GLOBALIZATION, EXCHANGE RATE VOLATILITY AND FOREIGN TRADE PERFORMANCE IN NIGERIA: AN EMPIRICAL ANALYSIS

BY

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BY

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This work is dedicated to God Almighty for his divine provisions and sustenance throughout the programme, and also to my beloved parents.
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May Almighty God bless all of you in Jesus name.
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Globalization, Exchange Rate Volatility and Foreign trade Performance in Nigeria: An Empirical Analysis

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Abstract

The biggest challenge facing Nigeria as a nation in a global economy is how to reduce its import dependence and have export led-growth policies. From the time of the collapse of agriculture to the current oil-led growth the economy has been at a cross road and the need for diversification consistently keep re-echoing in every policy regime. The economy is import dependent and the need to consider choice of exchange rate regime that will be in harmony with the economy’s international trade realities are given ignorable consideration. Right from the early 70s, the choice of exchange rate regime is based on monetary policy target void of any BoP considerations – how exchange rate fluctuations affect trade flows is not any regime’s concern.
In all, since Nigeria is an import dependent economy and operates the system of float managed exchange rate one expects exchange rate volatility to be a big issue in determining the country’s balance of payments position. It is these issues that the study investigated. The study follows linear specification through partial adjustment approach using Distributed Lag Scheme(DLS)-autoregressive distributed lag model(ARDLM).Variables are in log form. The study, contrary to one way directional impact (positive or negative) on BoP recorded in various literature shows that the dynamism of the impact of exchange rate volatility on BoP ranges from short run (SR) to a very long run (VLR). In the Short run it has negative impact on BoP, while in the long run (LR) it has a positive impact, which is reversed to negative in the very long run (VLR).
CHAPTER ONE
INTRODUCTION

1.1 Background of study

Basically international trade has been regarded as an engine of growth of any economy either advanced or less developed economy. The recent waves of interdependence of economies via an increase in cross-border transactions in goods and services, natural resources, capital and labour explain the new trend of globalization. In the past decade, the process of globalization has accelerated as the use of ever more sophisticated information and communication technology has grown exponentially, while a breakthrough in connectivity, partly via the internet, has reduced the costs of transporting goods and information across the globe (Okonjo and Osafo, 2007). This technological empowerment across the world has been accompanied by a strong rise in foreign direct investment. This has led to new ways of doing business; production processes have become increasingly internationalized as companies have established affiliates abroad to gain access to foreign markets and reduce input costs, while supply chains have been set up on a global scale as a way of gaining a competitive edge.

Alongside the globalization, exchange rates across the world have fluctuated widely particularly after the collapse of the Bretton Woods system of fixed exchange rates. Since then, there has been extensive debate about the impact of exchange rate volatility on international trade. The most commonly held belief is that greater exchange rate volatility generates uncertainty thereby increasing the level of riskiness of trading activity which will eventually depress trade. The consequences of exchange rate volatility on trade have long been at the centre of the debate on the optimality of alternative exchange rate regimes. Proponents of fixed rate argue that since the advent of the floating regime, exchange rates have been subject to excessive volatility and deviations from equilibrium values and these have persisted over sustained periods of time. In their view, exchange rate volatility deters industries from engaging in international trade and compromises progress in trade negotiations.

In contrast, proponents of flexible rates argue that exchange rates are mainly driven by fundamentals (i.e. some key macroeconomic variables) and that changes in fundamentals would
require similar, but more abrupt movements in fixed parities. Therefore, a system of fixed rates would not reduce unanticipated volatility. Moreover, greater exchange rate flexibility facilitates balance of payments adjustment in response to external shocks, and hence reduces the need to raise protective tariff barriers or to impose capital controls to achieve equilibrium.

However, the exchange rate policy in Nigeria has been moving in a circle form, starting from a fixed exchange rate system from 1986-1993, a temporary halt deregulation in 1994 when the official exchange rate was pegged and reversal of the policy in 1995 with the guided deregulation of the foreign exchange market (Sanusi 2002). There has been volatility of exchange rate swinging from one mood to another resulting to overvaluation and depreciation of exchange rate. This exchange rate volatility has a significant effect on import depending on whether it is rising or falling. A high and rising exchange rate tends to depress exports and a low exchange rate tends to depreciate or depress import. The idea behind this is that, when exchange rate of dollar against the naira increases in favour of naira, it becomes relatively more expensive to import goods and services from Nigeria. See figure 2 and 3 for the relationship between liberalization and output growth in Nigeria, and exchange rate volatility in Nigeria.

Figure 1: The relationship between liberalization and output growth (vertical axis-output growth)
Sources: Authors computation based on data from CBN statistical bulletin, jubilee edition
1.2 Statement of Problem

The biggest challenge facing Nigeria as a nation in a global economy is how to reduce its import dependence and have export led-growth policies. From the time of the collapse of agriculture to the current oil-led growth the economy has been on a cross road and the need for diversification consistently keep re-echoing in every policy regime. The economy is import dependent and the need to consider choice of exchange rate regime that will be in harmony with the economy’s international trade realities are given ignorable consideration. Right from the early 70s, choice of exchange rate regime has been based on monetary policy target void of any BoP considerations – how exchange rate fluctuations affect trade flows is not any regime’s concern.

Since Nigeria is an import dependent economy and operates the system of float managed exchange rate one expects exchange rate volatility to be a big issue in determining the country’s balance of payment position. The problem of achieving a sustainable development in a new global environment happens to be one of the major problems facing Nigeria and indeed the third World countries. The process of joining hands with the wave of global capitalists system in order to enhance accelerated economic development becomes a problem. Thus a prime concern today for most policymakers everywhere is how to maximize the development benefits of globalization and trade. This is as a result of the ‘New World Economic Order’ of the notion of survival of the fittest and the elimination of the unfits.

However, some authors for instance, Bayo (2000), and Salimono (1999) among others, argue that globalization offers developing countries like Nigeria the opportunities to create wealth through the export-led growth, to expand international trade and to gain access to new ideas and technologies. Globalization which is rooted in multilateral trading and investment arrangements, and the opening up of trade through liberalization suggest that there will be free flows of goods and capital across countries due to the erosion of trade barrier existing among the different countries. Consequently, the reduction in those barriers would increase trading among the countries.
Interestingly, the recent developments in globalization have reinvigorated the policy debate over the pros and cons of different exchange rate systems. One of the issues in the debate is the trade effect of exchange rate volatility. Proponents of fixed exchange rates have long argued that the risks associated with exchange rate volatility discourage economic agents from trading across borders. Opponents have maintained that there are good instruments to hedge against the exchange rate volatility, and hence the effect should be immaterial.

Available literature provided a well documented fact on the relationship between exchange rate volatility and trade. The basic idea is that: if commodity traders are risk averse (or even risk neutral), higher exchange rate uncertainty may lead to a reduction in the volume of trade because they may not want to risk their expected profits from trade. Exchange rate volatility can affect trade directly, through uncertainty and adjustment costs, and indirectly, through its effect on the structure of output and investment and on government policy as argued by Brodsky, (1984).

The studies that provide evidence which support negative relationship are Hooper and Kohlhagen (1978), Ariccia (1999), Broda and Romalis (2003) and Hondroyiannis et al. (2005). Yet some studies provide enough information to indicate positive effects of exchange rate volatility on trade. The studies are: Morgenroth (2000), Pickard, (2003), Todani and Munyama (2005) and Rey, (2006).

In midst of these diverse findings regarding the relationship between exchange rate volatility and trade on the one hand, as well as the impact of globalization on trade on the other hand, we could not authoritatively conclude that the impact of exchange rate volatility and globalization on trade would be positive or negative.

