



INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE AND MANAGEMENT

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BALANCE OF PAYMENT ADJUSTMENT: AN ECONOMETRIC ANALYSIS OF NIGERIA'S EXPERIENCE

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ABSTRACT

This study deals with the Balance of Payment adjustment for Nigeria for the period (1986-2007) using an econometric analysis. The main objective of the study is to empirically investigate the effect to which the monetary phenomenon approach to Balance of Payment adjustment explains the observed behaviour of Nigeria's balance of payment. Annual time-series data on the variables under study covering twenty-two year period are used. The balance on Current Account is considered. The ordinary least squares single equation technique is used for the study. In the model specified the study looked at the impacts of monetary and real variables on the current account balance. The explanatory variables include the total domestic credit, GDP and government expenditure. The study find out that the aggregate credits to the Domestic Economy were significant in explaining the current account balance. There were positive and significant relationship between GDP and current account balance. Also government expenditure was significant in explaining current account balance. It is recommended that the Nigerian Monetary and Fiscal Authorities should give greater priority to measures other than monetary tools to achieve balance of payment stability

KEYWORDS

Balance of payment, Credit, Current Account Balance, GDP.

INTRODUCTION

In any nation, there are basically four objectives of macroeconomic policy, such as high level of employment, a reasonably stable price, rapid economic growth, and maintenance of equilibrium in the international balance of payments. The last objective (balance of payments stability) is very crucial since the basic condition of the world community is one of mutual interdependence. Stemming from the above objectives, balance of payment (BOP) is very relevant. According to Kalu (2008) its importance includes:

- To provide us with important information about whether or not a country is "paying its way" in the international economy.
- It helps forecast a country's market potential – especially in the short run. If a country is running a deficit balance, it will not import as much as if there was a surplus balance.
- It is an important measure of the relative performance of nation's economy in global economy.
- The balance of payment helps measure the strain under which that country's currency is.
- It also plays an essential role in providing vital information to the government, private sector and firms. Such information includes nature and extent of transactions and the accompanying issues that affect the transactions, such as exchange rate, reserves, interest rate, among others.
- The balance of payment helps determine if investors are to expect a gain/loss in exchange rates.
- The Balance of payment helps show the size of any surplus or deficit that may exist. It tells us something about the state of the economy in question, both on its own and in comparison to other world markets.
- The BOP may be used as the indicator of economic and political stability. For example, if a country has a consistently positive BOP, this could mean that there is significant foreign investment within that country. It may also mean that the country does not export much of its currency.
- Balance of payments data are important for monetary and financial monitoring and policy deliberations in both territorial and international context. Such data are useful for analytical studies on income growth, external orientation of the economy, relationship between trade in goods and services and direct investment flows, links between the exchange rate and the current and financial accounts, international banking transactions, assets securitization and financial market development and external debt situation.
- Data in current transfers, when combined with Gross National Product (GNP) will enable the compilation of Gross National Disposable Income for a nation which should be a very useful measure of aggregate income for analyzing changes in consumption and savings.
- Data on external investment flows (direct investment, portfolio investment, financial derivatives and other investments) will provide a macroeconomic database to support economic analysis on many important issues like economic growth, productivity change, and industrial development among others.

Again, there is no country in the world that does not rely on international trade and payments for its well being. This truth carries particular force for most developing countries whose trade and payment magnitudes are particularly large in relation to domestic economic activity (killick 1981). Most of these countries run large deficits and their payments are thus of great importance to the economic progress of such countries and Nigeria in particular.

STATEMENT OF THE PROBLEM

For several years, Nigeria has been pursuing a strategy aimed at re-establishing international credit-worthiness and to achieve this goal, she has been seeking to narrow her balance of payments deficits on current account. But having such international payments equilibrium or deficits reduction is not an easy task. However there has been ways of achieving it, as offered by the traditional theories or approaches of balance of payments adjustment mechanism. More recently, a modern theory (monetary approach) has developed and it emphasizes the application of monetary analysis to the international balance of payments problem. This modern theory needs empirical investigation, and that is the major concern of this study.

Conventionally, the theory of balance-of-payments adjustment mechanism is viewed as a succession of approaches: the Hume's price specie flow mechanism, the elasticity's approach, the Keynesian Multiplier or income approach, the absorption approach and the policy approach that stresses internal and external balances (Arize, Grivoyannis, Kallianiotis & Malindretos, 2000). However a modern approach, a Monetary Phenomenon has developed in recent years. It is the monetary approach to the theory of balance-of-payments adjustment mechanism. The essence of the approach or theory is a consistent insistence that the balance of payments is a "monetary and not a real phenomenon" as postulated by the conventional theories such as Keynesian Multiplier approach, Absorption approach, Elasticity approach, and Economic Policy approach, Ardalan (2003). While the traditional theories maintain that balance of payment disequilibria are permanent, the major point of the modern approach is the recognition of the fact that a country in balance of payment deficit (surplus) would ceteris paribus,

experience a change in its money stock. The simplicity of the approach gives it the research efficiency award and therefore deserves a reasonably thorough exposition and verification, in order to ascertain its validity (Bhatia, 1982).

OBJECTIVES OF THE STUDY

The main objective of the study is to empirically investigate the extent to which the monetary phenomenon approach to balance of payments adjustment explains the observed behaviour of Nigeria's balance of payments. The specific objectives are as follows:

- i. To examine the relationship between monetary variables (domestic credit) and current account balance.
- ii. To assess the impact of real variables (Government expenditure and Gross Domestic Product) on current account balance.
- iii. To determine the impact of monetary and real variables in explaining variations in the current account balance.

