the price of foreign currency in terms of domestic currency, and subscripts *d* and *f* denote the domestic and foreign countries. On differentiation, and with the simplifying assumption that trade is initially balanced, this system yields, for the effect of devaluation on the trade balance.

$$\frac{1}{M}\frac{d(\frac{B_d}{r})}{dr} = \frac{s_d s_f(\eta_x + \eta_m - 1)}{s_h m_f + s_f m_d + s_f s_d} \qquad (2.2)$$

Where the lower case letters refer to the marginal propensities to save and to import. The relationship derived concludes that devaluation will improve the trade balance depending on the validity of Marshal Lerner condition, and if there exist unemployed resources that can be used to satisfy the excess demand for domestic output.

4.1.3 The Absorption Approach.

Alexander (1952) defines the trade balance as the difference between domestic output and domestic absorption that is different from the elasticity and Keynesian multiplier approach. Taking the equation of national income

$$\begin{aligned} Y &= C + I + G + X - M \\ Y &= A + X - M \\ \Rightarrow TB &= X - M = Y - A \end{aligned} \qquad (3.1)$$

Where A= C+I+G,

Taking difference on both sides

$$d(TB) = dY - dA \qquad (3.2)$$

And

$$dA = adY + dAd \ ;$$

Put in equation (3.2)

$$\begin{aligned} d(TB) &= dY - adY - dAd \\ d(TB) &= (1-a)dY - dAd \end{aligned} \qquad (3.3)$$

Trade balance will improve if the change in domestic output level is greater than the domestic absorption level, i.e. $(1-a)dY > dAd$.

Two types of policies that aim at output expansion and expenditure reduction needs to be distinguished. Expenditure reduction policies curtail expenditure, have a negative impact on the output level and thus lead to unemployment in the economy. Therefore they are not desirable for the economy operating at below full employment. While expenditure switching policy, e.g., devaluation curtails expenditure on imports by switching demand from imports to domestic goods and increases output by switching the input resources towards the domestic export oriented industries provided that there are unemployed resources in the economy, export import supplies are infinite and Marshall

Lerner condition hold. So under the absorption approach also we reach to the same conclusion that devaluation has a positive impact on the trade balance.

A general consences accepted by most of the economists is that elasticites are lower in the short run than in the long run, in which case the Marshall Lerner conditions may only hold in the medium to long run [(Goldstein and Khan (1985); Gylfason(1987); Krugman(1991)]. The possibility that in the short run the marshall-lerner conditions may not be fullfilled although it generally holds over the longer run leads to the phenomenon of what is popularly known as the J-Curve effct. The idea underlying the J-curve effect is that in the short run export volumes and import volumes do not change much, so that the price effect outweighs the volume effect leading to deterioration in the current account. However after a short time lag export volume start to increase and import volumes start to decline; consequently the current deficit starts to improve and eventually moves into surplus. This phenomenon is attributed to imperfect competition, time lags involved in the consumer and producer responses due to habitation, production and agreement time periods.

4.1.4 Empirical Estimation of Trade Balance Equation.

According to the Keynesian view of the balance of payments trade balance is negatively related to the relative prices and relative income but positively related to exchange rate[16] devaluation under the necessary Marshal Lerner condition. However, it may be possible that, at first trade balance deteriorates, but latter on it improves as the export and import volumes take time to adjust in response to exchange rate devaluation also known as the J-curve phenomenon. The trade balance is defined as;

$$TB = (X / M) = f(p_d / p_f, y_d / y_f, e) \qquad (4.1.1)$$

or alternatively it can be written as

$$(1 + t / m) = f(p_d / p_f, y_d / y_f, e)$$

Where t is the ratio of trade balance to GDP ratio and m represents imports to GDP ratio. Country's balance of payments improves if its trade balance to imports ratio increases over time. Taking natural log on both sides

[16] Exchange rate has been taken separately from the relative prices to see the separate impact of nominal exchange rate and the changes in relative prices on balance of payments.

$$\ln TB = \ln(X) - \ln(M) = \alpha_O + \alpha_1(\ln p_d - \ln p_f) + \alpha_2(\ln y_d - \ln y_f) + \alpha_3 \ln e + \varsigma$$

Where α_o = constant, $\alpha_1 < 0$, $\alpha_2 < 0$; $\alpha_3 > 0$;

It can be written as the capital letters represent the relative price and relative income.

$$TB = \ln(X) - \ln(M) = \beta_O + \beta_1 P + \beta_2 Y + \beta_3 e + \xi \qquad (4.1.2)$$

Where β_o = constant, $\beta_1 < 0$, $\beta_2 < 0$; and $\beta_3 > 0$;

4.1.5 Empirical Estimation of Current Account Balance Equation.

One criticism of the Keynesian approach is that it excludes various accounts like transfers, dividend, interest payments and income causing the balance of payments disequilibria. With a view to addressing this problem an attempt has been made to include all other accounts with the traded goods and services. The analysis has been extended from simple trade balance to the current account balance that includes trade balance of goods, traded services, net transfers and net income. The traded services and transfers and net income transfers also depend upon the country's relative income, relative prices and exchange rate, thus the current account balance is also defined in terms of three variables, i.e. relative income, relative prices and exchange rate.

$$\ln CAB = f(\ln(p_d / p_f, y_d / y_f, e) \qquad (4.2.1)$$

$$\ln CAB = \alpha_O + \alpha_1(\ln p_d - \ln p_f) + \alpha_2(\ln y_d - \ln y_f) + \alpha_3 \ln e + \varsigma$$

Where α_o = constant, $\alpha_1 < 0$, $\alpha_2 < 0$; $\alpha_3 > 0$;

It can be written as

$$\ln CAB = \beta_O + \beta_1 P + \beta_2 Y + \beta_3 e + \xi \qquad (4.1.2)$$

Where βo = constant, $\beta_1 < 0$, $\beta_2 < 0$; and $\beta_3 > 0$;

Trade balance and current account balance have been presented here as in terms of export and imports demand "equilibrium" relationship [Goldstein and Khan: 1978, pp.1066]. In the real world, however the process of adjustment costs and of incomplete information implies that the adjustment of dependent variables to explanatory ones will not be instantaneous, i.e. importers and exporters will not always on their long run demand and supply schedule. Gauging the pattern and length of such time lags is important not only for obtaining forecasts of imports, exports and trade balance but also for evaluating many

related policy issues, e.g., exchange rate devaluation etc. Therefore a long run investigation has been attempted by the method of cointegration and error correction models have been used to trace the short run dynamic adjustment mechanism.

4.1.6. Data and Variables:

We use the quarterly data for the period 1972:1 to 2005:4 and 2000 as base year for the computation. The data have been taken from the IFS CD-ROM and various issues of IFS statistics.

i) Trade balance (TB)

Most of the studies define trade balance as the difference between exports and imports. Shirvani and Wilbratte (1997), Baharumshah (2000), and Chudhari (2000) prefer to define trade balance as a ratio of exports to imports instead of exports minus imports. Trade balance in terms of ratio has three advantages. First, the ratio is not sensitive to the units of measurement. Second, it obviates the need for an appropriate price index to express the trade balance in real terms. Third, it allows us to express in logarithmic form. Thus for our analysis we define the trade balance as a ratio of exports and imports of goods and services, i.e., lnTB=ln(X)-ln(M), where X includes both exports of goods and services, and M includes imports of goods and services.

ii) Current Account Balance (CAB)

Similarly for current account balance we use the ratio of all debit items in the current account balance to the credited items in the current account. Debit items includes exported goods and services, income received, transfers received by the county. While credit items include imports of goods and services, income and interest payments, transfers paid etc. The current account balance for our analysis has been defined as lnCAB = ln(debit items)-ln(credited items), and data has been taken from the IFS.

iv) Relative price (P)

Relative price is defined as the difference between the log of consumer price indexes of Pakistan and U.S (as representing foreign country). In using the consumer price index base year selection is a serious issue. We select 2000 as base year, for both domestic and foreign country prices. The data has been taken from the IFS CD-ROM for the period 1972:1 to 2005:4. For CPI (line 64) has been taken for both Pakistan and U.S.

v) Relative income (Y)

In Pakistan national income accounts data are compiled on annual basis[17]. In this study the Manufacturing production index is taken as a proxy for the real income because it is internationally acceptable practice in the literature. This proxy is useful in the case where we have to make comparison with other countries. Relative income is defined as the difference between the log of manufacturing production index (proxy for real income) of Pakistan and US manufacturing production index both at base 2000.

vi) Exchange Rate (e)

Exchange rate is the price of one currency in terms of other currency. Since like many other countries, Pakistan's major trading is in dollar, analysis of exchange rate in terms of US dollar is relevant. Since the Keynesian framework is basically the flow analysis of trade balance and current account balance, therefore the average exchange rate during that period is the most relevant than the exchange rate of end period. Exchange rate is defined as Rupees per Dollar value, and data has been taken from IFS CD-ROM (average rate i.e. line rf).

[17] However, estimated quarterly GDP series by Kemal and Arby (2004) are also available.

4.2 The Monetary Approach to Balance of Payments.

4.2.1 Theoretical construction of model:

We develop a model in which reserve flows are derived by using money demand and money supply relationships i.e., the core of the monetary approach to balance of payments. According to the monetary approach there is equilibrium in the money market when the money demand equals money supply. This can be defined as

$$M^s = M^d \qquad (4.2.1)$$

$$M^d = pL(i, y, \pi) \qquad (4.2.2)$$

Money demand is defined as a function of real income and interest rate (as the opportunity cost of holding money). In case of developing countries, inflation rate is also included as a determinant because people hedge against inflation. Thus the nominal money demand can be written as:

$$\log M^d = \beta_o + \beta_1 \log y + \beta_2 \log P + \beta_3 \log \pi + \beta_4 \log i$$

$$M^d = f(\overset{+}{y}, \overset{+}{p}, \overset{-}{\pi}, \overset{-}{i}) \qquad (4.2.3)$$

Where y denotes real income; p denotes price level; π is used to represent country's inflation rate and i denotes interest rate. The money supply function consists two components, domestic credit and foreign currency reserves, defined as:

$$M^s = mm(R + D) \qquad (4.2.4)$$

Where *mm* is money multiplier, R is reserves and D denotes domestic credit, which is under the control of monetary authorities. The money supply equation can be approximately[18] written as

$$\log M^s = \kappa_1 \log R + \kappa_2 \log D \qquad (4.2.5)$$

The crucial postulate of the monetary approach to balance of payments is that money demand function is stable. Because of this, money exerts a predictable influence on the economy, and money supply can be used as a policy tool by monetary authorities. (Frenkel and Johnson; 1976).

[18] Money supply is approximately written as the function of domestic credit and reserves for simplicity, as the money multiplies assumes to be constant over time.

Since money demand (4.2.3) is equal to money supply (4.2.4), the following reserves flow relationship has been obtained.

$$\log R_t = \frac{\beta_0}{\kappa_1} - \frac{\kappa_2}{\kappa_1}\log D_t + \frac{\beta_1}{\kappa_1}\log y_t + \frac{\beta_2}{\kappa_1}\log P_t + \frac{\beta_3}{\kappa_1} i + \frac{\beta_4}{k_1}\pi_t \qquad (4.2.6)$$

This relationship is constrained by the estimates of money demand function. It may be written as

$$\log R_t = \alpha_o - \alpha_1 \log D_t + \alpha_2 \log y_t + \alpha_3 \log P_t + \alpha_4 i + \alpha_5 \pi_t$$

$$R = f(\overset{+}{y}, \overset{+}{p}, \overset{-}{i}, \overset{-}{\pi}, \overset{-}{D}) \qquad (4.2.7)$$

Equation (4.2.7) that determines the balance of payments under monetary approach, states that country's reserve position is positively related to real income and prices. As both lead to increase the demand for money, there will be a capital inflow from abroad to fill the gap between money demand and money supply, as a result reserves will rise, and balance of payments situation will improve. Interest rate and inflation both have negative impact on the reserves, as both cause a negative impact on money demand, so excess money supply will flow abroad, reserve position will go down and balance of payments situation would get worse off. The core of the monetary approach to balance of payments is the domestic credit component that has a negative impact on country's reserve position. Whenever there is contraction in money supply owing to a contraction in the domestic credit, there will be reserve inflows and balance of payments situation will improve. In case of increase in the domestic credit, money supply is greater than its domestic money demand, the excess money supply will flow abroad, and reserves will go down and balance of payments will deteriorate. Similarly when there are reserves inflows (outflows), monetary authorities do respond to contraction (expansion) in domestic credit component.

Under fixed exchange rates, excess demand for money is satisfied by an inflow of money (reserves) from abroad to restore equilibrium in the money market, and balance of payments will improve. In case of managed floating exchange rate regime, the adjustment takes place through money supply components as well as through exchange rate adjustments. In free-floating exchange rate system, the whole adjustment takes place through adjustment in exchange rate. Pakistan practiced a truly fixed exchange rate

during (1972-1981) and managed float during (1982-1999), and beyond that the exchange rate system is relatively more market based but still can be characterized under managed floating system. Developing countries including Pakistan preferred to have a stable exchange rate and avoid appreciation even if there are large foreign currency inflows. This has been done intentionally to keep safe the interests of exporters in the international market. The managed floating exchange rate system remained in policy operation in actual terms during the entire period; therefore it provides a rationale to study Pakistan's balance of payments problem under the assumption of quasi-fixed exchange rate system[19], and reserves are endogenous in the system.

4.2.2 Empirical Estimation for Monetary Approach.

We have defined the reserve flow equation under monetary approach to balance of payments as follows.

$$\log R_t = \alpha_o + \alpha_1 \log D_t + \alpha_2 \log y_t + \alpha_3 \log P_t + \alpha_4 i + \tau \qquad (4.2.8)$$

Where α_o = constant, $\alpha_1 < 0$, $\alpha_2 > 0$; $\alpha_3 > 0$; and $\alpha_4 < 0$;

4.2.3 Data and Variables:

We use the quarterly data for the period 1972:1 to 2005:4. During this period Pakistan economy practiced a fixed and managed floating system which is also close to fixed exchange rate system, as state bank always intervened in the market to stabilize the exchange rate extensively. The data have been taken from the IFS CD-ROM and various issues of IFS statistics.

i) Foreign Reserves (R)

A country's overall external balance situation can be described by the foreign currency reserves accumulated. For this IFS (line 11.d), total reserves minus gold has been taken denominated in million U.S dollar. To convert it to rupees it is multiplied by the end period nominal exchange rate i.e., (line ae).