1.3 Research Questions

Emanating from the discussions in the statement of problem section, the study raised the following research questions; from the foregoing one could ask;

1) how does globalization affect Nigeria’s balance of payments (BoP) position if one controls the exchange rate uncertainty?
2) how does exchange rate fluctuation affect trade performances in Nigeria?
3) are there any long run relationship between exchange rate volatility, globalization and trade in Nigeria?. Can one use trade policy to control exchange rate volatility or use exchange rate policy to control the effects of globalization?

1.4 **Objectives of Study**

1. To investigate the impact of **globalization** on foreign trade in Nigeria.
2. To ascertain the effect of **exchange rate volatility** on foreign trade in Nigeria.
3. To find out if there is any **long run relationship** between exchange rate volatility, globalization and foreign trade in Nigeria?

1.5 **Statement of Hypothesis**

Ho:

1) globalization does not have any impact on Nigeria’s foreign trade performance;
2) exchange rate fluctuation has negative impact on Nigeria’s trade performance; and
3) there is no long run relationship between exchange rate volatility and foreign trade performance.

1.6 **Significance of study**

The study is still relevant for number of reasons: the changing character of the financial sector especially, the banking sector reforms and global financial crises that have both affected trade and financial flows in recent times. One expects that these two events will push studies on globalization to new evidence(s) of which this study is fortunate to benefit from.

1.7.1 **Scope of the Study**

The study covers the period 1970-2008; and the computation of exchange rate volatility is a matter of methodological question whose outcome depends on the approach adopted. There are different ways of measuring volatility. Each outcome is expected to influence both the outcome and magnitude of its effect on the balance of payment and the economy, generally.
CHAPTER TWO
LITERATURE REVIEW

2.1 Literature Review

There are many theories which attempted to explain the reasons for international trade. These theories are the Mercantilist, Absolute Advantage, Comparative Advantage Theories, The Heckscher-Ohlin Theory of Factor Endowment, Country Similarity Theory, International Product Life Cycle Theory (IPLC), Porter’s Theory of National Competitive Advantage and Global Strategic Rivalry Theory. We present a brief review of these theories below.

2.1.1 Mercantilism Economic Philosophy

The mercantilism economic philosophy in the sixteenth-century maintained that a country's wealth was measured by its holdings of gold and silver this required the countries to maximize the difference between its exports and imports by promoting exports and discouraging imports. The logic was if foreigners buy more goods from you than you buy from them, then the foreigners have to pay the difference in gold and silver, enabling the economy to amass more treasure. With the treasure acquired the nation could build greater armies and hence expand the nation’s global influence. The mercantilists judged the success of trade by the size of the trade balance (Mahoney, et al. 1998).

2.1.2 Absolute Advantage

The theory of absolute advantage developed by Adam Smith, suggests that a country should export those goods and services for which it is more productive than other countries, and import those goods and services for which other countries are more productive in producing. According to him, mercantilism’s basic problem is the fact that it confuses the acquisition of treasure with the acquisition of wealth. In An Inquiry into the Nature and Causes of the Wealth of Nations (1776), Smith attacked the intellectual basis of mercantilism and demonstrated that mercantilism actually weakens a country. Smith maintained that a country’s true wealth is measured by the wealth of all its citizens, not just that of its monarch. A country is said to be more productive than another country, if it can produce more output (goods) for a given quantity of input, such as
labour or energy inputs. The producer that requires a smaller quantity of inputs to produce a
good is said to have an absolute advantage in producing that good (Lipsey, & Chrystal, 1996).

2.1.3 Comparative Advantage Theories

The theory of comparative advantage developed by David Ricardo in attempt to solve the
problem of the theory of absolute advantage, states that a country should produce and export
those goods and services for which it is relatively more productive than other countries and
imports those goods and services for which other countries are relatively more productive than it
is. Hitherto, the absolute advantage have suggested that no trade would occur if one country has
an absolute advantage over both products. The differences between absolute and comparative
advantage theories are subtle. Absolute advantage looks at absolute productivity differences,
while the comparative advantage looks at relative productivity differences. Nonetheless,
economists use the term comparative advantage when describing the opportunity cost of two
producers (Mankiw, 1999).

2.1.4 The Heckscher-Ohlin Theory of Factor Endowment

The difference in relative commodity prices between two nations is evidence of their
comparative advantage and forms the basis for mutually beneficial trade. Factor Endowments
and the Heckscher-Ohlin theory takes this one step further by analyzing the effect that
international trade has on the earnings of factors of production in the two trading nations. The
Heckscher-Ohlin theory presents the issue that international and interregional differences in
production costs occur because of the differences in the supply of production factors. Those
goods that require a large amount of the abundant, thus less costly factor will have lower
production costs, enabling them to be sold for less in international markets. Countries with
relatively large amounts of land do export land intensive products, whereas a country with
relatively large amounts of labour would export labour intensive products (Salvatore, 1995).

2.1.5 Country Similarity Theory

Steffan Linder a Swedish economist developed the country similarity theory. Although, before
the country similarity theory can be analyzed it is essential to understand the concept of intra
industry trade. Intra industry trade is trade between two countries of goods produced by the same
industry. Linder believed that international trade of manufactured goods occurred between countries at the same stage of economic development that shared the same consumer preferences. Therefore the country similarity theory consists of the value that most trade in manufactured goods should be between nations with similar per capita income, and that intra industry trade in manufactured goods should be common (McCulloch, 1999).

2.1.6 International Product Life Cycle Theory (IPLC)

The International Product Life Cycle theory is a valuable instrument in analyzing the effects of product evolution on the global scale. The IPLC generally applies to established companies in industrialized countries who expand their product range. The theory is broken up into five major areas; Release: As competition in industrialized countries tends to be fierce, Manufacturers are therefore forced to search constantly for better ways to satisfy their customer needs (McCulloch, 1999). The core elements in new product design are gained from customer feedback from previous models. Once the product enters the domestic market and begins to create a positive reputation, the demand would increase. Exports: As the product receives positive customer response, the international demand for the product begins. The manufacturer begins exporting to increase its market share. Foreign Competition in exports markets; this is a threatening stage for the company. Local manufacturers have gained experience in producing and selling their product, hence their costs have fallen. As they have saturated their initial market, they may begin to look elsewhere (i.e. other nations) to promote their product. This is threatening stage because of competitive advantage from other company abroad. Import Competition in Home Market: If the competitors have a competitive advantage, or they reach the economies of scale needed, they will enter the original home market.

At this stage the competitors will have a quality product which will be able to undersell the original manufactures. Eventually they will be pushed out from the market and imports will supply the home nation. Eventually, as the product’s technology becomes more renowned, developing nations will enter the market. This will begin the International Product Life Cycle again, as these nations have a competitive edge with their low labour costs. ‘With future innovations and new products and services the eventuality is that it’s value and hence its price is likely to diminish’ (Lendrum, 1995).
2.1.7 Porter’s Theory of National Competitive Advantage

Porter, (1980) developed a new theory of how nations, states, and regions compete and their sources of economic prosperity. Porter questions how Switzerland, a nation with few natural resources, is a world leader in the production of chocolates, and Japan, a country whose economy was in shambles after World War 2, is now a global leader in making low cost, mass-produced, quality, high-technology products. Porter outlines a number of factors for this that go beyond natural resources, among these are; a sizeable demand from sophisticated consumers, an educated and skilled workforce, intense competition in the industry, and the existence of related and supporting suppliers. Porter also discusses external influences such as government and chance Demand Conditions: He argues that companies should be ‘participating in national markets with the strongest rivals and most demanding customers, in order to build international competitiveness. A company faced with more competitive forces will strive to make themselves more efficient in order to have an edge over their competitors and maximize profits.

2.1.8 Global Strategic Rivalry Theory

The Global Strategic Rivalry theory was developed in the 1980s as a means to ‘examine the impact on trade flows arising from global strategic rivalry between Multi National Corporations. It explores the notion that in order to stay viable, firms should exploit their competitive advantage globally and try to keep it sustainable. The firms can sustain their competitive advantage globally by many ways such as owning intellectual property rights, achieving economies of scale or scope and by investing in research and development (Mahoney, et al 1998).