STATEMENT OF THE RESEARCH HYPOTHESES

The research work is guided by the following hypotheses:

- H₀₁: There is no significant relationship between monetary variables (domestic credit) and current account balance.
 H₁₁: There is a significant relationship between monetary variables (domestic credit) and current account balance.
 H₀₂: There is no significant relationship between current account balance and real variables (Government expenditure and Gross Domestic Product).
 H₁₂: There is a significant relationship between current account balance and real variables (Government expenditure and Gross Domestic Product).
 H₀₃: Compared to monetary variables, real variables are not more important in explaining variations in current account balance.
 H₁₃: Compared to monetary variables, real variables are more important in explaining variations in current account balance.

This work is a study of a developing country, Nigeria. The choice is made out of the researcher's interest given the country's economic circumstances. The period covered by the research is twenty-two years period, 1986 – 2007. The availability of uniform data on the relevant variables informed the researcher's choice of the period of analysis.

The study does not consider all the components of balance of payments such as overall balance, the basic balance and reserve changes. Also, it excludes such monetary and real variables as exchange rate, interest rate, foreign price, and domestic price index. Reason is because these real variables are not major explanatory variables in the models of the study.

ORGANIZATION OF THE STUDY

This research work is divided into five parts. The first part is the introduction which presents the background of the study; the statement of problem; the importance of the study; scope of the study. In part two, the relevant Literature is presented and discussed. The methodology of the research is presented in part three. Part four concentrates on the presentation and analysis of regression results. Part five concludes the research work, showing the findings, recommendation and conclusion.

LITERATURE REVIEW

The major goal of monetary and fiscal policies is Balance of payments equilibrium that is ensuring that the external sector of the economy is in balance. While most countries do not worry if there is a surplus in the external accounts, the major source of concern is the existence of a deficit in these accounts. The deficit gives much concern: first, because it affects the competitiveness of a country's exports in the international market place; second, and as a derivative of the first, it creates payment problems, that is, ability of a country to finance its imports, and thirdly, it impairs performance of macroeconomic aggregates in other sectors of the economy. Governments all over the world, especially in developing countries, thus suffer sleepless nights trying to make sure that the external sector accounts are in balance, i.e. that the balance of payments is in equilibrium. (Adegbite 2007).

APPROACH TO CORRECTION OF BALANCE OF PAYMENT DEFICIT

Balance of payment deficit can be corrected via the fiscal approach and monetary approach.

FISCAL APPROACH

The fiscal approach to correction of balance of payment deficit requires the adoption and manipulation of taxation and other fiscal policy instruments in correcting balance of payment deficit. This may include the adoption of expenditure switching or expenditure changing policies, which alter consumption pattern by discouraging consumption of certain goods and services so as to maintain both external and internal balances in the economy. This approach may also involve reducing aggregate demand through higher taxes and tariff rates thereby reducing expenditure (Jhingan 2001).

MONETARY APPROACH

According to Kalu (2008), the problems in balance of payment are solely due to the disequilibrium between the supply and demand for money. The approach emphasizes the importance of monetary factors in the adjustment of balance of payment to disturbances. The main message of the monetary approach is that disequilibrium in the BOP reflects disequilibrium in the money market, excess demand or supply of money. The final cause of the BOP-disequilibria is the divergence between the quantity of money in existence and the optimum or desired quantity. Consequently, BOP analysis needs to focus on both the supply and demand for money.

The fact that balance of payments is especially a monetary phenomenon is obvious because the BOP has, by its very nature, to do with monetary magnitudes and the accounting relationships between real and financial flows in the economy: the variation in the official international reserves is nothing but overall balance of payments. The variation of international reserves is the difference between the variation in the stock of money and the variation in other financial assets. Thus, it is obvious that the BOP is a monetary phenomenon.

The basic idea of monetary approach is that any monetary disequilibrium produces an effect on the aggregate expenditure for goods and services in the sense that:

- An excess supply of money causes absorption to be greater than income and a BOP deficit. The only way of absorbing more than one produces is to receive from foreign countries more than one supplies to them.
- An excess demand for money causes absorption to be smaller than income and a BOP surplus. If the public has an excess supply of money it gets rid of it by increasing absorption and ultimately, by passing its excess cash balances to foreign countries in exchange for goods and services which generates a BOP deficit if the public desires to keep more than it has in stock, it produces it by reducing absorption and ultimately, it passes goods and services on to foreign countries in exchange for money, which generates a BOP surplus. BOP disequilibria is merely a reflection of a disequilibrium in the money market: in this sense monetary flows are independent items in the balance of payments while the purchases and sales of goods, services and investments are viewed as accommodating items.

In one-way or the other, most of the studies reviewed have made useful contributions to the understanding of the proposition that 'Balance Payments is a monetary phenomenon' in the context of monetary approach to balance of payment theory and adjustment. However the empirical studies undertaken so far test the new theory "in isolation," in no way is it pitted against the traditional approaches and the researchers must have gone too far in emphasizing monetary variables to the virtual exclusion of everything else. The empirical literature also revealed that none of the studies was on a West African country and Nigeria in particular.

