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**A MONETARY MODEL OF EXCHANGE MARKET PRESSURE
APPLIED TO THE KENYAN EXPERIENCE:1967-1990.**

by

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Research Paper submitted to the Department of Economics, University of Nairobi in partial fulfilment of the requirements for the degree of Masters of Arts in Economics.

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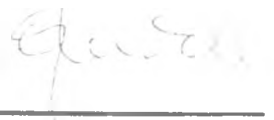


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This Research paper has been submitted for examination with our approval as University supervisors.



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ABSTRACT

A monetary model within the modern quantity theory tradition(monetarist proposition) is developed which is then used to test the relevance of the monetary approach to the balance-of-payments adjustments using a framework test analysis,the exchange market pressure model on Kenya's experience during the period 1967-1990.

The findings of the study revealed that the model was satisfactory and fulfilled the objectives of the study.The estimated model,despite all its imperfections was found to trace the turning points of the exchange market pressure satisfactory, indicating the model to be valid.The general analysis of the estimation results showed that the coefficients had the expected signs and three were found to be significant at the five per cent level of significance.The model gave a reasonably high R^2 and F-statistic was highly significant.The model passed the diagnostic test indicating the results to be representative of the data used and the model to be valid. In a nutshell the results of the study supports the monetarist proposition to the balance of payments in Kenya. This result support the findings of Grubel and Ryan (1979).

The study found monetary factors to be significant in explaining the exchange market pressure,implying the possibility of conducting stabilization policies through better management of the country's monetary affairs and is supportive of the monetary approach to the balance of payments adjustment,blaming the persistent payments imbalances largely on the excessive expansionary monetary policy.

The paper emphasise on the proper domestic management of monetary affairs by the monetary authorities,especially domestic credit creation in their attempts in achieving balance of payments equilibrium.These poicies should be accompanied by other measures to ensure smooth adjustment of the country' performance.The weaknesses of the study are also suggested.

CHAPTER ONE

INTRODUCTION

This chapter is divided into five sub-sections which contain: the background, the statement of the research problem, the objectives of the study, the significance of the study and the organization of the rest of the paper.

1.1 BACKGROUND.

Kenya is basically an open economy in which imports and exports account for more than one third and about a quarter of its Gross Domestic Product (GDP), respectively. In a relatively small country like Kenya, which has a very open economy, trade is of great importance because their economic and financial transactions are high proportions to total economic activity. This can be reflected by trade indices of a particular country's imports and exports expressed as a percentage of its Gross Domestic Product (GDP) at factor cost as shown in Table 1.1 below. The value of exports and imports are high as a percentage of Gross Domestic Product, indicating that international trade (transactions) obviously have significant effects on our economy's performances. Furthermore, the country's trade dependence index expressed as a percentage of the value of exports plus imports to Gross Domestic Product at factor cost has remained high since independence, with minor fluctuations, indicating that Kenya rely heavily on international trade.

International trade takes place between countries since they have differing technology and resource endowments. Trade permits, therefore, each country to exchange those commodities which it can produce most efficiently and import those it requires but cannot be produce domestically at all or can only produce for part of the domestic market (implying that

the local requirements are not fully satisfied). Kenya's economic connection to the rest of the world is not necessarily 'a bad thing' has learnt from economic theory. For all the brave (or foolish?) words about self-reliance and economic independence, the basic structure of the world community is one of mutual interdependence making trading and payments relationships between Kenya and the rest of the world very essential for the entire country's economic and social prosperity. Thus, we can hypothesise on a priori grounds that balance of payments disequilibria would affect the performance of our economy for three reasons: Firstly, that imports of our country are mainly producer and capital goods, which can be regarded as inputs into the productive system, and therefore payments disequilibrium will tend to manifest themselves in shortages in foreign reserves, thus limiting the access to imports which tend to impede production and capital formation. Secondly, foreign trade seems to be contributing to economic development directly through their impact on savings, investments and the export sector on Gross Domestic Product of our country. Lastly, economic growth can be influenced by the balance of payments situation on how it conditions the expansion of the domestic aggregate demand and also has an impact on other key macroeconomic variables such as employment and inflation.

TABLE 1:1 KENYA'S INTERNATIONAL TRADE INDICES.

	(selected years)					Percentages.			
Years	1967	1969	1971	1973	1975	1977	1979	1981	
Exports (X) /GDP	21.1	20.4	19.7	24.2	23.2	30.5	20.9	20.6	
Imports (M) /GDP	29.5	27.0	35.1	30.6	35.3	32.8	31.3	35.8	
(X+M) /GDP	50.6	47.4	54.8	54.9	58.5	63.3	52.2	56.5	
1983	1985	1987	1989	1990					
19.8	18.2	14.1	13.9	23.4					
27.4	27.2	25.5	30.5	26.7					
47.1	45.3	39.6	44.5	50.1					

Source: Central Bank of Kenya: Quarterly economic Review; various issues.

However, Kenya has experienced the problems of high domestic rate of inflation and/or a deficit in the balance of payments as it pursues her development programmes.¹ The recent payments problem of Kenya has set some constraints on the remarkable growth rate of Gross Domestic Product in real terms of about 6.5 per cent per annum during the period 1963-1973, which is reported to be as a result of policies aimed at the development of both the agricultural and industrial sectors, aided with rapid growth of Kenya's tourist industry and large inflows of capital, when Kenya seemed to have a high and stable economic growth rates with price stability and balance of payments equilibrium at the same time, even though her population is among the fastest-growing in the world. Underlying the buoyant growth was an excellent savings and investment record over that period, accompanied by the absence of foreign exchange constraints. Table 1.2 below shows the country's real Gross Domestic Product growth rates and the domestic rate of inflation. The most notable fact about Kenya's price history is that inflation rate has never gone beyond 25 per cent during the period of the study. The first decade of independence saw only moderate price increases with rates of between 0-3 per cent throughout 1962-1972 indicating that Kenya had an enviable price stability. However, there was a rapid inflation commencing in 1973 to a record average rates of around 12 per cent and 9 per cent for the sub-periods covering 1974-1983 and 1984-1989 respectively, but there were significant changes in these year-to-year inflation rates and were generally high in most years showing no signs of returning to the low levels experienced during the first decade since independence². Turning to the Gross Domestic Product growth rates we noted that these showed a worsening trend of growth in GDP since 1974 with wide

¹ See various issues of Economic Surveys, Central Bank of Kenya: economic and financial reviews, Development plans, and Killick, T (1981)

² see Mwegu and Killick (1990), CBK (1986), Adongo (1978), and Economic Survey: various issues.

fluctuations year-to-year. The GDP declined to an annual average of about 4.2 per cent for the period 1974-1989 which is quite low as compared to 6.5 per cent for the first decade since independence but the year-to-year GDP growth rates varied with a short-lived improvement in 1975-1978. Kenya's balance of payments first run into serious difficulties in 1974 after the oil shocks of 1973/74 (with a minor payments problem in 1971 which acted as an indicator of later payments difficulties). It is of no coincidence that the economy plunged into serious payments difficulties which together with much higher rates of inflation interrupted the high and stable economic growth rate of the first decade after independence. The most serious economic problems facing Kenya since 1974 are the increasing external resource gap (balance of payments), a slow economic growth rate and continuing rise in inflation. In short, what happens to the balance of payments of a particular nation has crucial bearings on that nation's entire economic and development progress.

TABLE 1:2. INFLATION AND GDP GROWTH RATES.
(percentages)

Years	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	
GDP rates	4.0	7.8	6.7	6.65	6.3	6.4	6.9	2.0	1.2	6.1	
Inflation	1.6	0.5	0.2	2.1	3.7	6.1	9.3	17.7	19.0	11.4	
1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
8.8	6.7	3.8	3.3	5.9	2.4	3.1	0.9	4.1	5.5	4.8	5.2
14.9	16.9	8.0	3.8	11.8	20.4	11.5	10.2	13.1	4.0	5.2	8.8
1989	1990										
4.3	2.2										
10.5	15.8										

Sources: Economic surveys, IMF international financial statistics: various issues.

An examination of the Kenyan payments data since 1967, reveals that Kenya's balance of payments situation showed marked fluctuations of differing magnitudes indicating that

Kenya has been structurally a deficit economy since 1974, which calls for some explanations. The best indicator of the country's ability to finance current account deficits is provided by the so-called "basic balance". A further indicator of the health of a country's balance of payments is provided by the "overall" balance which indicates the position of a country's international reserves. The balance of payments record for the Kenyan economy as shown in table 1:3 below; gives the structure of Kenya's trade balance and balance of payments situations; indicating that Kenya experienced a record of balance of payments surplus in the overall balance in 1969-70, 1972, 1973, 1976, 1977, 1979, 1983, 1984, 1986, and 1989 as a result of various factors like favourable terms of trade, imposition of stringent import and exchange control measures by the monetary authorities, absence of natural hazards and economic mismanagement (see Economic Surveys: various issues). Mostly, the current account deficits were sustainable up to the early 1970s as they could be financed by capital inflows during that period. However, after 1973 several balance of payments crises emerged and the Kenya government had to draw-down their reserves at the cost of increasing their indebtedness to the rest of the world, example by borrowing from international organizations and other donor agencies.

TABLE 1.3 SUMMARY OF KENYA'S BALANCE OF PAYMENTS:1967-1989.
(K£ millions)

YEAR	1967	1968	1969	1970	1971	1972			
1.EXPORTS (f.o.b)	79	83.9	90.2	102.0	104.9	120.5			
2.IMPORTS (c.i.f) a	116.5	120.8	120.8	152.5	196.2	186.0			
3.BALANCE OF TRADE (1-2)	-37.5	-36.9	-30.6	-50.5	-91.3	-65.5			
4.NET SERVICES AND TRANSFERS (b)	14.2	13.9	21.0	24.3	44.1	28.0			
5.CURRENT ACCOUNT (3+4)	-23.3	-23.0	-9.6	-26.2	-47.2	-37.5			
6.NET INFLOWS OF LONG-TERM CAPITAL (b)	13.8	25.0	27.4	37.9	23.6	43.8			
7.BASIC BALANCE (5+6)	-9.5	2.00	17.8	11.7	-23.6	6.3			
8.SHORT-TERM CAPITAL (c)	2.1	-2.0	-17.3	-9.8	-0.75	2.7			
9.OVERALL BALANCE (7+8)	-7.40	0.0	0.5	1.9	-24.4	9.0			
1973	1974	1975	1976	1977	1978	1979	1980	1981	
164.5	226.1	232.4	311.2	468.0	368.4	385.5	468.0	474.8	
219.0	384.8	361.0	407.9	529.3	724.9	684.9	994.6	971.8	
-54.5	-158.7	-128.6	-96.7	-61.3	-356.5	-299.3	-526.6	-497.0	
-0.3	37.9	23.8	46.2	46.6	71.3	110	153.3	125.9	
-54.2	-120.8	-104.8	-50.5	-14.7	-285.2	-189.3	-373.3	-371.1	
56.5	80.5	77.3	79.2	110.0	196.9	219.6	247.6	228.9	
2.3	-40.3	-27.5	28.7	95.3	-88.3	30.3	-125.7	-142.2	
9.4	18.2	10.8	6.65	17.15	9.4	68.35	53.3	42.95	
11.7	-22.1	-16.7	35.35	112.45	-78.9	98.65	-72.4	-99.25	
1982	1983	1984	1985	1986	1987	1988	1989*		
509.9	615.8	745.15	774	949.4	747.55	902.85	952.65		
939.95	929.05	1118.55	1219.4	1180.1	1335.0	1599.2	2019.6		
-430.05	-313.3	-373.4	-445.35	-230.7	-587.4	-696.4	-1067.0		
128.15	144.1	123.2	160.5	78.9	63.5	60.3	173.7		
-301.9	-169.2	-250.2	-284.9	-151.8	-523.9	-636.1	-893.3		
177.9	214.3	250.9	196.75	205.95	378.15	522.25	916.35		
-124	45.1	0.65	-88.2	54.2	-145.8	-113.9	23.1		
19.2	22.8	38.4	2.25	18.85	41.4	46.2	57.5		
-104.8	67.9	39.1	-86.25	73.0	-104.4	-67.7	80.6		

SOURCES:1. Central Bank of Kenya: Its evolution, Responsibilities, and Organization.
2. _____: Quarterly Economic review, vol.23 no.11 January-March 1991.

NOTES:

- (a) Imports are valued on a f.o.b basis from 1983-89.
(b) government transfers have been re-allocated to long term capital from the current account.
(c) includes errors and omissions.

* Provisional.

Kenya therefore, is such an economy which seems to possess a structural tendency to be in balance of payments deficits situations most of the time, so long as the country lives or tries to live beyond its economic means³. Thus, the persistence of the current account deficits might be construed as an indication that Kenya lives or tries to live beyond its economic means. The measures for correcting such persistent payments difficulties has been of high priority to the Kenyan policy makers and other interested parties since the 1970s. There is a wide range of possible policy options available to governments to influence the balance of payments trend and developments. However, the Kenya government have tried different forms of balance of payments approaches in her bid to balance her external transactions and to achieve economic progress which include long-term borrowing from overseas (mainly in form of credits from the IMF, the World Bank, and other foreign governments), revision of the export compensation scheme, import controls, slowing down the approvals of foreign exchange allocations, controlling government expenditures, stabilizing domestic prices and better economic management (see Central Bank of Kenya, 1986). But the system does not work as well as it could, especially from our country's viewpoint. Therefore, many reasons have been forwarded by various authors for the inability of the Kenyan governments to finance and curtail these payments deficits. An analysis of the causes of Kenya's balance of payments therefore, may broadly be classified into three major categories, namely: (i) external factors beyond the governments control, which stresses the effects of exogenous shocks such as the oil crisis, the adverse effects of the operations of transnational financial institutions, fluctuations of the exchange rates, and the deterioration of the terms of trade; (ii) domestic factors which emphasizes aspects such as poor economic management, deficient fiscal and financial policies, misuse of public funds, and lack of trained personnel and dependency; and

³ see Girton and Roper (1977), Jimoh (1990) and Economic Survey (1976).