[19] Under flexible exchange rate system, all changes in the balance of payments are adjusted through the exchange rates adjustments and balances of payments remain in equilibrium i.e., no change in the international reserves. But in actual situation it is not zero as the economies do not let free the exchange rate on market forces. Therefore the analysis of balance of payments under the assumption of quasi-fixed exchange rate regime is relevant.

ii) Real income (Y)

For real income manufacturing production index has been used as proxy to represent the real income with base 2000 (line 66ey).

iii) Price level (P)

For prices, consumer price index with base 2000 (line 64) has been used as it represents more accurately the domestic prices than the wholesale price index.

iv) Interest Rate (i)

Call money rate is used (as an opportunity cost of holding money) as a proxy for the interest rate.

v) Inflation rate (π)

Inflation rate has been calculated from the consumer price index (base with 2000), as the first difference of logarithmic consumer price index (line 64).

vi) Domestic credit (D)

Domestic credit denominated in million rupees has been taken from the IFS CDROM as well.

4.3 A Synthesis of Monetary and Keynesian Approaches to Balance of Payments.

4.3.1 Theoretical Construction of Model.

The synthesis model, given by Frenkel, J.,Gylfason, T. & Helliwell, J. (1980) consists of the elements of both Monetary and Keynesian approaches and integrates goods market and aggregate supply equation in a unified framework. The Keynesian approach comprises the trade balance account and capital account, by adding the two components, balance of payments identity has been derived below.

Real Trade balance: $T = T(\bar{Y}, eP^{f\,+} / P^d)$ (4.3.1a)

Net Capital inflow: $F = F(\overset{+}{r})$ (4.31b)

Balance of payments identity:

$$\Delta R = PT + F \quad (4.3.1c)$$

$$\Delta R = PT(\bar{Y}, \overset{+}{eP^{f}} / P^d) + F(\overset{+}{r}) \quad (4.3.1)$$

According to equation (4.3.1), trade balance is inversely related to its income and price level, as former causes the imports to increase and latter causes the exports to decrease, hence trade balance deteriorates. Exchange rate devaluation has positive impact on trade balance; under the Marshal- Lerner condition.

The Monetary approach to BOP

Money Market: $M^s = M^d$ (4.3.2a)

Money demand function: $M^d = L(\overset{+}{P^d}, Y, \bar{r})$ (4.3.2b)

Money supply: $M^s = R + D$ (4.3.2c)

Balance of payments:

$$R = L(\overset{+}{P}, \overset{+}{Y}, \bar{r}) - D \quad (4.3.2)$$

Monetary approach to balance of payments focuses on the money market equilibrium identity, i.e., money demand is equal to money supply. And any disequilibrium in this identity creates disequilibrium in external balance. Money supply consists of mainly two components; international reserves and domestic credit component. The money demand

function is positively related to real income and price level and negatively related to the interest rate.

Introduce the income and expenditure equation and a simple aggregate supply equation in to the system IS Equation (Goods market)

$$Y = E(\overset{+}{Y}, \overset{-}{r}) + G + T(\overset{-}{Y}, eP^{f\,+} / P^{d}) \qquad (4.3.3)$$

and Aggregate supply equation is

$$Y = Y(\overset{+}{P^{d}}) \qquad (4.3.4)$$

Equation (4.3.3) shows domestic output as the sum of private final expenditure (E), government expenditure (G), and net exports (T), and Equation (4.3.4) is a standard aggregate supply function that can be derived from equilibrium condition in the labor market. First, the aggregate supply equation (4.3.4) is solved for P by writing;

$$P^{d} = P^{d}(\overset{+}{Y}) \quad \text{Inverse supply function} \qquad (4.3.5)$$

Then using Equation (4.3.5) and the income/expenditure equation (4.3.3) is solved for "r" (interest rate) by writing:(see details in appendixA.).

$$r = r(\overset{-}{Y}, \overset{+}{G}, \overset{+}{e}) \qquad (4.3.6)$$

In the equation (4.3.6) which is derived from equation (4.3.3), interest rate is negatively related to Y, and positively related to G and e. when government expenditures increase, IS curve shifts to the right, less money is available to the public, leading to an increase in the interest rate. Similarly with the exchange rate devaluations, IS curve shifts to the right as trade balance improves (under the Marshall-Lerner condition), and interest rate goes up.

Substituting equations (4.3.5) and (4.3.6), into the balance of payments equation (4.3.1) and (4.3.2), gives the following relationships between R and Y.

Keynesian approach (Ka schedule)

$$R = \overset{-}{k}_1 Y + \overset{+}{k}_2 G + \overset{+}{k}_3 e + R_{-1} \qquad (4.3.7)$$

Where $k_1 = \dfrac{\partial PT}{\partial Y} + \dfrac{\partial F}{\partial r}.\dfrac{\partial r}{\partial Y} < 0$, $\quad k_2 = \dfrac{\partial F}{\partial r}.\dfrac{\partial r}{\partial G} > 0;$ $\quad k_3 = \dfrac{\partial PT}{\partial e} + \dfrac{\partial F}{\partial r}.\dfrac{\partial r}{\partial e} > 0;$

Ka-schedule captures the relationship between the variables under the Keynesian approach. Reserves are negatively related to country income level, as income rises, imports will rise and trade balance will deteriorate, so reserves will go down. The exchange rate devaluation has a positive impact on reserves through positive impact on trade balance and interest rate. Similarly government expenditure and exchange rate devaluation, both have positive impact on interest rate. The high interest rate will lead to capital inflow and reserves will go up so balance of payments will improve.

Monetary approach (Ma-schedule)

$$R = \overset{+}{m}_1 Y + \overset{-}{m}_2 G + \overset{-}{m}_3 e + m_4 D \qquad (4.3.8)$$

Where

$$m_1 = \frac{\partial L}{\partial Y} + . \frac{\partial L}{\partial r} . \frac{\partial r}{\partial Y} > 0; \qquad m_2 = \frac{\partial L}{\partial r} . \frac{\partial r}{\partial G} < 0; \quad m_3 = \frac{\partial L}{\partial r} . \frac{\partial r}{\partial e} < 0;$$

$$m_4 = 1$$

Under monetary approach to the balance of payments, the govt. expenditure and exchange rate devaluation cause the interest rate to rise, that negatively impacts the money demand, so if money demand goes down, excess money supply will flow abroad, thus reserves will go down and balance of payments will deteriorate. In case of increase in income, it leads to increase in price level, as well as the money demand, thus there will be inflow of money from abroad, reserves will go up. Therefore reserves are positively related to income, and negatively with the government expenditure and exchange rate devaluation.

We can see from the above discussion that same policies have different effects on the balance of payments. Therefore it is essential for policy makers to clearly understand the structure followed by the country's balance of payment. It may also possible that both approaches apply to some extent, or monetary approach effects dominate the Keynesian approach or Keynesian approach effects dominate the monetary approach. The validity of the approach depends on the sign and coefficient values of the determinants.

The synthesis model, given by Frenkel, J.,Gylfason, T. & Helliwell, J. (1980) is more suitable model that permits the short-run endogeneity of Y, P and r to be explicitly taken into account, to show the consequences of different stabilization policies under both the

two approaches to the balance of payments. These relationships have been derived from a unified model than the earlier partial ones. Hence, we can say that it gives a more comprehensive picture of the balance of payments and its determinants.

4.3.2 Empirical Estimation for Synthesis Model.

4.3.2a The Keynesian equation

Synthesis of Monetary and Keynesian approaches can be estimated as:

$$R = \overset{-}{k}_1 Y + \overset{+}{k}_2 G + \overset{+}{k}_3 e + k_4 R_{-1} + \mu \qquad (4.3.9)$$

Where $k_1 < 0; k_2 > 0; k_3 > 0; k_4 = 1; \mu = \text{error term}$

According to the Keynesian approach real income has a negative impact on reserves while government expenditure and exchange rate both have positive impact on the reserves position, the former causes the capital inflow and the latter increases the exports price competitiveness in the international market, thus improving the balance of payments situation. In case of Keynesian approach domestic credit (D) has no effect on the international reserve level (R). (See details in appendix A and B)

4.3.2b The Monetary equation

$$R = \overset{+}{m}_1 Y + \overset{-}{m}_2 G + \overset{-}{m}_3 e + m_4 D + \psi \qquad (4.3.10)$$

Where $m_1 > 0; m_2 < 0; m_3 < 0; m_4 = -1; \psi = \text{error term}$

Under the monetary equation reserves are positively related to real income, as it cause the money demand to rise having a resultant capital inflow. The government expenditure and exchange rate have negative impact as both cause the interest rate to rise, having negative impact on money demand thus there will be capital outflow. The core of the monetary approach is that the domestic credit component has a negative impact on reserves. (See details in appendix A and B)

4.3.3 Data and Variables:

i) Nominal Reserves (R)

A country's overall external balance situation can be described by the foreign currency reserves accumulated. For this Total reserves minus Gold has been taken denominated in million U.S dollar has been taken. To convert it into rupees, multiplied by the end of period nominal exchange rate.

ii) Real Income (Y)

For synthesis model, Gross domestic product (GDP) estimated by Kemal and Arby (2004) is used. Kemal and Arby (2004) GDP series is estimated at 1980-81 prices, for current analysis the series has been adjusted through conversion method to have consistent GDP series at 2000-01 prices.

iii) Nominal domestic credit (D)

Total domestic credit includes domestic credit to government and domestic credit to private sector. For domestic credit denominated in million rupees (line 32) of IFS has been taken.

iv) Real Government Expenditure (G)

Like other national income accounts data, expenditures in Pakistan are also compiled on annual basis and no other series have been available for use. For this I have utilized the information from financing approach and revenues side to quarterize the govt. expenditures.

$$BD_t = \mathrm{Re}venue_t - Expenditure_t$$
$$Expenditure_t = BD_t + Rvenue_t$$
$$BD = BankBorrowing + Nonbankborrowing$$

Budget deficit is equal to government borrowing from banks and non-banks sources. For this data has been collected on bank borrowing and public borrowing (that include NSS and other savings schemes). Quarterly factors for tax revenues have been obtained from the quarterly available tax revenue data, it is assumed that this pattern is true in case of total collected tax revenues. By multiplying the quarterly tax factor with the annual tax revenues, quarterly tax revenue series has been generated. These revenues are then added in to quarterly budget deficit to estimate the quarterly expenditures.

v) Nominal Exchange Rate (e)

Exchange rate is the price of one currency in terms of another currency. Since like many other countries, Pakistan's major trading involves the dollar, so analysis of exchange rate in terms of dollar is relevant. Exchange rate is defined as rupees per dollar value, and data has been taken from IFS (market rate line ae).

Appendix A

$$Y = E(\overset{+}{Y}, \overset{-}{r}) + G + T(\overset{-}{Y}, eP^{\overset{+}{*}} / P)$$
$$dY = E_Y dY + E_r dr + dG + T_Y dY + T_e de$$
$$(1 - E_Y - T_Y)dY = E_r dr + dG + T_e de$$

$$\frac{dr}{dY} = \frac{1 - E_Y - T_Y}{E_r} = \frac{(+ve)}{(-ve)} < o; \qquad \frac{dr}{dG} = \frac{-1}{E_r} = \frac{-ve}{-ve} > 0;$$

$$\frac{dr}{de} = \frac{-T_e}{E_r} = \frac{-(+ve)}{-ve} > 0;$$

Appendix B

$$k_1 = \frac{\partial PT}{\partial Y} + \frac{\partial F}{\partial r}.\frac{\partial r}{\partial Y} < 0, \qquad k_2 = \frac{\partial F}{\partial r}.\frac{\partial r}{\partial G} > 0; \qquad k_3 = \frac{\partial PT}{\partial e} + \frac{\partial F}{\partial r}.\frac{\partial r}{\partial e} > 0;$$

$$m_1 = \frac{\partial L}{\partial Y} + .\frac{\partial L}{\partial r}.\frac{\partial r}{\partial Y} > 0; \qquad m_2 = \frac{\partial L}{\partial r}.\frac{\partial r}{\partial G} < 0; \quad m_3 = \frac{\partial L}{\partial r}.\frac{\partial r}{\partial e} < 0;$$

$$m_4 = -1$$

Part II. Econometric Methodology and Quantitative Techniques.

The study uses a three-step methodology to estimate the long run relationship as well as the short run adjustment dynamics among the variables under three approaches to balance of payments. The following steps have been undertaken to estimate the final version of the model.

STEP I: The uni-variate analysis of time series.

STEP II: The multivariate co integration analysis and the estimation of the long run relationships by using the Johansen (1988) maximum likelihood method.

STEP III: Estimate a parsimonious error correction model for the above discussed models.

4.4 Uni-variate Analysis.

The first step in the empirical analysis comprises of uni-variate time series analysis. In this study as we are dealing with annually as well as quarterly data, therefore HEGY (1992) seasonal unit root has been used in case of quarterly data to test the stationarity properties of the data series.

4.4.1 Seasonal unit root test:

A time series is said to be seasonally integrated if the Δ4 filter is needed to make it stationary and the time series is said to have seasonal unit roots. The HEGY test is a test for seasonal and non-seasonal unit root in a quarterly time series. The HEGY test is a test for the appropriateness of Δ4 versus its nested components like (1-L) or (1+L). The HEGY test is based on a result on the decomposition of polynomials.

The test is based on the following auxiliary regression

$$\Delta_4 y = \sum_{s=1}^{4} \alpha_s D_{st} + \gamma T + \pi_1 y_{1,t-1} + \pi_2 y_{2,t-1} + \pi_3 y_{3,t-2} + \pi_4 y_{3,t-1} + \sum_{i=1}^{k} \phi_i \Delta_4 y_{t-i} + \varepsilon_t$$

Where D_{st} are seasonal dummies. T is the trend, and

$$y_{1t} = (1 + L + L^2 + L^3)y_t$$
$$y_{2t} = -(1 - L + L^2 - L^3)y_t$$
$$y_{3t} = -(1 - L^2)y_t$$

If $л_{1=0;}$ the series contains a unit root test at the zero frequency which implies that the series contains a non-seasonal stochastic trend. If $л_{2=0;}$ the series contains biannual unit root. If $л3= л_{4=0;}$ the series contains the roots **í** and **– í,** i.e. seasonal unit roots at annual frequencies.