This study therefore intends to improve on the reviewed studies by using Nigeria as empirical evidence, to test the theoretical proposition of the monetary approach to theory of balance of payment adjustment mechanism. The researcher shall also include some non-monetary variables in the model. A longer time period will be employed in the analysis or empirical test.

In its original usage, a 'balance of payments meant an excess of payments over receipts and under the gold standard this excess meant a gold outflow. But the term soon acquired the neutral meaning of the "state of the balance of international accounts", whether negative or positive. Thus one speaks of a "balance of payments problem" whether gold is flowing in or out, and the term "balance of payments theory" is used to cover the entire subject.

Now the accounting of balance of payments records both regular transactions and transactions made to settle any gap between regular purchases and sales. In other words, the accounting framework records the international exchange of goods and services and movement of capital. This measurement of international economic performance is divided into three accounts: the current account, the capital goods and services and unrequited transfers in a country: they are referred to as autonomous transaction and they help to determine rather than depend on the balance of payments. On the other hand, the capital account records all exchanges and money capital for various kinds of real or financial assets. Thus, the capital account transactions are "compensatory transactions" as they often only reflect short falls or surplus as might occur in the current account and the cash account therefore, is that part of the balance of payment that is referred to as the "balancing item", or reserve movements. It wipes out such discrepancies that might arise, like when the volume of transaction of commodities and assets do not balance as they should (Frenkel, Gylfason & Helliwell, 1980).

The balance of payments is related to other aspects of the economic system because it describes the transactions of all the residents of the country with the rest of the world. These connections have given rise to various approaches to balance of payments analysis. The classical international theory therefore, began with David Hume's refutation, by use of the analysis of the price-specie-flow mechanism, of the mercantilist belief that a country could achieve a persistent balance of trade (payments) surplus by import-substituting and export-promoting policies. The price-specie-flow mechanism made a key part of the mechanism of adjustment a temporary rise or fall of the general price level in the country experience excessive or deficient supply of money relative to demand. This relative price level movement leading to a balance of trade deficit or surplus, and the deficit or surplus altering the stock of money in the direction of equilibrium. The need for price level movements was disputed by latter writers, who based their argument on the most classical writers that what is in question was general movements of national price levels, not alterations in the Terms of Trade.

In the Keynesian multiplier approach, Arize, Grivoyannis, Kallianiotis & Malindretos (2000) simplified the approach by assuming a two-good international economy (exportable and importable goods only) and production of export at constant domestic money cost. It hypothesizes that the extra demand for domestic output created by a successful devaluation will be satisfied by re-employing some of the unemployed and that, because part of it will be saved, the extra income generated by increased employment will not increase demand enough to wipe out the initial improvement in the balance of payments.

In the absorption approach, Jimoh (1990) argues that devaluation will produce inflationary price rises that will cancel out the initial relative price effect, unless inflation itself deflates the aggregate demand for goods through an income redistribution effect or through a reduction in the real value of existing money balances.

Economic policy approach improved substantially on previous approaches by analyzing devaluation, not as an arbitrary policy change whose positive effects on the equilibrium of the international economy were to be analyzed, but as one of the two independent policy instruments (wage price flexibility and devaluation) required to achieve the two policy objectives of full employment (internal balance) and a balanced balance of payments (external balance).

The implicit assumption inherent in these approaches is the balance of payments disequilibria are permanent. However, these theories differ from one another in emphasis as well as point of departure but they are reconcilable in terms of their analytical apparatus and policy implications.

In recent years, a new approach, which centers on the idea that the balance of payments is essentially a monetary phenomenon, has developed. It originated in the 1950, by Polak (1957) and his associates at the International Monetary of Fund and developed in the 1960s and early 1970s by Mundel (1968) and Johnson (1972). However, modern academic work on the approach is often traced to the Meade-Tinbergen of internal and external balance in the early 1950, developed further in the 1960s. Mundel demonstrated that monetary policy is more effective than fiscal policy, in attaining external balance, basically because monetary policy improved both the current and capital accounts of the balance of payments. Presumably therefore, it was this concentration on monetary policy and on the overall balance-of-payments position, coupled with the gradual realization that with perfect capital mobility the money supply ceased to be controlled by the monetary authorities even in the short-run that led Mundel and Johnson to develop the modern monetary approach. Thus, Mundel and Johnson with the help of graduate students at the University of Chicago were led to develop on entirely different analytical framework and offer it as a substitute for the traditional approaches. What emerged is a cohesive body of theory that becomes known as the monetary approach to the balance of payments. The essence of the approach is a consistent insistence that the balance of payments is a 'monetary' and not a real phenomenon as posited by the conventional theories. The major point of departure of the new approach is the recognition of the fact that a country imbalance of payments deficit (surplus) would ceteris paribus, experience a change in its money stock. The persistent deficits run down the stock of money and perennial surpluses build up the stock and sooner or later, the spending pattern changes such that the imbalance is soon eliminated.

The main distinguishing feature of the modern approach to payments problem is its focus upon the monetary implications of balance of payments disequilibria. That balance of payments problems are monetary problems in a monetary world economy is basically the assertion of the proponents of the approach. Therefore, the relevant concept of the balance of payments refers specifically to the official settlement balance or the money account.