(iii) those focusing upon factors which includes protectionism and other trade barriers.

Considering the structure of the Kenyan economy as given by her dependent relations with the rest of the world, especially the developed countries, we would be able to address ourselves to the question of what set of fiscal and financial policies that could be used in the government's efforts to restore a balance in the country's external transactions. Unfortunately, there has been no generally accepted approach(es) as to what constitutes a set of wise payment policies, since different approaches to the balance of payments management have given rise to different and sometimes conflicting policy recommendations. Hence, adjustment programmes have been undertaken from time to time in an attempt by the government to try and eliminate balance of payments disequilibria and to restore external viability. These approaches are the elasticity approach, the Keynesian approaches (consisting of the elasticity-cum-multiplier approach), absorption and monetary approaches. However, these approaches can be categorized into two contesting schools of thought, because the elasticity, income, and the absorption approaches to the balance of payments are internally consistent or complementary systems of thought, and shall hence be called the "traditional" approaches to the balance of payments. The monetary approach to the balance of payments stands in contrast to the traditional approaches to the balance of payments; since the acceptance of the traditional approaches is the rejection of the monetary approach and its framework for the balance of payments policy formulations. Therefore, a test of the relevance for one is a test for the irrelevance of the other, since the acceptance of the traditional approaches implies the rejection of the monetary approach and also the two gives different predictions for policy.

The new monetary approach, however, is an extension of the domestic monetarism to

the international economy in that it views the balance of payments as an essentially monetary phenomenon, that is, money plays a crucial role in the long-run both as a disturbance and adjustment in the nation's balance of payments. The monetary approach, however, is not identified with the view that "only money matter," nor is it asserted that the monetary approach is encompassed in any single, specific, theoretical model, but it encompasses a broad class of models which share certain basic features⁴. The ability of the monetary authorities to pursue an effective monetary policy depends on the extent to which net domestic assets from a country's financial system is offset by changes in the net foreign assets of the financial system in augmenting money supply.⁵ The analytical framework used is the money supply identity which consolidates the balance sheet of the financial system (see Grubel and Ryan, 1979). In this identity, however, changes in net foreign assets are expressed as the differences between changes in money supply and net domestic assets, which is the basis of the monetary approach to the balance of payments. Considering Kenya's payments experience in light of this approach shows a striking inverse relationship between changes in net foreign assets and net domestic assets, interpreted in terms of the monetary approach to the balance of payments determination (see Mweha, F.M 1990). The clear negative relationship between net foreign assets and net domestic assets is as shown in table 1.4 below suggest that the monetary approach to balance of payments is potentially a useful framework for analysis. Of course, one can raise the question of causality in all such historically observed correlation in time series data. Thus, there is need to apply the monetary approach to such experience and see its relevance.

⁴ for details see Mussa, M (1974), Grubel, H.G (1977) Johnson, H.G (1976), Frenkel and Johnson (1976).

⁵ Mweha, F.M (1990)

TABLE 1.4 SOME INTERNATIONAL FINANCIAL STATISTICS FOR KENYA:1968-1989.

YEAR	CHANGES IN NET- FOREIGN ASSETS	CHANGES IN NET DOMESTIC ASSETS	CHANGES IN HIGH- POWERED MONEY
1968	266	-157.6	108.4
1969	427	-77.80	349.2
1970	351	-253.8	97.20
1971	-391	-312.1	-78.90
1972	130	-22.40	107.6
1973	211	-105.6	105.4
1974	-569	947.9	378.9
1975	-318	138.3	-179.7
1976	787	-363.6	423.4
1977	2176	-985.8	1190.2
1978	-1496	1519.8	23.8
1979	1459	-781.2	677.8
1980	-1323	1712.5	389.5
1981	-1965	2271.5	306.5
1982	-2319	3323.8	1004.8
1983	1792	-1910.5	118.5
1984	631	-121.2	509.5
1985	-1768	2936.5	1168.5
1986	1656	978.8	2634.8
1987	-1335	2661.6	1326.6
1988	-998	1912.2	914.2
1989	283	1523.3	1806.30
1990	-2872	26299.1	23426.9

Source: Central Bank of Kenya: Quarterly Economic review, various issues

2.1 STATEMENT OF THE RESEARCH PROBLEM.

Kenya like most developing countries has limited resources for development purposes. This has necessitated her to resort to external sources of resources to supplement the domestic resources for her economic progress. The external sector therefore can play or plays a major role in achieving our development objectives as outlined in the development plans and sessional papers.

Indeed one of the limiting factors in Kenya's economic prosperity has been the widening external resource gap and the shortages of foreign exchange to pay for the ever increasing imports of capital goods, intermediate products and raw materials, especially petroleum, necessary for economic progress. Thus, the high dependence of the Kenyan economy on foreign sources has led the country to incur persistent and increasing current account deficits that are generally financed by grants, aid, and loans, including capital inflows. To reduce this high dependence on foreign sources, foreign exchange management and exchange rate policies have assumed considerable importance in the country's macroeconomic stabilization of the economy.

One of the most persistent and difficult problems confronting the Kenyan policy makers since the early 1970s has been the increasing balance of payments deficits. Kenya's external balance performance shows that the country has not been able to manage its balance of payments to manageable levels so as to achieve a stable and steady economic growth with macroeconomic stability. The economy's inability to achieve a healthy balance of payments position implies that trade policies were either inconsistent with the country's socio-economic structure and the nature of the problem and/or were mildly applied. Given the importance of the payments situation care should therefore be exercised to ensure that the payments position does not grow out of proportions and to restore external viability so as to avoid a crisis. Therefore, the basic objective of the Kenya government's balance of payments management policies is for a sustainable growth of the economy and should maintain a viable external trade and payments position.⁶

⁶see development plan:1989-1993 pp 63.

Although most discussions on Kenya's economic performances tend to ascribe an important role to the external sector performance, there has been little success in the management of the external sector in order to achieve equilibrium. Before any policy recommendations are made, it is therefore crucial to understand the broader theoretical and practical issues of international economics, taking institutional factors into consideration. We are concerned here with the use of monetary policy in pursuit of macroeconomic objectives, especially the balance of payments equilibrium. This calls for the modelling of the economic relationships of the economy based on the understanding that money matters in all modern economies, and its effects on the behaviour of the macroeconomic variables.

There has been several empirical investigations on the influence of monetary variables on the aspects of the real economy like inflation, balance of payments, and investments. However, there has been some controversy in the literature on the Kenyan economy about the influences of the monetary variables on the macroeconomic variables, especially the balance of payments. In general, this study is an attempt to examine the relevance of the monetary approach to the balance of payments on the Kenyan experience.

1.3 OBJECTIVES OF THE STUDY

The overall objective of the study as made clear in the statement of the problem is to examine the relevance of the monetary approach to the balance of payments with a view of suggesting a wise framework for the formulation of balance of payments policies. Thus, the specific objectives of the study are:

- (1) To specify and estimate a monetary model of the balance of payments,
- (2) To assess the relative significance of the variables in the model,

- (3) Based on the findings of the above, draw policy implications and make conclusions.

1.4 SIGNIFICANCE OF THE STUDY

As has already been indicated, the external sector is a vital sector in the process of economic development of our economy. The balance of payments problem causes a lot of constraints on the foreign exchange reserves and affects the economic performances of our economy. Thus, the need therefore for sound management policies of the balance of payments situations to a viable situation becomes crucial. The government had tried various approaches to the management of the balance of payments problems which calls for the study of the various approaches in order to assist in policy formulation, hence a test of the relevance of the monetary approach to the balance of payments may be of great importance.

The study also will generate vital information that could help us achieve the balance of payments equilibrium and a clear understanding of the situation and the causes. The study will generate knowledge about the significance and extent to which monetary variables have influenced the real macroeconomic variables. Findings of such investigations will assist policy makers in designing, reviving, and adoption of policy measures on the balance of payments and other macroeconomic objectives not only based on a prior judgement but also on the empirical estimation of the model results. Thus, it could improve the quality and approach of policy decisions. Finally, the findings of the study should also provide reference materials for readers and further research in the area of trade and development with respect to monetary variables in Kenya.

1.5 ORGANIZATION OF THE REST OF THE PAPER.

The rest of the paper is organised as follows:-Chapter two looks at the literature on monetary relationships in the economy in three stages. In section 2.1 we discuss the controversy between the monetarist and the non-monetarist debate, while section 2.2 contains the literature review in two parts. Section 2.2.1 scans at the literature on monetary phenomena in some selected developing countries showing various approaches used, and section 2.2.2 then turns to specific literature on the Kenyan monetary sector. The last section 2.3 of the chapter summarizes the survey of the literature undertaken herein.

Chapter three, which contains the methodology of the study has got three sections also. Firstly, section 3.1 gives a general theoretical framework to the monetary approach to the balance of payments, and secondly, section 3.2 deal with the specification and the estimation technique to be used. Lastly, section 3.3 looks at the data requirements, sources, measurement and the data limitation.

Chapter four contains data analysis, in two sections, focusing on stationarity and cointegration analysis respectively. Chapter five of the paper, however, presents the analysis of the results of the model estimation and a summary. The last chapter, gives some policy implications and conclusion of the study. It also looks at the limitations of the study. The paper lastly gives an appendix and a bibliography.

CHAPTER TWO

LITERATURE REVIEW.

This chapter outlines the main literature on the studies for analysing the role of money in an economy and its economic impact. It, therefore, acts as a starting point for the understanding of monetary relationships with the other sectors and assists in the econometric model specified in chapter three to test the relevance of the monetary approach to balance-of-payments.

2.1 THE MONETARIST VERSUS NON-MONETARIST DEBATE.

“Everything is more complicated than most People Think” by EVANS, B.

Monetary economics is a branch of economics that has witnessed a lively debate concerning the role of money in an economy. The debate over the macroeconomic events and policy is often forced into a narrow confrontation between two seemingly polar analytical positions, giving rise to two prominent schools of thought namely; the monetarist (the most notable of whom is Milton Friedman) versus the Keynesianism (non-monetarist) views. The two schools of thought basically differ in their implications for economic policy as well as on their views on the role of money in an economy.

The monetarist critique of the non-monetarist can usually be separated into two different sets. The first set of which we shall call the extreme monetarist critique of the non-monetarist analysis, which is aimed at the use of monetary and fiscal policies for business cycle stabilization. The second set of critique which shall be called the moderate monetarist is aimed

at the idea that monetary and fiscal policies can be used to lower the average rate of unemployment in an economy. In the extreme monetarist view the problem of macroeconomic instabilities has been caused and reinforced dominantly by disturbances emanating from the financial sectors (that is stabilization policies can be effective only if the authorities can control the money supply) implying that money plays a crucial role in the economy. On the other hand, the non-monetarist contend that both the monetary and fiscal policies can be used for stabilization policies. The extreme monetarist argued that the alleged counter-cyclical variation in money supply brought about by deliberate policies of monetary authorities in the past have often been increasing rather than decreasing the magnitudes and frequency of business cycles, for three reasons⁷. Firstly, the monetary policy based on orthodox keynesian views of the problem considers its primary objective as the stabilization of the interest rates and through it the level of income and employment. Secondly, the non-monetarist framework of analysis neglects the role of prices and expectations about the rate of inflation in the determination of the demand for credits, the interest rates, and the quantity of money supplied. Lastly, changes in the money supply and interest rates caused by monetary authorities affect the spending on goods and services, not immediately but with lags of varying and unknown lengths.

The moderate monetarist critique of the keynesian analysis of the phillips' curve trade-off seems to be believed by many economists that while governments' can use discretionary monetary and fiscal policies to reduce successfully the magnitude and frequency of business cycles, they cannot use the average rate of unemployment over the full business cycles as

⁷ These are as given by Grubel, H.G (1976), but for further detail see also Ghatak (1981), Harris (1981), and Grubel (1977).

implied by the phillips curve analysis. The keynesian analysis can also be applied to the most basic international monetarist proposition: All persistent balance-of-payments imbalances are due to increases in the money supply at a rate above that at which the real economic output is growing. As a norm by which to judge the effects of government policies, we should consider a world where all countries adhere to the extreme monetarist principles for domestic demand management ⁸.

Nevertheless, the rise of these debates can be viewed in the light of some recent developments in monetary economics. Money was held very important up to the early 1930s and it was widely accepted that over the long-run changes in the quantity of money were the prime source of changes in the macroeconomic events. The emergence of Keynes' "general theory" in 1936 produced a revolution in economic circles from that time which cautions the attention hitherto given to the role of money in the economy. This development, therefore, had the impact of de-emphasizing the role of money in influencing the macroeconomic events of an economy. However, this was short-lived since the publication by Friedman on the "restatement of the quantity theory" of money in 1956, which produced yet another turning point (see Friedman, M. 1956, pp 3-21). His restatement which has come to be known as the "modern quantity theory of money" in the literature as propounded by Friedman and his predecessors has given rise to the monetarist view that money matters in all modern economies. This kind of reasoning enshrined in monetarism has revived interest in money and related issues.

⁸ For further details see Grubel, H.G (1977) chapter 19, Harris, L (1981) chapter 21.

Needless to say, the monetarist views to national and international economic policy making is not generally accepted universally and the keynesian views still constitute the orthodox view held by most economist to date. Therefore, the monetarist challenge to the non-monetarist view of international adjustment emerges clearly and directly from the view of the monetarist school on domestic macroeconomic stabilization policies. As a general methodological proposition about the merit of the traditional (keynesian) models against the monetarist models of the international adjustment mechanism (the choice between them) remains of great debate since it depends on the economist view (subjective) but, either approach can equally be valid. Therefore, the choice between the keynesian and the monetarist models depends largely on their abilities to explain real-world phenomena and to predict the consequences of certain government policies correctly. The non-monetarist models in the opinion of most economist have failed badly in recent years, thus explaining partly the widespread interest in monetarist models. But it is too early to reach a verdict on the ability of the monetarist models to explain and predict consistently better than did the keynesian models, simply because there has been not enough empirical work to make the verdict on the Kenyan case. The results has been a proliferation of empirical work in economic literature to test the validity and relevance of the monetarism, and to analyse its implications for economic policy.