Hypothesis.		Unit roots	Appropriate Filter
A	$л_{1=0}$	Unit root at zero frequency	(1-L)
B	$л_{2=0}$	Bi-annual unit root.	(1+L)
C	$л3= л_{4=0}$	Seasonal unit root	$(1+L^2)$

Simulated critical values for the t-tests for the significance of $л_{1\ and}$ л2, and F-test for the joint significance of $л_3$ and л4 are compared with tabulated value of HEGY (1992). The results of Monte Carlo study by Hylleberg (1995) shows that the size and power of the HEGY test is reasonable when the data generating process is an AR process. However, the HEGY test performs poorly in the presence of the MA process and cannot cope with very weakly changing seasonal components in addition to a strong deterministic seasonal pattern.

An important problem is how many lags of dependent variable have to be included in the equation. With the increase in number of lags we lose degrees of freedom, and the optimal criteria are to include as many lags necessary to remove the serial correlation. To check serial correlation LM (Lagrange Multiplier) test has to be applied at lag one and at lag four in case of quarterly data frequency.

4.5. The Multivariate Cointegration Analysis.

The second and most important step of methodology deals with the theory of cointegration. For the analysis of long run relationship among the variables, Johansen (1988), Johansen and Juselius (1990) method of cointegration has been used (for detailed methodology please see Appendix. A).

Johansen's procedure applies maximum likelihood to the VAR model, assuming that the errors are gaussian.

Start

$$Y_t = A_t Y_{t-1} + \cdots + A_k Y_{t-k} + U_t, \qquad t = 1,\ldots,T$$

Where Y_t is an n-vector of I (1) variables.

Write it as

$$\Delta Y_t = B_1 Y_{t-1} + B_2 \Delta Y_{t-1} + \cdots + B_k \Delta Y_{t-k+1} + U_t$$

Where $B_1 = -I + \sum_{i=1}^{k} A_i,$ For j = 2,…,T

$$B_j = -\sum_{i=j}^{k} A_i$$

Since $\Delta Y_t,\ldots,\Delta Y_{t-k+1}$ are all I (0) but Y_{t-1} is I (1), in order that this equation be consistent, B_1 should not be of full rank. Let its rank be r. Write

$$B_1 = \alpha\beta'$$

Where α is an n x r matrix and β' s an r x n matrix. Then $\beta' Y_{t-1}$ are the r cointegrated variables, β' is the matrix of coefficients of the cointegrated vectors and α has the interpretation of the matrix of error correction terms.

4.6 The Error Correction Model.

We have used here the general to specific approach proposed by the Hendry (1994) to estimate the parsimonious error correction model. To estimate ECM, following cases have been used.

4.6.1 Error Correction Model with separate Drift.

$$\Delta X_t = \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-1} + \alpha\beta' X_{t-1} + \mu + \Psi D_t + \varepsilon_t \qquad (1.6)$$

This is the case of the stochastic cointegration. A (separate) drift term in the ECM implies the first-differenced variables in the ECM do not have the same mean. And thus the level variables may have different growth patterns (though they have common stochastic growth patterns).

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Appendix C. Multivariate Cointegration Analysis, Error Correction Modeling and Diagnostic tests

C.1 Johansen and Juselius method of cointegration.

Johansen's procedure applies maximum likelihood to the VAR model, assuming that the errors are Gaussian.

(i) Start

$$Y_t = A_t Y_{t-1} + \cdots + A_k Y_{t-k} + U_t, \qquad t = 1,\ldots,T$$

Where Y_t is an n-vector of I (1) variables.

(ii) Write it as

$$\Delta Y_t = B_1 Y_{t-1} + B_2 \Delta Y_{t-1} + \cdots + B_k \Delta Y_{t-k+1} + U_t$$

Where $B_1 = -I + \sum_{i=1}^{k} A_i$, For j = 2,…,T

$$B_j = -\sum_{i=j}^{k} A_i$$

(iii) Since $\Delta Y_t, \ldots, \Delta Y_{t-k+1}$ are all I (0) but Y_{t-1} is I (1), in order that this equation be consistent, B_1 should not be of full rank. Let its rank be r. Write

$$B_1 = \alpha\beta'$$

Where α is an n x r matrix and β' s an r x n matrix. Then $\beta' Y_{t-1}$ are the r cointegrated variables, β' is the matrix of coefficients of the cointegrated vectors and α has the interpretation of the matrix of error correction terms.

(iv) Since our interest is in α and β', we eliminate $B_{2\ldots}$ B_k first. To do this we proceed as follows. Regress ΔY_t on $\Delta Y_{t-1,\ldots}$ $\Delta Y_{t-k+1.}$ Get the residuals and call them $R_{ot.}$ Regress Y_{t-1} on these same variables. Get the residuals and call them $R_{1t.}$ Now our regression equation is reduced to

$$R_{ot} = \alpha\beta' R_{1t} + \mu_t$$

This is a multivariate regression problem. Define

$$\begin{bmatrix} s_{00} & s_{01} \\ s_{10} & s_{11} \end{bmatrix}$$

as the matrix of sums of squares and sum of products of Rot and $R_{1t.}$ (Each of these matrices is of order n x n). Johansen (1991) shows that the asymptotic

variance of $\beta' R_{1t}$ is $\beta' \sum_{11} \beta$, the asymptotic variance of R_{ot} is Σ_{00} the asymptotic covariance matrix of $\beta' R_{1t}$ and R_{ot} is $\beta' \sum_{10} \beta$ where Σ_{00}, Σ_{10}, and Σ_{11} are the population counterparts of S_{00}, S_{10} S_{11}.

(v). We shall maximize the likelihood function with respect to α holding β constant and then maximize with respect to β in the second step. We get

$$\hat{\alpha}' = (\beta' S_{11} \beta)^{-1} \beta' S_{10}$$

Note that $\hat{\alpha}'$ is an (r x n) matrix and the conditional maximum of the likelihood function is given by

$$\left[L(\beta)\right]^{-2/T} = \left| S_{00} - S_{01}\beta(\beta' S_{11}\beta)^{-1}\beta' S_{10} \right|$$

Maximization of the likelihood function with respect to β implies minimization of this determinant with respect to β.

(vi) We shall use the identity

$$\left|C - B'A^{-1}B\right| = \frac{\left|A - BC^{-1}B' \cdot \right|C|}{|A|}$$

With $C=S_{00}$, $A = \beta' S_{11} \beta$, and $B = \beta' S_{10}$. We then have to minimize

$$\frac{\left|\beta' S_{11}\beta - \beta' S_{10} S_{00}^{-1} S_{01}\beta\right| \cdot |S_{00}|}{|\beta' S_{11}\beta|}$$

But

$$\min_x \frac{|X'(A_1 - A_2)X|}{|X'A_1X|}$$

is given by the maximum characteristic root of the equation $|A_2 - \lambda A_1| = 0$. Thus, substituting $A_1=S_{11}$ and $A_2 = S_{10}S_{00}^{-1}S_{01}$, we get the maximum of the likelihood function by solving the eigenvalue problem

$$\left|S_{10}S_{00}^{-1}S_{01} - \lambda S_{11}\right| = 0$$

Or finding the eigenvalue of

$$\left|S_{11}^{-1}S_{10}S_{00}^{-1}S_{01} - \lambda I\right| = 0 \qquad (1.1)$$

But the roots of this equation are the r canonical correlations between R_{1t} and R_{0t}. That is we seek those linear combinations of Y_{t-1} that are highly correlated with linear combination of ΔY_t after conditioning on the lagged variables $\Delta Y_{t-1},\ldots,\Delta Y_{t-k+1}$.

(vii) Note that if the eigenvalues of A are λ_i, the eigenvalues of (I-A) are $(1-\lambda_i)$. Hence if λ_i are the canonical correlations given by solving equation (5.6), then $(1-\lambda_i)$ are the eigenvalues of $(I - S_{11}^{-1}S_{10}S_{00}^{-1}S_{01})$.

(viii) Since the value of the determinant of a matrix is equal to the product of its eigenvalues, we have

$$\prod_{i=1}^{n}(1-\lambda_i) = \left|I - S_{11}^{-1}S_{10}S_{00}^{-1}S_{01}\right| = \frac{\left|S_{11} - S_{10}S_{00}^{-1}\right\}}{\left|S_{11}\right|}$$

Again using the determinant identity in (vi) we get this equal to

$$\frac{\left|S_{00} - S_{01}S_{11}^{-1}S_{01}\right|}{\left|S_{00}\right|}$$

Hence
$$L_{\max}^{-2/T} = \left|S_{00}\right| \cdot \prod_{i=1}^{n}(1-\lambda_i) \qquad (1.2)$$

Note that this result corresponds to the result for the normal multiple regression model

$$L_{\max}^{-2/T} = cons\tan t \cdot (y'y)(1-R^2)$$

$y'y$ is replaced by the generalized variance $\left|S_{00}\right|$ and 1-R^2 is replaced by $\prod_{i=1}^{n}(1-\lambda_i)$; Where λ_i are the canonical correlations.

(ix) To determine the number of CI vectors Johansen (1992) suggests two tests; the trace test and the maximum eigenvalue test.

The trace test, tests the hypothesis that there are at most r cointegrating vectors. The second called the maximum eigenvalue test, tests the hypothesis that there are r +1 cointegrating vectors. Johansen and Juselius (1990) suggest that the maximum eigenvalue test may be better.

i) Trace Test.

Result (1.2) shows that the maximum of the likelihood function is given by

$$-2\log L_{\max} \propto T\sum_{i=1}^{n}\ln(1-\lambda_i)$$

Where λ_i are the roots of the determinant equation (1.1). The LR test statistic for the hypothesis of at most r cointegrating vectors is

$$\lambda_{trace} = -T\sum_{i=r+1}^{n}\ln(1-\hat{\lambda}_i)$$

Where $\hat{\lambda}_{r+1},...,\hat{\lambda}_n$ are the (n-r) smallest eigenvalues of the determinant equation (5.6). The asymptotic distribution of this statistic is given by the trace of the stochastic matrix.

$$\int_0^1 (dw)w'(\int_0^1 ww'dr)^{-1}\int_0^1 w(dw)' \qquad (1.3)$$

Where w is an (n-r) dimensional Brownian motion. In case there are a constant and or a trend term in the VAR model, we start with, (6.8) is changed to

$$\int_0^1 (dw)\widetilde{w}'(\int_0^1 \widetilde{w}\widetilde{w}'dr)^{-1}\int_0^1 \widetilde{w}(dw)' \qquad (1.4)$$

Where $\widetilde{w}$ is the demeaned or detrended Brownian motion.

ii) Maximum Eigen Value Test.

To estimate the null hypothesis of r cointegrating vectors versus the alternative of (r+1) cointegrating vectors the LR test statistic is

$$\lambda\max = -T\ln(1-\hat{\lambda}_{r+1})$$

The asymptotic distribution of this statistic are given by the maximum eigenvalue of the stochastic matrix (1.3) and (1.4) according to the different specification of deterministic trends in the VAR model.

Detailed tables of critical values for these tests are provided in Osterwald-Lenum (1992) who tabulates them for systems of order n<11, and number of cointegrating vectors 0 to n (0 implying all linear combinations are I (1) and n implying that all the variables are stationary. He also tabulates them for different cases of constant and /or trend terms included.

The Johansen method gained widespread popularity; particularly as we have seen in (1.3) and (1.4) the asymptotic distributions of test statistics are different according to the different specifications of deterministic trends in the VAR model. Moreover, when we construct the ECM from the VAR model, the deterministic terms in the ECM may differ from those in the VAR model. When there is deterministic cointegration relationship among variables, deterministic trend terms in the VAR model will not be present in the ECM model. On the other hand if there are stochastic cointegration relationship, deterministic trend terms appear in the ECM. But in this case there is only one possibility that involve the deterministic trend via the error correction term (so there is no separate drift term in the ECM). Thus the critical values of table should be used according to the following cases.

C.2 The Error Correction Model.

We have used here the general to specific approach proposed by Hendry (1994), to estimate the parsimonious error correction model. To estimate ECM, following cases have been used.

Error Correction Model with separate Drift.

$$\Delta X_t = \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-1} + \alpha\beta' X_{t-1} + \mu + \Psi D_t + \varepsilon_t \qquad (1.6)$$

This is the case of the stochastic cointegration. A (separate) drift term in the ECM implies the first-differenced variables in the ECM do not have the same mean. And thus the level variables may have different growth patterns (though they have common stochastic growth patterns).

C.3 Diagnostic Tests.

Diagnostic tests that are applied involve the Serial Correlation Lagrange Multiplier (LM) test; ARCH LM Test; White's Hetrocedasticity Test; Jerque-Bera Normality test; Ramsey (1969) RESET test; and for model stability, CUSUM, CUSUM of squares graphs.

C.3.1 Serial Correlation LM Test

This test is an alternative to the Q-statistics for testing serial correlation. The test belongs to the class of asymptotic (large sample) tests known as Lagrange Multiplier (LM) tests. Unlike the Durbin-Watson statistic for AR (1) errors, the LM test may be used to test for higher order ARMA errors, and is applicable whether or not there are lagged dependent variables. Therefore, its use is recommended whenever errors exhibit autocorrelation.

The null hypothesis of the LM test is that there is no serial correlation up to lag order p, where p is a pre-specified integer. The local alternative is ARMA(r,q) errors, where the number of lag terms p = max{r,q}. Note that the alternative includes both AR (p) and MA(q) error processes, and that the test may have power against a variety of autocorrelation structures [Godfrey (1988)].

The test statistic is computed by an auxiliary regression as follows: suppose the estimated the regression

$$y_t = X_t b + e_t$$

Where e are the residuals. The test statistic for lag order p is based on the regression

$$e_t = X_t \gamma + \alpha_1 e_{t-1} + \alpha_2 e_{t-2} + \cdots + \alpha_p e_{t-p} + \upsilon_t$$

This is a regression of the residuals on the original regressors X and lagged residuals up to order p. The F-statistic is an omitted variable test for the joint significance of all lagged residuals. Because the omitted variables are residuals and not independent variables, the exact finite sample distribution of the F-statistic under Ho is not known, but we still present the F-statistic for comparison purposes.

The Obs*R-squared statistic is the Brush-Godfrey(1981) LM test statistic. This LM statistic is computed as the number of observations, times the (uncentered) R^2 from the test regression. Under quite general conditions, the LM test statistic is asymptotically distributed as a $\chi^2(p)$.