Furthermore, the proponents of this approach formulate the balance of payments surplus in terms of difference between the demands for money and the actual money supply both in the stock sense. Here, there is the assertion that a balance of payments surplus would only result from balance of payments policies that increase the quantity of money demanded and "domestic credit policy forces the resident population to acquire such extra money wanted through an excess of receipts over out payments". The monetary approach also asserts the national price levels are pegged to the given world price level and must move "rigidly in line" with it and hence prices of other countries. This assumption is justified on the ground that among the industrial countries, industrial competition is endemic and because of this fact inter country elasticity's of substitution among products tend more towards infinity than the relatively low numbers implicit in the elasticity approach.

In terms of time dimension, the monetary approach to the theory of balance of payments adjustment mechanism is a long run phenomenon and the basic feature of the monetary approach is a concentration on the long run consequences of policy and parametric changes for the behavior of the balance of payments coupled with an eclectic view of the processes through which these long run consequences come about. The new approach further recognizes the existence of reserve-currency-countries and incorporates in its analysis reserve currencies held as substitute for international money. It provides a framework within which it is possible to assess the impact of monetary disturbances in a world, which there is at least one reserve currency.

THEORETICAL FRAMEWORK

The theoretical underpinning of the monetary approach to the theory of balance of payments adjustment mechanism or the theoretic foundation of the new approach is anchored in the demand for money function (Johnson, 1976). Grubel (1981) derived briefly the equation system or the formal model of monetary approach, which underlies the most important and central studies, and generally the model can be defined of presented in nine different steps.

Let us assume that the money demand function has the following form:

$$M = (P^a Y^b) \dots \dots \dots (1)$$

($i^c u$)

Where:

M_d	=	demand for money
P	=	Price index
Y	=	real income or output

I	=	rate of interest	
a	=	Price }	} elasticity's of demand
b	=	Income }	} for money
c	=	interest }	
u	=	error term	

The main characteristics of this mathematical specification of this money 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. The money supply function is assumed to be:

$$M_s = mH \dots\dots\dots (2)$$

Where:

M_s	=	Money supply
m	=	money multiplier
H	=	high-powered money

The link between the foreign sector and the domestic money market is established by considering that the high-powered money base consists of a domestic component and a foreign component.

$$H = R + D \dots\dots\dots (3)$$

Where:

H	=	high-powered money
R	=	foreign component of high-powered money
D	=	domestic component of high powered money

Substituting Equation (3) into (2) yields:

$$M_s = m(R + D) \dots\dots\dots (4)$$

And expressing R and D as a proportion of H yields:

$$M_s = m \left\{ \frac{R}{H} + \frac{D}{H} \right\} H \dots\dots\dots (5)$$

In equilibrium, money demand and supply are equal

$$M_d = M_s \dots\dots\dots (6)$$

Through substitution of (1) into (5) and (6) we get:

$$mH \left\{ \frac{R}{H} + \frac{D}{H} \right\} = \frac{(P^a Y^b)}{(i^c u)} \dots\dots\dots (7)$$

Taking logarithms of (7) and differentiating with respect to time yields:

$$\frac{G^m + \frac{R}{H} g^R + \frac{D}{H} g^D}{H} = a g^P + b g^Y - c g^i - g^u \dots\dots\dots (8)$$

Where g for each variable in the equation is:

$$G_x = \frac{1}{x} \frac{dx}{xdt} \quad (x = M, R, D, Y, P, \text{ and } i)$$

Rearranging Equation (8) to make $\frac{R}{H} g^R$ the dependent variable on the left hand

side, we arrive at the equation used for estimation.

$$\frac{R}{H} g^R = a g^P + b g^Y - c g^i - g^u - \frac{D}{H} g^D \dots\dots\dots (9)$$

In words, equation (9) 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 other variables influencing the transactions demand for money: real income, prices and interest rates, and changes in the money multiplier. Furthermore, the equation implies that if the growth rates of price, income, interest and the money multipliers are zero and therefore economy requires no changes in the supply of money to satisfy increase in the transactions demand for money, then growth in the high-powered money base D , influences the growth of reserve R directly and in a magnitude determined by the relative sizes of

$$\frac{R}{H} \text{ and } \frac{D}{H}$$

Any positive growth in the money base, D , controlled by the authorities therefore are the immediate cause of the reserve loss and the opposite holds when the growth of D is negative.

Alternatively, if we assume only interest rate, prices and money multipliers to be constant,

$$\frac{R}{H} g^R = b g^Y - \frac{D}{H} g^D \dots\dots\dots (10)$$

That is weighted growth rate of reserves is a decreasing function of the weighted growth rate in the domestic component of high-powered money base and an increasing function of growth rate of output. Simplifying further by assuming no domestic growth rate ($g^Y = 0$).

$$\frac{R}{H} g^R = - \frac{D}{H} g^D \dots\dots\dots (11)$$

That is weighted growth rate of reserves and balance of payments is inversely related to the weighted growth rate in the domestic component of high-powered money base.

Now the above results are to be contrasted with various Keynesian theories about the relation between economic growth and the balance of payments. According to one such theory derived from the multiplier analysis, economic growth must worsen the payments through increasing imports relative to exports; this theory neglects the influence of demand for money on export supply and import demand and on the international flow of securities. According to another and more sophisticated theory, domestic credit expansion will tend to improve the balance of payments by stimulating investment and productivity increase and so lowering domestic prices in relation to foreign goods in the foreign and domestic markets. This theory bags a number of questions even in naive Keynesian terms; in terms of the present approach it commits the error of attempting to deduce the consequences of domestic credit expansion from its presumed relative price effects without reference to the monetary aspect of balance-of-payments surpluses and deficits.