Other trade theories, however, lead to different conclusions about the impact of globalization on trade. The new trade theories (developed mainly to explain the existence of extensive intra-industry trade among developed economies) replace the assumption of perfect competition on product markets with the one of monopolistic competition, and introduce product differentiation, scale economies and utility functions including preference for variety. These theories describe well the existence of intra-industry trade flows between trade partners with similar factor intensities and comparative advantages. Hence they are consistent with the view that more open
global markets would ultimately lead to a fall in cross country industrial specialization (Melitz, 2004).

The literature on the new economic geography, by contrast, suggests that industrial activities concentrate in certain countries or regions, determined by the availability of skilled labour pools, specialized suppliers and knowledge externalities. In these theories, specialization across countries is thus motivated not only by factor proportions but also by externalities and spillovers that lead to self-reinforcing equilibria in agglomerated industry clusters. Predictions of trade flows arising from the theory of economic geography are, however, ambiguous, since they mostly depend on historical “accidents”. Furthermore, agglomeration also creates congestion costs, offsetting some of the positive effects (Eaton, et al 2002).

Grossman and Rossi Hansberg, (2006) in an attempt to solve some of the puzzles of recent trends in international trade, focus their analysis on a growing feature of globalization, the increasing fragmentation of production across countries. Their models have two main implications. First, while specialization may still be in line with factor endowments, it will apply not only to final goods but also to individual production tasks. For example, regardless of the nature of the final product, labour-intensive tasks or stages of the production process will tend to be relocated to labour abundant countries. Developed economies will be more likely instead to focus on the upper stages of the value chain (e.g. research, development, planning and design, the production of skill and technology-intensive parts and the marketing of products). The second implication is that, because of the critical role of multinational companies in the global economy, the concepts of national boundaries and geographical specialization across countries is becoming less meaningful.

Furthermore, as multinational companies take advantage of differences in endowments, factor costs, skills and technology across countries, emerging economies can through them gain easy access to otherwise unavailable technologies. As a result, emerging economies could experience large increases in productivity as they quickly move up the technological ladder, possibly leading to a specialization in high-tech (final or intermediate) goods. Similarly, industrialized economies, by making use of the abundant labour in developing countries via production or task off-shoring, may ultimately increase their specialization in labour-intensive products while reducing the domestic labour devoted to it.
Melitz, 2004) argue that the main conclusion on this discussion is that even theoretically, there is no single benchmark against which to assess the way global trade patterns will move in the light of globalization pressures. This is because a number of forces tend to pull in different directions than a simple comparative advantage model would have predicted. As the overall results of these forces are indeterminate, and theory on the issue is still nascent, the question of the direction in which trade patterns are changing, is essentially an empirical one. A corollary to this discussion is that changes in market shares and in countries’ trade specializations might not be a clear and fully satisfactory signal of the underlying national competitiveness.

Again, traditional indicators of trade performance used by the applied trade literature need to be cautiously interpreted in the light of trade globalization. The overriding reason for this is that globalization triggers substantial structural changes in production and trade specialization, which may either not be captured by standard indicators or make their interpretation difficult. A loss in export market share, for instance, might well be expected if new trade players are entering the field. And, more generally, there may even be circumstances in which such a loss can actually be seen as a positive development, as it could in fact allow developed economies to reorient their production and exports towards goods with higher value added content.

### 2.2 Exchange rate volatility and trade

There is wide-spread opinion that increase in volatility has a negative impact on the volume of trade. In theory, the link between exchange-rate fluctuations and the volume of trade is drawn by the risk that firms face due to exchange-rate movements. The risk has an impact on decisions of the firms that are engaged in trade if the firms are assumed to be risk averse. The risk averseness means that the utility functions of the firms are concave in profits. Due to the risk, returns and expenses cannot be predicted with certainty if the trade contract is factorized in a foreign currency and the payments are not completely covered by financial instruments. Then, the risk induces firms to incur costs to avoid this uncertainty. Though, the expected profit decreases, they are able to reach a higher utility level by covering trade flaws (Bailey, et al. 1987).

Exchange rate volatility can affect trade directly, through uncertainty and adjustments costs, and indirectly through its effect on the structure of output, investments as well as on government policies. Some characteristics of the indirect impacts are being considered as important
background variables that have defined the relation and its firmness. The expected effect is paired with demand/supply elasticity to relative prices; an inelastic export demand/supply to relative prices makes uncertain the theoretical presence of nominal/real exchange rate effect on trade flows (Kroner et al, 1993).

### 2.3 Globalization and Trade Nexus

Globalization is increasing the integration of national markets and the interdependence of countries worldwide for a wide range of goods, services, and commodities. In the last three decades, international trade flows have expanded dramatically and, generally, at a rate faster than global output, with a doubling of the value of trade in a 10-years period since the mid-1990s. In 2006, the dollar value of world merchandise exports reached US$11.98 trillion (as compared to about US$5.17 trillion in 1995), and that of commercial services exports rose to US$2.71 trillion, thus raising total world trade to over US$14 trillion. (WTO, 2008)

Several factors have played an important role in the recent expansion of trade, the growing integration of economies through the process known as globalization, and the increasing contribution of trade to development. These include the liberalization of tariffs and other barriers to trade; foreign direct investment through trade and investment negotiations and agreements; autonomous unilateral structural reforms; technological innovations in transport and communications; international solidarity through supportive measures (like trade preferences); and the strategic use of policies, experimentation and innovation. Trade driven-globalization has also manifested in the changing geography of the world economy today. Its key features include the emergence of a dynamic South as an additional to the North competing for world trade and new investment, and an expansion in South-South trade in goods, services and commodities (WTO, 2008).

UNCTAD, (2008) argues that in order to assure development gains from international trade in the context of trade-driven-globalization necessitates the quantitative benchmarks of integration in international trade through increased trade performance, increasing shares in world trade and in GDP. More importantly, a major improvement in the qualitative benchmarks of integration such as increased competitiveness and enhanced productive capacity, adequate and modern
infrastructure (physical and social), trade facilitation, human resource development, diversification, higher value addition of production and exports, employment generation, a sound financial and investment climate, competition culture, technological advances, and more environmentally sustainable and climate friendly production, consumption and trade patterns will also be required.

Furthermore, accelerated economic growth and increased returns from trade should be channeled into achieving human and social development including food security, energy security, and rural development, universal access to essential services, gender equality, and poverty reduction. All these noble objectives are embodied in internationally agreed development goals, including in the Millennium Development Goals (MDGs) and the Monterey Consensus on Financing for Development. Reducing inequalities and democratizing the trade and development gains within and across countries should become the essential attributes of the globalizing world.

UNCTAD, (2008) maintains that trade driven globalization has reached unprecedented pace, scope, and scale. It has spawned new opportunities and realities as well as persistent challenges to the acceleration of economic growth, development, and poverty reduction. Some developing countries are beginning to realize the prospects of a more beneficial integration, both quantitative and qualitative into the global economy and the international trading system. For many others, an increased quantitative integration has not had positive results. Often, their liberalization has not translated into qualitative gains with widespread and structural developmental impact. Still others have seen only partial gains. In the LDCs especially, the promised and expected gains of trade-driven globalization are still missing or insufficient. There is concern that the costs of trade driven globalization maybe economically, socially, politically, and environmentally unsustainable, resulting in increasing inequalities and the loss of social cohesion within and across countries.