C.3.2 ARCH LM Test

This is a Lagrange multipler (LM) test for autoregressive conditional heteroskedasticity (ARCH) in the residuals (Engle 1982). This particular specification of heteroskedasticity was motivated by the observation that in many financial time series, the magnitude of residuals appeared to be related to the magnitude of recent residuals.

ARCH in itself does not invalidate standard LS inference. However, ignoring ARCH effects may result in loss of efficiency. The ARCH LM test statistic is computed from an auxiliary test regression. To test the null hypothesis that there is no ARCH up to order q in the residuals, we run the regression

$$e_t^2 = \beta_o + \beta_1 e_{t-1}^2 + \beta_2 e_{t-2}^2 + \cdots + \beta_q e_{t-q}^2 + \upsilon_t$$

Where e is the residual. This is a regression of the squared residuals on a constant and lagged squared residuals up to order q. The F-statistic is an omitted variable test for the joint significance of all lagged squared residuals. The Obs*R-squared statistic is Engle's LM test statistic, computed as the number of observations times the R^2 from the test regression. The exact finite sample distribution of the F-statistic under Ho is not known but the LM test statistic is asymptotically distributed $\chi^2(q)$ under quite general conditions.

C.3.3 White's Heteroskedasticity Test

This is a test for heteroskedasticity in the residuals from a least squares regression (White,1980). Ordinary least squares estimates are consistent in the presence of heteroskedasticity, but the conventional computed standard errors are no longer valid. If there is evidence of heteroskedasticity, there are two options: either choose the robust standard errors option to correct the standard errors or, model the heteroskedasticity to obtain more efficient estimates using weighted least squares.

White's test is a test of the null hypothesis of no heteroskedasticity against heteroskedasticity of some unknown general form. The test statistic is computed by an auxiliary regression, where we regress the squared residuals on all possible (nonredundant) cross products of the regressors. For example, suppose we estimated the following regression:

$$y_t = b_1 + b_2 x_t + b_3 z_t + e_t$$

The test statistic is then based on the auxiliary regression:

$$e_t^2 = \alpha_o + \alpha_1 x_t + \alpha_2 z_t + \alpha_3 x_t^2 + \alpha_4 z_t^2 + \alpha_5 x_t z_t + \upsilon_t$$

The F-statistic is an omitted variable test for the joint significance of all cross products, excluding the constant. It is presented for comparison purposes. The Obs*R-squared statistic is White's test statistic, computed as the number of observations times the centered R^2 from the test regression. The exact finite sample distribution of the F-

statistic under Ho is not known, but White's test statistic is asymptotically distributed as χ^2 with a degrees of freedom equal to the number of slope coefficients (excluding the constant) in the test regression. White also describes this approach as a general test for model misspecification, since the null hypothesis underlying the test assumes that the errors are both homoskedastic and independent of the regressors, and that the linear specification of the model is correct. Failure of any one of these conditions could lead to a significant test statistic. Conversely, a non-significant test statistic implies that none of the three conditions is violated.

C.3.4 Jerque-Bera Normality test.

Jerque-Bera(1980) is a test statistic for testing whether the series is normally distributed. The test statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution. The statistic is computed as:

$$JB = \frac{N-k}{6}\left(S^2 + \frac{1}{4}(K-3)^2 \right)$$

Where S is the skewness, K is the kurtosis, and k represents the number of estimated coefficients used to create the series.

Under the null hypothesis of a normal distribution, the Jerque-Bera statistic is distributed as with 2 degrees of freedom. The reported probability is the probability that a Jerque-Bera statistic exceeds (in absolute value) the observed value under the null hypothesis-a small probability value leads to the rejection of the null hypothesis of a normal distribution.

C.3.5 Ramsey's RESET Test

RESET stands for Regression Specification Error Test and was proposed by Ramsey (1969). The classical normal linear regression model is specified as

$$y = X\beta + \varepsilon ,$$

Where the disturbance vector is presumed to have the multivariate normal distribution $N(0,\sigma^2 I)$. Specification error is an omnibus term, which covers any departure from the assumptions of the maintained model. Serial correlation, heteroskedasticity, or non-normality of all violate the assumption that the disturbances are distributed $N(0,\sigma^2 I)$. Tests for these specification errors have been described above. In contrast, RESET is a general test for the following types of specification errors:

- Omitted variables; X does not include all relevant variables.
- Incorrect functional form; some or all of the variables in y and X should be transformed to logs, powers, reciprocals, or in some other way.
- Correlation between X and ε, which may be caused by measurement error in X, simultaneous equation considerations, combination of lagged y values and serially correlated disturbances.

Under such specification errors, LS estimators will be biased and inconsistent, and conventional inference procedures will be invalidated. Ramsey (1969) showed that any or all of these specification errors produce a non-zero mean vector for e. Therefore, the null and alternative hypotheses of the RESET test are

$$Ho: \varepsilon \sim N(0, \sigma^2 I)$$

$$H_1 : \varepsilon \sim N(0, \sigma^2 I), u \neq 0$$

The test is based on an augmented regression

$$y = X\beta + Z\gamma + \varepsilon .$$

The test of specification error evaluates the restriction γ= 0. The crucial question in constructing the test is to determine what variables should enter the Z matrix. Note that the Z matrix may, for example, be comprised of variables that are not in the original specification, so that the test of γ = 0 is simply the omitted variables test described above. Output from the test reports the test regression and the F-statistic and Log likelihood ratio for testing the hypothesis that the coefficients on the powers of fitted values are all zero. A study by Ramsey and Alexander (1984) showed that the RESET test could detect specification error in an equation which was known a priori to be mis-specified but which nonetheless gave satisfactory values for all the more traditional test criteria—goodness of fit, test for first order serial correlation, high t-ratios.

C.3.6 CUSUM test.

The CUSUM test is based on the cumulative sum of the recursive residuals. This test plots the cumulative sum together with the 5% critical lines. The test finds parameter instability if the cumulative sum goes outside the area between the two critical lines.

The CUSUM test is based on the statistic

$$W_t = \sum_{r=k+1}^{t} w_r / s_t \qquad t = k+1,\ldots T$$

Where w is the recursive residual defined above, and s is the standard error of the regression fitted to all T sample points. If the b vector remains constant from period to period, $E[W_t] = 0$, but if β changes it tend to diverge from the zero mean value line. The significance of any departure from the zero line is assessed by reference to a pair of 5% significance lines, the distance between which increases with t. The 5% significance lines are found by connecting the points

$[k, \pm 0.948(T-k)^{1/2}]$ and $[T, \pm 3 \times 0.948(T-k)^{1/2}]$

Movement of Wt outside the critical lines is suggestive of coefficient instability.

C.3.7 CUSUM of Squares Test.

The CUSUM of squares test is based on the test statistic

$$s_t = \sum_{r=k+1}^{t} w_r^2 / \sum_{r=k+1}^{T} w_r^2$$

The expected value of S under the hypothesis of parameter constancy is

$$E[s_t] = (t-k)/(T-K)$$

Which goes from zero at t=k to unity at t=T. The significance of the departure of S from its expected value is assessed by reference to a pair of parallel straight lines around the expected value. The CUSUM of squares test provides a plot of against t and the pair of 5 percent critical lines. As with the CUSUM test, movement outside the critical lines is suggestive of parameter or variance instability. For a table of significance lines for the CUSUM of squares test. [See Brown, Durbin, and Evans (1975) or Johnston and Dinardo (1997, Table D.8)].

C.3.8 Exogeneity Test

The only exception to the short run forecastibility condition of a cointegrated relationship is if a variable is statistically exogenous to the long run equilibrium. Thus a variable may not respond by adjusting to the new equilibrium if it is statistically exogenous.

Johansen (1992) proves that explanatory variable is weakly exogenous if it does not react to any of the disequilibrium errors in the equation. Therefore for weak exogeneity to be present in the system α's in other explanatory variables equation must be equal to zero, and only respond to lagged changes in vector Δxi. In this case the parameter β only

appears in the first equation, and the estimated single equation is fully efficient in describing the long run relationship.

A stronger form of exogeneity is also possible; if with the weak exogeneity the explanatory variables do not granger caused by the changes in endogenous variable. In this case, we say explanatory variable is strongly exogenous since it does not respond to either lagged changes in endogenous variable or any of *the* disequilibrium errors βxt.

5.Empirical Evidence on the Keynesian Approach to Balance of Payments in case of Pakistan.

A country's external position can be represented by mainly two accounts, trade balance account and current account balance. Trade balance includes the exports and imports of goods and services. The current account is a broader concept than trade in describing a country's transactions with other foreign countries as it includes income receipts and payments as well as unilateral transfers. Under Keynesian approach we have included both trade balance and current account balance in our analysis.

5.1. Seasonal Unit Roots

The first step is the uni-variate analysis of individual series for analyzing the statistical properties and HEGY (1990) seasonal unit root test has been used for that purpose. The HEGY seasonal unit root test results with the appropriate lag selection that ensures the white noising of residuals are reported in Table.5.1.

The results show the existence of unit root at zero frequency for all the series and rejects the hypothesis of unit roots at seasonal frequencies, implying that all the series are non-stationary at zero frequency and stationary at seasonal frequencies. To test the order of integration, the same test has been applied by taking first difference of series. The results show that series are stationary at first difference thus implying that series are integrated of order 1, or we can say series are difference stationary. So our data series qualify for the existence of long run relationships, and we can use Johansen (1988) and Johansen and Juselius (1990) method of cointegration (that is based on the existence of unit root at zero frequency).

Table: 5.1. Hegy Seasonal Unit Root Results.

Series	Lag	Deterministic	HA=t:$\pi_{1=0}$	HB=t:$\pi_{2=0}$	HC; F ($\pi_3=\pi_{4=0}$)
Y	3	(C, T, SD)	-1.76	-2.90*	6.29*
Δy	0	(C, SD)	-5.88***	-3.18**	5.35*
E	0	(C, T)	--2.57	-9.80**	73.98**
Δe	0	(C)	-5.88***	-7.42***	79.23***
P	4	(C, T, SD)	-3.03	-3.81***	27.36***
Δp	4	(C, SD)	-3.04*	-3.07**	20.78***
Ltbp	0	(C, T, SD)	-2.88	-3.99***	31.92***
Δltbp	0	(C, SD)	-6.77***	4.126***	30.60***
Lcab	0	(C, T, SD)	-3.02	-5.57***	48.07***
Δlcab	0	(C, SD)	-6.49***	-4.62***	28.57***

**All data have been taken from IFS (CD ROM) and various issues of IFS.

5.2. Multivariate Analysis for Trade Balance.

The second step involves estimating the long run relationships among trade balance, current account balance and their determinants.

5.2.1 Tests of Cointegration.

To estimate the long run relationship between trade balance and its determinants the relevant variables are trade balance (Ltb), relative income (Y), Relative prices (P) and nominal exchange rate (e). The lag selected for estimation is six, determined on the basis of white noising of the residuals obtained from the VAR equations.

The trace test suggests that there are two (one) cointegrating vectors at 5% (1%) level of significance while the maximum eigen value test detect one cointegrating vector at 1% level of significance, here we select the one with maximum[20] eigen value.

[20] Standard practice is that when there are more than one cointegrating vectors, take the first one that has maximum eigen value.

Table: 5.2.

Johansen Maximum Likelihood Procedure:

Likelihood Ratio Tests of Cointegration between the Trade Balance and its Determinants (LTB, E, Y, P).

Trace Test.

Null Hypothesis	Alternative Hypothesis.	Trace Test Statistics
r ≤1	r =1	59.86**
r ≤2	r =2	31.58*
r ≤3	r =3	11.61
r ≤4	r =4	0.08

Maximum Eigen Value Test.

Null Hypothesis	Alternative Hypothesis.	Maximum Eigen Value
r =0	r =1	28.28*
r =1	r =2	19.97
r =2	r =3	11.52
r =3	r =4	0.08

*(**) denote rejection of null hypothesis at 5 % (1%) level of significance.

5.2.2 Long Run Relationship

The estimated long run relationship is described by the following equation.

$$LTB = \underset{(5.42)}{1.228749}\,E - \underset{(-5.37)}{0.834134}\,Y - \underset{(-2.95)}{1.025811}\,P - 4.847592 \qquad (5.1)$$

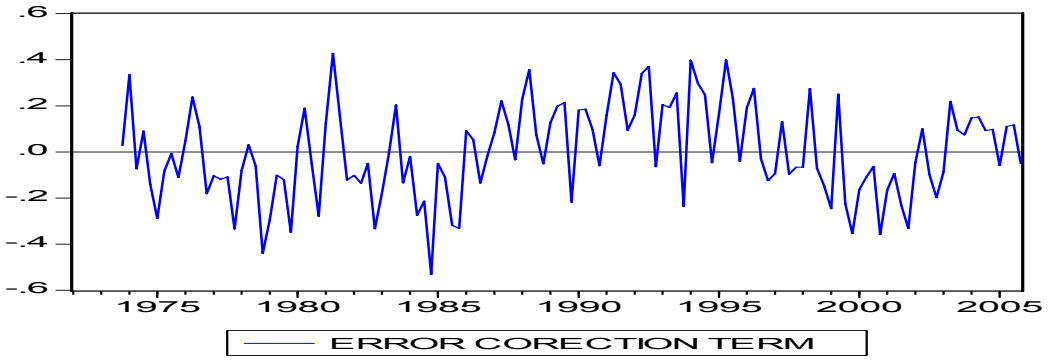
The estimated cointegrating vector supports the Keynesian approach to balance of payments, as the trade balance is positively affected by exchange rate and inversely related to relative price level and the relative income. With the exchange rate devaluation country's exports become cheaper and imports become costly, so exports will rise and imports will fall, and trade balance will improve. However if a country's price level increases relative to foreign countries, its exports will lose price competitiveness in the international market, leading to a decline in exports and an increase in imports, eventually culminating in deterioration in the trade balance.

Similarly if economy grows, the increase in imports is likely to precede the increase in exports leading to deterioration in the trade balance. Because there is time required to develop the infrastructure and organize the factors of production for exports so the immediate effect will be on consumption not on production.

5.2.3. Error Correction Term.

The error correction term has been derived from the above-cointegrated vector as follows.

$$ect = LTB(-1) - 1.228749\,E(-1) + 0.834134\,Y(-1) + 1.025811\,P(-1) + 4.847592 \qquad (5.2)$$



This relationship has been further utilized in the error correction model, to estimate the short run adjustment dynamics towards the long run equilibrium.