At this juncture, the theoretical framework will be incomplete if we fail to highlight various writings on the defects of the new monetary approach to the theory of balance of payments adjustment mechanism. Writing on the defects Taylor (1987) asserts that the monetary approach is defective in the sense that it attempts to provide a theory of the net sum without attempting to explain its decomposition. There is the disturbing lack of consensus on the most critical concept on which the approach lies – namely the demand for money function and this was why Spanos & Taylor (1984) noted that the casual way in which specification of the function picked in preference to the others does not inspire much confidence.

Another related issue is the failure of proponents of the monetary approach to distinguish between the transaction, precautionary and speculative demand for money. If we accept the decategorization of the motives for the demand for money and the consequent building, of the different motives into one 'super motive' represented by the speculative motive, it is obvious that in the event of a liquidity trap, the monetary approach loses its predictive power (Spanos & Taylor 1984). We should be left with a situation in which the balance of payments would be whatever was dictated by exclusively non-monetary factors. Another

defect is the 'small country' assumption of the monetary approach. The assumption that the country under analysis is so small that it is a price taker in world trade poses some analytical problems and also too limiting to have relevance to practical policy problems. However, this criticism has been countered by assertion that the terms of trade play only a secondary role.

Since the monetary approach seems applicable only in a regime of fixed exchange rate, the impression then is that only countries in a currency union or otherwise linked by exchange rates that are guaranteed to remain rigidly fixed would find the monetary approach relevant. With flexible exchange rate and less than full employment, expansionary monetary policy would have a negative effect on foreign income. The new approach has also been criticized of the time dimension element and difficulties associated with the empirical testing of its theoretical propositions. More so, the role, which the monetary approach, arrogates to international reserves as the channel for feedbacks of external transactions on the domestic system, is not clear. Settlement in overall balance of payments does not necessarily involve transfer of international reserves that affect domestic economy.

Again, the monetary approach, like the absorption approach, stresses the need for reducing domestic expenditure relative to income, in order to eliminate a deficit in the balance of payments. However, whereas the absorption approach looks at the relationship between real output and expenditure on goods, the monetary approach concentrates on deficient or excess nominal demand for goods and securities, and the resulting accumulation or non accumulation of money. So, the monetary approach looks at the balance of payments as the change in the monetary base less the change in the domestic component.

Empirical work on the monetary approach to the balance of payments can be divided into two different approaches; one tests the theory in long-run equilibrium, the other considers the adjustment mechanism and the channels through which equilibrium is reached. In consideration of the criticism of the new approach earlier stated, the study will adopt approach of the second approach which considers adjustment mechanism and the channels through which equilibrium is reached.

EMPIRICAL LITERATURE

Since any theory can be judged by the accuracy of its predictions or by the validity of its assumptions, the empirical studies reviewed will therefore cover both types of test. In this review, the studies whose result upholds the theoretical propositions of the monetary approach are termed studies with positive result while those, which do not, are taken to be negative. However, neither positive result nor negative results are taken to be studies with mixed result. The technique of regression analysis used in these studies was ordinary least squares.

A major premise of the monetary approach is that under fixed exchange rate, changes in a country's reserves are as a result of excess demand for or supply of money as a stock. This proposition is tested by what has become known as 'reserve-flow equation'. A reserve flow equation is an equation in which the dependent variable is either the level of the country's international reserves, the change in reserves or the rate of change in. The explanatory variables were interest rate, Government Expenditure, money multiplier, money stock, price index, exchange rate (number of units of domestic currency per unit of foreign currency), and demand for nominal and real money balances and so on. Within this range, the explanatory variables may however vary from study to study.

Using this equation, three studies got negative results: a study of fifteen industrial countries for the time period between 1958 and 1968 (Courchene, 1973); a study of five less developed countries for the time period between 1948 and 1973 (Sargen 1975) and a study of seven European countries for the time period between 1959 and 1970 (De Granwe, 1976). Equally, three studies got positive results: a study of fourteen industrial countries for the period between 1960 and 1969 (Courchene and Singh, 1976); a study of United Kingdom for the time period between 1952 and 1971 (Akhtar, Putnam, and Wilford, 1977); and a study of Canada and Mexico for the time period between 1963 and 1969, and the time period between 1952 and 1971 (Cos and Wilford, 1976). Still using the reserve flow equation, seven studies got mixed results: a study of Japan for the time period between 1959 and 1970 (Bean, 1976); a study of thirteen less-developed countries plus Finland for time period between 1957 and 1972 (Connolly and Taylor, 1976); a study of thirteen less developed countries plus seven developed countries for time period between 1952 and 1972 (Connolly and Taylor, 1977); a study of Sweden for the time period between 1950 and 1968 (Genberg, 1976); a study of thirty-nine less developed countries for the time period between 1957 and 1966 (Aghevi and Khan, 1977); a study of Spain for the time period between 1955 and 1971 (Guitan 1976); and finally a study of Australia for the time period between 1950 and 1971 (Zecher, 1976).