In addition, disappointment with the lack of sufficient development dividends and increasing hardships on account of adjustment in many developing countries calls for the question of ‘raison d'être’ of trade liberalization and globalization. Even developed countries thus far the drivers and main beneficiaries of trade driven globalization now have anxieties about job displacement, wage stagnation, rising inequalities, and adjustment costs arising from freer trade. This is particularly so as more and more developing countries are becoming competitive in different
sectors, and posing a challenge to the domestic manufacturing and services industries as well as the labour force of developed countries. This has begun to arouse protectionist sentiments, and even threaten a backlash against their trade with and investment relations with developing countries.

Efforts to create and sustain an enabling environment to benefit from globalization will have to be pursued in the context of an increasingly differentiated trade and development landscape. There is need to capture the 'common development denominators' across developing countries. These include the structural characteristics and policy issues of common concern and applicability to developing countries, irrespective of their size or weight in the world economy and international trade. These are reflected in the qualitative benchmarks of beneficial participation and integration of developing countries in international trade and economy.
2.4 Theoretical Framework

Basically, there are two general theoretical schools of thought that attempt to explain the effect of exchange rate volatility on international trade. They are the traditional school which holds that higher volatility increases risk and therefore depresses trade flows and the risk-portfolio school that maintains that higher risk presents greater opportunity for profit and should increase trade.

Traditional models examined the exchange rate volatility effect on trade based on producer theory of the firm under uncertainty, where firm profitability is related to the movements of the exchange rate. A risk-averse firm, in a situation of a dependency between its profit and exchange behavior, would prefer to reduce risk, reducing the level of trade. Côté, (1994), suggested that when the exporter invoices in foreign currency, he faces price risk. The quantity demanded is known (contracted), since prices may change during contract period, the revenue stream and profit yield uncertainty. When a firm invoices in local currency the firm faces quantity risk, quantity demanded is not certain because prices are uncertain (import prices may become more competitive in currency appreciation and consumer preferences may shift). Risk averse firm would minimize risk, affecting prices, but price movements are different for those firms invoicing in foreign currency (under demand certainty - price would increase to minimize risk) and those invoicing in local currency (under demand uncertainty – price would decrease).

Pickard, (2003) however, points out that the traditional school has examined not only the presence of risk, but also its degree, which in turn depends upon such factors as whether production inputs are imported, the opportunity to hedge risk and the currency in which contracts are denominated. However, one of the main objections to the traditional school is that it does not properly model how firms manage risk, not only through the use of derivatives, but also as an opportunity to increase profitability.

The risk-portfolio school is not a unified body of thought, but is comprised rather of multiple theories, varying in complexity, but united in the opinion of the traditional school as unrealistic. De-Grauwe, (1996), in a straightforward attack on the traditional school, convincingly argues that due to the convexity of the profit function, exporters’ return from favorable exchange rate movements and the accompanying increased output outstrip the decreased profits associated with
adverse exchange rates and decreased output, and therefore, as a result, risk neutral individuals will be attracted by these higher profit opportunities.

Although the convexity of the profit function may imply a positive correlation between trade and exchange rate risk, the more prominent tenet of the risk-portfolio school examines exchange rate risk in light of modern portfolio diversification theory. Farrell, et al, (1983), summarized that economic agents maximize profitability by diversifying the risk levels in their investment portfolios by simultaneously engaging in low medium and high risk activity with corresponding potential rates of return. Greater exchange rate volatility resulting in higher risk would then not discourage risk neutral agents from engaging in trade, but would present an opportunity to diversify their risk portfolios and increase the likelihood of profitability.

However, De-Grauwe, (1996) suggests a third, political-economic, theory. This approach proposes that nations that have flexible exchange rate systems and experience exchange rate misalignments are susceptible to lobbying from failing industries to create or increase protection from trade. As a result, greater exchange rate volatility would decrease trade flows as a result of protectionist legislation or executive order. However critics of this approach, point out that (1) an industry’s vulnerability due to adverse exchange rates often reflect deeper competitiveness issues and (2) flexible rates help absorb the output and unemployment costs of misalignments. The adaptive theoretical framework for this study follow the traditional school which holds that higher volatility increases risk and therefore depresses trade flows.

2.5 Empirical Literature Review

There exists a plethora of research studies on the impact of exchange rate volatility on trade on the one hand, and the impact of globalization on trade on the other hand both in developing and developed countries. Briefly, we present some of their findings below:

Kai-Li Wang and Christopher B. Barrett (2007), toke a new empirical look at the longstanding question of the effect of exchange rate volatility on international trade flows by studying the case of Taiwan’s exports to the United States from 1989-1999. In particular, they employ sectoral level, monthly data and an innovative multivariate GARCH-M estimator with corrections for leptokurtic errors. This estimator allows for the possibility that traders’ forward-looking contracting behaviour might condition the way in which exchange rate movement and associated
risk affect trade volumes. They find change in importing country industrial production and change in the expected exchange rate jointly drive the trade volumes. More strikingly, monthly exchange rate volatility affects agricultural trade flows, but not trade in other sectors. They concluded that their results differ significantly from those obtained using more conventional and restrictive modelling assumptions.

Côté, (1994), study looks at bilateral trade, but focuses on how the choice of invoicing currency affects an exporting firm’s production and pricing decisions when exchange rates are volatile and the marketplace is not perfectly competitive. Baron shows that exporting firms face greater price risk when invoices are denominated in the foreign currency and face greater quantity demand risk when the home currency is used. In response, as exchange rate uncertainty increases, risk averse, profit maximizing firms will increase prices when the foreign currency is used to invoice goods. Baron argues that the way in which a firm maximizes utility (minimizes risk) when the home currency is used for invoicing depends on the shape of the demand curve it faces e.g., reducing prices when demand is linear, thereby increasing demand and decreasing profit variance (uncertainty).

Hooper and Kohlhagen (1978), equally examine the relationship between volatility and bilateral trade in the context of the traditional theory. They derive demand and supply schedules for individual firms, where the explanatory variables include the currency denomination of contracts, the degree of firms’ risk aversion and the percentage of risk hedged in the forward market. Interestingly, the most significant contribution of the study is how it allows nominal exchange rate volatility to only impact the amount of risk that remains un-hedged. Their study includes a number of a priori assumptions, including the importer being a price-taker where imports are assumed to be inputs used for producing goods that are sold domestically, the importer facing a known demand curve and exporters that sell all of their products abroad in a monopolistic market framework. They find that increased exchange rate volatility leads to both downward shifting supply and demand curves, where quantities and prices decline when importers face the exchange rate risk depending on demand elasticity and their degree of risk-aversion, and quantities decline and prices increase when exporters (suppliers) bear the risk.

Dellas and Zilberfarb, (1993) examine trade decisions in the framework of a portfolio-savings decision model under uncertainty. Their theoretical model assumes a small open economy with
an individual domestic agent importing, exporting and consuming two products in two time periods, where asset markets are incomplete and the agent makes trade decisions with incomplete knowledge of price risk. Their study examines the effects of uncertainty both in the absence of a forward market and with complete and incomplete hedging opportunities. They find that the effects of volatility on trade are ambiguous depending on the risk parameter. With complete hedging possible and costless, individuals can insulate themselves from exchange rate risk and increased volatility does not depress trade levels. They then extend these findings to producers selling to both domestic and foreign markets and find results consistent with those for the individual domestic agent.

Brada and Méndez, (1999) theoretical model demonstrates how higher exchange rate volatility increases the potential gains from trade. Their study uses an international firm that sells its product either entirely at home or abroad, and must also determine which market to choose with incomplete knowledge of exchange rate volatility. Their theoretical construct results in a generally positive relationship between the variance of the foreign spot exchange rate and the volume of output and total export. Their findings collaborate with the findings of Dellas and Zilberfarb, the increase in the value of the firm’s option to export depends on the convexity of the relationship between profits and the exchange rate, and ultimately upon the degree of the firm’s risks aversion.

Franke, (1990) provide the effects of exchange rate volatility across major sectors of an economy such as fishing, mining, manufactured goods, import and export, chemicals and others. From his study, he found that foreign bilateral trade is particularly sensitive to exchange rate volatility. He concluded that trade (import and export) is more responsive to exchange rate volatility because trade is relatively open to international trade where openness is measured by the ratio of import and export.

