

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

There have been several financial crises in the past 150 years across the globe, of which some had degenerated into depression. The concept, origin, causes and the effect of these financial crises on both developed, emerging market and developing economies from the 1830s depression to the global financial crisis of 2007 and 2008 had been considered by several authors (Moritz, 2010; Nkoro & Uko, 2012; Eichengreen & Portes, 1987; Anil & Neha, 2011; Osaze, 2009; Jimenez-Rodriguez, 2010; Khalid, Irfan, & Farhat, 2015; Manuel, Moritz, & Christoph, 2015; Krugman, 1979; Alabi & Ntukekpo, 2009; Steiner, 2012; Bordo, Eichengreen, Klingebiel & Martinez-Peria, 2001). These Scholars in different views and concepts have defined financial crises. Osaze (2009) and Jimenez-Rodriguez (2010) referred to financial crisis as the continuous and gradual drop in economic indicators over a relatively period of time, which resulted to disruption of the financial markets which serves as the propelling force of an economy. Alabi and Ntukekpo (2009) defined financial crisis as the gradual slowdown in economic growth and development in almost all sectors across the world.

The 1830s depression primarily affected land investors in the United States of which farmers lost their farms through mortgages. Consequently, failure by government to re-charter the Second Bank also helped fuelled the crisis (Nkoro & Uko, 2012; Njogo, 2012). The 1929 stock market crash in history occurred on 24th of October, 1929. On this day, the New York stock market and other stock markets across Europe unexpectedly crashed due to the high volume of shares traded

in respect to sharp decline in prices, as well as the rumours of speculators who committed suicide (Nkoro & Uko, 2012; Asaju & Yarie, 2013). The Great Depression was another financial crisis in the 1930s that degenerated into a depression. The cause of the Great Depression was attributed to the resultant effect of the 1929 crash of stock market as a result of the tight monetary policy introduced by the United States Federal Reserve. The policy was intended to stop the outflow of gold (Tavlas, 2011; Nkoro & Uko, 2012). However, some authors related the cause of the depression to widespread panic among depositors as a result of the liquidation of some large banks in the United States (Coe, 2002; Eichengreen & Sachs, 1985; Perry & Vernengo, 2011; Chong-Yah & Hui-Ying, 2011). The Scandinavian crises were another financial plague that affected the Scandinavia regions (Denmark, Norway and Sweden). These regions experienced a classic boom in asset prices and bust (collapse in oil prices and decline in trade with the Soviet Union) cycle in the 1980s and in the early 1990s. This resulted to both banking crisis and currency crisis known as the twin crises (Englund & Vihriala, 2006; Allen & Gale, 2007).

The gloomy Monday affected the United States stock market on October 19th, 1987. This started from Wall Street due to drop in value of equity, which led to loss of large sums of money by investors (Bogle, 2008). The Stock Market Crash of 1987 crisis was described to have brought about credibility in the market pricing mechanism of the United States stock market as well as prevented bad times in the future as a result, ending unjustifiable good times (Arbel, Carvell, & Postnieks, 1988). History also recorded the Mexican crisis in 1994. This crisis was attributed to the currency devaluation and the ensuing financial crisis due to the series of political shocks occasioned by rebellion and assassinations of prominent politicians (Whitt, 1996; Banco de Mexico, 1995). Besides, the 1997 and 1998 Asian crisis was another plague known to the World that severely ravaged the Middle East of Asia. The cause of the crisis was traced to the currency

devaluation in Thailand that subsequently led to the spread of the crisis to other Asian economies, resulting to excessive foreign borrowings and fixed assets purchases (Maroney, Naka & Wansi, 2004; Kanaoka, 2012; Mahmood, Xinping, Ali, Usman, & Shahid, 2011). Harvey, Lundblad and Valderrama, (1999) in their own arguments stated that the root cause of the Asian crisis was due to the activities of corruption and cronyism which was a form of favouritism to friends and relatives such was in the case of Malaysia.

Also were the Russian and Brazilian crises. The Russian crisis of 1998 was attributed to the effect of financial linkage with the Asian economies. The Asian crisis had its impact on Russian external terms of trade which resulted to capital flight, thereby reducing its capital account. Subsequently, the Brazilian economy also suffered from the effect due to the collapse of the Russian ruble and the debt crisis occasioned by the Asian crisis (Taimur & Ilan, 2000; Harvey, Lundblad & Valderrama, 1999). Furthermore, the Argentina crisis in 2001 and 2002 was another country that undergone financial crisis in the American continent. The Argentina financial shakeup was due to its failure to pay sovereign debt in 2001 as well as the unsuitable nature of the exchange-rate regime in early 2002, which resulted to the Brazilian currency devaluation (Bustelo, 2004; Haussman & Velasco, 2002; Perry & Serven, 2003; Harvey *et al.*, 1999).

Finally, the 2007 and 2008 global financial crisis has been the most recent global shakeup on the world (developed, developing and emerging) economies. The global financial meltdown that slowed down the economies has generated some controversies in theoretical literature. Some authors attributed the global financial meltdown to be the resultant effect of the sub-prime housing mortgage loans in the United States which was at low interest rates occasioned by a fall in long-term interest rates (Lin, 2008; Naude, 2009; Chong-Yah & Hui-Ying, 2011).

The study of financial crisis on the global economies has generated in literature some theories; Wicksell's theory, Keynes theory, Minsky's theory, Schumpeter theory, Kaleckian theory and Fisher's theory. Amongst these theories, the financial instability hypothesis of the 1960s by Minsky's has been a very robust theory. This theory is an explicit model which explains the position of an economy with stable financing regimes and unstable financing regimes. It explains how an economy can move from financing regimes during period of economic boom which are stable to regimes of economic bust which are unstable.

Nigeria is one of Africa's developing economies, whose foreign reserves was estimated at over \$60 billion which was tagged as guarantee against external financial crisis on the banking sector (Akperan & Awujola, 2013). Thus, during the global financial crisis, Nigeria was thought to be insulated from the effect of the plague due to the belief that the Nigerian financial economy was not deeply integrated in the global financial system. The impact of the crisis in Nigeria was mainly felt on crude oil prices and the banking sector which consequently drained the foreign exchange reserves (Akperan & Awujola, 2013; Oke, 2012; Okonjo-Iweala, 2009; Onuoha & Nwaiwu, 2016). Oluseyi (2008) and Amba (2011) relatively opined that crude oil prices dropped due to reduced demand of oil in the global market as a result of the crisis, thereby depleting the Nigerian foreign exchange reserve. Some authors (Fischer, 2001; Mendoza, 2004; Summers, 2006) were of the opinion that foreign reserves is the main determinant of a country's ability to prevent economic and financial crisis. The effect of financial crisis on crude oil price is the biggest component of external shocks that has hit Nigeria. The collapse of crude oil prices has been attributed to the excesses in the global oil market, which has in subsequent times drained the Nigerian reserves (Okonjo-Iweala, 2009; Stober, 2016). Sascha, Maurizio and Livio (2015)

stated that positive oil price shocks triggered currency appreciation for oil exporting countries and eventually increased the accumulation of foreign reserves.