A variant of reserves-flow equation is capital flow equations. For the authors embracing this variant, the only balance of payments transaction induced is a private capital inflow. In this equation, the dependent variable was either the net private capital inflow or the net private short-term capital inflow. The explanatory variables were current-account balance plus net official capital inflow, net private long-term capital inflow and some of the regressors of reserve-flow equation. Using this equation Porter (1972) carried out an empirical test on Germany for a seven-year period (1963-1970) and got a negative result. Others who used this equation got mixed results: Kour and Porter (1974) for Australia, Italy, Netherlands (1960-1971); and Germany (1960-1971); Hodjera (1976) for Austria, France (1960-1971); and Neuman (1978) for Germany (1963-1970).

Furthermore, others also used a different equation in the empirical test. Under a pegged exchange rate, the reserve flow and capital flow equations are used to test the theoretical propositions of the monetary approach. With a floating exchange rate these equations give way to an "exchange rate equation" in which the dependent variable is the exchange rate, defined as the domestic currency price of foreign exchange. Since we are not interested in the exchange rate explanation but rather in the explanation of balance of payments outcome, there may not be need for review of studies using the exchange rate equation.

In an impressive extension of the aforementioned monetary models, Gorton and Roper (1977) derive an equation that integrates the reserve flow and exchange market equations. The resulting equation is "exchange-market pressure equation" which has as the dependent variable the sum of the change in reserves as a percentage of the monetary base and the rate of appreciation of the domestic currency. The equation is therefore usable for periods encompassing fixed rates, freely fluctuating rates, and managed floats. Using this equation, Gorton and Roper (1977) carried out an empirical study of Canada for a twenty-two year period (1952-1974) and got positive result. Finally, Sargen (1975) got a mixed result from an empirical study of Australia, Canada, Germany, Japan and United Kingdom, for the time period between 1952 and 1975.

It is interesting to note, from a close examination of the studies reviewed above, that the number of studies we consider to yield negative results concerning the monetary approach is approximately equal to the number that produce positive results. Also, and perhaps more revealing, the vast majority of studies, viewed independently of one another provide mixed findings. This suggests that the empirical evidence is inconclusive. Again, it seems that three of the models used in the empirical studies – reserve flow, capital flow, and exchange rate equations – do not produce conclusive results. However, the fourth model, the exchange market pressure equation yields results that, while mixed balance, are positive for certain countries.

METHODOLOGY

TECHNIQUES ADOPTED IN THE ANALYSIS OF DATA AND SOURCE OF DATA FOR THE STUDY

The econometric method is the approach employed for the research. There is no doubt that the method will facilitate the model specification, parameter estimation and appropriate econometric tests.

Annual time-series data on the variables under study covering twenty-two year period 1986-2007 are used in this study for estimation of functions. The balance on current account is explicitly considered because if it is assumed that there are no capital movements, any analysis made from the standpoint of the flow market for money is equivalent to analysis made in terms of the market for goods and services. Aggregate credit to Domestic economy, credit by central bank and credit by commercial banks is the relevant monetary variables as postulated by the theory under study. Equally, the relevant real variables are Gross Domestic Product and Government Expenditure.

Data were collected from various editions of the World Bank, World Tables; various issues of Central Bank of Nigeria Economic and Financial Review; Annual Reports and Statement of Accounts; and Principal Economic and Financial Indicators, and Central bank of Nigeria Statistical bulletin.

PROCEDURE OF DATA ANALYSIS

The ordinary least squares single equation technique is the estimation procedure chosen for this study. It will be used for estimating the equation specified below. As a justification for this method, Maddala (1977) identified that ordinary least squares is more robust against specification errors than many of simultaneous equation methods and also that predictions from equation estimated by ordinary least squares often compare favorably with those obtained from equations estimated by the simultaneous equation method.

MODEL SPECIFICATION

In the model specified below, the researcher intends to investigate the impacts of monetary and real variables on current account balance. The explanatory variables include the total domestic credit, or its components (Credit by Central Bank and Credit by Commercial Banks), Gross Domestic Product and Government Expenditure. Explicitly, the equations estimation, and the expected signs of the coefficients are presented below:

$$\begin{aligned}
 B_{CA} &= \alpha + \beta_{DC} + ei & \beta < 0 \dots\dots\dots (1) \\
 B_{CA} &= \alpha + \beta_{CBN} + ei & \beta < 0 \dots\dots\dots (2) \\
 B_{CA} &= \alpha + \beta_{CB} + ei & \beta < 0 \dots\dots\dots (3) \\
 B_{CA} &= \alpha + \beta_Y + ei & \beta > 0 \dots\dots\dots (4) \\
 B_{CA} &= \alpha + \beta_{GE} + ei & \beta < 0 \dots\dots\dots (5) \\
 B_{CA} &= \alpha + \beta_1 DC + \beta_2 Y + ei & \beta_1 < 0, \beta_2 > 0 \dots\dots (6) \\
 B_{CA} &= \alpha + \beta_1 CBN + \beta_2 Y + ei & \beta_1 < 0, \beta_2 > 0 \dots\dots (7) \\
 B_{CA} &= \alpha + \beta_1 CB + \beta_2 Y + ei & \beta_1 < 0, \beta_2 > 0 \dots\dots (8) \\
 B_{CA} &= \alpha + \beta_1 CBN + \beta_2 GE + ei & \beta_1 < 0, \beta_2 < 0 \dots\dots (9) \\
 B_{CA} &= \alpha + \beta_1 CB + \beta_2 GE + ei & \beta_1 < 0, \beta_2 < 0 \dots\dots (10)
 \end{aligned}$$

Where:

BCA	=	Current Account Balance
DC	=	Aggregate Credit to Domestic Economy
CBN	=	Credit by Central Bank of Nigeria
CB	=	Credit by Commercial Banks
Y	=	Gross Domestic Product at current market prices
GE	=	Government Expenditure
ei	=	Stochastic variable or error term
α	=	Intercept
β, β_1, β_2	=	Parameter estimates

The model of the study will employ monetary phenomenon approach. This is a modern approach to the theory of balance of payments adjustment mechanism. The economic arguments that is, justifications for this model / approach include the fact that:

- The Nigerian policy makers have bias for monetary policy instruments in their measures to achieve macroeconomic stability.
- The availability of monetary variables data for the period under analysis.
- The simplicity of the approach gives it the research efficiency award and therefore deserves a reasonably thorough exposition and verification, in order to ascertain its validity (Bhatia, 1982).