2.2.1 GENERAL LITERATURE ON MONETARY RELATIONSHIPS: A selected survey.

Monetary economics has recently witnessed a lively debate concerning the role of money in the economy and their impact on macroeconomic events. Nevertheless, there has been a

controversy as to which approach is more appropriate in analysing these phenomena. Therefore, the following is a review of several selected studies on monetary relationships in an economy.

Aghevli (1977) developed a monetary model which enables us to quantify the relationships between money, income, the balance of payments and prices in a macroeconomic context for the Indonesian economy. The model is linear in parameters but nonlinear in variables and enables us to examine the internal consistency of the monetary, budgetary, and the balance of payments policies. The model was estimated using quarterly time series data for the period 1968:1 to 1973:4 by two stage least squares technique. The model was found to be valid, since it tracks actual values of endogenous variables quite well. This model was the first attempt for the Indonesian economy, which has undergone drastic changes in the last two decades, hence the results should be treated with caution.

Agry (1969), developed a very simple macro-model as a basis for examining the role of monetary variables in the balance of payments. The model is basically Keynesian with interest rate being the only link between monetary and real variables and that, monetary variables are autonomous (under the control of the authorities). The model was estimated using annual data and the results were encouraging and found the model to be valid to some degree over the sample period. However, the model only uses the simplest functions and assumed no lags operates. It is also rich in policy implications and allows even for comparison of the various policy issues.

Genberg, A.H. (1973) investigated some aspects regarding the monetary approach to the balance of payments theory looking at the question of the goods and asset market integration in the world, the link between the reserves flows and the domestic money stock, and finally combines the evidence in a monetary interpretation of reserve flows. He found Sweden to be part of an integrated world market notwithstanding the controls imposed on capital movements. He also found a high correlation between the predicted and actual reserve flow series strongly supporting the monetary interpretation to balance-of-payments adjustments. On the reserve flow, he used the following model summarized below;

$$[R/HgR] = \alpha_0 + \alpha_1 [D/HgD] + \alpha_2 gM + \alpha_3 [\log P - \alpha \log P - 1] + \alpha_4 [\log Y - \alpha \log Y - 1] + \alpha_7 [\log I - \alpha \log I - 1] + \alpha_8 \log M - 1 + u \dots \dots \dots 1$$

$$[D/HgD] = \beta_0 + \beta_1 [R/HgR] + \beta_g \text{Gov't. debt outstanding} + v \dots \dots 2$$

Where, R is foreign reserves, H is high-powered money, D is the domestic component of the monetary authorities, m is the money multiplier, P is the domestic price level, Y is the real income, I is the interest rate, and M-1 is the lagged money supply. The variables with a negative one are the lagged ones. u and v are the random error terms. Equation (1) is the reserve flow equation with the short-run demand for money function and equation (2) is a government policy reaction function, assuming that open market operations are dictated by the changes in international reserves (the sterilization hypothesis). The coefficients were found to possess the expected signs and five were significant at the usual five per cent level of significance. The two-stage least squares estimates of the model shows that the specification of the central bank reaction function is inadequate but as far as the reserve flow equation is concerned, our conclusion still holds, that is, it is supportive of the monetary approach to the balance of payments.

Girton, L and Roper, D (1977) developed a monetary model of exchange market pressure which does not rely on the small-country assumption and is applicable to all exchange rate regimes and test the model on the postwar Canadian experience. The model used can be summarized symbolically as follows:

$$R_c + E_c = -\alpha_c D_c + \alpha_u H_u + \beta_c Y_c - \beta_u Y_u + v. \text{_____} 1.$$

Where, R_c is the Canadian international reserves, E_c is the exchange rate (U.S dollar price of Canadian dollar), H_c is the Canadian monetary base, H_u is the U.S monetary base, Y_c and Y_u is the U.S and Canadian real gross national product, and D_c is the domestic assets held by Canadian monetary authorities. The purpose of the model was to estimate the monetary equation of the exchange market pressure and to measure the degree to which the central bank in an open economy can pursue an independent monetary policy. Using OLS method of estimation, the results were supportive of the relevance of the monetary interpretation to the balance of payments in the case of Canada. Hence, the dependent variable can be said to be appropriately used for determination of the volume of intervention. However, the model was formulated for a developed country, but a similar model has been tested by Jimoh for the Nigerian case and also found the approach to be relevant.

Guitian, M (1972) investigated the relationship between the balance of payments and the rate of domestic credit expansion in Spain during the period 1955-1971. Using two tests he intended to determine the relationship of the effects of domestic credit expansion on the current account balance and on the overall balance of payments, and the connection between these two external accounts with some macroeconomic variables. The nature of the tests indicates that the analysis has been conducted in terms of the flow market for money (hoarding). The results were quite satisfactory and strongly point at the monetary character of

balance of payments disequilibria. They also indicated a significant relationship between the balance of payments (the current account) and the two major concepts of domestic credit used in the analysis. Conclusion inferred from the results is that the safest way to cope with external imbalances is to control the rate of credit expansion.

Jimoh, A (1990) in his study employing two alternative test framework tested the relevance of the monetary approach to the balance-of-payments to a less developed country (Nigeria). The models employed are similar to those of Girton and Roper's (1977) and that of Aghevli and Khan (1977). The results suggest that the monetary approach to the balance of payments is an adequate representation of the Nigerian data over the period of the study. This implies that the approach probably has a wider region of application than hitherto thought. Also, the evidence from the study showed the framework to be highly relevant to the explanations of the Nigerian balance of payments, thus the monetary authorities must pay adequate attention to domestic credit creation in their attempts to control the balance of payments trends and development in Nigeria.

Khan (1974) and (1976), used a short-term monetary model for the Venezuelan economy to provide a simple aggregate demand model that would forecast the behaviour of key macroeconomic variables and also show the effects of monetary policy on these variables. The model centres on the monetary aspects of income and balance of payments determination. However, the model is linear in terms of variables but is autoregressive in nature. The model was estimated using full-information likelihood method for the sample period 1950-1972 on an annual basis and the results were very good in terms of parameter estimates as well as simulations, thus the model is valid. Nevertheless, many major changes in the economy would

probably render the model less relevant for forecasting purposes, hence the results should be handled with caution. The results of the 1976 model were very encouraging for the monetary model since it was able to explain a great part of the fluctuations and trends in the BOP during the sample period, with two stage-least squares estimation technique. Major limitations are the small number of observations, and the accuracy of the model may be due to its autoregressive nature. Also, there appears to be some evidence of instability in the model.

Khan and Knight (1981) designed a framework to study stabilization programs in developing countries. While there is no single theoretical model underlying all programs, a broad framework of models have evolved. In this framework there is a highly aggregated well-defined relationships between money, the BOP, and the domestic prices, in which the supply of and the demand for money play a central linking role; and more importantly to use this framework to analyze the effects of policy changes on all macroeconomic variables. The model was estimated using a pooled sample of time-series cross-sectional data for 29 countries using full-information likelihood technique, since the model is linear in parameters and nonlinear in variables. The overall goodness of fit of the model using the carter-nagar R^2 was 0.998 indicating

the reasonableness of the overall specification. Therefore, the results are representative of the structural characteristics of these developing countries.

Kimaro (1975), applied the Polak model to some 23 African countries and the results using annual data were compared to those from regression models. It was found that the marginal propensity to import showed diverse patterns of variations, both between and within countries. As to the income velocity of money it was mainly constant in most countries, except

for a few where it showed declining trends, but the time trend is too short for any conclusive evidence. The money-import ratio (also equal to the weighted average lag in the model) was found to be generally much more unstable than either of the above two. In the same study, some simple import regressions models were made and their performance compared vis-a-vis those of the Polak model, and found that the Polak model performed generally better than the regression models in terms of explaining import payments for these countries.

Otani and Park (1976) developed a monetary model of the Korean economy of the short-run analysis, which explains the interactions between the monetary and the real sectors of the economy. It emphasizes the role of money in determining prices, real output, and the BOP position. The model formulated is linear in parameters but nonlinear in variables. They tested the model using quarterly data and found to be stable and valid particularly for the sample period, and its predictive ability beyond the sample period are mixed. The sample is small in size but it is rich in implications for stabilization policies and showed symmetric properties hence it is useful for stabilization programs.

Polak (1957), the Polak model has been the pioneering piece of work in this direction, designed to investigate the effects of domestic credit creation on imports, international reserves, and the supply of money. The model is based on two crucial assumptions; (i) a stable velocity function, and (ii) a stable import function. The model is a short-term one for the predictions of changes in imports, reserves and income. The coefficients are derived from the reduced form of the model. However, the velocity and the import functions which were assumed to be stable by the Polak model have been found to be rather unstable in developing countries, where the model is supposed to be used. This instability can

be attributed to the changing structure of these economies during development ,especially due to monetization and changes in institutional factors.Despite this instability,the model provides a rough basis for analysis and predictions.

Zecher,J.R(1976) developed a money market approach to the balance of payments which is slightly a modified version of that of Johnson,H.G(1972) and is similar to that of Grubel and Ryan.He tested the model on Australian experience and found the results to be supportive of the monetary approach to the balance of payments.However,there arises the controversy concerning the sterilization of reserve flows through monetary policy by either the money multiplier or the high-powered money.This objection remains an open question for further research.Bean,D.L (1976) also used a similar model and arrived at the same conclusions as Zecher.

2.2.2 THE LITERATURE ON KENYA'S MONETARY SECTOR.

Studies on the monetary sectors with respect to macroeconomic events on the Kenyan economy is relatively very little in terms of empirical research work,but it could be worthwhile looking at some studies that have already been done in kenya.

Bolnick (1975) studied the supply side of money to examine the stability and controllability of the important parameters affecting the money aggregate by the Central Bank of Kenya.It was found that the money multiplier was rather unstable,implying the underlying instability of the behavioural parameters affecting the money stock.Some sources of this variation were attributed to the unpredictable nature of commercial banks' liquidity and the

fact that the liquidity ratio is not affected by the demand for credit or the deposit structure. This makes it rather hard for the Central Bank of Kenya to have a firm grip on the money stock.

Grubel and Ryan (1979)[hereafter G&R] is a more comprehensive work on Kenya's economy and places an explicitly monetarist interpretation on the payments trends. This study is clearly in the same tradition as King's but set out in the conventional Hicksian IS-LM analysis to policy instruments. However, their model differs from King's in isolating the domestic component of the base money as the key variable. The model can be summarized as follows;

$$R/HgR_t = agP_t + bgY_t - cgI_t - gm_t - D/HgD_t$$

Where R is the international reserves, H is the money base, P is the price level, Y is the real income level, I is the interest rate, m is the money multiplier, D is the domestic component of the money base, and $g = (1/x)(dx/dt)$; $x=R, H, P, Y, m, I,$ and D . They tested the model with Kenyan data for the period 1967-1978 on quarterly basis and obtained the predicted negative correlation between changes in foreign reserves and the changes in the domestic credit significant at the 99 per cent level of confidence despite the small number of observations. The model was found to be valid since it was quite successful in tracking the actual behaviour of foreign reserves. But while the monetarist interpretations are open to criticism, they nevertheless, do contribute to the understanding of Kenya's payments problem.

King(1979) designed a model useful for short-term predictions of the behaviour of prices, unemployment, and the balance of payments and how these are influenced by government policies. The model was developed to study the relative merits of the keynesian

and the monetarist models in explaining macroeconomic behaviour and concludes firmly in favour of the latter. The model initially consist of five equations which is summarized symbolically as follows;

$$Y = A + X^* - M \quad \text{_____} (1)$$

$$MO = kY \quad \text{_____} (2)$$

$$M = mY \quad \text{_____} (3)$$

$$\delta MO = \delta FR + \delta DA \quad \text{_____} (4)$$

$$\delta FR = X^* - M + F^* \quad \text{_____} (5)$$

Where A is a flow variable for absorption of resources available for domestic investment and consumption, X is the exports, M is the imports, MO is the money supply stock, FR is the foreign reserve assets, Y is domestic output, DA is the domestic assets, F is the foreign capital receipts, and m and k are parameters. The asterisks shows exogenous variables and δ indicates the change in the relevant variable. King also extended the model to include prices. Applying the model to kenyan data over the sample period 1963-73, the results were encouraging since it tracks the actual behaviour quite well and that the relationship postulated in the model appears valid.

Mwega(1990), investigated several econometric relationships which bear upon monetary policy in Kenya. The first issue was whether the demand for money is stable for policy makers to be in a position to predict the macroeconomic consequences of their financial policies. The results found the demand for money stable in the 1980s in the face of exogenous and policy shocks and a very rapid growth in private non-bank financial institutions, in support of the study by Dharat (1985). The second issue was whether money and credit matter in the sense that they influence the level of domestic prices and the balance of payments. The analysis

indicated that inflation is significantly influenced by money supply, increases with import prices and significantly decreases with real income growth rates in Kenya. Similarly, the study found that changes in domestic credit significantly offset changes in net foreign assets over the sample period 1973:1 to 1988:4 without significant feedback effects, but these results were not stable hence cannot be generalised. Lastly, the study addressed various issues concerning the controllability of money and credit in Kenya. It analysed the money multiplier and found to be unstable mainly due to commercial banks liquidity decisions found to be influenced by a wide range of factors. The public sector was found to crowd out the private sector financially. Also credit from non-banking financial institutions were found to be almost perfect substitutes for credit from commercial banks and the banking system, with similar effects on output, inflation, and the balance of payments.