However, keeping substantial foreign reserves is one very good practice of any nation, but the control, management and diversification of reserves are major problems to most developing nations. For instance, the Nigerian foreign exchange reserve was about 60 billion United States dollars before the global financial crisis in 2007 and 2008, eventually dropped to about 30 billion United States dollars in 2015. The problem of foreign reserves accumulation is being complicated due to crude oil excess in the international oil market and fear of global shortage has consequently led to the collapse in the price of crude oil. However, the fluctuating trend in Nigerian foreign exchange reserve is partially due to militancy and oil pipeline vandalism in oil producing regions which had caused reduction in the volume of crude oil production (Stober, 2016; Ogiri, Amadi, Uddin & Dubon, 2013).

Thus, the study of financial crisis, crude oil price shocks and foreign exchange reserves in empirical literature have shown that the financial crisis has a strong relationship with crude oil price and foreign exchange reserves. These studies revealed that the Nigerian economy absolutely depend on crude oil for its revenue earnings, subsequently the accumulation of the foreign exchange reserves. Thus, the survival of the Nigerian economy without crude oil would be in doubt based on its mono-cultural economy. In fact, the fluctuation in crude oil mainly accounted for Nigeria's external reserves movement (Stober, 2016; Abiola & Adebayo, 2013; Osigwe, Okechukwu & Onoja, 2015). In regard to the relationship between crude oil prices and foreign exchange reserves during the global financial crisis, foreign reserves in some countries such as Nigeria, India, Pakistan, Korea, Malaysia, and Bangladesh tend to deplete (Bogunjoko, 1997; Kaminsky, Lizondo, & Reinhart, 1998; Nteegah & Okpoi, 2016; Ajakaiye & Fakiyesi,

2009); While reserves in some countries mostly the Asian continent (Thailand, China, the Philippines, and Hong Kong) experienced increase in their foreign exchange reserves (Goldstein & Xie, 2009).

1.2 Statement of the Problem

The series of financial crises, specifically the global financial crisis of 2007 and 2008 have been major issues on the foreign exchange reserves of developed, developing and emerging economies in different periods. The global financial crisis significantly affected most global financial institutions and economies which resulted to adverse pressure on foreign exchange reserves across the globe. The global financial crisis which was thought would not affect the Nigerian economy due to its assumed weak financial link with the global financial economies, plagued the entire Nigerian financial institutions in 2009 and 2010. Its effect on the foreign reserves was due to the adverse fluctuation in crude oil prices; the adverse (high) exchange rate; and the inverse in net trade of crude oil (Khan, 2008; Osaze, 2009; Soludo, 2008).

The problem of crude oil price fluctuations at the international oil market due to the global financial crisis had a regressive effect on the level of Nigerian foreign exchange reserves. The adverse fluctuating trend in crude oil price is a major concern to the Nigerian economy which is the major determinant of its foreign reserves (Abiola & Adebayo, 2013). In fact, drop in the Nigerian foreign reserves was in correlation with the severe and continuous depreciation of the Naira, relating to the United States dollar in attempt to regulate the Naira at the foreign exchange market due to economic recession (Stober, 2016; Uguru, 2015; Ogundipe & Ogundipe, 2013; Okonjo-Iweala, 2009). Besides, the adverse net trade of crude oil, due to continuous dependence of the Nigerian domestic economy on imported refined crude oil products was also a

deteriorating effect on the foreign reserves (Inyiama & Ikechukwu, 2015). Considering, the instability in the economy which collaborated with the wide fluctuations in the Nigerian foreign exchange reserves between 1993 and 2016. Thus, we were by these situation and trends, motivated to empirically evaluate if apparently the financial crisis, crude oil price shocks, exchange rate and net trade of crude oil were responsible for the economic instability as well as the wide fluctuations in the Nigerian foreign exchange reserves within the period of this study.

Several related literature had considered series of financial crises including the global financial crisis for Nigeria and other foreign economies. They considered the effect and relationship of some macroeconomic factors such as financial crisis (proxy as money supply to gross domestic product), crude oil price shocks and exchange rate on foreign exchange reserves. It was obvious that most of these studies undertaken by researchers in developed, developing and emerging market economies in context of empirical analyses differ significantly, such that their results portrayed inconsistencies and contradictions (divergent views). For instance, some of these studies reported positive significant relationship between financial crisis, crude oil price shocks, exchange rate and foreign exchange reserves (Imarhiagbe, 2015; Stober, 2016; Gosselin & Parent, 2005; Umeora, 2013; Rizvi, Naqvi, Ramzan & Rizavi, 2011; Audu & Okumoko, 2013). Besides, some revealed negative but significant relationship in their empirical studies of financial crisis (Fang-Yuan & Jun-Guo, 2013; Nguena & Abimbola, 2013; Shuaibu & Mohammed, 2014; Chowdhury, Uddin & Islam, 2014; Gosselin & Parent, 2005; Olanipekun, 2016; Osigwe, Okechukwu & Onoja, 2015), hence creating a gap which this study seeks to cover.

It was also observed from these related studies (Chuku, Akpan, Ndifreke & Ekpeno, 2011; Imarhiagbe, 2015; Ajao & Festus, 2011; Odularu, 2007; Polterovich & Popov, 2003; Umeora, 2013) especially on Nigeria, had empirically used macroeconomic variables such as financial

crisis (proxy as money supply to gross domestic product), crude oil price shocks, exchange rate, remittances, domestic interest rate, per capita income, volume of crude oil production, inflation, real gross domestic product, foreign direct investment on foreign exchange reserves, but did not include net trade of crude oil apart from Hillard (2015) who considered 91 countries, did not ineptly examined the relationship between net trade of crude oil and foreign reserves. Besides, no Nigerian researchers that were considered for this study had used net trade of crude oil as a control variable to determine its relationship on Nigeria foreign exchange reserves. This has absolutely created a central gap in knowledge; thus instigating a robust study to be undertaken by this present study.

1.3 Objectives of the Study

The broad objective of this research is to assess the effect of financial crisis, crude oil price shocks on the Nigerian foreign exchange reserves: 1993 - 2016. The specific objectives are to:

1. Ascertain the effect of financial crisis on the Nigerian foreign exchange reserves.
2. Examine the relationship between crude oil price shocks and the Nigerian foreign exchange reserves.
3. Study the relationship between exchange rate and Nigerian foreign exchange reserves.
4. Evaluate the relationship between net trade of crude oil and Nigerian foreign exchange reserves.
5. Determine if the financial crisis, crude oil price shocks, exchange rate and net trade of crude oil granger cause the Nigerian foreign exchange reserves and vice versa.

1.4 Research Questions

The following research questions will be answered.