TECHNIQUE FOR EVALUATION OF RESULTS

The technique for evaluation of results implies the use of the following standard criteria: R^2 (adjusted R^2 for degrees of freedom) for testing goodness of fit of the estimated regression equation; F (ratio) for testing the significance of the regression coefficient; t (ratio) for testing the significance of each regression coefficient; and 'd' statistic (Durbin-Watson) for testing the randomness of the residuals.

Finally, a priori sign and magnitude of the coefficients will be used to evaluate the results and tests conducted to ensure that the assumptions of the ordinary least square method are fulfilled.

DATA PRESENTATION AND ANALYSIS

PRESENTATION OF RESULTS

This part focuses on the analysis of, and interpretation of the result generated from the regression analysis. It helped in providing the set of data used a practical meaning, the result, serving as a yard-stick/benchmark for the measurements of the various impacts which the different variables have on Nigeria's Current Account Balance (BCA) of the country (NIGERIA).

The regression results are summarized in table 1 below:

TABLE 1 SUMMARY OF REGRESSION RESULTS

Equation	Constant	DC	CBN	CB	Y	GE	R^2	Fs	D.W.
1.	-2.95	1.79 (0.33)					0.6005	30.06	0.807
2.	2.86		1.67 (1.50)				0.058	1.23	0.197
3.	-2.52			4.46 (0.49)			0.8049	82.52	0.92
4.	-5.30				0.23 (0.02)		0.8148	88.02	0.492
5.	-4.74					1.88 (0.26)	0.718	50.93	0.597
6.	-5.11	-0.83 (0.55)			0.32 (0.06)		0.8346	47.93	0.547
7.	-21168		-2.92 (0.50)		0.30 (0.02)		0.9332	132.74	1.51
8.	-4.38			1.83 (1.95)	0.14 (0.10)		0.823	44.17	0.633
9.	91741		-3.58 (0.73)			2.61 (0.23)	0.8749	66.42	1.93
10.	-1.32			6.04 (1.96)		-0.72 (0.87)	0.8117	40.96	1.08

Source: PC-Give Regression Result Print out

The number in parentheses is standard error values

STATISTICAL TESTS OF SIGNIFICANCE

In this study, two types of test are conducted: the test for the statistical significance of each estimator (t-test) and similarly the test of the estimator's significance (F-test). The tests are conducted at the 5% significance level.

In a given regression equation with k regressors for estimator's test of significance, the null hypotheses is:

$$H_0: \beta_i = 0$$

And the alternative hypothesis is

$$H_1: \beta_i \neq 0$$

For a decision the observed F-ratio, F_s , is compared with the theoretical F-ratio, $F_{0.05}$, which has $V_1 = k - 1$, $V_2 = N - K$ degrees of freedom; N is the sample size and K is the total number of parameters estimated.

The decision rules are:

- If $F_s > F_{0.05}$, Reject H_0 - the regressor have a significant influence on the dependent variable;
- If $F_s < F_{0.05}$, Accept H_0 - the regressor have an insignificant influence on the dependent variable.

Furthermore, two-tailed tests are conducted by comparing the observed t-ratio, t_s , with the theoretical t-ratio, $t_{(0.025)}$ that has degrees of freedom $N - K$. The null and alternative hypotheses are respectively,

$$H_0: \beta_i = 0$$

$$H_1: \beta_i \neq 0$$

The decision rules are:

- If $|t_s| > |t_{(0.025)}|$, Reject H_0 - β_i is not equal to zero and with regressor influence, the dependent variable significantly;
- If $|t_s| < |t_{(0.025)}|$, Accept H_0 - β_i is not statistically different from zero and with explanatory variable does not influence the regression significantly.

Now, from the 'F' distribution table, the theoretical F-ratios at 5% significance level are 4.3248 and 3.4928 for the cases of one and two regressors, respectively. From the student's 't' distribution table, the theoretical t-ratio for two-tailed test at 5% significance level are 1.721 and 1.725 for the cases of one and two regressors respectively. At this point, these theoretical ratios are compared accordingly with the F_s of the various estimators and observed t-ratio (t_s) for each parameter, and next we simply summarize which equations are significant or not.

In equation (1), both tests revealed that Aggregate credits to Domestic Economy were significant in explaining current account balance. But in equation (2), both tests showed that Aggregate credits by the Central Bank of Nigeria were insignificant in explaining current account balance. However, both tests indicated that credit by Commercial Bank, Gross Domestic Product and Government Expenditure were respectively significant in equations (3), (4) and (5).