Nganda (1985) used a simple monetary model within the quantity theory tradition to analyse the relationship between money supply, output, international reserves, and prices over the period 1968-83. The general analysis shows a strong relationship running from real output to real money balances to exist in the economy. Prices are found to be highly influenced by real money balances and real output. From the estimated model, it is also shown that most of the coefficients have the expected signs and are significant. The model also appears to be valid since it tracks well the trends and turning points of the chosen macroeconomic variables.

2.3 AN OVERVIEW OF THE LITERATURE.

The literature review above reveals quite diverse and different models that have been used to analyse the role of money in modern economies. We have reviewed some works on

the relationships between the monetary sector and the other sectors of the economy, including the foreign sector. Also, we have looked at the literature on the test of the relevance of the monetary models in an economy with diversified models. Although, we have dwelt mainly on studies on developing countries, most of the studies revealed the monetarist proposition to be valid. Therefore, a simple monetary model is specified in the next chapter to test the relevance of the monetary approach to the balance-of payments in the Kenyan case.

CHAPTER THREE

METHODOLOGY

In this chapter, we give a verbal general theoretical framework, develop a model which can be used as a framework to test the monetary approach to the balance of payments, discuss the estimation technique and data requirements, sources, and data type. The overall objective is to discuss a model which can be used as a framework for testing the monetary approach to the balance of payments.

3.1 THE THEORETICAL FRAMEWORK.

In this section, we are set to present a general and verbal explanation of the basic monetary approach to balance of payments theory. The new monetary approach derives originally from monetary theory (which rests basically on the quantity theory of money) rather than balance of payments theory; is an extension of domestic monetarism (stemming from the Chicago school) to the international economy. The monetary approach views the balance of payments as an essentially (but not exclusively) monetary phenomenon, that is, money plays the crucial role in the long-run both as a disturbance and adjustment in the nation's balance of payments.

To begin with, the approach is described as 'monetary' and not 'monetarist' precisely to avoid confusion with the recent domestic policy debates in which the term 'monetarist' has been used by debaters to represent attaching 'too much' (or exclusive) importance to money, and specifically to the use of monetary as contrasted with fiscal policy in economic

stabilization. The monetary approach is often presented as a superior alternative to the traditional approaches and frequently leads to predictions and policy implications diametrically opposing those of the traditional approaches. While the term 'balance of payments' is often used to refer to particular components of the balance of payments accounts, such as the visible balance, the current account balance, the 'basic balance' or the overall balance; policy concern about aggregates so defined is a concern about the composition of a country's international accounts or the structure of its economic relations with the rest of the world. Therefore, the relevant term to balance of payments properly defined refers to the items that are 'below the line' in the overall balance of payments, the item in question constitutes the 'money account', that is the net resultant inflow or outflow of international reserves relevant to macroeconomic policy— monetary and fiscal policies, exchange rate policy, and controls on trade and payments imposed for balance of payments reasons.

The central point of the monetary approach to balance-of-payments policy theory is that balance-of-payments deficits or surpluses reflect stock disequilibrium between the demand for and supply of money in the money market. The basic difference between it and the "orthodox" (i.e. post-keynesian) approaches to the balance of payments is not, as some economists have suspected, one of long-run growth versus short-run static equilibrium, or as others have claimed, one of extreme emphasis on monetary flows as against the emphasis on the "real" flows in general equilibrium analysis of a monetary economy. Rather, it is one of the methodology in the treatment of a monetary economy in balance of payments disequilibrium.⁹ In particular, the monetary approach stresses three points which are stated below as given by Johnson (1977),

⁹ see Johnson, H.G 1977

- (a) Balance of payments problems are monetary problems in a monetary world system, and should be analysed by models that explicitly specify monetary behaviour and integrate it with the "real" economy, rather than by models that concentrate on "real" relationships and treats monetary behaviour as a (usually not integrated) residual of real behaviour.
- (b) Money is a stock, not a flow, and monetary equilibrium and disequilibrium require analysis of stock equilibrium conditions and stock adjustment processes.
- (c) Though the distinction is not always necessary or convenient for abstract theorizing, it is essential for balance of payments analysis in a fixed-rate system to recognize that, although money can be obtained from two alternative sources ____ the expansion of domestic credit, and the exchange of goods or assets for international money and the conversion of international into domestic money via the monetary authority --- only the second affects the balance of payments.

According to the monetary approach to balance-of-payments, a surplus in the nation's balance of payments arises from an excess in the stock of money demanded that is not satisfied by domestic monetary authorities, but by an inflow of money from abroad. On the other hand, a deficit in the nation's balance of payments results from an excess in the stock of money supplied that is not eliminated or corrected by the nation's monetary authorities. The nation's balance of payments surplus or deficit is temporary and self-correcting in the long-run; that is, after the excess in the supply of or demand for money has been eliminated through an inflow or outflow of funds. Thus, according to the monetary approach to the balance of payments, there is an automatic tendency towards equilibrium in the balance of payments. However, the adjustment process operates as explained above unless the nation

sterilizes or neutralizes the effects of changes in money supply or unless the causes of the disturbance persist (see Grubel and Ryan, 1979 PP17). Of course, in reality even a country which creates money only at a rate equal to the growth in the domestic demand may still suffer from temporary payments imbalances because of random disturbances affecting output, prices, and the demand for money. Such disturbances tend to average out through time and they will not be permitted to distort the equilibrium growth rate of the money supply.

However, in the subsequent discussion we do not in fact analyse changes in the money supply, but in the so-called the high-powered money base. This consists of the domestic component of the nation's monetary base and the foreign component of the nation's monetary base. The money supply is assumed to be a function of the money multiplier (assumed to be stable and predictable) and the nation's monetary base (consisting of currency in circulation plus commercial banks liquid assets). Therefore, we shall focus on the growth and control of the money base as the effective method for controlling money supply. However, we should notice a theoretical interdependence between monetary and fiscal policies.

The monetary approach unlike the Keynesian models emphasizes the domestic factors, that money matters in the determination of the balance of payments. The monetary approach, however, is not itself a structural model, but rather a framework of analysis that is compatible with diverse macroeconomic models. Unfortunately, this body of knowledge is not as neat and systematic as that about pure theory of international trade (see Grubel, 1977). Moreover, this body of knowledge is continuously evolving, and in the 1970s it was caught in the middle of the agonizing reappraisal of the validity of some theorems of Keynesian analysis as compared to views of the greater importance of money. Further, these issues are confused by the changing

institutions such as the abandonment by many countries of the maintenance of fixed parity exchange rates, the uncertain role of gold in the system, and the formations of regional monetary and trading associations like the European Economic Community (EEC). Hence, for a long time economists have been interested in studying how money affects the economy. This study is, therefore, an attempt to answer questions like how important are changes in money supply as compared to changes in the demand for money in explaining macroeconomic events.

3.2 THE EMPIRICAL MODEL SPECIFICATION, HYPOTHESES AND ESTIMATION TECHNIQUE.

The model developed here is a monetary model in the sense that it organizes the analysis around the demands and supplies of national monies, that is in line with the concept that money matters in all modern economies. The new monetary approach to the balance of payments is an extension of domestic monetarism to the international economy in that it views the balance of payments as an essentially monetary phenomenon. That is, money plays a crucial role in the long-run both as a disturbance and adjustment in the nation's balance of payments. The model is derived by applying the basic assumption that the money market is always in equilibrium.

The monetary approach begins by postulating that the demand for nominal money balances is positively related to income and is stable in the long-run. We therefore, obtain an equation representing the demand for money (M^d) as follows.

$$M_t^d = P_t \cdot L(Y_t, I_t, K_t) \dots\dots\dots (1)$$

Where; M^d is the quantity demanded of nominal money balances, p is the domestic price level, I is the interest rate, K is the real money balances in the previous period, t is the time trend in years and L is the familiar demand function for real cash balances. The main characteristics of this specification of the demand function are that the quantity demanded is an increasing function of the price and income levels, and a decreasing function of the interest rate.

On the other hand, the nations supply of money (M^s) is assumed to be given by:

$$M^s = mH_t ; H_t = D_t + R_t \dots\dots\dots (2)$$

Where; M^s is the money supply, m is the money multiplier, t is the time trend in years and H is the high-powered money of the monetary authorities. The link between the foreign sector and the domestic money market is established by considering that the high-powered money base consist of the domestic component of the nation's monetary base (D) and the foreign component of the nation's monetary base (R).

Thus, the continuous money market equilibrium condition is given by the equality of the quantity of money demanded and money supplied, that is,

$$M^s = M^d \dots\dots\dots (3)$$

substituting equation (1) and (2) into equation (3), we get

$$m(D+R) = P.L(Y,I,K) \dots\dots\dots (4)$$

Taking the natural logarithm (ln) of both sides of the equation (4), we have:

$$\alpha_1 \ln P_t + \alpha_2 \ln Y_t - \alpha_3 \ln I_t + \alpha_4 \ln K_t = \ln m_t + \ln(D+R)_t \dots\dots\dots (5)$$

Totally differentiating equation (5) with respect to time (t) and rearranging the equation to make $R/Hd\ln R$ the subject (dependent variable), yields;

$$(R/HdlnR)_t = \alpha_1 dlnP_t + \alpha_2 dlnY_t + \alpha_3 dlnI_t + \alpha_4 dlnK_t - \alpha_5 dln m + \alpha_6 (D/HdlnD)_t + u_t$$

..... (6)

Where d is the change in the relevant variable and u is the stochastic disturbance term. All the other variables are as define earlier. In other word, equation (6) says that the weighted growth rate of reserves is a decreasing function of the weighted growth rate in the domestic component of the high-powered money base after adjustment for the exogenous growth in the other variables influencing the transactions demand for money: real income, prices, interest rates, and lagged money balances, and for changes in the money multiplier¹⁰. For the monetary approach to the balance of payments to be true, the weighted growth rate of the nation's international reserves is equal to the negative weighted growth rate of the domestic component of the nation's monetary base, that is α_6 must be equal to negative one. A similar model has been used by Grubel and Ryan and found the monetary approach to be relevant to the Kenyan experience.

However, a variant of the above model which could incorporate the ideas of Kouri and Porter (1974) that it is the net private capital inflows rather than the overall balance of payments that is explained by the disequilibrium in the money markets. However, in Kenya like most other less developed countries (LDCs), capital is generally acknowledged to be quite immobile because of the nature of their financial and capital markets. Hence, rather than formulating a "capital-flow" model a "product flow" model might be more appropriate to LDCs because an excess of money supply within a monetary framework is expected to lead to an excess demand for foreign goods and services. Therefore, an appropriate test framework would be the estimation of an aggregate import function which has monetary aggregates as

¹⁰ see Grubel and Ryan (1979) pp 25-26.

some of its explanatory variables. However, the central concern of this study is not whether or not the money supply is an important determinant of total imports, but rather the issue is whether or not there is a one-for-one correspondence between domestic credit (or money supply) and total imports. Since import and exchange controls were the norm during the period of study, the monetary "no impediment to free-trade" assumption would not be met. This might render the use of a "product-flow" model not as meaningful as a test framework.

Roper and Girton (1977) derived a model to explain both exchange rate movements and official intervention without relying on the small country assumption. A review of Kenya's historical data on exchange practices during the period of study reveals that external balances had been influenced by a combination of changes in reserves and exchange rate (see Mwamadzingo 1988). Therefore, a more relevant framework for testing the monetary approach to the balance of payments in Kenya might be a model for a hybrid exchange rate system such as a crawling peg. Roper and Girton developed the "exchange market-pressure equation" as the relevant test framework which is applicable to all exchange rate systems. Therefore, a similar model will be used for Kenya to test the relevance of the monetary approach to the balance of payments, where the dependent variable which is called the exchange market pressure (EMP) provides a measure of the value of intervention necessary to achieve any desired exchange rate target. They, therefore, suggested that the appropriate model can be stated as follows;

$$[dR/H + d1/e/1/e]_t = \alpha_0 + \alpha_1 [dD/H]_t + \alpha_2 [dY/Y]_t + \alpha_3 [dFH/FH]_t + \alpha_4 [dFY/FY] + V_t$$

..... (7)

Where, R, H, D and Y are as defined before, while FH is the foreign monetary base, FY

is the foreign income and e is the effective exchange rate. While V is the random error term and d represents the change in the relevant variable.

HYPOTHESIS:

The model predicts the coefficients to possess the following signs; $\alpha_1 < 0$; $\alpha_2 > 0$; $\alpha_3 < 0$ and $\alpha_4 > 0$. However, the monetary approach to the balance of payments predicts α_1 to be equal to negative one. This model will be tested using Kenya's experience to see the relevance of the monetary approach.

To see whether or not the results of the study favours the monetary approach to the balance of payments over the other traditional approaches to the balance of payments, the following guidelines according to Jimoh shall widely be used. For the estimates of α_1 to be said to provide an evidence in favour of the monetary approach to the balance of payments, the following conditions must be satisfied:

- (i) the estimate must be significantly different from zero;
- (ii) the absolute value of the estimate is not significantly different from unity; and
- (iii) the point estimate of the parameter must not as a number be too different from unity.

Estimation Technique

The model will be estimated using the Ordinary Least squares (OLS) technique.

3.3 DATA REQUIREMENTS,SOURCES.MEASUREMENT AND DATA

LIMITATIONS:

The econometric estimation of the model discussed and specified above implies that we require data on the following variables for our study,namely;the high-powered money base (H), the domestic component of the nation's monetary base (D), the foreign component of the nation's monetary base (R), real income (output) (Y), the effective exchange rate (e), the foreign monetary base (FH), and lastly the foreign income(FY). Some of these variables are however, easily mentioned but are very difficult to obtain or to be measured with some degree of accuracy. Official statistics do not furnish most of these variables as required for use in this study. Hence some of the variables were derived indirectly from published data to be utilized for purposes of the study,notwithstanding there shortcomings.

All the data used in the statistical work in this study were derived from secondary published sources. In particular, the data on the variables,H,D,R,and Y are found in the following publications: the Central Bank of Kenya:Economic and Financial reviews,Quarterly economic reviews;the International Monetary Fund (IMF): International Financial Statistics (IFS); and the Kenya government publications,mainly the Economic Survey's.