5.2.4. Error Correction Model.

We have used here the general to specific approach proposed by David Hendry(1994) to estimate the error correction model. This model enables us to investigate the impact of error correction term, growth and lagged growth of explanatory variables on the dependent variable.

The sign of the error term is negative and significant, showing that about 39% of adjustment takes place in one quarter towards the long-run equilibrium. Relative price growth and relative income growth impact is negative on trade balance growth, as both accelerate the imports demand and weaken the country's exports demand as described under the standard price law of demand and income law of demand.

Table 5.3:
Error Correction Model
Dependent variable: Trade balance Growth
Sample Period: 1973:4 2005:4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.009864	0.02	0.54	0.5924
Error correction term	-0.395139	0.10	-4.00	0.0001
Growth of relative Income	-0.254553	0.09	-2.92	0.0042
Growth of relative prices	-1.346145	0.78	-1.73	0.0863
1 quarter lagged growth of trade	-0.232093	0.09	-2.71	0.0079
3 quarters lagged growth relative prices	1.261857	0.58	2.17	0.0324
5 quarters lagged growth relative prices	-1.113629	0.57	-1.96	0.0519
3 quarters lagged relative income	-0.169599	0.09	-1.90	0.0604
1 quarter lagged exchange rate growth	0.904839	0.49	1.83	0.0694
2 quarter lagged exchange rate growth	-1.323275	0.53	-2.50	0.0139
3 quarter lagged exchange rate growth	1.061157	0.48	2.19	0.0306
5 quarter lagged exchange rate growth	0.961518	0.39	2.48	0.0145
6 quarter lagged exchange rate growth	-0.603272	0.26	-2.35	0.0204
Seasonal dummy D3	-0.136347	0.03	-4.05	0.0001
Dummy for 1998 blasts	-0.290244	0.12	-2.49	0.0141
Dummy for period (1988-96)	0.086851	0.03	2.86	0.0051

R-squared	0.60	Mean dependent var	-0.00
Adjusted R-squared	0.55	S.D. dependent var	0.17
S.E. of regression	0.11	Akaike info criterion	-1.45
Sum squared resid	1.38	Schwarz criterion	-1.09
Log likelihood	109.42	F-statistic	11.54
Durbin-Watson stat	1.92	Prob(F-statistic)	0.00

Exchange rate devaluation has a mixed effect, as in the second quarter it recorded a negative sign which in the 3rd and 5th quarter turned to positive as explained under J-curve [21]phenomenon. However in the 6th quarter it reverses back to the negative, which may be attributed to deterioration in terms of trade over time. It implies that continuous improvement in trade balance requires continuous devaluation of exchange rate.

Relative income growth turns out to be negative and its negative impact lasts up to 3 quarters showing that with the rise in relative income country's domestic absorption increases and balance of payments situation worsens. This may be because first there is production lags involved to boost up the exports capacity, so impact on consumption

[21] J-curve refers to a situation where a country's trade balance will deteriorate initially as the result of devaluation, but as time passes, it will start to improve.

(imports) will precede the impact on production (exports). Secondly, a major part of Pakistan's imports consist of capital machinery and industrial raw material which are unavoidable as Pakistan is at the developing stage.

In the error correction model relative price growth and its 5th quarter lagged growth has a negative impact consistent with the long run relationship. However deviations from long run relationship have been observed in case of 3rd quarter lagged price growth.

A dummy variable for the year 1998 has been included in the error correction model to capture the extreme down fall in exports due to nuclear blast in 1998. The dummy variable is found to be negative and significant. Similarly another dummy variable has been introduced for the period 1988-96. This period is important in the sense that trade liberalization, reforms, openness and overall macroeconomic consistent policies were initiated during this period. The variable is found to be positive and significant. Dummy variable for 3rd quarter shows that during July-September period overall trade balance situation remained weaker than the other quarters.

5.2.5 Exogeneity tests

The only exception to the short run forecastibility condition of a cointegrated relationship is if a variable is statistically exogenous to the long run equilibrium. Thus a variable may not respond by adjusting to the new equilibrium if it is statistically exogenous. To investigate the exogeneity issue zero restrictions are imposed on the α's to the estimated long run relationship for the explanatory variables. The estimated t values shows that error correction terms are insignificant for the explanatory variables in VECM. Similarly the maximum likelihood test shows that relative income, relative prices and exchange rate are found to be exogenous in the estimated long run relationship.

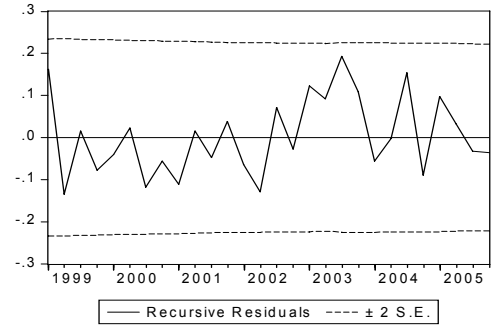
Table. 5.4 Exogeneity Test
VECM using a symmetric and proportional cointegrating vector

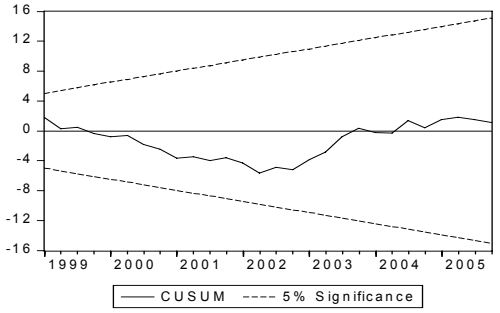
Dependent variable	Trade Balance Growth	Relative price growth	Relative Income Growth	Exchange rate growth
Error correction term	-0.201142	0.045889	-0.077007	0.041387
	[-4.01401]	[1.01401]	[-1.38788]	[1.07526]

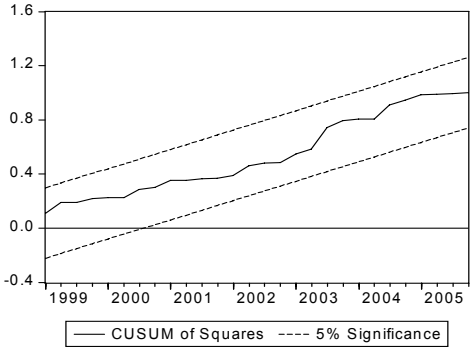
Significance at 5% critical value of -4.296
Significance at 1% critical value of -4.949
Maximum likelihood ratio test for binding restriction; (α(2,1)=0, α(3,1)=0, α (4,1)=0)= [χ^2(3)=4.12341],

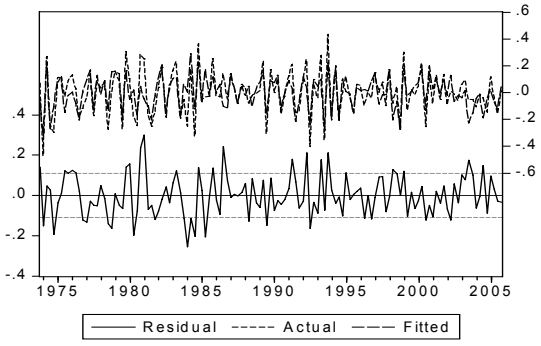
5.2.6. Diagnostic Tests.

The residual passed the diagnostic tests of no autocorrelation at lag 1 [$\chi^2(1)=0.60$] and lag 4 [$\chi^2(4)=3.27$], no functional form misspecification [$\chi^2(1)=2.21$], normally distributed [$\chi^2(2)=1.39$], and no ARCH at lag 1 and lag 4 [$\chi^2(1)=1.85$] [$\chi^2(4)=4.49$] at the 5% level of significance .The model stability that is most crucial is tested and confirmed by the CUSUM and CUSUM of squares. The graphs of Cusum and Cusum of squares and the over all fit is shown below. The cumulative sum of squares series, within the 5% level of significance represented by the dotted line along the series, shows that the model is stable.









5.3 Multivariate analysis for Current Account Balance.

5.3.1. Tests of Cointegration.

To estimate the long run relationships between current account balance and its determinants, data on current account balance, relative income, relative prices and nominal exchange rate have been used in logarithmic form. The optimal lag selected for cointegration estimation is 8. The results are reported in the Table.5.3.

The trace test and maximum eigen value statistic suggest that there are two cointegrating vectors at 5% level of significance. We select the one with maximum eigen value, as more powerful test statistics.

5.3.2 Long Run Relationship

The following equation describes the estimated long run relationship among the current account balance and its determinants.

$$\underset{}{Lcab} = \underset{(3.05)}{0.419634}\,E - \underset{(-1.57)}{0.154128}\,Y - \underset{(-2.08)}{0.425384}\,P - 1.657869 \qquad (5.3)$$

Table No. 5.5

Johansen Maximum Likelihood Procedure:

Likelihood Ratio Tests of Cointegration between the Current Account Balance and its Determinants (Lcab, E, Y, P)

Trace Test.

Null Hypothesis	Alternative Hypothesis.	Trace Test Statistics
r ≤1	r =1	61.06*
r ≤2	r =2	26.78
r ≤3	r =3	6.84
r ≤4	r =4	0.00

Maximum Eigen Value Test.

Null Hypothesis	Alternative Hypothesis.	Maximum Eigen Value Statistics
r=0	r =1	34.28*
r=1	r =2	19.94
r=2	r =3	6.84
r=3	r =4	0.00

*(**) denotes rejection of null hypothesis at 5 %(1%) level of significance.

The estimated long run relationship shows that exchange rate devaluation has a positive and significant impact; however the coefficient value is small as compared to the previous case. With exchange rate devaluation, a country's exports become cheaper, imports become costly, so exports rise and imports fall leading to an improvement in the current account balance, implying the validity of the Marshall- Lerner condition. It is noted that devaluation impact would be even more strong if Pakistan's textile exports and clothing exports to EU-15 were not bound with the quota restriction. Therefore it seems that quota restriction had a negative impact and played down the gains from exchange rate devaluation during this period.

Relative price and relative income level both have significant and negative signs, and weaken the overall current account balance. If a country's price level increases relative to foreign price level, exports will go down and imports will rise, leading to deterioration in the current account balance. Similarly with the increase in relative income level, a country's absorption level will rise and consequently imports will rise thus creating a deficit situation in the current account balance.

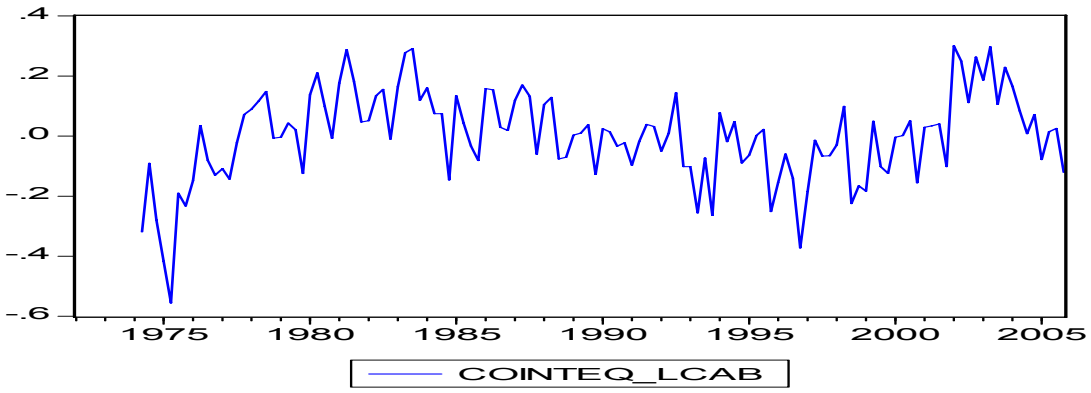
If we compare these results with the trade balance equation the estimated coefficient of all variables are found to be small in magnitude, and this may be because of current account balance includes some components like transfer payments; interest income and dividend payments, emphasized by the Machlup (1950); Branson (1968) and Cooper (1966). A country may be facing disequilibrium in the balance of payments that can be attributed to unilateral transfers as well as payments of dividends and interest to the rest of the world, and therefore relative prices, relative income and exchange rate are not enough to monitor the changes in current account balance.

5.3.3. Error Correction Term.

The error correction term can be obtained from the following cointegrated vector.

$$ect = Lcab(-1) - 0.419634\,E(-1) + 0.154128\,Y(-1) + 0.425384\,P(-1) + 1.657869 \qquad (5.4)$$

The error correction term has been further utilized in the error correction model to estimate the short run adjustment dynamics toward long run.



5.3.4. Error Correction Model.

The general to specific approach given Hendry (1994) has been used to estimate the parsimonious error correction model. This model enables us to incorporate the error correction term, simple growth and lagged growth of the explanatory variables effect on the dependent variable.

The sign of the error term is negative and highly significant, showing that about 80% of adjustment takes place in one quarter towards the long-run equilibrium. Relative price growth and its lags have the expected negative impact on the current account balance showing the validity of long run relationship in the short run adjustment dynamism.

Exchange rate devaluation is found to be insignificant in the first four quarters. Although it becomes significantly positive and improves the current account balance situation in the 5^{th} quarter but turns negative in the 6^{th} quarter. This implies that exchange rate devaluation is required from time to time to continue the resultant price competitive gains.

In contrast to the exchange rate devaluation and the relative price growth, relative income level and its lag show significant deviations from estimated long run path, as the signs are positive in the error correction model. This phenomenon indicates the positive bi-directional causality between exports and income as supported by many empirical studies. Seasonal dummy for the third quarter (July-Sept) indicates that current account deficit situation remained poor during July–September quarter relative to other quarters just like in the case of trade balance.