Feensta and Kendall, (2005) examined the relationship between exchange-rate volatility and foreign export volumes for 12 industrial economies using a model that includes real export earnings of oil-producing economies as a determinant of industrial country export volumes. A supposition underlying the model is that, given their levels of economic development, oil exporters’ income elasticities of demand for industrial country exports might differ from those of industrial countries. Five estimation techniques, including a generalized method of moments
(GMM) and random coefficient (RC) estimation, was employed on panel data covering the estimation period 1977-2003 using three measures of volatility. The result provides no evidence of a single instance in which volatility has a negative and significant impact on trade.

Todani and Munyama, (2005) investigate the impact of exchange rate volatility on foreign South African exports flows to the rest of the world, as well as on South African goods, services and gold exports. The ARDL bounds testing procedures developed by Pesaran et al. (2001) were employed on quarterly data for the period 1984 to 2004. The results suggest that, depending on the measure of volatility used, either there exist no statistically significant relationship between South African exports flows and exchange rate volatility or when a significant relationship exists, it is positive. No evidence of a long run gold and services exports demand relations were found. These results are however not robust as they show great amount of sensitivity to different definitions of variables used.

Vita and Abbott, (2004) used the ARDL econometrics technique to analyse the impact of exchange rate volatility on UK exports to the European Union (EU). The study estimated an export demand equation using disforeignd monthly data for the period 1993 to 2001 and concluded that UK export to the EU are largely unaffected by exchange rate volatility.

Aristotelous, (2001) obtain similar results while examining the case of Irish exports to Britain. Estimated error correction models by Doyle (2001), also for Irish export to Britain, reveal that both real and nominal volatility are significant determinants of changes in total exports and in a number of sectors. Both positive and negative short-run elasticities for exchange rate volatility were estimated, although positive elasticities predominate.

Wang and Barrett, (2002) analyzed the effect of exchange rate volatility on international trade flows by studying the case of Taiwan’s exports to the United States from 1989-1999. They found that real exchange rate risk has insignificant effects in most sectors, although agricultural trade volumes appear highly responsive to real exchange rate volatility.

Ariccia, (1999) used the gravity model and provides a systematic analysis of exchange rate volatility on the bilateral trade of the 15 EU members and Switzerland over a period of 20 years from 1975 to 1994. In the basic regressions, exchange rate volatility has a small but significantly negative impact on trade.
Pickard, (2003) uses stochastic coefficients econometric modeling to forecast real exchange rate volatility and examine how expected and unexpected volatility affect bilateral trade flows of certain steel products between Canada, Mexico and the United States using monthly data for the seven-year period 1996-2002. The results of the model indicate that the effects of exchange rate volatility on bilateral trade flows for this sector are relatively minor, where sustained changes in the spot exchange rate, sectoral economic growth, and the price of goods being traded all exert more significant influence on trade levels than exchange rate volatility. However, the model results also tend to indicate that as exchange rate volatility increases, the well developed U.S.-Canadian forward currency exchange market may present economic agents with profit opportunities through risk-portfolio diversification, resulting in a positive correlation between volatility and trade. For the less developed U.S.-Mexican forward currency market, the model results indicate that the relationship between trade and volatility, both expected and unexpected, is weak and predominantly negative.

Rey, (2006) investigates the impact of nominal and real effective exchange rate volatility on exports of six Middle Eastern and North Africa (MENA) countries to 15 member countries of the European Union (EU), for the period 1970Q1-2002Q4. Moving average standard deviation and conditional standard deviation at ARCH model was used to generate four different measures of volatility for each country. The co integration results indicate a significant relationship, negative for four countries (Algeria, Egypt, Tunisia, and Turkey), positive for the last two (Israel and Morocco), between MENA exports and exchange rate volatility. The short run dynamics, using an error correction model, shows that the Granger causality effects of the volatility on real exports are significant, whereas the effects of real exchange rate and the gross domestic product of EU are more contrasted.

Chowdhury, (2007) compare real and nominal foreign exchange volatility effects on exports. Using a flexible lag version of the Goldstein-Khan two-country imperfect substitute’s model for bilateral trade, the study identifies the overall effect into both timing as well as a size impact. The result shows that the size impact of forecasted foreign exchange volatility does not vary according to the measure used in terms of magnitude and direction. However, there are very different timing effects, when compared with real and nominal foreign exchange rate volatility.
Broda and Romalis, (2003) on the study of the relationship between trade and exchange rate volatility, develop a model of international trade in which international trade depresses real exchange rate volatility and exchange rate volatility impacts on trade in products differently according to their degree of differentiation. In particular, commodities are less affected by exchange rate volatility than more highly differentiated products. Using disforeign trade data for a large number of countries for the period 1970-1997 they find strong results supporting the prediction that trade dampens exchange rate volatility. Similarly, some few empirical studies on the relationship between globalization and trade were examined.

Okoh, (2004) conducted a study on the global integration and the growth of Nigeria’s non-oil exports; she sought to understand the implications of Nigeria’s membership of the World Trade Organization (WTO) and subsequent implementation of its agreements on the growth of Nigeria’s non-oil exports. The study employed the Vector Error Correction Model in a bid to delineate the long run relationship between growth in non-oil exports, growth in import of capital inputs and global integration, which was proxied by the index of openness. The results showed that global integration though positive was not significant in explaining the behaviour of non-oil export in the long run as well as in the short run. However, growth in import of capital inputs positively impacts on the growth of non-oil exports. The implication is that while the Nigerian economy is unable to gain from greater integration and trade, her trading partners (exporters of capital inputs) gained from greater access into the Nigerian market. This study recognizes that though Nigeria needs to look inwards for solutions to the declining non-oil exports there is a need to renegotiate her commitments/bindings with a view to increasing them. She concluded that, though contrary to WTO objective of eliminating all barriers to free trade by the year 2004, the tariffication process is hurting the Nigerian economy.

Reid, (2000) conducted a study on free trade, business strategy and globalization in Scotland. The study links the economist's analysis of free trade with the business strategist's analysis of the forces behind the globalization of competition. It is argued that, although the drive to globalization may seem different from the seeking of superior outcomes in competitive markets, this may be only because the modern reference point for competition is inappropriate. However, reference back to classical ideas of competition shows that both the advantages of globalization, and its disadvantages, had been anticipated by classical writers of the eighteenth century, most
notably by Adam Smith. He concluded Globalization is an issue that has captured the popular imagination, both positively and negatively.

Bayo, (2000) in his study, globalization and the Nigerian economy show that globalization offers developing countries like Nigeria the opportunities to create wealth through the export-led growth, to expand international trade in goods and services and to gain access to new ideas, technologies and institutional design. This means that globalization affects all aspects of Nigeria development including her economy. In essence, globalization offers many opportunities to Nigeria and other developing countries as well as other actors in the global economy he concluded.

AbdulRaheem, (2003) study the effect of Globalization on Nigerian economic development. He reviewed the existing literature on the implication of globalization on the economic development in Nigeria. Thus, he conceptualizes globalization and development as well as some components of Nigeria development and the impact of globalization on the world economy. Based on determining implication of globalization on economic development, he concluded that if necessary measures are not put in place Nigeria may be excluded in this process and globalization of poverty rather than prosperity will occur.

Salimono, (1999), on globalization and the challenges in Nigeria demonstrated that globalization has reduced barrier existing in international trade. The reduction in those barriers has opened the door for export led growth. He gave the instance that Nigerian economy has been mono-cultural since independence and has so much depended on the western countries for its survival.