The problem,however, arises on how we should measure the remaining variables: namely e, FY and FH. Examining Kenya's trading pattern with the rest of the world during the period of the study reveals that Kenya's trading relationship with the Organization for Economic Co-operation and Development (OECD) Member Countries is strong and high with an increasing trend as indicated by the trade directions with these countries. Kenya's total imports which

are supplied by the OECD countries on average is about 66 per cent, while her total exports bought by the OECD countries on average also is about 50 per cent. From these observations, therefore, the variables FH and FY will be measured by the import weighted dollar value of the high powered money and import weighted index of national output of the OECD countries respectively.

On the measurement of the effective exchange rate(e), the formula used by Jimoh,1990 will also be highly used here and is given as,

$$e = r_j / r_{j0} - \sum \{ B_i [r_i - r_{i0}] / r_{i0} \} r_{j0}$$

Where; r_j is the domestic currency price of the U.S dollar in kenya, r_{j0} is the 1967 domestic currency price of the U.S dollar in kenya, r_i is the domestic currency price of the U.S dollar in the i^{th} country of the OECD countries, r_{i0} is the 1967 domestic currency price of the U.S dollar in the i^{th} OECD countries, and B_i is the kenyan imports from the i^{th} country of the OECD countries as a percentage of the total imports from those OECD countries. All these variables are found in the International Financial Statistics, the Direction of International trade statistics both published by the International Monetary Fund (IMF). Mwamadzingo (1988) used similar method with trade weights considering only five OECD countries.

The data used in the estimation of the model is therefore annual secondary data extracted from various publications as mentioned above covering the period 1967-1989. The choice of the period of our study was however dictated by data availability and also our wish was to cover the period in which the Central Bank of Kenya was in operation. The data used in our study for statistical purposes is given in the appendix.

CHAPTER FOUR

DATA ANALYSIS

4.1 STATIONARITY ANALYSIS:

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 by domestic component of the monetary authorities or by the reserve flows (foreign component of the monetary authorities) because majority of economic theory is built upon the assumption of stationarity in all economic time series. However, most economic variables tend to move together over time, but cannot be assumed to be stationary. In order, to avoid the problem of spurious association, we first test for stationarity in the data set to be used in the model estimation.

Testing for stationarity is called the theory of integration. This determines the order of integration of the variables or unit root test, on the assumption that most economic time series are integrated of order one: $I(1)$ or have a unit root. A variable is said to be stationary, if it has at least a constant unconditional mean and a finite variance over time, while innovations have only temporary effects on this variable, that is, a variable is integrated of order zero $I(0)$. On the other hand, a non stationary variable has a mean that changes with time and its variance is infinite, while innovations have permanent effects instead of transient¹¹. Thus, statistical inferences from econometric models when non stationary variables are used may be impaired

¹¹ Ndungu (1992) PP15 and Dolado and Jenkinson (1987) PP2.

by several factors. "A model with a non-stationary error term, in turn violates the assumption of the error term being identically, independently, and normally distributed with zero mean and a constant variance" [see Ndungu (1992) PP14]. Therefore, to solve this problem of non-stationarity of variables, one requires to difference once or several times until stationarity is attained (differencing induces stationarity). If a series requires k differencing before it becomes stationary, it is said to be "integrated of order k ": $I(k)$. Thus, the analysis of integration involves determining the level of differencing to be undertaken before a variable becomes stationary.

The unit root test follows the Sargan and Bhargava (1983) conventional Durbin-Watson statistic (SBDW-test) from a static regression of the variable under consideration on a constant term, that is;

$$X_t = c + u_t \dots\dots\dots 4.1 \text{ (random walk plus a drift, } c).$$

$$\Delta u_t = -\alpha u_{t-1} + e_t ; e_t \sim N(0, \sigma_e^2) \text{ (random walk).}$$

"The null hypothesis to be tested is that the $\alpha(\alpha) = 0$, against the alternative hypothesis ($\alpha < 0$) that the errors follow a stationary first order auto-regressive process. A unit root for the error process is equivalent to the structural element following a random walk"¹². However, the SBDW test tends to be low when the root in the residuals tends to unity and is only powerful in discriminating between simple random walks and stationary first order auto-regressive process.

An alternative test that will also be used in this study is the Dickey-Fuller (DF) test which depends on a deterministic trend and a stochastic one. The DF-test is obtained by

¹² see Dolado and Jenkinson (1987) PP13

running an auxiliary regression of the form;

$$\delta X_t = u + b(t-t^\wedge)_t + \pi X_{t-1} + e_t \dots\dots\dots 4.2$$

The DF-test is to determine $\pi = 0$, against the alternative that $\pi < 0$, hypothesis.

The augmented Dickey-Fuller (ADF) test (which is a more powerful test than the SBDW and the DF) is obtained by adding polynomial lags of the dependent variable in the DF-test to capture the possibility of serial correlation. We considered only one lag of the dependent variable. The ADF test also maintains the same null hypothesis: $\pi=0$ or $\pi<0$. The ADF-test is obtained by running the regression of the form;

$$\delta X_t = u + b(t-t^\wedge)_t + \pi X_{t-1} + \sum_{i=1}^p \rho^i \delta X_{t-1} + e_t \dots\dots\dots 4.3$$

The table 4.1 below shows the results of the unit root tests.

TABLE 4.1 UNIT ROOT TEST RESULTS.

Variables	SBDW	DF	ADF	Order of cointegration
EMP	0.843	-2.797	-2.823	I (1)
dC/H	1.136	-4.001	-4.212	I (0)
dY/Y	1.052	-0.636	-0.443	I (1)
dFH/FH	1.183	-1.813	-2.115	I (1)
dFY/FY	1.514	-2.788	-2.246	I (1)
Q	1.514	-3.915	-1.511	I (1)
.....				
critical values.		5%	1%	
	SBDW	0.78		
	DF&ADF	-3.45	-4.04	

Considering the unit root test results above, the SBDW test at the five per cent level of significance showed the economic series to be "integrated of order zero":-I(0), implying that the series are stationary. However, the DF test at the usual 5% level of significance showed the series to be I(1) except for dC/H and Q which were found to be I(0). The ADF-test reported similar results that all the series are integrated of order one, except dC/H which was I(0). Owing to the shortcomings of SBDW test cited earlier, we thus rely on DF and ADF

tests. Thus we conclude that the series are $I(1)$ except for dC/H alone, hence the economic series are non-stationary.

4.2 CO-INTEGRATION ANALYSIS.

The concept of co-integration analyses groups of variables integrated of the same order. The DF and ADF tests can be used to determine the order of integration of residuals. If a linear combinations of variables integrated of the same order is got, then that linear combination will be integrated of the same order as the variables used, except when the variables are cointegrated, then this linear combination assumes a lower order of integration. If Y and X_s (regressors) are $I(1)$ then the residuals from the regressions of these series will also be $I(1)$, unless they are co-integrated. If the variables forming a linear combination are cointegrated, then their linear combination will assume a lower order of integration than the variables used. Then, we say that these variables are cointegrated, that is, they have a long-run solution that we postulate or postulated by economic theory. Thus, if the residuals are $I(0)$ then we accept co-integration in the linear combinations of the variables. The major reason for this is the possibility of estimating and testing the existence of long-run economic relationships suggested by theory¹³. In general therefore, co-integration of the series implies non-linear restrictions on the parameters.

Most economic time series appear to be non-stationary, but economic theory suggest equilibrium should be stable a function of the variables involved. There are two responses in solving such problems. Firstly, the estimation can be performed using data differenced once

¹³ see Dolado and Jenkinson (1987) PP20.

or several times until they are stationary. Secondly, we can use an error correcting mechanism (ECM) representation in econometric models. Models including the ECM have the advantage of retaining information about the levels of variables (so as to include an ECM representation the variables must be in difference form) and hence any long-run relationships between such variables within the model.¹⁴ Granger (1983) established that ECM's produce co-integrated sets of variables and if a cointegrated set of variables is found, it must have an ECM representation. ECM could be reflected by a cointegrating vector.

Co-integration analysis provides formal statistical support for the use of an ECM as a parameterization which is capable of adequately representing the time series properties of the data set because economic variables move stochastically together over time. "It has been proved that co-integration implies Granger Causality and co-integration in levels implies cointegration in logarithms, though not vice versa"¹⁵. Testing for cointegration between a set of time series is simply a test for the existence of a unit root, although in this case we apply the test to the residuals from the static regression models. Table 4.2 below gives the co-integration results tested using the DF and ADF tests. A static regression was ran for the chosen independent variable, using two sets of all variables as the regressors.

¹⁴ Dolado and Jenkinsen (1987).

¹⁵ Ndungu (1992) PP19 and Dolado and Jenkinson (1987) PP34.

TABLE 4.2 COINTEGRATION TESTS RESULTS.

RESIDUAL OF REGRESSION ON	DF ¹	ADF ¹	ORDER OF INTEGRATION
EMP	-3.197	-2.096	I (1)
EMP ²	-3.129	-2.368	I (1)
.....			
Critical values.	5%	1%	
DF k1	-4.35	-4.94	
k2	-4.76	-5.41	
ADF k1	-3.95	-4.61	
k2	-4.15	-4.80	

EMP and EMP² had 4 and 5 regressors used in the static regression respectively.
 K=Number of regressors in the static regression, k1=4 and k2=5. N = 23 i.e the sample size.

Notes:

1. DF and ADF test follow from the unit root tests.
2. Regression of EMP with one additional regressor(Q).

The cointegration test results turned out to be quite interesting. The Dickey-Fuller test, which involves estimating an auxiliary regression of the form;

$$\delta X_t = u + b(t-t^\wedge)_t + \pi X_t + e_t \dots\dots\dots 4.4$$

Where X_t is the residual from the static regression and the augmented Dickey-Fuller test of the form,

$$\delta X_t = u + b(t-t^\wedge)_t + \pi X_{t-1} + \sum_{i=1}^p \rho^i \delta X_{t-1} \dots\dots\dots 4.5$$

turn out to reject the fact that there exist a unit root in the residuals in both regressions.

The unit root hypothesis is not rejected for both residuals indicating that for each series the residuals from the static regression models are integrated of order one. Therefore, we conclude that the series are not cointegrated. Hence, the variables should be used in difference or use an ECM representation, which will measure the extent of deviation from "equilibrium path". If variables are not cointegrated, then we use the first difference and add the

cointegrating vector as suggested earlier.

4.3 DEVELOPING AN ERROR CORRECTION MODEL.

From the results of cointegration we have established the variables are not cointegrated, we therefore need to have an ECM representation. Equation (7) is re-specified in first difference and include the respective cointegrating vector as the ECM. Models including ECM have the advantage of retaining information about the levels of variables and hence any short- and long-run relationships between such variables. If we only specify the variables in first difference alone, makes the model loose its long-run interpretations. The model is re-specified as follows,

$$D\{(dR/H)+[(d1/e)/(1/e)]\}_t = \alpha_0 + \alpha_1 D(dC/H)_t + \alpha_2 DD(dY/Y)_t + \alpha_3 D(dFH/FH)_t + \alpha_4 D(dFY/FY)_t + \alpha_5 D(ECM)_{t-1} + e_t \dots\dots[8]$$

The aim of including the ECM representation was to provide a model which, (i) is consistent with the data set, (ii) exhibited parameter stability over time, and (iii) conformed to long-run postulates of economic theory.

Secondly, we have included the lagged dependent variable instead of including lagged regressors in the model as a partial adjustment model (PAM) of the form,

$$D(EMP)_t = \alpha_0 + \alpha_1 (dC/H)_t + \alpha_2 DD(dY/Y)_t + \alpha_3 D(dFH/FH)_t + \alpha_4 D(dFY/FY)_t + \alpha_5 DECM_{t-1} + \alpha_6 D(EMP)_{t-1} + e_t \dots\dots(9)$$

Where $EMP = \{(dR/H)+[(d1/e)/(1/e)]\}$, and the D's represents first difference of the variable in question. The domestic component of the monetary authorities is in levels, since it was found to be stationary. While the domestic income variable is in the second difference level

in order to patch out the high multicollinearity between it and the domestic credit variable.

Equation [9] above will be estimated using OLS and the parameters are expected to have the following signs; $\alpha_1 < 0$; $\alpha_2 > 0$; $\alpha_3 < 0$; $\alpha_4 > 0$; $\alpha_5 < 0$; $\alpha_6 > 0$.

CHAPTER FIVE

EMPIRICAL RESULTS:

The model discussed in chapter three and re-specified in chapter four [equation (9)] was estimated using Ordinary Least Squares (OLS) and the results are discussed below.

5.1 THE EMPIRICAL RESULTS ANALYSIS:

The results of our estimation model (equation[9]) with the data provided in the appendix are presented in table 5.1 below¹⁶. The standard errors of the estimates (std error), the multiple coefficient of determination (R^2), the t-statistic, the Durbin-Watson statistic (DW stat.), the residual sum of squares (RSS), and the F-statistic are also presented.

TABLE 5.1: REGRESSION RESULTS.

Variable	Coefficient	Std. error	t-statistic.
c	0.087	0.069	1.258
dD/H	-0.737	0.199	-3.656
DDdY/Y	2.725	1.745	1.562
DdFH/FH	-1.448	0.393	-3.682
DdFY/FY	1.330	0.384	3.461
DEMP-1	0.075	0.206	0.364
DECM-1	-0.301	0.204	-1.474
R ² = 0.7566		RSS = 0.986	
F-statistic[6., 14.] = 7.39		σ = 0.265	
n	= 21		

¹⁶ All the data in this paper were regressed using: Micro PC-GIVE Version 6.01.

DIAGNOSTIC TEST.

Normality	Chi ² (2)	=	1.26.
ARCH 1	F[1., 12.]	=	0.01.
ARCH 2	F[2., 10.]	=	0.01.
AR1-2	F[2., 12.]	=	0.55.
RESET TEST	F[1., 13.]	=	1.71.
CHOW TEST	F[8., 6.]	=	0.68 [0.699].