1. To what extent has the financial crisis affected the Nigerian foreign exchange reserves?
2. How has the variation in crude oil price shocks correlate with the Nigerian foreign exchange reserves?
3. How has change in exchange rate influenced changes in the Nigerian foreign exchange reserves?
4. How does net trade of crude oil relate to the Nigerian foreign exchange reserves?
5. To what extent has the financial crisis, crude oil price shocks, exchange rate, and net trade of crude oil granger caused the Nigerian foreign exchange reserves and vice versa?

1.5 Research Hypotheses

Hypothesis 1

H_0 : There is no positive effect of financial crisis on foreign exchange reserves in Nigeria.

Hypothesis 2

H_0 : There is no positive significant relationship between crude oil price shocks and foreign exchange reserves in Nigeria.

Hypothesis 3

H_0 : There is no positive significant relationship between exchange rate and foreign exchange reserves in Nigeria.

Hypothesis 4

H_0 : There is no positive significant relationship between net trade of crude oil and foreign exchange reserves in Nigeria.

Hypothesis 5

H_0 : Foreign exchange reserves has not significantly granger caused financial crisis, crude oil price shocks, exchange rate and net trade of crude oil in Nigeria and vice versa.

1.6 Significance of the Study

The conclusion of this study would significantly be relied upon as bedrock in enacting policies for economic planners such as the Central Bank of Nigeria, National Assembly and the Nigerian Federal Executive Council. Policies such as foreign reserve diversification policy aimed at increasing the sources of foreign reserves for Nigeria; As well as foreign reserve control and management policy aimed at setting standard and limit on foreign travels such as tourism and medical vacations for government officials including the presidency.

The results of this study would enable policy makers, investors and other market participants in the capital market and banking sectors to take advantage of relatively financial market stability by designing and implementing appropriate financial/trading strategies. These strategies could be in the area of financial diversification into commercialised information technology and agricultural activities by financial and multinational institutions operating in Nigeria. This would ensure relative stability during financial shocks in the economy.

The results of this study would proffer ideas to the Federal Government of Nigeria on the need to come up with a blueprint on strategic development plan aimed at sustainable capacity building and growth on education, solid minerals, Agriculture, information technology, etc., to reduce over dependence on crude oil sales. This would help to rejuvenate moderate economic and financial stability.

Moreover, the knowledge gained from this study would be of immense benefits to relevant academic communities as a reference point and source of research materials for future researchers who would wish to carry out studies on financial crises, crude oil price shocks, foreign reserves and related topics.

1.7 Scope of the Study

The focus of this study is on financial crisis, crude oil price shocks and foreign exchange reserves in Nigeria. The period considered for this study is from 1993 to 2016. The study considered 1993 as its base year due to the series of significant political activities that took place in Nigeria. For instance, the annulled June 12, 1993 election as well as the August 1993 rescheduled election that never took place. In the same year 1993, power was transferred to an interim civilian national government and the subsequent takeover by the military.

However, the period of study has been an overall mixed period especially the 1999 elections resulting to the May 29th swearing in of a democratically elected government. The Paris Club rich lenders in 2005 agreed to write off two-thirds of Nigeria's \$30b debt as well as the 2005 bank recapitalization exercise. In 2006, Niger Delta militancy started as well as Nigeria ceded sovereignty of Bakassi peninsula to Cameroon. This period also captured the global economic and financial crises of 2007 and 2008 especially in the wake of dwindling crude oil price in 2008

that led to depletion of the foreign reserves. Also, it was a period of continuous increase in foreign exchange rate. It has well covers the period of two presidential elections in 2011 and 2015 with different economic ideologies. Also, was the oil price surge between 2014 and 2015 that lead to the National Assembly having a disagreement with the Executive on the benchmark for oil price in the 2015 financial plan. We are analysing annual data for this period because data were readily available for financial crisis, crude oil price shocks, exchange rate, net trade of crude oil and foreign exchange reserves.

Apparently, the period would allow us to empirically examine the effect of financial crisis, crude oil price shocks, exchange rate and net trade of crude oil on foreign exchange reserves in Nigeria. The method of estimation used is the time series econometric techniques to execute the descriptive analysis and inferential analyses of the data using e-views software. The results from these econometric tools would show the significant effect of the variables of interest on foreign reserves in Nigeria.

1.8 Limitations of the Study

This study has its own limitations like every other research in which constraints are inevitable. In this research, the variables (data) adopted is limited to the Nigerian Foreign exchange reserves. This is in attempt to study the effect of crude oil price shocks, exchange rate and net trade of crude oil on the Nigeria Foreign exchange reserves during the period of financial crises.

There are other macroeconomic factors which were not captured by this study that also adversely affected the Nigerian foreign exchange reserves during the period of financial crises, such as domestic interest rate, remittances, volume of crude oil production, foreign direct investment, external debt services, foreign trade on non-oil product, inflation, etc. It would be more difficult

and tedious to include the entire macroeconomic factors of foreign reserves in this study. Consequently, this would result to a major limitation of capturing the true model for the secondary data due to the series of omitted macroeconomic factors.

A limitation of this study would also come about in the constraints of estimating econometric techniques using the regression framework. The Ordinary Least Square results could be spurious as a result of the presence of autocorrelation. This is a basic problem on practical economic analysis, limiting how definite one can forecast observations using empirical models that are obtained from econometric processes. However, autocorrelation was corrected using the Cochrane-Orcutt Iterative Procedure.

Finally, data for this study could not go beyond 2016 because as at the time of carrying out the analysis for this study, there are no available economic data for 2017.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Conceptual Review

2.1.1 Concept of Financial Crises

Financial crises across countries could be referred to as global disruption to the financial market occasioned by banking and currency crises, having its effect on commodity prices at the international market. Scholars in different views and ideologies have referred to financial crises, global meltdown and currency crises to mean the same concept. Amongst these scholars, Osaze (2009) referred to financial crisis as the continuous decline in economic indicators over time, resulting to disruption in the financial markets which serves as the propelling force of the economy. Jimenez-Rodriguez (2010) in his own view, defined financial crisis as a disruption to financial markets which can disrupt the original financial equilibrium of the economy resulting to high inflation, drop of property value, and high unemployment causing recession and depression. However, Moritz (2010) opined that financial crises represent disruptions in financial intermediation process. In the view of Nkoro and Uko (2012), they based financial crisis as a loss of confidence in a country's currency, as well as financial assets which is leverage for foreign investors to withdraw their funds from the crisis country. They further attributed financial crisis to unexpected change in the financial stability of a country, in which some multinational financial institutions abruptly lose large parts of their assets.