Table:5.6
Error correction model

Dependent Variable: Current Account Balance Growth				
Sample (adjusted): 1974Q2 2005Q4				
Included observations: 127 after adjustments				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Constant	0.076036	0.02	4.79	0.0000
Error Correction Term	-0.804709	0.08	-9.94	0.0000
Relative price growth	-1.458226	0.58	-2.52	0.0133
Relative income growth	0.163994	0.13	1.24	0.2184
3 quarter lagged dependent variable	0.126679	0.07	1.82	0.0720
4 quarter lagged dependent variable	0.324179	0.08	4.25	0.0000
5 quarter lagged dependent variable	0.113517	0.07	1.63	0.1070
8 quarter lagged dependent variable	-0.109059	0.06	-1.79	0.0760
5 quarter lagged price growth	-1.852213	0.47	-3.97	0.0001
6 quarter lagged price growth	-1.420560	0.50	-2.83	0.0056
7 quarter lagged price growth	-1.471310	0.48	-3.06	0.0028
8 quarter lagged price growth	-0.806345	0.51	-1.59	0.1159
1 quarter lagged relative income growth	0.239381	0.14	1.75	0.0828
2 quarter lagged relative income growth	0.486241	0.15	3.35	0.0011
3 quarter lagged relative income growth	0.416874	0.16	2.67	0.0089
4 quarter lagged relative income growth	0.193081	0.13	1.51	0.1337
7 quarter lagged relative income growth	-0.187005	0.12	-1.60	0.1126
5 quarter lagged exchange rate growth	0.787353	0.36	2.16	0.0328
6 quarter lagged exchange rate growth	-0.483386	0.35	-1.37	0.1743
Seasonal dummy for 3rd quarter	-0.088352	0.03	-2.92	0.0043
R-squared	0.65	Mean dependent var		0.00
Adjusted R-squared	0.59	S.D. dependent var		0.13
S.E. of regression	0.08	Akaike info criterion		-1.99
Sum Squared Resid	0.74	Schwarz criterion		-1.54
Log likelihood	146.3	F-statistic		10.4
Durbin-Watson stat	1.92	Prob(F-statistic)		0.00

5.3.5 Exogeneity tests

To investigate the exogeneity issue zero restrictions are imposed on the α's to the estimated long run relationship for the explanatory variables. The estimated t values show that error correction terms are insignificant for the explanatory variables in VECM. Similarly the maximum likelihood test detect that relative income, relative prices and

exchange rate are found to be exogenous in the estimated current account balance long run relationship.

Table. 5.7 Exogeneity Test
VECM using a symmetric and proportional cointegrating vector

Dependent variable	Current Account Balance Growth	Relative price growth	Relative Income Growth	Exchange rate growth
Error correction term	-0.778630	0.006374	0.162427	0.018724
	[-4.76709]	[0.27692]	[1.57935]	[0.49846]

Significance at 5% critical value of -4.296
Significance at 1% critical value of -4.949
Maximum likelihood ratio test for binding restriction; (α(2,1)=0, α(3,1)=0, α (4,1)=0)= [$\chi^2(3)$=3.3671],

5.3.6. Diagnostic Tests.

The residual passed the diagnostic tests of no autocorrelation [$\chi^2(1)$=0.58] [$\chi^2(4)$=7.24], no functional form misspecification [$\chi^2(1)$=0.13], normally distributed [$\chi^2(2)$=1.19], and no ARCH [$\chi^2(1)$=0.12], at the 5% level of significance. The model stability can be shown by the CUSUM of squares in the following graph.

Fig. (5.1)

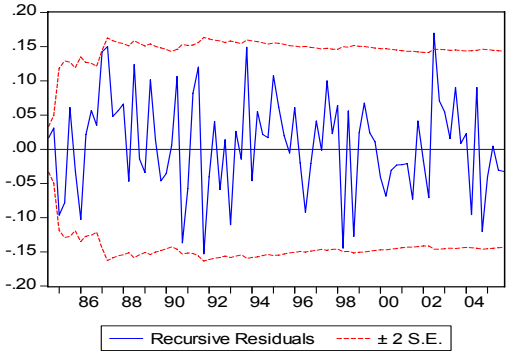
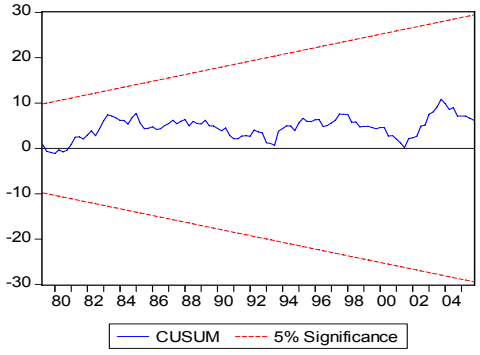


Fig. (5.2)



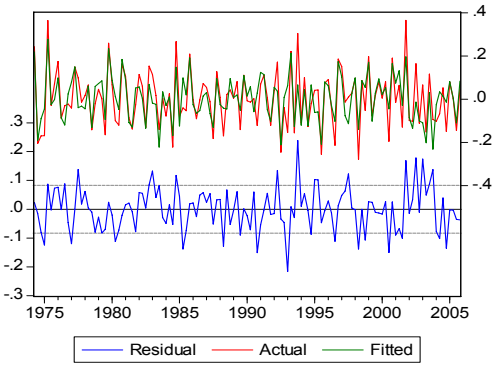


Fig. (5.3)

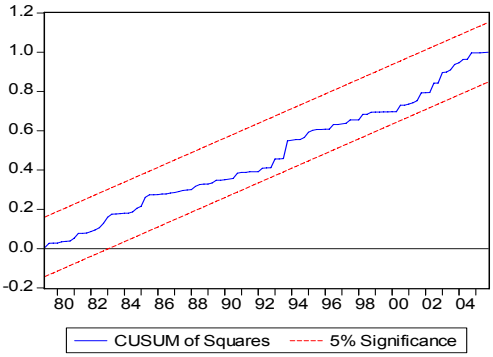


Fig. (5.4)

The overall fit of the model is presented by the following graph that shows the fitted, actual and residual series.

5.4. Concluding Remarks

The estimated trade balance and current account balance equation strongly supports the Keynesian approach to balance of payments. The exchange rate devaluation positively influences the trade balance and current account balance in the long run as well as in the short run, and its positive impact lasts up to the 5th quarter to devaluation period, implying that continuous devaluation is required to continue the price competitiveness gains in the international market. Relative prices have a negative impact on trade balance and current account balance in the long run, as well as in the short run. So if the domestic country's price level rises relative to foreign countries, it negatively impacts the external balance situation of a country. Relative income level has expected negative impact on both current account balance and trade balance situation in the long run; however slight deviations have been recorded in the short run error correction models.

It is noted that the exchange rate devaluation is the most important policy variable that has been used to improve the trade balance and current account balance deficit of Pakistan during 1971-2005. Devaluation gain would be even stronger if Pakistan textile exports were not faced with quota restrictions. Relative price level has a negative impact; this implies that the policy makers should ensure the price competitiveness of exports to survive in the international market. With the rise in relative income, the imports are observed to grow faster than the exports as a result of high domestic absorption that leads to deterioration in the trade balance and current account balance. This requires a need for export promotion policies that would help in developing and raising the potential export capacity with the country's economic growth.

6 Empirical Evidence on Monetary Approach to Balance of Payments in case of Pakistan.

6.1. Seasonal Unit Root Test.

The first step in the time series analysis is the unit root test. For this we have used the HEGY (1990) seasonal unit root test. Unit root test has been applied on the variables in level as well as in difference form. The computed t-values of $л_1$, $л_2$ are compared to table critical value given by HEGY (1990) and for the joint hypothesis $л_3=л_4=0$; the F calculated value is compared to the F table values. The results reported in Table No.7.1, show the existence of unit root at zero frequency for all the series and reject the hypothesis of unit roots at seasonal frequencies. To make the series stationary, there is a need to test the order of integration. For this purpose same test has been applied on difference form of the data series. Results show that variables in difference form are stationary at zero as well as at seasonal frequencies, implying that all the series are integrated of order 1. Hence all our data series qualify for the existence of long run relationships, and we can use Johansen (1988) and Johansen and Juselius (1990) method of co-integration (which is based on the existence of unit root at zero frequency).

Table. 6.1 Seasonal Unit Root Test Results.

Series	Lag	Deterministic	HA=t:$\pi_{1=0}$	HB=t:$\pi_{2=0}$	HC; F ($\pi_3=\pi_{4=0}$)
lcpi	4	(C, T, SD)	-2.05	-3.75***	22.09**
Δlcpi	3	(C, SD)	-3.70**	6.71***	22.44***
ldc	1	(C, T,SD)	-1.64	-6.64***	96.47***
Δldc	0	(C, SD)	--3.53**	-4.91***	30.15***
ly	1	(C,T, SD)	-1.73	-2.63*	6.58*
Δly	1	(C, SD)	-5.31***	-3.39***	6.92*
Cmmr	0	(C, T, SD)	-2.61	-5.46***	32.47***
Δcmmr	0	(C, SD)	-6.67***	-4.27***	18.19***
lrsrp	0	(C, T, SD)	-2.19	-8.39***	37.59***
Δlrsrp	0	(C, SD)	-6.73***	-7.27***	27.25***

(*), (**) and (***) denotes the rejection of null hypothesis at (10 %), (5%) and (1%) level of significance.

6.2 Multivariate Cointegration Analysis

6.2.1 Tests of Cointegration

To estimate the long run relationship among the variables proposed by the monetary approach to balance of payments we use the Johansen and Juselius (1990) method of cointegration. The variables included in the estimation process are reserves denominated in Pak rupees (R), real income (y), price level (p), call money rate (i) and domestic credit (D). The estimation process assumes the linear deterministic trend in the data, and lag determined on the basis of white noising of the residuals obtained by unrestricted VAR analysis.

Table. 6.2

Johansen Maximum Likelihood Procedure:

Likelihood Ratio Tests of Cointegration between the Reserve Flow and its Determinants(R, y, p, i, D).

Trace Test.

Null Hypothesis	Alternative Hypothesis.	Trace Test Statistics
r ≤1	r= 1	93.85**
r ≤2	r =2	58.05**
r ≤3	r =3	30.74*
r ≤4	r =4	14.07
r ≤5	r =5	2.097

Maximum Eigen Value Test.

Null Hypothesis	Alternative Hypothesis.	Maximum Eigen Value
r =0	r =1	35.80*
r =1	r =2	27.30*
r =2	r =3	16.67
r =3	r =4	11.98
r =4	r =5	2.10

*(**) denotes the rejection of null hypothesis at 5% (1%) level of significance.

The optimal lag selected in this case is eleven. Maximum likelihood trace statistic suggests two cointegrating at 5% level of significance and one cointegrating vector at 1% level of significance; however maximum eigen value test diagnoses only one cointegrating vector at 1% level of significance. Hence we select the one with maximum eigen value as the more powerful test.

6.2.2 Long Run Relationship.

$$R = \underset{(1.36))}{3.299717}* y + \underset{(6.57)}{11.11285} * p - \underset{(-1.16)}{0.154700} * cmmr - \underset{(-3.62)}{6.737288}* D + 42.49215 \qquad (6.1)$$

The long run relationship suggests that reserve balances are positively related to the income level and price level as both cause the domestic demand for money to rise, so there will be a resultant inflow of reserves, leading to an improvement in the balance of payment. While call money rate (interest rate is used as a proxy to represent the opportunity cost of holding money) is found to be negative but insignificant in the estimated long run relationship, it depicts the money demand interest rate insensitivity during the underlying period. This result is in line with the previous studies conducted on money demand and interest insensitivity issues by Mangla(1979); Khan(1980); Gujrati (1968); Adekunle (1968); Singh (1970); and Wong (1977)[22].

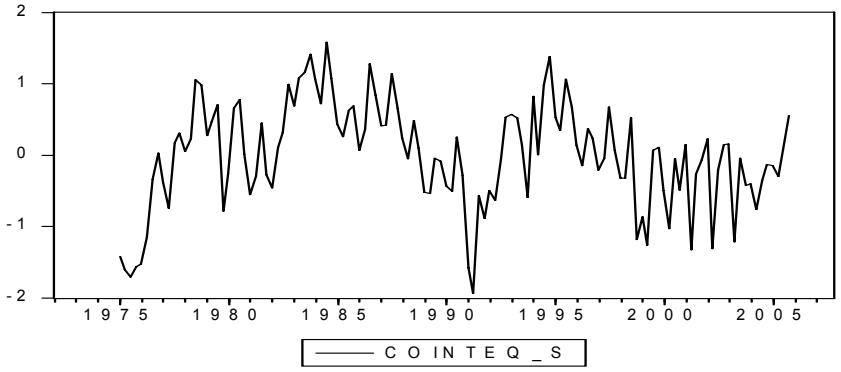
The most important variable associated with the monetary approach is the domestic credit component of money supply has negative and significant coefficient, thus showing the validity of monetary approach to balance of payments in the long run.

6.2.3 Error Correction Term.

From the above estimated long run relationship, the error component has been drawn that will be further utilized in the error correction model

[22] Mangla (1979) attempts all interest rates as determinant of money demand function but unsuccessful in finding out any type of relationships. Khan (1980) finds the interest rate variable with anticipated negative sign but statistically insignificant, implying that it does not have any impact on nominal money demand balances. In case of real money demand balances, the time deposit rate is found to be significant. The paper concludes that when money demand function is specified in nominal form, the interest rate turns out to be insignificant. The studies done by Gujrati (1968), Adekunle (1968), Singh (1970), Wong (1977) and Khan (1980) show the virtual non-existence of a well developed money market and the fact that interest rate is not determined by the free play of the market but is controlled by the authorities in developing countries, make the money demand insensitive to interest rate.

$$R = \underset{(1.36)}{3.299717}* y + \underset{(6.57)}{11.11285} * p - \underset{(-1.16)}{0.154700} * cmmr - \underset{(3.62)}{6.737288}* D + 42.49215 \qquad (6.2)$$



6.2.4. Error Correction Model.

The general to specific approach to estimate the parsimonious error correction model proposed by David Hendry has been used to analyze the short run adjustment dynamics towards the long run. The error correction model shows that error correction term is significant and has a negative sign, about 20% adjustment takes place in one quarter towards the long run relationship.

In the error correction model, domestic credit growth has a negative impact on the reserves growth and it validates the monetary approach to balance of payments in the short run as well. However the lagged growth of domestic credit for 4^{th}, 7^{th} and 10^{th} have registered deviations from the estimated long run equilibrium path in the short run dynamics. This may be attributed to the central bank lack of independence in controlling the money supply. Like many other developing countries Pakistan's State Bank has to finance government. large budget deficit that creates excess money supply, resulting into reserve outflow and consequently has an adverse impact on the overall balance of payment situation. Similarly price growth and its lags are found to be with negative signs in the error correction model in contrast to estimated long run relationship. This outcome supports the argument that in Pakistan balance of payments is not purely a monetary phenomenon.

Lagged growth in income has a positive expected sign as predicted by the monetary approach to balance of payments. However Call money rate is found to be insignificant in current as well as in lagged period depicting the interest insensitivity of the money demand and alternatively reserves balances in case of Pakistan.