The estimated coefficients have the expected signs and the domestic component of the monetary authorities, the growth of foreign income, and the growth of foreign money base are statistically significant at both the five and one per cent level of significance. However, the coefficient of the speed of change of the domestic income component and the error correcting mechanism representation are statistically significant at the one per cent level. The coefficient of the lagged dependent variable (adjustment parameter) is statistically insignificant at all levels of significance. The constant term is not significant at both the five and ten per cent level of significance, and the model has got no implications for the sign or the significance of the constant term. We have chosen the student's t-distribution to test our hypothesis because the sample size ($n=21$) is small.

The F-statistic tests the joint effect of all the explanatory variables on the dependent variable. Thus, the null hypothesis is that the coefficients in the regression are all equal to zero, that is, $H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$. It tests this hypothesis that all the variables in the model do not explain at all the dependent variable (exchange market pressure), against the alternative hypothesis that the coefficients in the regression are not equal to zero, that is, $H_a: \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq 0$. In order to determine whether the regression is significant at the usual five per cent level of significance, we have to compare the computed F-ratio against the critical F-ratio from the F-tables. The critical F-statistic is 2.85. However, the computed value of F-statistic from the regression results is 7.39. This is

highly significant since the computed F-ratio is greater than the critical F-ratio which implies the rejection of the null hypothesis. What all this implies is that the case-mix variables in our model in explaining the variation in the exchange market pressure are important, that is, the explanatory variables included in the model are crucial in explaining the variation of the dependent variable.

The coefficient of determination, which is given as R^2 , explains to what extent the total variation of the dependent variable is being explained by all the independent variables taken collectively. It is assumed that a high value of R^2 implies that the greater is the percentage of total variation of the dependent variable explained by the explanatory variables included in the model, that is, the better is the "goodness of fit" of the regression plane to the sample observations. While, the closer the R^2 is to zero, the worse is the fit. However, R^2 is generally higher in time series data than in cross-sectional data because economic variables tend to move together overtime. Our model, however, gives a R^2 of 0.757, which means that 75.7 per cent of the total variation in the dependent variable (exchange market pressure) is being explained by all the independent variables taken collectively. Therefore, our R^2 is generally high which shows the proportion of the variation of the dependent variable explained by the explanatory variables.

DIAGNOSTIC TESTING AND STABILITY.

It is common to estimate a totally unjustified or meaningless models and yet obtain "correct signs" for the coefficients which may be significant and a high R-squared in most econometric research findings. But this results obtained may suffer major econometric

problems. Thus, there is need to supplement conventional regression with various diagnostic tests analysis. We therefore reported some diagnostic tests above which are briefly discussed below.

We are not going to use the DW or D-h tests in testing for autocorrelation. The DW test could not be used due to the presence of lagged dependent variable as a regressor and there are more powerful test than the D-h test. We resort to other test for autocorrelation, in our case, the autoregressive process of the disturbance term. Assuming that the residuals follow first order or second order autoregressive [AR(1-2)] process of the form,

$$u_t = \Theta_1 u_{t-1} + \Theta_2 u_{t-2} + \dots + \Theta_p u_{t-p} + e_t$$

In order to check for autocorrelation of the first-order [AR(1)] (or higher orders [AR(P)] for $p = 2, 3, \dots, n$) in our model, we applied a more general LM (Lagrange multiplier) test of mis-specification commonly known as Breusch-Godfrey (BG) test. This test concerns the significance of the parameters in the model, that is residual autocorrelation. This test is more robust and it tests against general autoregressive and moving average serial correlation in the model. The $AR(1)-2F[2, 12]$ is 0.55 computed from the regression did not reject the null hypothesis of non-serial correlation, since the computed F-value is less than the critical F-value of 3.89.

The random variable u_i is assumed to have a normal distribution around zero mean with a finite variance. The meaning of the normality assumption is that small values of u have a higher probability to be observed than large values, while extreme values are more and more unlikely to be observed the more extreme they get. Thus, the normality test which follows a chi-square distribution investigates the assumption of normality in the residuals by looking

at the skewness and excess kurtosis. The calculated value of Chi-square from the regression model is 1.26, compared to the critical Chi-square value of 5.99 fails to reject the null hypothesis of normality in the distribution of the residuals. This test is crucial since it shows that the errors in our estimated model are random (that is, they are normally distributed with a mean of zero and a finite variance).

A key assumption in any linear regression models about the random variable u_{it} is that their probability distribution remains the same over all observations and in particular, the variance of each u_{it} is the same for all values of the explanatory variables.

$$E(u_i) = 0; \text{ for all } i.$$

since, we assume u_i to have a mean of zero, then

$$\text{Var}(u_i) = \sigma_u^2$$

If this assumption is not satisfied in any particular case, we say that the u 's are Heteroscedastic. The violation of this assumption leads to inefficient estimates and invalid test statistics, which renders our parameters not to be BLUE any longer. The Engles (1982) autoregressive conditional heteroscedasticity (ARCH) model, the conditional distribution of Y_t is assumed to be normal with mean μ_t and variance h_t which depends on past disturbances, of the form indicated below will be used,

$$\text{Var}(Y_t / Y_{t-1}) = h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \dots + \alpha_p \varepsilon_{t-p}^2.$$

We therefore, performed Engles test on ARCH process with autoregressive (AR) order of one and two. This follows a Chi-square distribution which has been approximated to follow the F-distribution. The F-statistic reported in the regression is 0.01 which is compared to the critical F-values failed to reject the null hypothesis of Heteroscedastic errors. Therefore, the results showed that we have efficient parameters and valid test statistics in our model.

To test for the functional form of mis-specification of the linear relationship between variables in the model, we applied the Ramsey's RESET (regression specification) test. The reset test has been proposed to be a powerful test for specification errors in regression analysis. The reset test (a linearity test), in which powers of the estimated dependent variable are added to the regression equation and tested for their significance. The null hypothesis to be tested is that all the coefficients of the predicted dependent variable be identically zero. The calculated values of the reset test from the regression is 1.71 for adding the powers of the estimated dependent variable. This value is less than the critical F-value of 4.67, thus we accept the null hypothesis, that the functional form of the model being functionally mis-specified is strongly rejected.

A very important indicator of the quality of the functional specification of the model is the stability of the parameters over various data sets. The Chow forecasting test for the stability of the relationships (obtain two estimates of the same relationships for two different periods of time) in order to test whether the two estimated relationships differ significantly.

$$Y_{1t} = \alpha_1 X_{it} + e_t$$

$$Y_{2t} = \beta_1 X_{it} + u_t$$

The results from the F-test suggested by Chow, test the null hypothesis that $\alpha_1 = \beta_1$, that is, there is no difference in the parameters obtained from the two samples against the alternative that $\alpha_1 \neq \beta_1$. What all this implies is that there are no structural breaks over the sample period or the regression coefficients have been stable overtime. We compared the computed F-value of 0.68 with the critical value of 4.15 from the F-tables. Since the computed F-value is less than the critical F value we accept the null hypothesis that the two estimated functions are not statistically significantly different. Therefore, the economic relationships

being studied is stable and any changes can be attributed to chance, that is, there are no structural breaks. The stability condition is clearly important from the economic point of view, especially on its long-run implications of the dynamic regression that has been estimated.

A crucial condition for the application of least squares is that the explanatory variables are not perfectly linearly (or near linearly) correlated. In multiple regression, the correlation among the independent variables is called multicollinearity, or simply intercorrelation. Multicollinearity is not a condition that either exists or does not exist in economic functions, but it is rather a phenomenon inherent in most relationships due to the interdependence of many economic magnitudes over time. In the linear relationship of the model discussed earlier, the net regression coefficients are of prime importance. However, multicollinearity may impair the accuracy and stability (reliability) of the parameter estimates but the exact effects have not yet been theoretically established. The multicollinearity problem is either serious or not depending on their magnitudes. The correlation matrix of the independent variables is given in the appendix two. The correlation matrix indicates that there is no high correlation of major concern between any two independent variables in the model. This reveals that the estimated model does not suffer from any serious multicollinearity problem. Acknowledging that we had no serious multicollinearity problem, then the results given in table 5.1 are assumed to be best, linear, unbiased, and efficient (BLUE) estimators.

The diagnostic tests were meant to show that the results got reflected the data used.

Let's consider the overall situation of the estimated signs of the coefficients in our model, giving brief explanations to each of them at a time as follows.

Looking at the foreign monetary base variable in our equation which is negatively related to the exchange market pressure which is in line with our hypothesis, thus the estimated coefficient of minus 1.448 implies that a ten per cent increase in the foreign monetary base would result to a decline of 14.8 per cent of the dependent variable and vice versa, all other things being equal. As far as the foreign exchange market pressure is concerned the country's monetary policy can be judged tight or easy by reference to what is happening in the rest of the world. Therefore, an expansionary foreign monetary policy through the increase in the monetary base will lead to an increase in the foreign money supply implying that foreign currency becomes cheap resulting to an increase in the purchases of foreign currency. This affects the exchange rate which is a major determinant of the balance of payments and other macroeconomic variables. In this case, therefore, the country's foreign exchange reserves rises along with the domestic money supply as the monetary authorities creates additional money to pay for the foreign currency purchased. This expansion in the domestic money supply will normally lead expansion in the domestic spending, prices, and production. Thus, it seems to cause excess supply of money over its demand resulting in balance of payments deficits.

The shifts in demand from one country's output to another causes balance of payments disturbances, since it is such shifts that cause similar changes in a country's balance of payments and the level of income. Thus, the foreign income variable is positively related to the exchange market pressure as predicted, implying that an increase of foreign income by ten per cent would lead to an increase of 13.3 per cent in the dependent variable, and vice versa. An increase in the foreign income variable, for example, reflects increases in the demand for money in foreign countries implying that there is boom in the business cycle being experience. This increases expenditure world wide, thus improving the balance of payments

position of our economy, though indirectly.

For the domestic income variable, which showed a positive relationship with the exchange market pressure as hypothesized with a coefficient of 2.725, implies that a 10 per cent increase in the speed of growth of the domestic income variable results in 27.25 per cent increase in the dependent variable, *ceteris paribus* and vice versa. This is so, because the rate of growth of income increases the demand for money from the process of economic growth. Thus, growth in output (income) is a factor improving rather than worsening the balance of payments position according to the monetary approach. Therefore, in the course of economic growth, not only productivity changes but also other many economic factors changes and this is vaguely conceived "effects of economic growth" on the balance of payments, which is often the composite results of simultaneous shifts in several exogenous factors in the economy¹⁷. Hence, all the fastest growing countries will generally tend to have the strongest balance of payments position because their demand for the stock of money tends to grow faster than the supply of domestic credit (money supply).

The domestic component of the monetary authorities variable in the model showed the hypothesized negative relationship with exchange market pressure. The estimated coefficient of the domestic component of the monetary system is minus 0.727 implying that an autonomous increase of one unit of this variable leads to a decline of 7.27 per cent in the independent variable, all other things held constant and vice versa. It is assumed that the monetary authorities controls money supply by controlling the domestic component of the

¹⁷ see KOMIYA (1969). Also this variable was included with the view that it represents economic situations in our economy.

monetary system. According to the monetary approach to the balance-of-payments, a deficit in the nation's balance of payments results from an excess in the nation's money supply over its demand for money; and a surplus in the nation's balance of payments arises from an excess of the nation's stock of money demanded that is not satisfied by domestic monetary authorities. Therefore, an increase in the domestic component of the monetary authorities implies an increase in money supply, which works to increase expenditure and this worsens the balance of payments position of a country. Monetary approach to the balance of payments predicts a minus-one coefficient for the domestic component of the monetary authorities, that is, an increase of the domestic component by one unit will lead to a decline of the dependent variable by an equivalent one-unit percentage and vice versa. In order to test the relevance of the monetary approach to the balance-of-payments, the estimated coefficient of the domestic component of the monetary authorities must be significantly different from zero, the absolute value of the estimate must not be significantly different from unity, and its absolute value must not as a number be too different from unity. But, the estimated coefficient of the domestic component of the monetary authorities is not far from unity as an absolute value and is statistically significantly different from zero and is also not significantly different from unity. This result of the model supports the relevance of the monetary approach to the balance of payments interpretations. Therefore, the test of the monetary approach to the balance of payments as passed the test.

The coefficient (adjustment parameter) of the lagged dependent variable in our model had the correct sign which turned out to be insignificant at both the five and ten per cent levels of significance. The lagged dependent variables is an important explanatory variable in most economic relationships because economic behaviour in any one period is to a great

extent determined by past experiences and patterns of behaviour, but this adjustments normally takes time before its achieved. Our results showed the speed of adjustment to be quite too low and was highly insignificant. Nonetheless, the implied pattern of adjustment in our model may sometimes be implausible.