Furthermore, Eichengreen and Portes (1987) defined crisis as a severe change in asset prices, leading to distress among participants in the financial markets. Financial crisis is a state in which

the value in assets of financial institutions drops rapidly which is often associated with a panic. This serves as Motivation to investors selling off their assets or withdraws money from accounts with the expectation that the value of assets would continue to drop (Anil & Neha, 2011). Khalid, Irfan, and Farhat (2015) posited that financial crisis is a state of affairs where the economy faces unexpected recession thereby experiencing uncertainty, current account deficits and fall in GDP. Also, Manuel, Moritz, and Christoph (2015) attributed financial crises to events during which a country's banking sector experience bank runs, severe increase in default rates accompanied by large loss of capital that resulted to public intervention, bankruptcy, or forced merger of financial institutions. Krugman (1979) tagged crisis as an inevitable state of a government that indulge in fiscal policy which is inconsistent with the exchange rate regime, resulting to the collapse of a country's currency. Financial crisis as measured by financial deepening, defined by money supply to gross domestic product which referred to the macroeconomic effect of increased ratio of money supply to GDP as liquid money in an economy. The more liquid money in an economy, the higher the existing opportunity for continued growth (Ajao & Festus, 2011).

Besides, Alabi and Ntukekpo (2009) referred to the global meltdown as a worldwide recession that slowed down economic growth and development, virtually in all sectors of the world. Steiner (2012) attributed the global crisis as that which began in a particular country and over time spreads to other countries due to financial links with the country in crisis. However, Bordo, Eichengreen, Klingebiel and Martinez-Peria (2001) opined that financial crises include banking crisis and currency crisis. Currency crisis is a tentative attack on the value of foreign exchange currency which results in a severe depreciation, thereby forcing monetary authorities to defend their currency through foreign exchange reserves or raising domestic interest rates.

2.1.2 Concept of Crude Oil

Crude oil, which is one of the irreplaceable resources, is a natural substance which occurs in certain formation of rocks inside the earth, refined to produce so many products such as diesel, gasoline, natural gas, kerosene, waxes, plastics, etc. Crude oil which can be Brent Light and Bonny Light could be characterised as light, heavy, sweet and sour (Inyama & Ikechukwu, 2015). The term petroleum refers to both crude oil and natural gas. Petroleum or Rock oil was derived from the word Petra - meaning rock; and Oleum, which means oil have been known to many for centuries (Akpan, 2011). The exploration of oil is said to have begun in around mid 1800's in Ontario, Canada, and Pennsylvania, United States of America in 1859 (Hamid, 2012). Subsequently, the first and second attempts of oil exploration in Nigeria was made in 1908 by Nigerian Bitumen Corporation (German Company), in Araromi area of Ondo State and in 1937, by Anglo Dutch Consortium, Shell D'Archy, which later became Shell Petroleum Development Company of Nigeria. These efforts were terminated due to the outbreak of the First and Second World War respectively (Alabi & Ntukekpo, 2012). However, oil was finally discovered in large quantity by Royal Dutch Shell in 1956, at Oloibiri, Bayelsa state (Baghebo & Atima, 2013).

The entire crude oil produced in Nigeria of which prices are regulated by OPEC (Organization of Petroleum Exporting Countries) were initially exported unrefined serving as major source of instant riches for Nigerian foreign exchange reserves. While the Country's needs for petroleum products were satisfied through importation due to the inefficiencies of the refineries, referred to as net trade of crude oil; consequently, believed to have affected the foreign exchange reserves. Crude oil price is referred to as the spot price of oil per barrel as regulated at the international oil market which has fluctuated over the years due to series of activities at the World market (Odularu, 2008; Alabi & Ntukekpo, 2012).

2.1.3 Concept of Foreign Exchange Reserves

Foreign reserves otherwise known as international reserves, external reserves, foreign exchange reserves or foreign deposits are classified as public external assets. It is referred to as official public assets in foreign accounts, usually kept in foreign banknotes, foreign treasury bills, short and long-term foreign government securities, gold reserves, special drawing rights, reserve position of International Monetary Fund that are always available and controlled by monetary authorities for direct financing of international payment obligations, exchange rate management, for credit worthiness of a Country and as a buffer against external shocks (Imarhiagbe, 2015; Osuji, 2015). In support, Akinwunmi and Adekoya (2016) referred to external reserves as official assets (international reserves) of Central Banks and other monetary authorities held in different reserves currencies - US Dollar, British Pound Sterling, Euro and Japanese Yen. These reserves currencies are used to back Central Bank's liabilities, such as issued local currency, reserves deposits of various deposit money banks (DMBs)/financial institutions and government. However, Foreign exchange holdings of individuals, banks and corporate bodies do not form parts of a nation's external reserves. Umeora (2013) posited that external reserves are foreign currencies, foreign deposits and bonds held by Central Banks and other monetary authorities of a nation. This is to meet balance of payments financing and interventions in exchange rate markets. Nzotta (2004) in his study stated that foreign exchange reserves come about when foreign exchange receipts exceed foreign exchange disbursement. It represents the balance of foreign exchange surpluses of a nation's accumulated reserves over a period of time.

Furthermore, External reserves have necessitated external sector developments such as international trade transactions, exchange rate, external debt and other related external obligations. It formed the means for holding Sovereign Wealth Fund (SWF). Reserves holdings

are means to measure a country's credit ratings and credit worthiness as a form of shock absorber in periods of shocks in the oil market. However, international trade settlements can be financed by reserves especially when there is deficit between exports proceeds and imports. These are cases of disequilibrium in the balance of trade and balance of payments (Umeora, 2013; Osuji & Ebiringa, 2012). Reserves allow the Central Bank of a nation an additional means to stabilize the issued currencies from shocks. Consequently to meet the transaction needs of countries as a precautionary purpose to provide means of absorbing unexpected shocks in a country's terms of trade as well as to meet unexpected capital outflows (Archer & Halliday, 1998).

2.1.4 Concept of Exchange Rate

Exchange rate refers to the price of one country's currency expressed in terms of some other currencies. It involves the relative prices of domestic and foreign goods, as well as the strength of external sector contribution to international trade. In most monetary policy regimes, exchange rate is used as policy instrument to achieve low inflation rate and to stabilize the economy (Obansa, Okoroafor, Aluko & Millicent, 2013). Uguru (2015) in support referred to exchange rates as prices at which countries currencies are exchanged for each other and can be categorised as nominal and real exchange rates. The nominal exchange rate is the measurement of relative price of two currencies; while the real exchange rate which may appreciate or depreciate measures the relative price of two commodities. Exchange rates serve as a sustainable competitiveness in international market, as well as a nominal pivot for domestic prices.

Inyiama and Ikechukwu (2015) as well referred to exchange rate as the price for which a country's currency is exchange for another currency which could be influenced by interest rate, inflation, or political condition of a country. They opined that the fixed exchange rate is usually

set by the government (Central Banks) as the official exchange rate which does not automatically adjust to changes in supply and demand; while the floating exchange rate is determined by the interactions of supply and demand for currency. In support, Ogundipe and Ogundipe (2013) referred to exchange rate as the price of a country currency expressed in terms of one unit of another country's currency. Exchange rates are quoted in values against the United States dollar. Besides, exchange rates can be quoted against another nations currency, which are known as a cross currency, or cross rate.