Table 6.3 Error correction model

Dependent Variable: Reserve growth
Sample adjusted : 1975:1 2005:4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.070367	0.07	1.05	0.2955
Error correction term	-0.205079	0.04	-5.13	0.0000
Growth of domestic credit	-4.426571	0.10	-4.45	0.0000
Growth of prices	-4.351891	1.75	-2.48	0.0147
One quarter lagged dependent variable	0.169471	0.08	2.25	0.0266
10 quarter lagged dependent variable	0.256969	0.07	3.58	0.0005
2 quarter lagged growth domestic credit	1.233517	0.77	1.60	0.1127
4 quarter lagged growth domestic credit	2.010903	0.80	2.50	0.0140
7quarter lagged growth domestic credit	1.672117	0.75	2.22	0.0285
10 quarter lagged growth domestic credit	1.862199	0.75	2.49	0.0143
1 quarter lagged income growth	-0.577175	0.33	-1.75	0.0832
4 quarter lagged income growth	0.424945	0.36	1.18	0.2408
8 quarter lagged income growth	0.701005	0.44	1.58	0.1166
9 quarter lagged income growth	0.592758	0.33	1.80	0.0753
10 quarter lagged income growth	0.486294	0.36	1.35	0.1792
2 quarter lagged growth of prices	4.404500	1.68	2.63	0.0100
3 quarter lagged growth of prices	-3.197340	1.74	-1.84	0.0685
9 quarter lagged growth of prices	-3.529310	1.33	-2.65	0.0094
4 quarter lagged interest rate growth	0.033893	0.01	2.47	0.0150
5 quarter lagged interest rate growth	0.030639	0.01	2.32	0.0225
8 quarter lagged interest rate growth	0.045681	0.01	3.42	0.0009
10 quarter lagged interest rate growth	0.035908	0.01	2.53	0.0128
11 quarter lagged interest rate growth	0.051307	0.01	3.70	0.0003

R-squared	0.58	Mean dependent var	0.04
Adjusted R-squared	0.49	S.D. dependent var	0.34
S.E. of regression	0.24	Akaike info criterion	0.17
Sum squared resid	5.92	Schwarz criterion	0.69
Log likelihood	12.60	F-statistic	6.43
Durbin-Watson stat	2.07	Prob(F-statistic)	0.00

6.2.5 Exogeneity tests

To investigate the exogeneity issue zero restrictions are imposed on the α's to the estimated long run relationship for the explanatory variables. The estimated t values show that error correction terms are insignificant for the explanatory variables in VECM. Similarly the maximum likelihood test ensures that domestic credit, income, prices and interest rate are found to be exogenous in the estimated reserve balance long run relationship.

Table.6.4 Exogeneity Tests
VECM and symmetric error correction term

Dependent variable	Reserve growth	Domestic credit growth	Income growth	Prices growth	Interest rate growth
Error correction term	-0.318809	-0.004185	0.002074	0.003147	-0.218869
	(0.08114)	(0.00582)	(0.01487)	(0.00388)	(0.45338)
	[-3.92922]	[-0.71937]	[0.13949]	[0.81218]	[-0.48274]

Significance at 5% critical value of -4.296
Significance at 1% critical value of -4.949
Maximum likelihood ratio test for binding restriction; ($\alpha(2,1)=0, \alpha(3,1)=0, \alpha(4,1)=0, \alpha(5,1),=0$)= [$\chi^2(4)=2.59`06$],

6.2.6 Diagnostic Tests.

The residuals passed the diagnostic tests of no autocorrelation [$\chi^2(1)= 0.44$], [$\chi^2(4)= 2.42$], no functional form misspecification [$\chi^2(1)=4.03$], normally distributed [$\chi^2(2)=1.10$], and no ARCH [$\chi^2(1)=0.01$], at the 5% level of significance . The model stability is shown by the following graph of CUSUM, CUSUM of squares and model overall fit is shown by graph of actual, fitted and residual series.

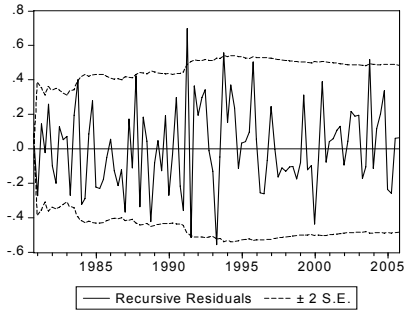


Fig.(6.1)

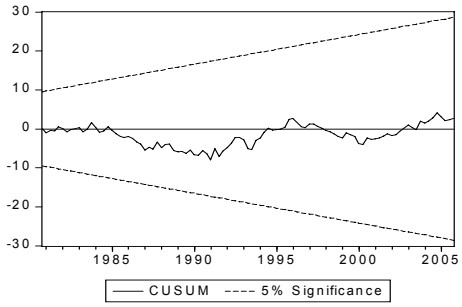


Fig. (6.2)

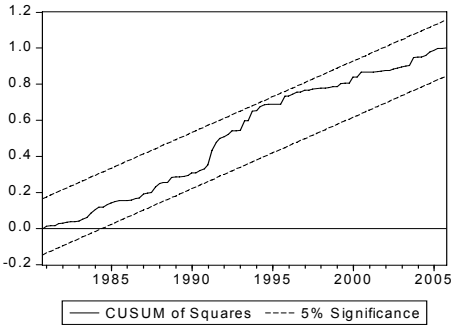


Fig. (6.3)

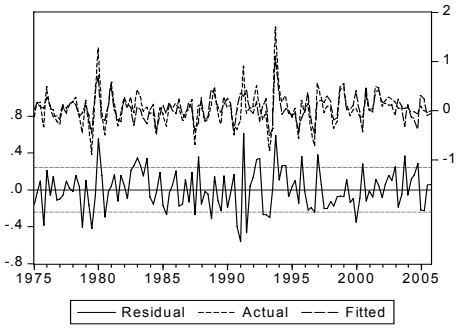


Fig. (6.4)

6.4. Conclusion

The long run relationship fully supports the validity of monetary approach to balance of payments for the period 1972Q1:2005Q4. All variables behave in an appropriate manner as proposed by the monetarists except for the interest rate insensitivity to reserves. Income level has maintained its positive relationship with reserves in both long and short run. Domestic credit is found to have a negative impact on reserves in the estimated cointegrated vector as well as in the error correction model, and it validates the monetary approach to balance of payments in both long and short run. In contrast its lagged growth has registered strong divergence from long run equilibrium path, which may be attributed to central bank's lack of independence in its operations. Similarly price growth and its lags are found to be negative in contrast to the estimated long run equilibrium path, confirming the fact that the balance of payments is not a purely a monetary phenomenon, there might be other factors as well such as price competitiveness as explained under Keynesian approach (see chapter 5).

7 Empirical Evidence on Synthesis of Keynesian and Monetary Approaches to Balance of Payments in case of Pakistan.

7.1. Seasonal Unit Root Test.

The first step in the time series analysis is the unit root test. For this we have used the HEGY (1990) seasonal unit root test. Unit root test has been applied on the variables in level as well as in difference form. The computed t-values of $л_1$, $л_2$ are compared to table critical value given by HEGY (1990) and for the joint hypothesis $л_3=л_4=0$; the F calculated value is compared to the F table values. The results reported in Table No.7.1, show the existence of unit root at zero frequency for all the series and reject the hypothesis of unit roots at seasonal frequencies. To make the series stationary, there is a need to test the order of integration. For this purpose same test has been applied on difference form of the data series. Results show that variables in difference form are stationary at zero as well as at seasonal frequencies, implying that all the series are integrated of order 1. Hence all our data series qualify for the existence of long run relationships, and we can use Johansen (1988) and Johansen and Juselius (1990) method of co-integration (which is based on the existence of unit root at zero frequency).

Table.7.1 Seasonal Unit Root Test Results.

Series	Lag	Deterministic	HA=t:$\pi_{1=0}$	HB=t:$\pi_{2=0}$	HC; F ($\pi_3=\pi_{4=0}$)
ldc	1	(C, T, SD)	-1.64	-6.64***	96.48***
Δldc	0	(C, SD)	--3.53*	-4.91***	30.15***
Ler	0	(C, T, SD)	-2.60	-7.53***	80.34***
Δler	0	(C, SD)	-5.54***	-7.20***	65.53***
ly	1	(C, SD)	-1.24	-1.88	18.78***
Δly	4	(C, SD)	-3.40*	-3.43**	10.84***
LG	2	(C, SD)	-1.24	-3.90***	18.89***
ΔlG	2	(C, SD)	-8.55***	-3.97***	20.29***
lrsrp	0	(C, T, SD)	-2.19	-8.39***	37.59***
Δlrsrp	0	(C, SD)	-6.73***	-7.27***	27.25***

7.2 Multivariate Analysis for Keynesian equation.

In this section we have investigated the number of cointegrating vectors for Keynesian equation by applying the likelihood ratio test that is based on the maximum eigen value and trace statistics of the stochastic matrix of the Johansen (1988) procedure.

7.2.1 Tests of Cointegration.

In applying the Johansen and Juselius (1990) method of cointegration on Keynesian equation (synthesis model), reserves and lag of reserves create a multicollinearity problem if we include both in the estimation process. For this we have to impose the restriction. As we know that Reserves(R) are I(1); similarly lag of reserves(R_{-1}) is also I(1) and change in reserves(ΔR) is stationary; that means there must exist one long run relationship between the reserves and lag reserves. That is why we impose a restriction[23] i.e. the coefficient of lag reserves (R_{-1}) in the equation is equal to one.

The variables included in the estimation process are reserves(R), real income (y), real govt. expenditure (G) and nominal exchange rate (e). All variables have been taken in logarithmic form. The optimal selected lag length of the VAR is 5 quarters, and linear deterministic trend has been assumed in the estimation process.

Table.7.2

Johansen Maximum Likelihood Procedure:

Likelihood Ratio Tests of Cointegration between Reserves and its Determinants under Keynesian Equation (R, y, g, e)

Trace test.

Null Hypothesis	Alternative Hypothesis.	Trace Test Statistics
r ≤1	r =1	70.43**
r ≤ 2	r =2	28.06
r ≤ 3	r = 3	7.35
r ≤ 4	r =4	0.00

[23] The same assumption has been applied by Johansen (1992) to estimate the real money demand function; and Civcir. I, and Parikh. A, (1992) to estimate the reserve flows.

Maximum Eigen Value Test.

Null Hypothesis	Alternative Hypothesis.	Maximum Eigen Value
r =0	r = 1	42.37**
r =1	r = 2	20.71
r =2	r = 3	7.35
r =3	r = 4	0.00

*(**) denotes the rejection of null hypothesis at 5%(1%) level of significance.

The maximum eigen value and trace statistic show that there are only one cointegrating vectors at 1% level of significance.

7.2.2 Long Run Relationship.

The following vector can define the long run relationship.

$$R = -29.99292 + \underset{(4.87)}{5.531810}\, y - \underset{(-7.87)}{5.947546}\, g + \underset{(6.01)}{2.825236}\, e - R(-1) \qquad (7.1)$$

Long run cointegrated vector shows the positive relationship among reserves, real income and exchange rate, while negative in case of government. expenditure. The variables income level and government. expenditures are in contrast to Keynesian approach to balance of payments. Under Keynesian approach, government. expenditure creates an upward pressure on interest rate leads to capital inflows, and as a result reserves position and overall balance of payments situation improves. But in this model estimated long run relationship does not support this underlying mechanism, possibly due to the absence of perfect capital mobility[24]. Similarly the real income has a positive impact on a country's reserves that is also in contrast to the Keynesian view, may be attributed to "Export led growth[25]" phenomenon as discussed in chapter 2 (section 2.2.6). These results may also

[24] In Perfect capital mobility, there is free capital inflow and outflow, so wherever the interest rate is higher the world capital will move to that country.

[25] Export led growth Phenomenon was first put forward by Nurkse in 1961. Nurkse was of the view that economic growth in the peripheral countries was not the result of internal specialization alone; rather the rapid growth that was taking place in the center (Great Britain) was transmitted to the other countries through the wheel of international trade. Irving B. Kravis (1971) has investigated the historical trade an engine of growth, and the trade pessimism theory and concluded that the engine of growth term involves expectations that cannot be fulfilled by trade alone, so a complete set of internal aiding factors is needed by a country to tread on the path of growth. Bela Balassa (1978) in principal agreed with the channel of

be due to the fact that Keynesian approach is more focused on trade balance and current account balance, while the foreign currency reserves are accumulated from various other sources like foreign direct investment, financial aids, capital inflows etc., other than the goods and services traded account. The one and only variable that supports the Keynesian approach in synthesis model is the exchange rate, it has a positive impact on reserves, consistent which validates the previously estimated results in chapter 5.

7.3 Multivariate Analysis for Monetary Equation.

For monetary equation (synthesis model), the variables included in the estimation process are reserves (R), real income (y), real government expenditure (G), nominal exchange rate (e) and domestic credit (D). All the series have been taken in logarithmic form.

7.3.1 Tests of Cointegration.

To estimate the long run relationship, Johansen and Juselius (1990) method of cointegration has been used. The optimal lag length of VAR is 9, selected on the basis of white noising of the residuals obtained from VAR equations, and estimation process assumes the linear deterministic trend in the data. The maximum eigen value suggest that there is one cointegrating vector at 1% level of significance in contrast to maximum likelihood trace test statistic that suggest that there are 1 cointegrated vector at 1% level of significance and 2 cointegrated vectors at 5% level of significance. We select the maximum eigen value results as it is the more powerful test.

7.3.2. Long Run Relationship.

The estimated long run relationship has been shown by the following cointegrated vector

$$R = \underset{(6.72)}{16.54344}\,y - \underset{(-10.65)}{9.321966}\,g + \underset{(4.01)}{2.427167}\,e - \underset{(-3.20)}{2.635864}\,D - 117.18 \qquad (7.2)$$

---

exports for raising economic growth of a country. As foreign trade enables a country to tap the benefits of its comparative advantage besides optimizing the capacity utilization in the economy. Reynolds Lloyd G.(1983) analyzed the pattern of growth of different regions of the world over the period ranging from 1850 to 1980 in his paper and identified the ratio of exports to GNP as an important indicator of economic growth of any country.

The estimated long run relationship shows that reserves are positively related to the real income, as the economy grows the money demand will also rise and there will be a resultant inflow of reserves. The government expenditure is found to be negative implying that deficit financing enforced by the increased government expenditure creates excess money supply, and on the other hand causes interest rate to climb up that leads to contraction in money demand, the resultant outflow of reserves worsens the balance of payments situation.