### 2.6 Limitation of Previous Study

Although, there is an avalanche of empirical studies on the impact of exchange rate volatility on trade as well as the impact of globalization on trade, however the existing evidence suggests that research in this area is promising. We noted the following

First, none of the studies among the one reviewed made any attempt to simultaneously investigate the joint impact of exchange rate volatility and globalization on trade in Nigeria.

Second, there is a clear inconsistency in the findings of those studies that investigated the impact of globalization on the Nigerian economy, for example, Bayo (2000) and AbdulRaheem (2003),
both reported contradictory results. Similarly, those that examined the impact of exchange rate volatility on trade had similar outcomes. Hooper and Kohlhagen (1978), Ariccia (1999), Broda and Romalis (2003) and Hondroyiannis et al. (2005) reports a negative relationship, while, Morgenroth (2000), Pickard, (2003), Todani and Munyama (2005) and Rey, (2006) provides evidence that support a positive relationship.

Third, majority of the studies were cross country analysis with no particular reference to the Nigeria economy. Lastly, there is equally the need to investigate the impact of exchange rate volatility on foreign trade in Nigeria especially in this present dispensation of aggressive financial sector reform.
CHAPTER THREE
METHODOLOGY

3.0 Methodology

This study will follow a linear specification via the partial adjustment approach. The specification will follow Distribution Lag Scheme (DLS) – autoregressive distributed lag model (ARDLM). Variables are in log form.

There may be need to re-specify the ARDLM to an error correction scheme if the variables show any long run relationship – the error correction version of the ARDLM will be specified to accommodate adjustment to equilibrium.

3.1 Model specification

Identification of variable symbol

- BoP: Nigeria’s balance of payment
- EXRV: Exchange rate volatility
- OPN: Trade degree of openness
- FPI: Foreign private investment
- INT: Domestic maximum lending rate
- USA: Foreign income (proxied with USA national income)
- INC: Domestic income
- NER: Nominal exchange rate

3.2 The Model

For the purpose of empirical computation, equation (1) converges to:

\[
\text{BoP} = \text{F(\,EXRV,\,OPN,\,FPI,\,INT,\,USA,\,INC)}
\]

\[
\text{EXRV} = \log \left[ \sqrt{\frac{1}{n-1} \sum_{k=1}^{n} \left( \text{NER}_{ik} - \text{\overline{NER}} \right)^2} \right]
\]

where

EXRV is as defined earlier, \( \overline{\text{NER}} \) is annual average of nominal exchange rate

For the purpose of empirical computation, equation (1) converges to:
LogBoP = $\lambda_0 + \lambda_1 EXRV_t + \lambda_2 OPN + \lambda_3 \text{LogFPI} + \lambda_4 \text{INT} + \lambda_5 \text{LogINC} + \lambda_6 \text{LogUSA} + \mu$  \hspace{1cm} (2)

Where:

$\lambda_0$ = the constant term

$\lambda_1$-to-$\lambda_6$ = the parameters to be estimated

$\mu$ = error term

The estimate is indicative of the fact that the relationship between BoP and its determinants are not instantaneous. They have lags, and to incorporate these lags we re-specify the model in its a priori form.

LogBoP = $\lambda_0 - \lambda_0 \text{LogEXRV}_t + \lambda_0 \text{LogEXRV}_{t-1} - \lambda_0 \text{LogEXRV}_{t-2} + \lambda_2 \text{LogOPN}_{t-4} + \lambda_3 \text{LogFDI}_{t-1} + \lambda_4 \text{LogINT}_{t-1} + \lambda_5 \text{LogINT}_{t-3} + \lambda_5 \text{LogINC}_t + \text{LogUSA}_t + \mu$  \hspace{1cm} (4)

3.3 Model Estimation

Data handling

Unit root – data used in the model are tested for unit root and equation (4) was re-specified to take care of the order of integration of the variables used. The accompanied unit root equation is specified in the spirit of ADF:

$\Delta y = \alpha y_{t-1} + \beta \sum_{i=1}^{n} \Delta y_{t-i} + e_t$  \hspace{1cm} (5)

Where $y$ is a vector of any of the variables in equation 1, and $\Delta$ is difference operator

$\Delta \Delta \text{BoP}_t = \lambda_0 + \lambda_1 \text{EXRV}_{t-i} + \lambda_2 \Delta \text{OPN}_{t-i} + \lambda_3 \Delta \Delta \text{LogFDI}_{t-i} + \lambda_4 \Delta \text{LogINT}_{t-i} + \lambda_5 \text{INF}_{t-i} + \Delta \Delta \Delta \text{LogGDP} + \mu$  \hspace{1cm} (6)

Co-integration – the variables will also be tested for long run relationship. If it exists, then equation (6) will be specified as an error correction model (ECM) following Granger two-step approach:

1) Estimating the long run equation and saving the residual

2) Incorporating the residual in the final model to form the ECM

3) The ECM parameter shows by how much the error is adjusted over time - in the long run

Co-integrating equation
The co-integrating equation specified as:
\[ \text{LogBop} = \beta_0 + \beta_1 \text{LogFPI} + \beta_2 \text{LogUSA} + \beta_3 \text{LogINC} + \beta_4 \text{INT} + \beta_5 \text{EXRV} + \beta_6 \text{OPN} + \chi_t \] (7)

where \( \chi \) is the random term satisfying all the classical assumptions. If we take the error term from equation (7) as \( \varepsilon \), we test \( \varepsilon \) for unit root. If unit hypothesis is rejected, that is, if the residual is stationary then, variables in equation (7) is said to be co-integrated. This could be specified as:

\[ \varepsilon_t = \rho \varepsilon_{t-1} + \kappa \sum_{i=1}^{9} \varepsilon_{t-i} + \delta_t \] (8)

The maximum lag length used in the unit root analysis of the co-integrating equation is a default optimal lag length generated by the E-views software used for estimation. There was a confirmation of co-integration between the dependent variable (BoP) and all the explanatory variables; the equation in (6) is re-specified as an error correction model. The error correction version of equation (6) could be specified as:

\[ \Delta \text{BoP}_t = \lambda_0 - \lambda_1 \text{EXRV}_{t_i} + \lambda_2 \Delta \text{OPN}_{t_i} + \lambda_3 \Delta \text{LogFDI}_{t_i} + \lambda_4 \Delta \text{INT}_{t_i} + \lambda_5 \Delta \text{INC}_{t_i} + \lambda_6 \Delta \text{LogUSA} - \phi \text{BoP}_{-\text{ecm}} + \mu \] (9)

where
\[ \phi \] = the coefficient of the ECM parameter showing magnitudes of
the error correct at every interval
\[ \text{BoP}_{-\text{ecm}} = \text{the error correction mechanism.} \]

Thus, the model in equation (9) is the distributed lag error correction model (DLECM). This is the final model estimated that generated the output in table 10.

### 3.6 Model interpretation and results evaluation

Three criteria are used: statistical; economic; and econometric. The statistical criterion evaluates the relevance of each of the variables included in the model by examining the “t” and the “F” ratios. It also include the explanatory power of the model such as the \( R^2 \); Durbin-Watson statistics (DW), the optimal lag length (Akaike, Schwarz, and Hannan-Quinn information
criteria) and The economic criterion examines the conformity of the results of the estimated parameters to known economic theory, otherwise the parameter is adjudged to be wrong or that new finding has been added to economic literature. The econometric criterion examines the policy reliability of the parameter estimates based on the ordinary least square (OLS) assumptions.

3.8 Data sources, frequency and frame – data to be used are annual time series 1962-2008; collected from the CBN statistical bulletin, golden jubilee edition. Supplementary was also collected from World Bank Global Development Finance (GDF) database, 2008

Figure 2: Exchange rate volatility in Nigeria, 1962-2008
Sources: Authors computation based on data from CBN statistical bulletin, jubilee edition
CHAPTER FOUR
PRESENTATION AND ANALYSIS OF RESULT

4.1 Data Analysis

4.1.0 Unit Root Analysis

Table 1-7 showcased the unit root test of data used in the study. The results show that apart from exchange rate volatility (EXRV) all the other variables are not stationary. Degree of trade openness (OPN) and maximum lending (INT) rate are stationary or in more technical term integrated of order 1, while balance of payment (BoP), foreign portfolio investment (FPI), domestic income (INC), and foreign income (USA) are stationary at order 2. All the variables are logged and will enter the final equation in their order of integration.