Several studies have shown that there are links between the global financial crises, exchange rate, crude oil price shocks and foreign exchange reserves. Changes in the United States (dollar) exchange rate could have effect on oil prices because of the global demand for oil. Exchange rate appreciates in response to rising oil prices and depreciates with response to falling oil prices in oil exporting countries, while the opposite is expected to be the case in oil importing countries. In as much as crude oil price is denominated in dollar at the international financial markets, any depreciation in the United States dollar leads to decrease in price of crude oil as it involves the domestic currency for consumers in non-dollar countries. A drop in crude oil prices leads to depreciation of the exchange rate of the Naira. A reflection of the crisis period was seen in the severe depreciation of the Nigerian currency to the United States dollar. For instance, decline in crude oil prices as a result of the global financial crisis and exchange rate depreciation led to significant decline in the level of foreign exchange reserves (Uguru, 2015; Ogundipe & Ogundipe 2013; Okonjo-Iweala, 2009; Oke, 2012).

2.2 Chronological Account of Financial Crises since 1830s

The World economies have witnessed several financial crises in the past 150 years across the globe. The origin, causes and the effect of these financial crises on developed, developing and emerging markets economies from the 1830s depression to the global financial crisis of 2007 and 2008 were relatively studied by several scholars. The most severe was the great depression of the 1930s. Subsequently, the global financial crisis in the latter part of 2000s, as these recessionary trends had been accompanied by shocks to the economies of one or more markets. The economies of developing African countries were mostly affected by the global financial downturn of 2007 and 2008, caused by the untimely removal of foreign capital flows (Satyanath, 2008).

2.2.1 The 1830s Depression in the United States

The 1830s depression mainly affected land investors in the United States, in which farmers lost their farms through mortgages resulting to bank crisis (Nkoro & Uko, 2012). All through the United States in the 1830s, assets bubbles were mainly in the prices of land. In the mid-1830s, the price of land, cotton and slaves rose continuously at rates comparable to home prices in the early 2000s prior to the 2007 and 2008 global financial crisis in the United States. The spectacular expansion in the number of state-chartered commercial banks with minimum control of banknotes issuance helped escalated the 1830s land bubbles. The lucrative cotton exports also spur up the boom of the 1830s resulting to the depression. The failure by the government to re-charter the Second Bank helped fuelled the crisis in the United States in the 1830s. Consequently, the depression also led to bank crisis as there were increase in unemployment, increase in prices due to wave of speculations regarding the halting of many construction works.

However, the crisis could only spread to some few European countries across the United States borders due to limited communication and globalization (Njogo, 2012). Globalization has given rise to an increase in the frequency of financial crises (Goldstein, 2013).

2.2.2 The Stock Market Crash of 1929

The 1929 stock market crash in history took place on Thursday 24th October, 1929. Prior to this day, major stock markets (New York Stock Exchange, London Stock Exchange, France Stock Market and Deutsche Börse Group) were steady from 1925 up to 23rd October, 1929. The New York Stock Exchange at Wall Street and other Stock Markets as well as the Dow Jones suddenly crashed due to high volumes (12,894,650) of shares traded in respect to sharp decline in prices. The high volumes caused the tickers to pause for hours. The panic on this day increased as a result of rumours of about eleven investors committed suicide (Nkoro & Uko, 2012; Asaju & Yarie, 2013).

2.2.3 The Great Depression of the 1930s

The financial crisis of 1930s started as a recession in the United States. This occurred about 100 years after the 1830s depression. The 1930s financial crisis was regarded as the Great Depression, because it was more global in spread due to advancements in communication technology (Njogo, 2012). The crisis of the Great Depression resulted in the collapse of money supply and credit intermediation of the United States economy. The depression lasted till the introduction of the federal deposit insurance scheme in early 1934. However, the use of fiscal policy as a tool for the recovery of the Great Depression in the thirties was unsuccessful. This was not because the theory did not work but due to the nonchalant policies of the Federal Reserve System refusing to act as lender of last resort to striving banks prolongs the Great

Depression. They believed that monetary changes played a vital role in the United States recovery from the Great Depression (Romer, 1992; Chong-Yah & Hui-Ying, 2011).

Coe (2002) opined that the Great Depression was not due to the stock market crash of 1929; rather he attributed the crisis to the 1930 bank failures that resulted to the widespread panic among depositors, who by fear of bank liquidation made huge withdrawals from the banks. Other writers as well as in their own opinion complemented the work of Coe. For instance, Perry and Vernengo (2011) argued that the economic shock of the Great Depression was due to the failure of monetary authorities as a result of monetary contraction and banking panic in the United States. The crisis would not have been caused by monetary contraction if there had been a rapid adjustment to prices and output. They further assumed that the deeper cause of the Great Depression was due to the unwillingness of the United States to take over as a dominant country on economic power of the international currency reserves after the collapse of the British dominance. The intended dominance by the United States was to provide liquidity and expand demand for currency in the event of a crisis as course for the recovery of the crisis. Also, Eichengreen and Sachs (1985) support was based on the fact that the Great Depression was caused by the tight monetary policy aim at reducing money supply in the United States economy. This was as a result of the misguided decisions of the United States Federal Reserve and the unfortunate commercial initiatives of the executive and legislative arms of government to reduce the supply of money in the economy.

Chong-Yah and Hui-Ying (2011) followed up to state that the failure of the Smoot-Hawley Tariff Act that was meant to raise the United States tariffs contributed to the Great Depression. Through this Act, the Federal Reserve operated a rigid monetary policy from early 1928 to mid-1929 due to the stock market boom as a consequence of monetary expansion in 1927. In attempt

to save the economy from the recession, the public expenditure in the 1930s was reduced. This reduction further dampened the economy through the contraction of overall effective demand. Besides, Banks failure was a pertinent issue that led to the Great Depression. Almost one-third of the United States banks failed during the depression. Thus, Anari, Kolari, and Mason (2005) stated that bank difficulties due to failure that arises from regulatory actions and voluntary liquidations of funds reduced credit supply, which progressively led to economic deterioration. This was due to bank actions and suspensions resulting to inaccessibility of funds to customers. The liquidation of most banks during the depression took longer period and resulted to loss of valuable assets to larger banks through low price sales contributed to the cause of the Great Depression. Nkoro and Uko (2012) opined that the Great Depression of 1930s was the resulting effect of the 1929 crash of stock market. Tavlas (2011) in support of the arguments carried out by other scholars who opined that the Great Depression was due to the tight monetary policy by the Federal Reserve in 1928 and 1929. The reason for the Federal Reserve to tighten its monetary policy was to stop the outflow of gold and to curb the stock market boom even in the wake of high interest rate.

2.2.4 The Scandinavian crises: 1985 - 1992

The Scandinavia region was formed between the 10th and 13th centuries. The Scandinavia region encompasses the geographical area of Denmark, Norway and Sweden. Inclusive are the Danish overseas territories – Iceland, Finland and Aland Islands. These Scandinavia regions experienced a classic boom (in asset prices) - bust (collapse in oil prices and decline in trade with the Soviet Union) cycle that led to the twin crises of banking and currency crises (Englund & Vihriala 2006).