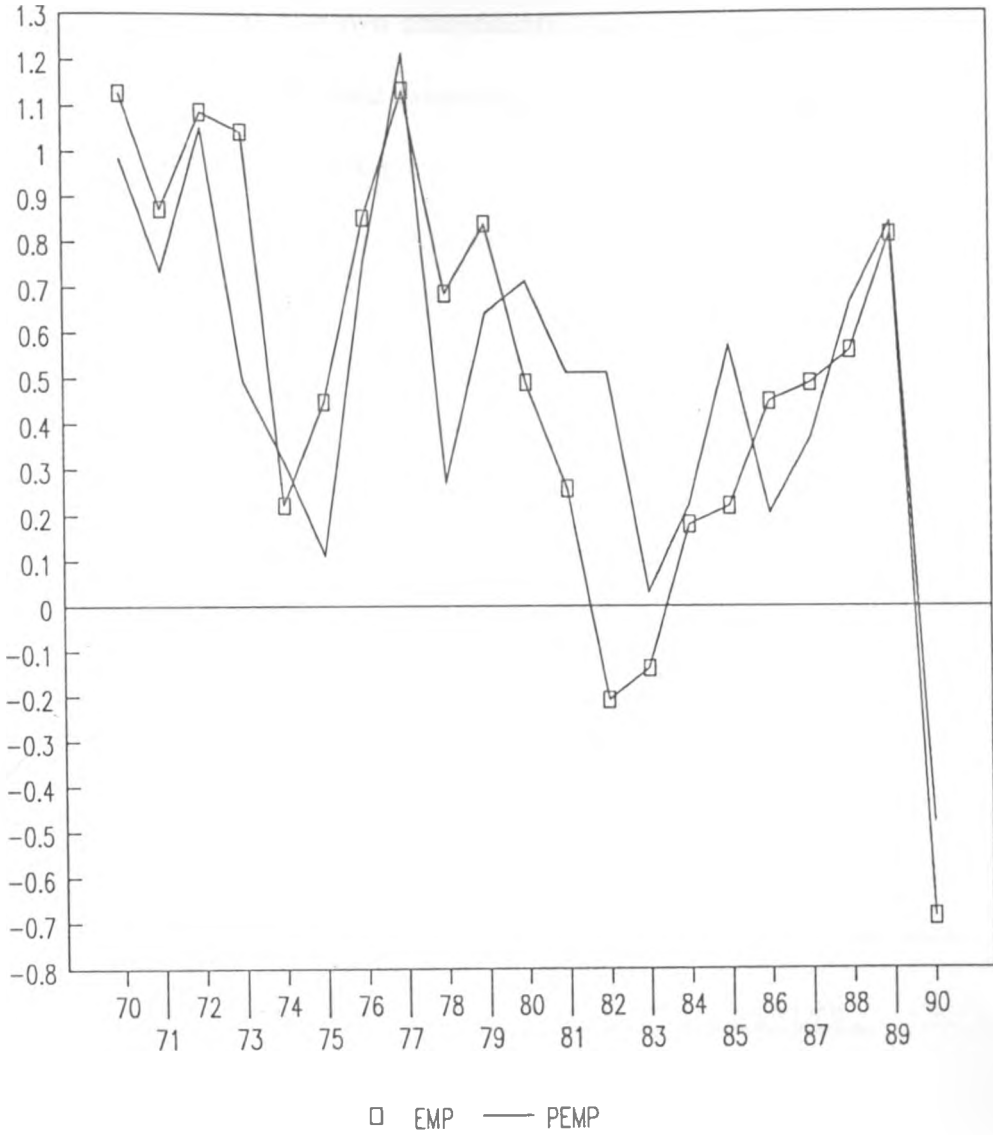
The coefficient of the error correction variable was found to be quite low and had the correct sign, but is highly insignificant at both the ten and five per cent levels of significance. This variable captures the feedback mechanism in the model. The negative coefficient of the error correction variable implies that the overall effects is to slow down the short-term growth in the exchange market pressure (dependent variable), thereby forcing it back towards its long-run path. This shows that the growth of the dependent variable is not sensitive to the departure of its value from the equilibrium value in the proceeding period, hence the dependent variable changes overtime to adjust itself to its long-run equilibrium value.

Using the estimates of the structural equation of the exchange market pressure, we plot the actual values versus the predicted values of the dependent variable in order to determine its ability to track the past behaviour of the dependent variable. The predictive power of the model is illustrated in figure 5.1 below. These explanatory power of the model can be viewed as a test of the goodness of fit of the model. From the figure, it can be seen that the model is fairly accurate in tracking the exchange market pressure. Even sharp turning points in the exchange market pressure seems to be picked up by the model.

In order to test for the sensitivity of the measure of exchange market pressure to its composition (i.e whether the authorities absorb pressure in international reserves or in the exchange rate). The equation was re-estimated with the ratio $Q = \{(dR/H)\} / \{d(1/e)/(1/e)\}$

FIGURE 4.1: ACTUAL AND PREDICTED

EXCHANGE MARKET PRESSURE



at both the five and ten per cent levels of significance, using the t-distribution since our sample size is small ($n=21$). The other coefficients are, however, left essentially unchanged and all the other statistics reported are not significantly affected. This indicates that the explained value of the exchange market pressure variable is unaffected by its composition (measured by Q), the exchange market pressure is independent of whether the authorities absorb the pressure in their reserves or in their exchange rates. Hence, the dependent variable is not sensitive to its composition. This implies that the dependent variable can be appropriately used to determine the volume of intervention necessary to achieve various exchange rate targets.

4.2 SUMMARY.

Overall, we estimated an exchange market pressure for Kenya. All the coefficients had the expected signs and the significant variables are three and five out of six at five and one per cent level of significance respectively. The model is stable as shown by the f-statistic and is good in explaining total variation in the exchange market pressure as evidenced by the high R^2 . Furthermore, the model is devoid of econometric problems mainly multicollinearity, heteroscedasticity and serial correlation so that our estimates are best, linear, unbiased, and efficient (BLUE). The model can be said to be representative of the data set used, since it passed all the diagnostic tests, hence, we can make correct conclusions from our analysis. The model also confirms the relevance of the monetary approach to the balance-of-payments in Kenya. Thus, the monetary authorities must pay adequate attention to domestic credit control (money supply) in their bid to control the balance of payments trends and developments in Kenya. Let us turn and proceed to make some policy implications and conclusions in our next chapter.

CHAPTER SIX

**POLICY IMPLICATIONS,SOME CRITICISMS OF THE
MONETARY ANALYSIS,CONCLUSIONS AND THE LIMITATIONS
OF THE STUDY:**

In this Chapter we focus our attention at some policy implication of our study and make conclusions concerning the findings of the study.We also give some criticisms of the monetary approach and suggest the limitations of our study.At the end of this Chapter we have given also an appendix of the study and the Bibliography.

5.1 POLICY IMPLICATIONS OF THE STUDY.

In this section,we are going to examine some simple but fundamental policy implications of the monetary approach to balance-of-payments adjustments¹⁹.

There are a number of various policy options that are open for governments' to adopt in their attempt to attain balance of payments equilibrium.However,the problem of national policy (or policies) are normally two-fold. Firstly, how to compromise between the goals of maintaining balance of payments equilibrium (external equilibrium) and at the same time keeping domestic prosperity and stability,(internal equilibrium),when the two are normally conflicting. Secondly, how to eliminate these conflict of national policy or policies and the need to compromise between them by developing and pursuing policy options or combinations of these policy options that will yield simultaneously both external and internal equilibrium

¹⁹ see Johnson (1976 & 1977).

in our country;remains a big problem and of great controversial debate among Kenya's policy maker's and academician's.But,we are only concerned here with policy implications towards external equilibrium according to the monetarist propositions in our model analysis.Policies are adopted with the view of getting to the point(or near the point) of Bliss from wherever(or in whichever zone) one is,but these policies normally do not work as expected especially for the case of developing countries,Kenya been included.

The central implications for economic policy for viewing balance of payments as a monetary phenomenon is that as long as the exchange rate is fixed,which has been the case in Kenya up-to may 1985 implies that monetary policy in the form of control over credit creation by the monetary authorities has a direct effect on the balance of payments trends and developments²⁰.Thus,the ultimate policy implications of the monetary approach to the balance of payments is that balance-of-payments adjustments occur through the money supply of the nation,and that instruments to adjust the balance of payments according to the monetary analysis operates via their effects upon the demand for and supply of real money balances in the country.In order to secure an improvement in the country's balance of payments via the monetary policy,the domestic component of the monetary base must be contracted or expanded at a slower rate than the projected rise in the demand for money given the assumed course of real income and prices in the economy over the policy period and vice versa. Therefore, any policy that increases the country's demand for money relative to its supply will lead to an inflow of money (reserves) from abroad,which represents a surplus in the country's balance of payments under fixed exchange rates system. On the other hand,any policy which

²⁰ For details on the policy issues on the monetary approach refer to Salvatore(1990),Lindert(1986), Scittovsky (1970),and Johnson(1976&1977) and any other relevant material.

increases the country's money supply relative to its demand will be met by an outflow of money (reserves) abroad, which represents a deficit in the country's balance of payments.

Sceptics of the monetary approach argue that the close inverse relationship between the exchange market pressure and the domestic credit creation is the result of sterilisation policies of the central bank of Kenya. Considering the domestic component of the high-powered money of our country (*ceteris paribus*) implies that a policy-induced changes in the domestic component of the monetary base are fully offset by equal and opposite changes in the external reserves of the monetary authorities in order to prevent the balance of payments from affecting the money supply. This interpretation is implausible since it implies an extraordinary stability of the Central Banks' behaviour with respect to policy formation and, that sterilisation is always of a magnitude consistent with the demand for money because prices, interest rates, and income are exogenously determined. Thus, the money market must be equilibrated through either reserve flows or domestic credit creation, but it seems too much far-fetched to assume that this kind of rules are followed by the Central Bank of Kenya. The domestic component of the monetary base is taken as a policy variable in our analysis, hence, is exogenously determined. For example, if there is an increase in the domestic component of the monetary authorities, an excess supply of money develops in the country. This, in turn, causes interest rates to fall and spending to increase, resulting in an outflow of money (reserves) which represents a deficit in the country's balance of payments according to the monetarist proposition and vice versa. Though, our estimation results do not confirm the monetary analysis prediction that a policy-induced changes in the domestic component of the monetary base are fully offset by equal and opposite changes in external reserves when all other factors are held constant, but predict the correct sign but does not fully

offset the policy induced changes in domestic credit. This is so because the model predicts that a unit change in the domestic credit result in 7.27 per cent change in the exchange market pressure in the opposite direction, indicating that the monetary analysis has great significance to balance of payments adjustments.

A devaluation in the country's currency, the imposition of import controls, and multiple floating exchange rate policies results in increases in the domestic prices which leads to an increase in the demand for nominal money balances in the nation. The increase in the demand for nominal money balances if not met by an equal increase in the supply of money by the nation's monetary authorities via the changes in the domestic component of the high-powered money, then, it will be satisfied by an inflow of money (reserves) from abroad (representing a balance of payments surplus) until the excess demand for nominal money balances is entirely eliminated and the money market equilibrium is re-established. If the country's monetary authorities for instances increase the money supply by the same amount of the increase in the nominal demand for money balances resulting from either of the above policies, then, these policies will not lead to any inflow of money (reserves) from abroad and the devaluation, import controls, and floating exchange rates policies will completely be ineffective in improving the country's balance of payments. The exact opposite will occur in the case of revaluation, removal of import controls, and multiple exchange rates. However, changes in import controls and exchange rates have only transitory effects on the country's balance of payments, but perhaps assist speed up the long-run automatic adjustment tendency postulated by the monetarist.

Turning to the economic growth component, we can say that if the monetary authorities of a particular country do not increase the domestic component of the country's monetary authorities sufficiently to meet the increased demand for money resulting from the growth of the economy's output (income) overtime, then, there arises excess demand for money leading to an inflow of money (reserves) from abroad (representing a surplus in the country's balance of payments) to make for the excess demand for money. This surplus will persist so long as the economy's growth of money supply falls short of the growth in its demand for money caused by the growth of the country's output (income) overtime. Thus, the fastest growing economies generally show a tendency to possess a strong balance of payments record. This is the opposite conclusion to what the "traditional" approaches to balance-of-payments prediction that these would result in the deterioration in the balance of trade and balance of payments via the marginal propensity to import (other things being held constant), while the monetary's analysis to the balance of payments predicts an improvement in the country's balance of payments.

A fall in the nation's interest rate levels reduces the opportunity cost of holding inactive money balances leading to an increase in the demand for money in the economy. Therefore, the failure of the monetary authorities to increase money supply via the domestic component of the monetary system to sufficiently meet the increased demand for money arising from an exogenous fall in the country's interest rates would result in excess demand for money which would be satisfied by an inflow of money (reserves) from abroad (representing a balance of payments surplus). The opposite is similarly true for a rise in the country's interest rate levels which leads to a decline in the demand for money implying that there exists an excess supply of money in the country which is satisfied by an outflow of money (reserves) abroad

(representing a deficit in the country's balance of payments). The traditional approaches postulate instead that an outflow of capital from the country will occur due to a fall in the country's interest rates level resulting in a balance of payments deficits (all other things held constant) and vice versa. Yet the monetary analysis predictions is opposite those of the traditional approaches in that it predicts an inflow of money (reserves) due to a fall in the country's interest rates from abroad resulting in a balance of payments surplus. Since capital has generally been known to be very immobile in Kenya, hence, the changes in the interest rates can be said to possess minimal effects on the balance of payments trends and development.

Under a flexible exchange rate system the balance of payments are immediately corrected by automatic changes in the exchange rates without any international flow of money (reserves). Thus, the country's monetary authorities retains dominant control over its money supply and monetary policy. Therefore, depreciating exchange rates equilibrates the supply and demand for domestic money balances through its effects in raising the domestic price levels which reduces the real value of a given stock of nominal money balances in the country. Indeed, with a flexible exchange rate system the impact of an excess supply of money is likely to be reflected in faster inflation in a shorter period than with a fixed exchange rate system through the induced effects on the domestic price levels of the depreciating exchange rates. Thus, a deficit in the balance of payments resulting from excess money supply leads to an automatic depreciation of the nation's currency which raises the domestic price levels and, therefore, induces the demand for money to increase thus, absorbing the excess supply of money and automatically eliminates the balance of payments deficits. On the other hand, a surplus in the country's balance of payments resulting from an excess of money demand will

automatically lead to an appreciation of the country's currency which reduces domestic price levels, implying a reduction in the demand for money, thus, eliminating the excess demand for money and the balance of payments surplus. According to the monetary approach, a currency depreciation results from excessive money growth in the country overtime, while a currency appreciation results from inadequate money growth in the country.