Table.7.3

Johansen Maximum Likelihood Procedure:

Likelihood Ratio Tests of Cointegration between Reserves and its Determinants under Monetary Equation (R, y, g, e, D).

Trace Test.

Null Hypothesis	Alternative Hypothesis.	Trace Test Statistics
r ≤1	r = 1	94.79**
r ≤ 2	r = 2	47.74*
r ≤ 3	r = 3	26.40
r ≤ 4	r = 4	7.09
r ≤ 5	r = 5	0.44

Maximum Eigen Value Test.

Null Hypothesis	Alternative Hypothesis.	Maximum Eigen Value
r =0	r =1	47.05**
r =1	r =2	21.34
r =2	r =3	19.31
r =3	r =4	6.65
r =4	r =5	0.44

*(**) denotes the rejection of null hypothesis at 5 %(1%) level of significance.

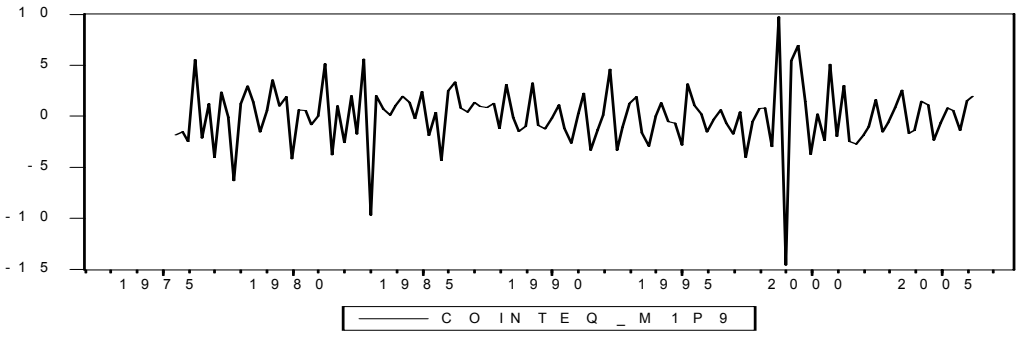
The exchange rate devaluation is found to have a positive impact on country's reserve position, in contrast to monetarist postulates but consistent within the Keynesian framework. It is noted here that even in the synthesis framework exchange rate devaluation maintains its positive impact on the external balance situation.

Domestic credit component of money supply i.e., core of the monetary approach to balance of payments is found to have a negative and significant impact on reserves position thus supporting the monetarist view proposed under synthesis framework of monetary and Keynesian approaches to balance of payments. However the magnitude is greater than the tradional value of offset coefficient i.e. "-1", possibly due to unstructured reduced from form of the money market.

7.3.3 Error Correction Term.

The estimated long run relationship is used to derive the error correction term, which is utilized in the error correction model that gives us the short run impact of the variables as well as short run dynamic adjustment towards long run equilibrium estimated by Johansen method of cointegration.

$$ect = R(-1) - 16.5434 * y(-1) + 9.3220 * g(-1) - 2.4272 * e(-1) + 2.6359 * D(-1) + 117.18 \qquad (7.3)$$



7.3.4 Error Correction Model

The study uses the general to specific approach to estimate the error correction model proposed by Hendry(1994). This model enables us to incorporate the error correction term, lagged variables effect and as well as static analysis of the simple growth rates effect of the independent variables on the dependent variable.

The results derived from the Error correction model show that error correction term coefficient has a negative sign and significant t values. It shows that about 15% of adjustment takes place in one quarter towards the long run equilibrium. If we compare the adjustment coefficient with the results obtained in chapters 5 and 6 (Keynesian and monetary error correction models), it can be observed that the magnitude of the

adjustment coefficient is smaller than that estimated in partial approaches model. This shows that under the synthesis approach, which suppose variables to behave in contrast to each other, so they both offset the impact of each other, resulting in large deviations from long run path and thus dampening the adjustment process.

The short run impact of the exchange rate devaluation and its lagged values have a positive and significant impact on reserve balances validating the Marshall- Lerner conditions. The positive impact of devaluation can also be traced under the monetary approach to balance of payments, devaluation improves the reserves balances through the effect on real money demand balance. If devaluation increases the demand for real money balances, there will be a resultant inflow of reserves and balance of payments would improve.

Table.7.4 Error Correction Model Dependent Variable: Reserves growth

Sample (adjusted): 1975:3 2006:2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Intercept	0.549	0.13	4.15	0.0001
Error correction term	-0.159	0.04	-3.66	0.0004
Growth of domestic credit	-5.554	1.24	-4.47	0.0000
Growth of government expenditure	-0.122	0.10	-1.21	0.2298
Growth of income	1.886	1.05	1.80	0.0756
2 quarter lagged dependent variable	-0.189	0.08	-2.34	0.0212
8 quarter lagged dependent variable	-0.093	0.08	-1.22	0.2266
1 quarter lagged income growth	1.291	1.11	1.16	0.2485
4 quarter lagged income growth	-3.254	1.19	-2.73	0.0075
5 quarter lagged income growth	-3.823	1.36	-2.82	0.0058
6 quarter lagged income growth	-2.052	1.07	-1.92	0.0574
7 quarter lagged income growth	-1.688	1.03	-1.64	0.1033
1quarter lagged growth of govt. expenditures	1.168	0.34	3.46	0.0008
2 quarter lagged growth of govt. expenditures	0.843	0.28	3.05	0.0029
3 quarter lagged growth of govt. expenditures	0.464	0.20	2.38	0.0190
4 quarter lagged growth of govt. expenditures	0.232	0.11	2.14	0.0348
5 quarter lagged growth of govt. expenditures	-0.111	0.05	-2.06	0.0419
7 quarter lagged exchange rate growth	-2.406	0.99	-2.44	0.0166
8 quarter lagged exchange rate growth	-2.016	0.96	-2.11	0.0374
5 quarter lagged domestic credit growth	1.348	0.94	1.44	0.1528
Seasonal dummy for 1st quarter	-0.302	0.25	-1.19	0.2370
Seasonal dummy for 3rd quarter	-0.567	0.26	-2.19	0.0311
R-squared	0.49	Mean dependent var		0.04
Adjusted R-squared	0.38	S.D. dependent var		0.34
S.E. of regression	0.27	Akaike info criterion		0.35
Sum squared resid	7.26	Schwarz criterion		0.86
Log likelihood	-0.03	F-statistic		4.63
Durbin-Watson stat	1.84	Prob(F-statistic)		0.00

The domestic credit growth component has a negative and significant impact on the growth of reserve balances, implying that the monetary approach to balance of payments does hold in the short run, and adjustment takes place towards the long run equilibrium path.

7.3.5 Exogeneity tests

To investigate the exogeneity issue zero restrictions are imposed on the α's to the estimated long run relationship for the explanatory variables. The estimated t values shows that error correction terms are insignificant for the explanatory variables in VECM. Similarly the maximum likelihood test ensures that domestic credit, income, exchange rate and govt.expenditure rate are found to be statistically exogenous in the estimated reserve balance long run relationship.

Table.7.5 Exogeneity Test
VECM and symmetric error correction terms

Dependent variable	Reserves Growth	Income Growth	Govt. expenditures growth	Exchange rate growth	Domestic Credit Growth
Error correction term	-0.110281	0.019633	-0.192958	0.007812	-0.01356
	(0.0406)	(0.0183)	(0.1118)	(0.01238)	(0.00944)
	[-2.71363]	[1.07486]	[-1.72638]	[0.63095]	[-1.43645]

Significance at 5% critical value of -4.296
Significance at 1% critical value of -4.949
Maximum likelihood ratio test for binding restriction; (α(2,1)=0, α(3,1)=0, α (4,1)=0, α (5,1),=0)= [χ^2(4)=7.13182],

7.3.6 Diagnostic Tests.

The residuals passed the diagnostic tests of no autocorrelation [χ2(1)= 0.78], [χ^2(4)= 5.45], no functional form misspecification [χ^2(1)=0.00], normally distributed [χ^2(2)=5.68] at 5% level of significance. The CUSUM test and CUSUM squares test is used to test the stability of the model. The over all model performance has been shown by the graph that depicts the actual, fitted and residual series.

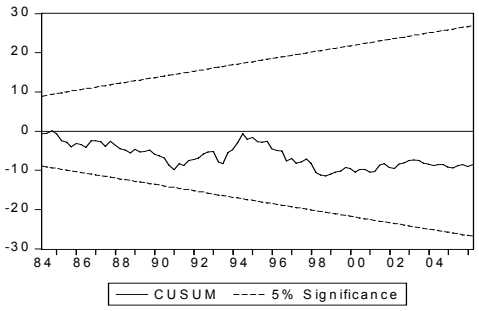


Fig. (7.1).

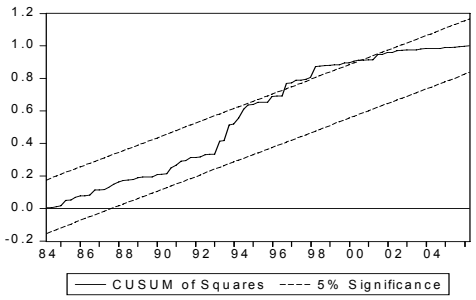


Fig. (7.2)

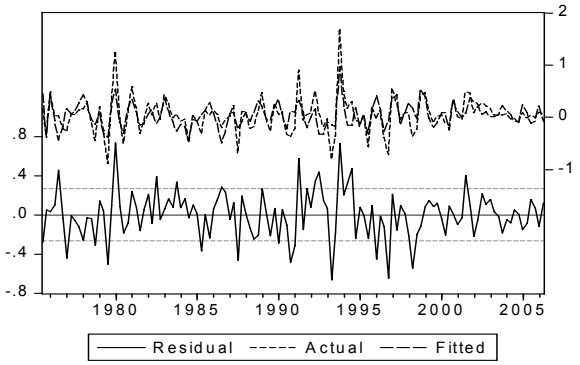


Fig.7.3

7.4 Conclusion.

Results obtained from synthesis model support the transmission mechanism devised by the monetary approach in the long run except for the role of exchange rate. In the short run the deviations observed in the error correction model support the Keynesian view. For example exchange rate devaluation and domestic credit both bear the wrong signs in contrast to the estimated long run relationship. The former can be traced within the Keynesian framework, while latter is the core of monetary approach to balance of payments. Real government expenditure is found to be positive in the estimated long run relationship, but in the short run dynamics lagged growth of real government expenditure impact turns out to be positive in line with the Keynesian analysis. Similarly the real income impact is negative in the long run relationship, but in the error correction model it is more inclined towards the Keynesian approach. Therefore, we can safely claim that

neither Keynesian nor the monetarist approach can exclusively explain the adjustment mechanism of balance of payments in case of Pakistan. Both approaches are valid and complement each other, and the synthesis model is capable of capturing the dominant factors of both, thus having the capability to incorporate the money as well as goods market in analyzing the balance of payments adjustment mechanism.

8 Summary Results and Policy Implications:

This study has empirically examined the adjustment mechanism of balance of payments devised under the two distinguished approaches in the literature known as "Keynesian approach to balance of payments" and "Monetary approach to balance of payments". An attempt has also been made to examine it within a unified framework known as "Synthesis of Monetary and Keynesian approaches to Balance of Payments" in the literature. For Empirical evidence we have used the quarterly data series for the period 1972:Q1 to 2005:Q4, and has employed the more advanced time series technique, Johansen & Juselius (1992) method of cointegration, that enable us to investigate the long run determinants as well as have the capability to trace out the short run dynamic adjustments in the error correction model.

The study has tried to address the controversy whether "*balance of payments is a real or a monetary phenomenon*" in case of Pakistan. To investigate this issue, theoretical relationship between balance of payments and its determinants under both theories have been derived and tested. The main conclusion drawn is that balance of payments is neither a purely monetary nor a real phenomenon, but both money and real markets play crucial role in explaining the balance of payments adjustment mechanism.

Keynesian analysis has been found to be more useful in explaining the trade balance and current account balance adjustment dynamics in short as well as in the long run. The main determinants such as exchange rate devaluation, relative price, and relative income proposed had expected significant coefficients, that impact the trade balance and current account balance. Exchange rate devaluation positively impacts the trade balance and current account balance in the long run as well as in the short run. Relative prices have a negative impact on trade balance and current account balance in the long run, as well as in the short run, providing a motivation to the regulatory authorities to control and stabilize the inflation to maintain the competitive position in the international market. Growth in relative income has a positive impact on the trade balance and current account balance in the long run; however in the short run the impact is mixed.

The devised path under the monetary approach has been estimated and result shows that all variables behave in an appropriate manner in the long run except the interest rate insensitivity to money demand during the underlying period. In the error correction model, domestic credit growth has a negative impact on the reserves growth showing the validity of monetary approach to balance of payments in the short run as well. However its lagged growth has registered some deviations from long run equilibrium path that may be due to the Central Bank's lack of independence in terms of monetary operations. Income level has maintained its positive relationship with reserves in both long and short run. However price growth and its lags are found to be negative in contrast to the estimated long run equilibrium path. Call money rate is not significant in the current as well as in the lag periods showing the interest insensitivity of the money demand and alternatively reserves balances in case of Pakistan, thus supporting the argument that in Pakistan balance of payments is not purely a monetary phenomenon.

Results obtained from the synthesis model support the transmission mechanism devised by the monetary approach in the long run except for the role of exchange rate. In the short run the deviations observed in the error correction model supporting the Keynesian view. For example in the error correction model, exchange rate devaluation and domestic credit both bear the wrong signs in contrast to estimated long run relationship. Real government expenditure is found to be positive in the estimated long run relationship validating the monetary approach, but in the short run dynamics lagged growth of real government expenditure impact is positive in line with the Keynesian framework. Similarly the real income impact is negative in the long run relationship as devised under monetary approach, but in the error correction model it turned out to be positive hence more inclined towards the Keynesian approach.

Therefore, it is noted that neither Keynesian and nor monetarist approach can exclusively explain the adjustment mechanism of balance of payments in case of Pakistan. Both approaches are valid and complement each other. The synthesis model is capable of capturing the dominant factors of both, thus having the capability to incorporate the money as well as goods market in analyzing the balance of payments adjustment mechanism. In light of these, it is concluded that while taking any policy action to deal with trade deficit and current account deficit in Pakistan, real factors

(relative prices and exchange rate) need to be focused, while to care about the overall international liquidity position, money market corrective actions should be the policy focus.

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