In Norway, lending increased consecutively by 40% in 1985 and 1986. Asset prices, investment and consumption increased significantly. However, the collapse in oil price which had contributed 16% of GDP helped bust the bubble that caused the severe banking crisis and recession (Stephens, 1995; Allen & Gale, 2007).

Finland experienced an expansionary budget in 1987 that resulted to the massive credit expansion. Their housing prices rose by about 68% in 1987 and 1988. The Central Bank in 1989 increased interest rates, as well as imposed reserve requirements to moderate credit expansion. Thereafter from 1990 to 1991, the economic situation in Finland collapsed due to decline in trade with the Soviet Union. The crash was catastrophic as GDP growth fell to 0.4% in 1990 and turned to -6.4% in 1991 and -3.6% in 1992. Unemployment increased considerably to 17% of the labour force. Asset prices collapsed as cost of banks bail-out had to be imposed on government and Central Bank equal to 7% of GDP. The banking crisis in Finland was the most severe in the Scandinavian region (Stephens, 1995; Allen & Gale, 2007).

In Sweden, a steady credit expansion through wage control by the Swedish government contributed to profits, resulting to property boom in the late 1980's. There was rapid economic growth, low unemployment and very high levels of labour force participation. Credit in Sweden tightened as interest rates rose in 1990 and 1991. Consequently, a number of banks experienced severe difficulties because lending was based on inflated asset values. The government intervention was not adequate enough hence a severe recession occurred (Stephens, 1995; Allen & Gale, 2007). However, in Sweden and Finland, the turn of economic events were generally regarded as crisis which equalled or exceeded that of the Great Depression.

2.2.5 The Stock Market Crash of 1987

The Stock Market Crash of 1987 was another crisis that was similar to the event of the 1929 crash leading to the Great Depression of the 1930s that took place on a Monday. The Stock Market Crash of 1987 was referred to as the gloomy Swan as a result of its extreme effect on the United States stock market on October 19th, 1987, which started in Wall Street, New York City. On this day, Wall Street had its worst day. The United States economy was very buoyant and there were no signs of any destabilization in the economy before 19th October, 1987. When unexpectedly, there was drop in the value of equity in the United States stock market that led to the loss of a total sum of \$1 trillion by investors (Bogle, 2008). The Dow Jones industrial average (stock market index) fell 508 points from 2,247 to 1,738 representing 22.6%. This crash was almost twice the 13% decline of October 24, 1929 stock market crash. The 1987 Stock Market Crash led to panic sales in equity market around the World, in which investors randomly sold their stocks for fear of further drop in the value of their stocks. On that same day the UK's All-Share Index had a decline of 9.7% from 1,190 to 1,075 (Breder, 2003).

The recovery of the Stock market started to improve from the 26th of October, 1987. The crash brought about credibility in the market pricing mechanism of the United States stock market as well as prevented bad times in the future as a result of ending unjustified good times. Portfolio insurance and plan trading prevented the crash from lasting too long as measured by Dow (Arbel, Carvell, & Postnieks, 1988; Breder, 2003).

2.2.6 The 1994 Mexico Devaluation and Financial Crisis

The 1994 Mexico financial crisis was attributed to the currency devaluation and the ensuing crisis on series of political shocks occasioned by rebellion and assassinations of prominent

politicians. The then armed rebellion in the Southern province of Chiapas was the first political shock. The armed rebellion was before a presidential election, resulted to political instability in Mexico, hence the collapse of the peso. Besides, was the severe political shock that took place when a well known ruling party's presidential candidate - Luis Donaldo Colosio and a high political chieftain - José Francisco Ruíz Massieu were assassinated on separate occasions. Their deaths heightened fears of political instability and set off a brief financial panic as Mexico's interest rates rose sharply, and the peso depreciated. The Mexico's international reserves experienced a huge loss of about \$11 billion in 1994 as the government intervened heavily to maintain the value of the peso during the political unrest (Whitt, 1996; Banco de Mexico, 1995).

2.2.7 The Asian Crisis: 1997 - 1998

The Asian crisis of 1997 and 1998 started in Thailand due to the devaluation of the Thai's currency as researched by several scholars. Maroney, Naka, and Wansi (2004) argued that the 1997 and 1998 financial crisis started after the devaluation of the Thai currency, due to the high financial techniques to multiple gains and losses. These techniques were through foreign borrowings and fixed assets purchases that caused a contagion leading to the spread of the crisis to other Asian markets. In relation to this claim, Kanaoka (2012) and Mahmood, Xinping, Ali, Usman, and Shahid (2011) opined that the Asian crisis began from Thailand when the Thai government started the float of its currency (baht). Floating of the Thai baht, led to the devaluation of the baht by about 20%, which had consequential effects on the currencies of the Philippines, Malaysia, Taiwan, Singapore, Indonesia and South Korea, hence, triggered the Asian crisis (Chowdhry & Goyal, 2000). Obstfeld and Rogoff (2009) supported the argument that the Asian crisis started with Thailand's currency crisis. The Thai currency (baht) before the 1997 crisis had long been fixed against the United States dollar. The crisis was as a result of the

fierce currency speculation against the baht-dollar pegs, which was broken in 1997. As a consequence, the crisis spread to other industrialized Asian economies such as Hong Kong, Korea, Singapore and Taiwan due to improved terms of trade and the international financial markets, which consequently led to drop in stock prices of the Asian stock markets as well as deterioration of their banking system. This situation Pressurized investors to quickly leave the stock market in order to avoid additional losses that resulted in higher liquidity and lower stock prices during the crisis (Engkuchik & Kaya, 2012; Chutatong, Raja, & Yupana, 2006).

However, King (2001) traced the root cause of the Asian financial crisis to the Japanese commercial banks which was the largest lenders in Asia and key creditor in Thailand. The Japanese banks reduced their exposure to Asia in response to emerging troubles in Thailand and South Korea due to the collapse of the real estate and stock market bubble in Japan in 1990. As a consequence, capital outflows triggered devaluation in Thailand in 1997, thereafter to Korea, Malaysia, the Philippines, Singapore, Indonesia, Hong Kong and Taiwan through to the end of 1998. Reuven and Hutchison (2011) stated that the Asian crisis was due to the effective link of some Asian currencies to the United States dollar in period when the dollar appreciated relatively to the Japanese yen and Chinese renminbi. They also attributed the Asian crisis to be partly caused by panic associated with bank depositors due to the fragility of Asian banking systems. Harvey, Lundblad, and Valderrama (1999) opined that the root cause of the Asian crisis was due to the activities of corruption and cronyism which was a form of favouritism to friends and relatives, such as in Malaysia in the 1990s.