Table 1: unit root analysis of trade openness (OPN)

Null Hypothesis: Δ(OPN) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-10.56900</td>
</tr>
</tbody>
</table>

Test critical values:
1% level: -2.617364
5% level: -1.948313
10% level: -1.612229


Table 2: unit root analysis of Balance of payment (BoP)

Null Hypothesis: Δ(BOP,2) has a unit root
Exogenous: None
Lag Length: 9 (Automatic - based on SIC, maxlag=9)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-5.023205</td>
</tr>
</tbody>
</table>

Test critical values:
1% level: -2.632688
5% level: -1.950687
10% level: -1.611059

**Table 3: unit root analysis of income (INC)**
Null Hypothesis: ΔΔ(INC) has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-11.29493</td>
</tr>
</tbody>
</table>

Test critical values:
- 1% level: -2.618579
- 5% level: -1.948495
- 10% level: -1.612135


**Table 4: unit root analysis of Exchange rate volatility (EXRV)**
Null Hypothesis: EXRV has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-5.914513</td>
</tr>
</tbody>
</table>

Test critical values:
- 1% level: -3.581152
- 5% level: -2.926622
- 10% level: -2.601424


**Table 5: unit root analysis of foreign income (USA)**
Null Hypothesis: ΔΔ(USA) has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-6.413724</td>
</tr>
</tbody>
</table>

Test critical values:
- 1% level: -3.605593
- 5% level: -2.936942
- 10% level: -2.606857
Table 6: unit root analysis of Interest rate (INT)
Null Hypothesis: Δ(INT) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>-7.749081</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Test critical values:
- 1% level: -2.618579
- 5% level: -1.948495
- 10% level: -1.612135

Table 7: unit root analysis of Foreign Direct Investment (FDI)
Null Hypothesis: Δ(FDI,2) has a unit root
Exogenous: None
Lag Length: 7 (Automatic - based on SIC, maxlag=9)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3.569510</td>
<td>0.0007</td>
</tr>
</tbody>
</table>

Test critical values:
- 1% level: -2.628961
- 5% level: -1.950117
- 10% level: -1.611339

4.1.1 Co-integration Analysis

Next we tested in there is a long run relationship between the explanatory variables and the dependent variables (BoP). Table 8 is the estimated co-integrating equation. In the spirit of Granger two-step procedure, firstly the co-integrating equation was estimated and the residual saved. We named this residual, Bop_cm. In the second step the saved residual (Bop_ecm) is tested for unit root. If there is evidence of unit root then we conclude that there is a long run relationship between the independent variables and the dependent variable (BoP). The unit root test of the residual is in table 9 and confirms that there is a long run relation – they are co-integrated. Having confirmed this, the final model will be estimated as an error correction model.

by including the long run variable (BoP\textsubscript{ecm}). Thus, we estimate and error correction model (ECM) by introducing and error correction mechanism.

**Table 8: Co-integrating equation**

Dependent Variable: LOG(BoP)
Method: Least Squares
Date: 01/26/10   Time: 19:32
Sample: 1962 2008
Included observations: 47

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG(INC)</td>
<td>0.305511</td>
<td>0.288380</td>
<td>1.059405</td>
<td>0.2958</td>
</tr>
<tr>
<td>LOG(USA)</td>
<td>-1.288749</td>
<td>0.601108</td>
<td>-2.143955</td>
<td>0.0382</td>
</tr>
<tr>
<td>LOG(FPI)</td>
<td>1.154489</td>
<td>0.212545</td>
<td>5.431747</td>
<td>0.0000</td>
</tr>
<tr>
<td>EXRV</td>
<td>-0.268722</td>
<td>0.016331</td>
<td>-16.45473</td>
<td>0.0000</td>
</tr>
<tr>
<td>INT</td>
<td>-0.024044</td>
<td>0.032754</td>
<td>-0.734068</td>
<td>0.4672</td>
</tr>
<tr>
<td>OPN</td>
<td>0.352374</td>
<td>1.226001</td>
<td>0.287417</td>
<td>0.7753</td>
</tr>
<tr>
<td>C</td>
<td>31.83792</td>
<td>11.56287</td>
<td>2.753461</td>
<td>0.0088</td>
</tr>
</tbody>
</table>

R-squared 0.895485  Mean dependent var 11.90296
Adjusted R-squared 0.879808  S.D. dependent var 2.177196
S.E. of regression 0.754806  Akaike info criterion 2.411891
Sum squared resid 22.78926  Schwarz criterion 2.687445
Log likelihood -49.67944  Hannan-Quinn criterion 2.515584
F-statistic 57.12025  Durbin-Watson stat 0.614698
Prob(F-statistic) 0.000000

**Table 9: Residual text of co-integration**

Null Hypothesis: BoP\_ECM has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

<table>
<thead>
<tr>
<th>Augmented Dickey-Fuller test statistic</th>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-3.652820</td>
<td>0.0005</td>
</tr>
</tbody>
</table>

Test critical values:
1% level -2.617364
5% level -1.948313
10% level -1.612229


4.2 **Error Correction Model (ECM)**
The model follows the Fleming-Mundell model. Balance of Payment (BoP) was modeled as a determinant of foreign income (USA), proxied with gross national income the United States of America, domestic income (INC), foreign portfolio investment (FPI), domestic maximum lending rate, (INT), degree of openness (OPN), and exchange rate volatility, (EXRV). There are three criteria used in the current analysis. These are: statistical, economics, and econometric criteria. The statistical criterion examines the relevance of each of the explanatory variables in the model; the economic criterion examines if the variables used in the study conform to the a priori expectation of if new things have been explained that contradicts the known theory, while the econometric criterion examines the reliability of the parameter estimates in the model.

**Income - domestic income (INC) and foreign income (USA)**

Domestic income (INC) and foreign income (USA) are not significant in the model, but conform to a priori. Theoretically, increase in domestic will lead to an increase in the demand for imported goods thus, having a negative relationship with balance of payment, while increase in foreign income will a have positive impact on Nigeria’s trade balance (BoP). As a result of their poor performance in the model they were dropped so as to maintain the parsimony of the model.

Also dropped from the model is foreign capital inflow (foreign portfolio investment) FPI as it was discovered to correlate with domestic lending rate. This correlation exists because capital mobility and subsequent inflow or outflow is dependent on interest rate differential. An increase in domestic lending rate will lead to inflow of capital and subsequent increase in capital account surplus in the domestic economy.
Table 10: Parsimonious Error Correction Model
Dependent Variable: ΔΔLOG(BoP)
Method: Least Squares
Date: 01/26/10  Time: 20:56
Sample (adjusted): 1967 2008
Included observations: 42 after adjustments

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δ(INT(-1))</td>
<td>0.047930</td>
<td>0.019934</td>
<td>2.404411</td>
<td>0.0216</td>
</tr>
<tr>
<td>Δ(INT(-3))</td>
<td>0.053195</td>
<td>0.019306</td>
<td>2.755427</td>
<td>0.0092</td>
</tr>
<tr>
<td>EXRV</td>
<td>-0.250277</td>
<td>0.010788</td>
<td>-23.19952</td>
<td>0.0000</td>
</tr>
<tr>
<td>EXRV(-1)</td>
<td>0.516801</td>
<td>0.013793</td>
<td>37.46763</td>
<td>0.0000</td>
</tr>
<tr>
<td>EXRV(-2)</td>
<td>-0.265398</td>
<td>0.011702</td>
<td>-22.67926</td>
<td>0.0000</td>
</tr>
<tr>
<td>Δ(OPN(-4))</td>
<td>3.011874</td>
<td>1.005512</td>
<td>2.995363</td>
<td>0.0050</td>
</tr>
<tr>
<td>BOP_ECM(-1)</td>
<td>-0.401331</td>
<td>0.118913</td>
<td>-3.374986</td>
<td>0.0018</td>
</tr>
</tbody>
</table>

R-squared 0.990551  Mean dependent var 0.000685
Adjusted R-squared 0.988932  S.D. dependent var 4.909976
S.E. of regression 0.516559  Akaike info criterion 1.667756

Sum squared resid 9.339149  Schwarz criterion 1.957367
Log likelihood -28.02287  Hannan-Quinn criter. 1.773910
Durbin-Watson stat 1.716886

Domestic maximum lending rate (INT)
Domestic lending rate (INT) theoretically affects the (BoP) through capital account. BoP is the summation of capital account and current account. Increase interest rate (INT) increases BoP by attracting capital inflow which increases capital account balance, hence the balance of payment.