The country's monetary authorities intervene in foreign exchange markets to either lose or accumulate international reserves to prevent an "excessive" depreciation or appreciation of the county's currency under a managed floating exchange rate system of the type in operation today. Kenya can be said to have maintain a fixed exchange system, though, not rigidly fixed but it started adopting a hybrid exchange rate system (crawling peg) since may, 1985. The balance of payments deficits under the hybrid exchange rate system is automatically corrected by a depreciation of the country's currency and partly by a loss of international reserves and as a result affects the country's money supply and domestic monetary policy losses some of its effectiveness. The opposite is similarly true for a balance of payments surplus. It also follows that floating exchange rates do not offer an escape from the constraints on domestic monetary policy and contrary to the previous analysis, do not enhance its power.

Our policy recommendation to the Kenya government is that Kenya's monetary authorities must pay more and adequate attention to monetary factors, especially the domestic component of the monetary system in their attempts to achieve a balance of payments equilibrium in the economy. A persistent balance of payments disequilibria (deficit/surplus) implies a continuous expansion/contraction of money supply by the monetary authorities

under a fixed exchange rate system. Also, one important conclusion that emerges from the monetary's approach with regard to the short-run effectiveness of policies to correct the balance of payments problem, namely, that an improvement will occur in the short-run only if the country's monetary authorities do not increase money supply to match exactly the increase in the demand for money resulting from devaluation policy or any other adjustment policies. As regarding to the exchange rate adjustments, little was possible in Kenya because Kenya had since independence adopted a fixed exchange rate system till May, 1985 when it shifted to a hybrid exchange rate (crawling peg). Therefore, exchange rate adjustments as a remedy for balance of payments problems in Kenya had little use in practice.

5.2 SOME CRITICISMS OF THE MONETARY ANALYSIS.

In the preceding analysis, it is suggested that Kenya can maintain a continuous balance of payments equilibrium if the domestic component of the high-powered money base is expanded/contracted so as to assume a steady growth in the overall base, given the exogenously determined disturbances in the foreign exchange rate, then the automatic operations of the money multiplier is assumed to assure that the domestic money market is in equilibrium, that is, domestic money supply must equal the demand for money. But in real world situations this does not normally happen, thus resulting to balance of payments disequilibria in most cases.

Some criticisms has been levelled against the monetarist models that the validity of these policy implications rests on three important assumptions which are not generally met in real world situations, namely.

- (i) the money multiplier is stable,
- (ii) the money base is under the direct control of the monetary authorities, and
- (iii) the money demand function is stable.

Control over the money supply is the rock-bed of an active monetary policy. The money multiplier in Kenya has been found to be generally much more unstable in the short-run than in long-run {see Bolnick, B.R(1975) Mwega, F.M(1990)}. But relevant for policy making is the long-run stability which has been observed to be less unstable (see Grubel and Ryan 1979). However, the money multiplier has also been shown to be influenced by factors exogenously determined outside the monetary authorities control in Kenya. Turning to the question of the control over the money supply by the monetary authorities in Kenya, we note that it is important to distinguish technical and political problems that affect money supply which are beyond the scope of this paper. However, there are some political circumstances which result in excessive money creation. Bolnick shows that the behavioural characteristics of the commercial banks emanating from the balance of payments and from the government budget itself are such as to make it doubtful whether the Central Bank of Kenya can control money supply in more than the most approximate manner. It seems that the Central Bank of Kenya has no autonomy over the control of money supply, but does possess some powers over money supply especially through credit creation. On the demand function for money in Kenya, it has been found to be stable and predictable, growing primarily as a function of time by various authors/researchers in Kenya {see Mwega (1990), Dharat (1985)}.

Other critique of the monetary theory to balance of payments have argued that the monetary approach is not suitable for developing countries, Kenya included because of the

existence of a large non-monetized sectors of these economies, together with a rudimentary capital and money markets. But Kenya's monetary framework is not as rudimentary as such, since the economy is relatively monetized when compared to some developing countries, especially in Africa, which renders the monetary approach not very inappropriate to the Kenyan case (making the test of the monetary approach of great importance to economists' and policy makers in our economy). Also, our empirical analysis results were in favour of the monetarist explanations for the balance of payments imbalances. The monetary analysis of the balance of payments basing itself on the deceptively simple identity that the changes in reserves is identically equal to the changes in the country's money supply less the changes in the domestic credit component (all other things being held constant) has tended to overemphasise the importance of monetary factors for the balance of payments at the expense of the more traditional non-monetary instruments of balance of payments correction. However, the value of one theory over the other is determined by their relative abilities to explain real-world phenomena and to predict the consequences of certain government policies. But it is too early to reach a verdict on the ability of the monetarist models to explain and predict consistently better than did the traditional models simply because there is not enough empirical work to reach a verdict on this question in Kenya, hence remains a debate.

In line with most monetarist analysis, it is the long-run that is emphasised rather than the short-run. The assumptions made, and the mechanism implied normally pertain to the analytical long-run, which if related to years, is almost invariably longer than the policy makers' horizons. This makes it difficult for empirical testing of the proposition of the monetary approach to balance of payments. However, it has also been argued that at least in the short-run, the monetary authorities are able to effectively sterilise the monetary effects on the

balance of payments adjustments. In emphasising also on the stock disequilibrium aspects of the balance of payments surplus/deficits the monetary theory of the balance of payments has much in common with the analysis of Macro-models including a governments' budget constraint that examines the stock implications of a governments budget surplus/deficit. This is so because monetary analysis of the balance of payments overlooks the fact that sterilisation can be effected by running a government budget deficit/surplus corresponding to the balance of payments surplus/deficit.

Notwithstanding all these criticisms, the monetarist models have been of widespread importance in analysing real-world phenomena in recent times.

5.3 CONCLUSIONS.

The empirical analysis of the exchange market pressure on Kenya's experience presented in this study strongly support the theses of the monetary approach and suggests that it is a useful framework for analysing these phenomena. It indicates that monetary factors are very important in the balance of payments analysis pointing out that it is possible to conduct stabilization policies through better management of the country's monetary affairs. Consequently, the evidence from these study suggest that the monetary approach has passed our test both as far as its underlying view of the world is concerned and in its implications with respect to balance of payments. This being the case, monetary authorities in Kenya should, therefore, pay adequate attention to domestic monetary factors in their attempts to control balance of payments in Kenya. The approach also stresses the powerful monetary linkages between countries and particularly the effects that money creation in other countries has on

the domestic money supply in our country when exchange rates are fixed. The estimated model, despite all its imperfections, was found to trace the turning points of the exchange market pressure quite satisfactorily, implying that the model is valid. Nevertheless, import controls and bans, exchange rate interventions and other government adjustment policies have at times been resorted to when the balance of payments position was in serious problems.

The balance of payments pressure has an effect on exchange rate, official intervention in the foreign-exchange market and the analysis of this study is equally relevant to the various system of exchange rate interventions (fixed, floating, hybrid, and managed floating exchange rate systems) in an attempt to achieve balance of payments equilibrium. However, Kenya had operated a fixed exchange rate system until May, 1985 which renders official exchange rate interventions of minimal use in Kenya's attempts to control balance of payments imbalances. In effect, the central bank's domestic monetary policy may be inconsistent with its exchange market interventions policy because the Central Bank buys domestic currency to limit exchange rate depreciation and simultaneously sells domestic currency in the domestic money market to sterilise the monetary effects of its exchange market interventions.

The policy implications of the monetarist analysis are very important in that they put the blame for persistent payments imbalances largely on the excessively expansionary monetary and fiscal policies of our country, relative to its demand. This implications are, however very hard to be taken by politicians, policy makers, and the public who have shown an understandable liking for the traditional approaches to the explanations of payments imbalances, blaming them mostly on factors outside the control of the government (external factors). However, we can conclude by pointing out an element of superficiality in the monetarist explanations that fail to examine political circumstances which may result in

excess money creation. This seems to be the case prevailing in the Kenyan situation.

5.4 LIMITATIONS OF THE STUDY.

There is need to recognize the limitations of the study apart from proving to be successful in obtaining its objectives.

The study uses annual time-series secondary data which has its own shortcomings. Secondary data may not be available in the required form for the study and may be highly aggregative. In most cases secondary data may give conflicting figures for a particular observation for a range of years or a particular year from either the same source or different sources. Thus, the use of secondary annual data may yield misleading results. The analysis should be done on either quarterly or monthly data not only to gain more degrees of freedom (and thus more reliable results) but because decisions on exchange rate interventions and balance of payments measures may be taken at intervals shorter than what is implied in the annual time-series data.

Some of the variables used were difficult to measure or not readily available, thus, rendering the use of proxies necessary. The construction of the proxies for effective exchange rate (e), the foreign money base, and the foreign income component may not really be reflective of the actual observation being measured because there are different approaches and weights that can be used. Therefore, the best approach and weights should be sorted for to determine the appropriate indices suitable to Kenya, which can be implemented.

The use of reserve money to represent the money base for each OECD member country may not be appropriate. Also, the use of GDP at current prices to reflect the income of each OECD member country may not be suitable because inflation is not taken care of. This was used notwithstanding its limitation because some member countries of the OECD reported GDP in real term and others GNP in real terms which renders the use of real income difficult. The 1990 observations of this variable were computed using only 16 OECD member countries due to data problems, which were not available for the rest.

On opinion consideration, the study is not affected by econometric problems, especially heteroscedasticity, autocorrelation and multicollinearity. However, the exchange market pressure model also appears to be recursive in nature which was assumed away in our study.

There is need for further research in this area to try and investigate case studies using various framework sets in order to reach a conclusive verdict concerning the validity of the monetary approach to the balance of payments adjustments in Kenya. This is so because the monetary approach is a theoretical framework of analysis.

APPENDIX 1
DATA USED IN THE REGRESSION ANALYSIS:

	MS	H	R	D	Y	E	FY	FH
1967	2047	651.7	555	96.7	38314	-6.33	196.93	18.53
1968	2301	760.1	821	-60.9	41608	-7.62	234.64	21.65
1969	2748	1109.3	1248	-138.7	43901	-7.62	212.94	18.83
1970	3505	1206.5	1599	-392.5	47142	-7.61	224.93	19.8
1971	3770	1127.6	1208	-80.4	50372	-7.6	252.04	21.99
1972	4295	1235.2	1338	-102.8	55141	-7.57	261.19	24.37
1973	5356	1340.6	1549	-208.4	58907	-7.65	341.28	32.93
1974	5819	1719.5	980	739.5	59784	-8.02	358.86	33.93
1975	6814	1539.8	662	877.8	61824	-8.68	419.16	36.28
1976	8455	1963.2	1449	514.2	66169	-9.4	435.21	37.46
1977	12413	3153.4	3625	-471.6	72402	-10.46	503.72	42.64
1978	14118	3177.2	2129	1048.2	78935	-11.33	598.38	51.71
1979	16396	3855	3588	267	81897	-12.02	661.17	54.66
1980	16208	4244.5	2265	1979.5	86477	-12.63	810.69	61.99
1981	18364	4551	300	4251	89720	-13.12	892.36	60.99
1982	21324	5555.8	-2019	7574.8	93790	-13.71	830.1	58.25
1983	22365	5437.3	-227	5664.3	93973	-13.66	861.36	61.05
1984	25242	5947.1	404	5543.1	95957	-12.26	814.53	58.83
1985	26929	7115.6	-1364	8479.6	99866	-9.67	965.07	66.76
1986	35686	9750.4	292	9458.4	106873	-6.59	949.48	73.71
1987	39666	11077	-1043	12120	113094	-3.09	1492.02	120.69
1988	42817	11991.2	-2041	14032.2	119951	-0.84	1347.83	113.42
1989	48353	13797.5	-1758	15555.5	126702	0.62	1494.63	125.64
1990	58036	37224.4	-4630	41854.6	142673	0.97	1640.82	181.07

Symbols and Sources of Data Used in Regressions.

- MS = domestic money supply(M2) defined as the sum of quasi-money and narrow-money, M1. M1 is defined as currency outside banks plus demand deposits. Quasi-money is composed of time and savings deposits in Kenya, from Central Bank of Kenya: Quarterly economic review, various issues.
- H = High-powered money base of the central monetary authorities, defined as currency in circulation plus Commercial Banks liquid assets, from the Central Bank of Kenya (CBK): Quarterly Economic review and Economic and Financial review; various issues.
- R = Net foreign assets of the central monetary authorities in Kenya, from CBK: Quarterly Economic review and Economic and Financial review; various issues.
- D = Net domestic assets of the central monetary authorities in Kenya, obtained from the monetarist proposition that $H=D+R$.
- Y = Gross Domestic Product (GDP) of the Kenyan economy at 1985 prices, from the International Financial statistics (IFS) published by the IMF.
- E = The effective exchange rate, computed as earlier discussed in chapter three, from IFS, Direction of Trade Statistics both published by the IMF and the OECD Economic Outlook.
- FH = Import-weighted OECD countries reserve money used as a proxy for the foreign high-powered money base, from the IFS, Direction of Trade Statistics by the IMF.
- FY = Import-weighted Gross Domestic Product (GDP) at current prices of OECD countries used as a proxy for foreign incomes, from IFS and Direction of Trade Statistics by the IMF.

APPENDIX 2

TABLE OF MULTICOLLINEARITY OF THE INDEPENDENT VARIABLES IN EQUATION (9):

	dD	dY/Y	DdFH/FH	DDdFY/FY	DEMP-1	DECM-1	DQ
dD/H	1.000	0.408	0.401	0.337	0.089	0.245	-0.535
DdY/Y	0.408	1.000	0.667	0.347	0.059	0.301	-0.670
DdFH/FH	0.401	0.667	1.000	0.755	0.277	0.128	-0.169
DDdFY/FY	0.377	0.347	0.755	1.000	0.185	0.251	-0.31
DEMP-1	0.089	0.059	0.277	0.185	1.000	0.150	-0.039
DECM-1	0.245	0.301	0.128	0.251	0.150	1.000	-0.125
DQ	-0.535	-0.67	-0.619	-0.31	-0.039	-0.123	1.000

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