2.2.8 The Russian and Brazilian Crises: 1998 - 1999

The Russian crisis of 1998 originated from the impact of the Thai currency devaluation. This crisis started when Russia tried to maintain a stabilized exchange rate policy that led to a severe financial crisis in mid-1998 owned to the collapse of the Russian ruble. This was primarily occasioned when Russia could not solve the problem associated with its large fiscal deficits as a result of the increase in its external debt, especially at the short run. The Asian crisis had its impact on Russia external terms of trade due to decline in international prices for Russia's main economic export. This consequently led to capital flight reducing its capital account due to panic investors' withdrawals from the emerging markets (Taimur & Ilan, 2000; Harvey, Lundblad, & Valderrama, 1999).

The impact of the Asian crisis did not only have its consequential effect on the Russia economy, but also on the Brazil's economy in 1999. The consequential effect from Asia which transcended into the Russia economy led to the collapse of the Russian ruble. The wave of the crisis from Russia slammed heavily on the Brazilian currency through devaluation in January 1999 when the currency was allowed to float freely against the United States dollar. As a consequence of the exposure of the Brazil's economy in terms of its continuous increase in internal and external market instability, caused a devaluation of its currency. The crisis mainly had its impact on the exchange rate market in Brazil due to the excess demand for dollar in the foreign exchange market. This resulted in loss of Brazil's reserves prompting loss of investor's confidence on the currency at the wake of a sudden collapse of Russian ruble. The Brazil economy experienced capital flight by foreign investors due to loss of market confidence. These withdrawals which were more severe in Russia than in Asia further aggravated the Brazilian crisis. Many corporations became bankrupt and were force to shut down operations. The consequences of this

crisis also had its effect on the banking system which resulted in massive unemployment. This led to the biggest economic crisis in Latin America's economy, as it greatly affected the Wall Street (Taimur & Ilan, 2000; King, 2001).

Besides, the Russia's debt crisis exerted pressure on Brazil's finance. The pressure on its finance heavily increases its external debt and this motivated the Brazilian government to seek loans from the International Monetary Fund. As a result of the Asian and Russian crises, the real was allowed to float temporarily against the dollar. This help in the recovery of the stock exchange market for a while, which initially dropped due to the currency devaluation that triggered the crisis. The restraint on export growth by Asian crisis further created a deficit to the economy of the Brazilian government, thereby heavily affecting its Gross Domestic Product (Harvey, Lundblad, & Valderrama, 1999).

2.2.9 The Argentina Crisis: 2001 - 2002

Bustelo (2004) argued that the failure to pay sovereign debt in 2001 as well as the neglect of the fixed exchange rate in 2002 resulted to the financial crisis in Argentina. The crisis led to the depreciation of the peso for more than 350%, as inflation rate hit 25.9% after 3 years of deflation, causing GDP to collapse by 11% within the crisis period. However, Mussa (2002) linked the cause of the crisis to the incompatibility between the rigid exchange-rate regime and the imprudent fiscal policies. Calvo, Izquierdo, and Talvi (2002) in their study, attributed the cause of the crisis to sudden stop in international capital markets after the Russian crisis in August 1998. This was due to the lack of confidence international investors had on the country's ability to finance its increasing fiscal indebtedness in the course of sustaining a currency peg to the dollar. Haussman and Velasco (2002); Perry and Servén (2003) blamed the cause of the crisis to

the inappropriate nature of the exchange-rate regime. The Brazilian currency devaluation caused reduction in Argentina's stock exchange market of blue-chip index and the Merval as a trading partner which had its impact on Argentina's car export as a result of Brazil being the key market for Argentina export (Harvey, Lundblad, & Valderrama, 1999).

2.2.10 The Global Financial Crisis: 2007 - 2008

The global economic crisis began as financial crisis in the United States, in August 2007. The financial crisis was considered to have been global because it affected almost all economies across the World. It has been the recent global shakeup on the world economy. The crisis was attributed to the sub-prime (credit quality) mortgage loans in the United States due to low interest rates occasioned by fall in long-term interest rates. When the problem started in the subprime mortgage markets in 2007, the United States Federal Reserve could not prevent the spread of the crisis all through its financial system. The spread of the crisis started from Wall Street in the United States to other parts of the World. Consequently, there were decline in investment, consumption and trade resulting to increased unemployment and inflation (Chong-Yah & Hui-Ying, 2011; Liang, 2012).

The global financial crisis started from the housing market, thereafter transmitted into the banking sector, as well as to other financial markets. Investors and homeowners simultaneously invested in what seemed to be a lucrative increase in the demand for housing. This occurred because sub-prime mortgage loans were available at low interest rates. Many homeowners and investors purchased houses which they later sold to business firms and multinational corporations. The activities in the housing market resulted to severe increase in money supply into the United States economy, thereby reducing the capital base of the banks. As a

consequence of a drop in the price of houses, many homeowners and investors walked away from their homes as a result of their inability to pay back mortgages which went into arrears (Lin, 2008; Naude, 2009; Keefer, 2007).

However, Obstfeld and Rogoff (2009) in their views stated that the reduction in mortgage rates in the United States was due to a fall in long-term interest rates, which brought about severe effect on real estate markets. As home prices increased steadily from mid-1990s in the United States, there were increases in demand for homes, due to ease of borrowing against housing equity. There were severe reductions in savings, with consequential effect on the United States deficit due to rapid home depreciation. Housing appreciation with low interest rates was a major cause of high consumers' spending and borrowings on increased home prices after 2003. Loans were based on the assumption that home prices will not fall. The crisis started when the home prices dropped, thereby leaving investors and homeowners incapable of paying back their mortgages and loans. Consequently, financial crisis gradually spread from the United States to other parts of the World as a result of the global nature of the housing bust and due to international financial linkages.

In support of this claim, Blanchard (2009) and Oke (2012) attributed the cause of the global financial crisis to the busting of the United States housing bubble which got to its peak around 2005 - 2006. High default rates on Subprime and adjustable rate mortgages began to increase rapidly. However, interest rates began to rise while housing prices started to drop gradually between 2005 and 2007 in many parts of the United States in which refinancing became more difficult. Defaults and foreclosure activities increased dramatically, causing housing prices to decline. Consequently, major global financial institutions that borrowed and invested heavily in subprime mortgages reported significant losses. The worthiness of homes became less than

mortgage loans due to declining housing prices; thus, creating a financial incentive to enter foreclosure. This created a serious financial crisis which spread to other part of the World.

Agbetsiafa (2011) as well attributed the cause of the global financial crisis to the housing price bubble as well as risky mortgages. The housing bubble was due to the expansionary monetary policy adopted by the United States Federal Reserve to increase liquidity in order to avert deeper output contraction. The increase in rates by the Federal Reserve (United States Central Bank) led to the end of the housing boom. The flamboyant housing prices suddenly started to decline. Homeowners abandon their speculative purchases as a result of their mortgages running into arrears which they were unable to pay back. The crisis that erupted spread very fast to other parts of the World because of the global financial linkage, as well as the involvement of both the United States and non United States multinational firms in sub-prime mortgage businesses. Liang (2012) argues that a reduction in real interest rates at the long-run due to foreign savings that was injected into the United States economy caused a stir in the prices of assets. This stir tempted house owners in the United States to acquire land and housing through excessive loans. The increase in the supply of loans caused a reduction in long term interest rate. The reduction in interest rate as well as the low mortgage rates increased household borrowings in financing housing transactions. This resulted to unsustainable increase in housing prices bringing about the collapse of the housing markets.