In multiple (three variables) regression equations (6), (7), (8), (9) and (10), both tests also revealed the significance of each estimator. But in equation (6), the estimator of Domestic Credit is revealed by the test to insignificant. The same is applicable to the estimator of Government Expenditure in equation (10). In equation (8), credit by Commercial Bank and Gross Domestic Product were not significant. In other equations, the two tests showed that both estimators are significant in explaining current account balance.

EXAMINATION OF ALGEBRAIC SIGNS OF PARAMETER ESTIMATES

How far do the directions of the influences of the various explanatory variables on the external account (balance on current account) conform to the a priori expectations as shown in the equation specified? This question is warranted since any reliable estimated regression equation is expected to conform to the priori restrictions imposed or determined by the theoretical underpinning of the study in question. They are examined below.

In simple regression equations, (1), (2) and (3), the coefficients of Aggregate Credit to Domestic Economy, credit by Central Bank and credit by Commercial Bank did not conform to the expected negative sign respectively. This was also the case with the coefficient of Government Expenditure in equation (5) as the wrong positive sign was got. However, the coefficient of Gross Domestic Product conforms to the expected 'positive' sign.

In multiple regression equations, the variables in equations (6) and (7) conformed to their respective a priori expectations. In equations (8), (9) and (10) Commercial banks credits and government expenditure, credits by the Central Bank did not conform to a priori expectation but gross domestic product and government expenditure (in equation 10) conformed to a priori expectations.

A common cause of worry in empirical research is the appearance of 'wrongly' signed coefficients in regression models. It is the view of Rao and Miller (1971) that if specification or interpretation of the coefficient is correct, a coefficient can still attain a wrong sign because of the sampling distribution of the estimates. If this is the case, it will be generally observed the coefficients to be not significantly different from zero statistically. Now the 'wrong' signs in some of our multiple regression results are consistent with the signs in the simple regression results and no error is detected in the definition or interpretation of variables. Also, an observation of the monetary variables show an increasing pattern while current account balance shows a non-systematic pattern and finally, the F-test and t-test tend to suggest the non-significance of some of the explanatory variables.

TEST OF MULTICOLLINEARITY AND AUTOCORRELATION

In applied econometric research, the realism of the assumptions of non-multicollinearity (or non-perfect collinearity) and non-autocorrelation are tested, in order to ascertain the reliability of the parameter estimates.

In multicollinearity test, the coefficient of multiple correlations, R , is compared with the simple correlation coefficient between two explanatory variables or with the partial correlation coefficient between any two independent variables. If several coefficients have high standard errors and dropping one or more variables from the equation lowers the standard errors of the remaining variables, multi-collinearity will usually be the source of problem (Pindyck and Rubinfeld, 1981). However, this study is limited to simple regression equation and three variables multiple regression equation, hence the tendency for multi-collinearity to exist is small or not likely to be of serious problem.

In auto correlation test, we use D.W. Limits on a 5% level of significance and k degrees of freedom; to compare the theoretical lower and upper limits of the Durbin-Watson statistics d_l and d_u respectively, with the observed or computed D.W. statistics d_c .

- If $D.W. = 2$ there is no autocorrelation;
- If $D.W. \neq 2$ then autocorrelation exists.

Now, the regression results as shown in table 1 reveal that autocorrelation exists in all the equations as the D.W. values of the equations are not equal to two (2).

FINDINGS, CONCLUSION AND RECOMMENDATIONS

The empirical evidence or test results presented do not support our first null hypothesis that there is no significant relationship between monetary variables (domestic credit, credit by Central Bank of Nigeria and credit by Commercial Bank) and account balance. The significance of credit by Central Bank, credit by commercial banks and Aggregate credit to the Domestic Economy can be seen in their respective low adjusted coefficient of multiple determination (R^2) and results of F-test and t-test.

The second null hypothesis that there is no significant relationship between the real variables and balance on current account does not tend to be supported by the empirical evidence. There was a positive and significant relationship between Gross Domestic product and current account balance. Although Government Expenditure was significant in explaining current account balance, yet its coefficient had a positive sign contrary to the expectation. Again, despite the significance of these real variables, they were associated with moderate adjusted coefficient of multiple determinations.

To evaluate the third hypothesis we have to examine equations (6) and (10) very critically. The evaluation of result of the regression results supports the third alternative hypothesis that compared to monetary variables, real variables (in this case, Gross Domestic Product) are more important in explaining variation in current account balance.

Generally, the results of this study tend to suggest that Nigerian Monetary and fiscal authorities should give greater priority to other instruments or measures than monetary tools to achieve balance of payments stability. From the various tests concluded and hypotheses evaluated, it might well imply that the

manipulation of domestic credit by the monetary authorities will not enhance the balance of payment viability over time rather that increases in the level of output (as indicated by significant positive coefficient of Gross Domestic Product).

As a test of economic theory, the results of this study may well suggest to the inconclusiveness of the monetary approach to the theory of balance of payments adjustment mechanism as already suggested by most studies reviewed in chapter two. In particular the results of the study imply that problems of the Balance of payments, cannot, to a large extent, be traced to the monetary policies of Government.

Finally, for a developing country such as Nigeria, the conduct of any policy instrument is likely to be a difficult task. Thus the use of a policy tool for the present study has revealed the relative importance of Gross Domestic Product to Domestic Credit in determining balance of payments outcome (current account balance). In essence, this means that policies should be directed to increase the level of output that will invariably lead to favorable balance on current account, than domestic credit control policies.

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