Table 10 shows that domestic lending rate (INT) follows this a priori. It is evident from the estimate that both in the long run (LR) and very long run (VLR) domestic lending rate affect BoP positively as an attractor of foreign capital inflow. A 10% increase in the domestic lending rate in the long run (Δ(INT(-1))) and very long run (Δ(INT(-3))) will improve BoP by approximately 0.5%.

Exchange rate volatility (EXRV)
Exchange rate uncertainty which could also be used as a measure of macroeconomic uncertainty was identified in literature, especially advocates of irreversibility theory of investment as the most important determinant of investment flow in the developing countries. In the Fleming Mundell model exchange rate is the price of trade flows and exchange rate appreciation (decrease in exchange rate) worsen BoP by increasing the prices of export. It even becomes worse when movements in exchange are highly sporadic and volatile. It creates a whole environment of uncertainty both for export and import, and BoP generally.

Results in table 10 confirm this theoretical underpinning. However, there are mix results as one moves from short run (SR) to a very long run (VLR). In the short run exchange rate volatility (EXRV) has a negative impact on BoP, but the effect is short lived as this impact is reversed in the long run EXRV(-1). A 10% increase in exchange rate uncertainty will decrease BoP account by approximately 2.5%, while action will reversed in the long run by approximately 5.2%, twice the decrease in the short run. In the very long run EXRV(-3) the rate decreases by approximately, 2.7%. There is one important observation in our regression that worth mentioning. A closer examination of the movement from SR to VLR revealed that the net effect of exchange rate volatility (subtracting the SR and VLR from the LR) is zero. That is, (-2.7-2.5+5.2) equals zero. Thus, the net effect of exchange rate volatility on Nigeria’s BoP in the long run is zero.

**Trade degree of openness (OPN)**

Degree of openness is measured as the ratio of total trade flow (import and export) to GDP. This measures the extent of protection in an economy. Our result follows the argument in literature that increased trade liberalization or globalization has a positive impact on BoP. In terms of parameter magnitude and rate of impact on BoP our estimates suggest that globalization (trade liberalization) is the strongest force in driving Trade flows in Nigeria. It is evident that an increase in trade liberalization by 10% improves BoP account by 30%. See table 10 for the result.

**Long run Equilibrium Adjustment (BoP_ECM)**

This shows the speed with which BoP adjust in the long run in response to any external or internal shocks. That is at every shock that displaces the BoP equilibrium, 40% of the adjustment is restored annually.

### 4.3 Statistical properties of the model
We focused on three major criteria: the explanatory power of individual and joint variables in the model, reliability of the estimated parameters, and optimal time horizon of the variables.

**Figure 3: in sample forecast of all the applied variables in the model**

Individually and jointly, all the variables used in the model are highly required for a complete examination of the reaction of the domestic economy’s trade flow to its determinants. This is highlighted in the magnitude of $R^2$ which is about 0.99. This means that about 99% of the determinants of trade flows to Nigeria are explained by the model. This has a serious trade policy implication. These variables have been identified by the model as a veritable tool to fine tune or reposition the country’s balance of payment equilibrium both in the SR and VLR. Figure 3 shows the tracking of the variables used in the model.
CHAPTER FIVE
SUMMARY, CONCLUSION, POLICY IMPLICATION AND RECOMMENDATION

5.0 Summary
The study x-rayed the trade implication of exchange rate uncertainty on the Nigerian economy given the fact that Nigeria is a monoculture economy. Using exchange rate volatility as a measure of macroeconomic variability and controlling for other balance of payments (BoP) determinants like interest rate, trade openness, foreign income, domestic income, and foreign capital flows, the study was able to model BoP determinants in Nigeria.

The study used distributed lag model with maximum four lag lengths. Typical of time series data, all the data used in the model were not mean reverting except exchange rate volatility necessitating the differencing of the data to make them stationary. It is also evident that the variables are co-integrated in the long run; as such error correction mechanism was applied to correct long run economic relation. The over-parameterized model was reduced to a parsimonious model by eliminating some irrelevant variables like, foreign portfolio investment, and foreign and domestic income. Thus, determinants of BoP in Nigeria are exchange rate volatility (core variable), interest rate, and trade openness, conforming to the traditional Mundell-Fleming model.

All the variables conform to a priori, but a new finding was made in the relationship between exchange rate volatility and BoP. The impact of exchange rate volatility on BoP varies from short run, long run and very long. While the short and the very long run have negative impact on BoP, the long run effect is positive which however, neutralizes in the very long run setting the net impact on BoP to zero.

5.1 Conclusion, Policy implication and recommendations
The impact of exchange rate volatility depends largely on the level of development of the economy under consideration. In the short run, and very long run exchange rate volatility is a
very serious threat to the suggestion that people adapt to exchange rate related problems which reduces the effect in the long run.

The foregoing suggests that exchange rate volatility has some interesting and thought provoking implications in every economy.

- Since the net effect and impact of exchange rate volatility in the very long run is zero, it gives the policy makers signal that players in international trade are adaptive in their decision making – backward looking expectation decision makers.
- Foreign income is a weak driver of trade flows to Nigeria manifesting the monoproduct nature of the economy and calls for immediate action for diversification – export dependent economy driven by the manufacturing sector.
- Foreign portfolio investment which drives capital account will continue for a very long time. The implication is that there will continue to be international crowding effect of the private domestic investment.
- Going by theoretical implication of rising domestic lending rate, the inflow of capital will compound the negative impact of exchange rate volatility in the long via a fall in exchange rate – exchange rate appreciation due largely to high demand for local currency, naira.
- The neutralizing effect of volatility in the long run may not hold after all. The upward pressure on exchange rate will cause high fluctuation of exchange and the impact on BoP in the short run will be enormous.
- The low demand for export caused by exchange rate overvaluation will create a reverse of the gain from capital account balance.
- Domestic output will fall because of the negative impact of rising interest rate on private investment, and through the multiplier effect causing the economy’s output to fall.
- This will make it difficult for any policy drive for export led growth, since output cannot meet up with both domestic and international demand.

Based on the findings from this study, the following recommendations are made:

- The policy makers are given signal that players in international trade are adaptive in their decision making since the net effect and impact of exchange rate volatility in the very long run is Zero.
ii Government considering that Nigeria is a monoproduct driven economy should diversify the economy emphasizing mostly in the manufacturing sector as foreign income is a weak driver of trade flows in Nigeria.

iii Through diversification and increase in manufacturing sector, high demand for export caused by exchange rate overvaluation will create gain in capital account balance.

iv The macroeconomic variables that were found to have positive or even negative effect on growth should be managed properly to enhance growth rate.

V This study shows the need for government to evaluate its policies before adopting such policies and also at certain interval of its implementation.
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