Relatively, Croxson, Lund, and Roxburgh (2012) also attributed the primary cause of the global financial crisis to the inability of homeowners to meet up to their mortgage debt payment due to unemployment as a result of job loss as well as medical emergencies. Marshall (2009) opined that the cause of the global financial crisis was caused by the stagnancy and decline of the average hourly wages of homeowners in the US, which extended beyond the 2002. This was

mainly characterised by the fact that homeowners had low financial reserves to upset financial back logs. This affected the ability and the willingness of mortgage owners to meet their payments as house prices collapsed. In some cases, house-owners simply could not face the rise in their payments resulting from the steep rise in the Federal Reserve's funds rate, thus abandoned their homes. Taylor (2008) attributed the cause of the financial crisis to frequent monetary excesses which resulted to a boom as well as an inevitable bust.

Kanaoka (2012) argued that the cause of the crisis was from the area of trade and financial services. He argued that illiquidity was the primary cause of the global financial crisis. Gorton (2009); Gorton and Metrick (2012) believed that the 2008 global financial crisis was due to loss of confidence in the United States financial system. Hutchinson (2008) attributed the worldwide economic downturn on banking failures, unemployment and corporate failures. Parson (2008) related global economic meltdown to changes in the principles of obtaining loans in the United States economy and abuse of these principles. Moore (2008) in his study related the origin and development of the global economic downturn on the mass default of the sub-prime mortgage debtors that eventually became bad loans. Marek and Kornelius (2015) stated that the 2007 and 2008 financial crisis was connected with the collapse of Lehman Brothers in 2008 as the primary cause for the turmoil on the financial markets.

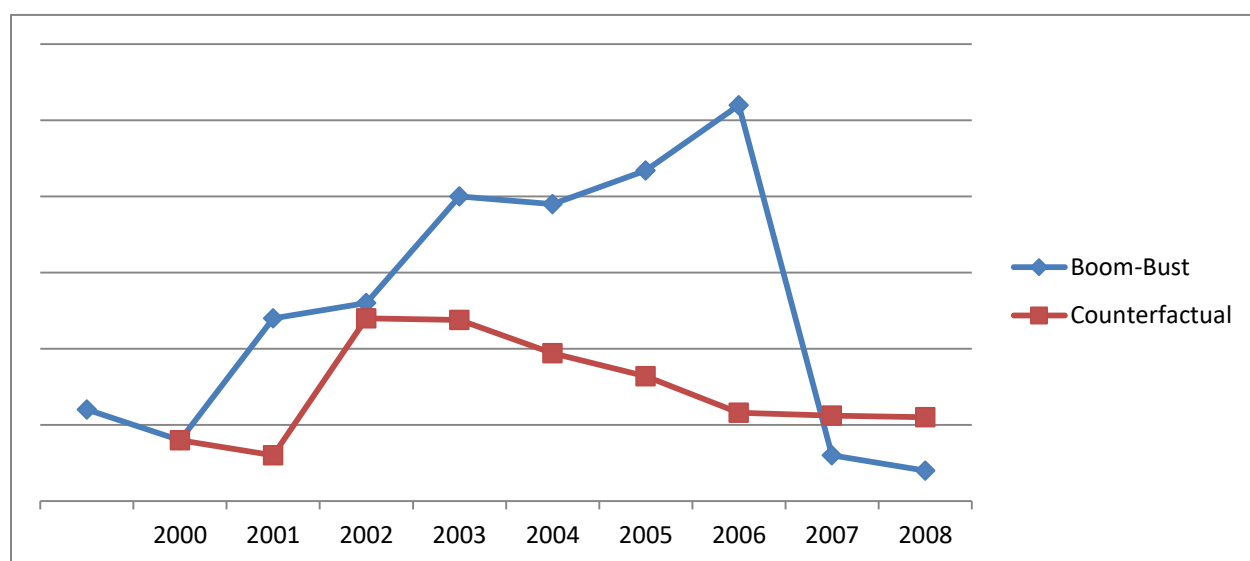
In contrast, Lo (2011) stated that the September 11, 2001 attack on the United States Trade Centre was considered as the major contributing factor to the cause of the global financial crisis. The attack on the World Trade Centre led to the loss of billions of dollars which negatively affected the United States economy. The United States Federal Reserve attempted to ameliorate the effect of the attack increased the supply of money into the United States economy which resulted to the financial crisis. Chossudovsky (2008) in his own view related the global financial

crisis to the series of war recklessly funded by the United States, such as the Middle East war. He argued that the warring economy had a direct impact on the fiscal and monetary policy, in which large sums of money were allocated to cover war costs. He related the financial crisis to the structure of the United States public investment, the role of United States Treasury and the United States monetary system in relentlessly funding war economy at the detriment of other sectors such as the consumer markets, and housing markets.

2.2.10.1 The boom-bust in housing market and the counterfactual

The boom – bust in the housing market in the United States economy resulted to the crisis that was transmitted to other economies of the World. The financial crisis from the United States spread globally as a result of the global nature of the housing bust, due to international financial linkages between the United States and the World economy. The interest rate deviation in the United States housing market plausibly resulted to the housing boom, in which monetary policy in the United States was the key cause of the boom, hence the bust of the crisis due to monetary excesses (Obstfeld & Rogoff, 2009). Taylor in his study as shown in Figure 2.1 (counterfactual line diagram) suggested that there would not have been a housing boom-bust that led to the global financial crisis if the United States Federal Reserves had followed the kind of policies (monetary and fiscal policies) that had worked well during the historical experience of the Great Moderation that began in the early 1980s. As such that the inflation targeting regime was applied in which Central Banks used interest rate to stabilised inflation. Simultaneously, fiscal policy was used to exert discipline over the public sector deficits, indirectly controlling the level of public debt – Fiscal housekeeping. This worked because the monetary authorities were in continuous check in stabilising the economy (Taylor, 2008). Figure 2.1 depicted the housing boom-bust in the United States and the counterfactual from 2000 to 2008. Taylor opined that the

housing boom that started from the year 2000 as a result of low interest rate policy, due to the inadequate policies (monetary and fiscal) to regulate and stabilise economic activities reached its peak in 2006 from the boom-bust line graph in Figure 2.1. Thus, the low interest rate policy did not attract high housing boom for the counterfactual line graph in figure 2.1 because of the proper monetary and fiscal policies in place regulating and stabilising economic activities. It was observed from the boom-bust line graph in Figure 2.1 that increase in interest rate brought about the housing bust crisis which started dropping gradually from late 2006 into 2007, leading to the global financial crisis in mid 2007. Besides, the stagnant average hourly wages in the United States from 2002 to 2008, which resulted to decline in personal savings from disposable income, were contributing factors to the bust of the housing market (Taylor, 2008).



Source: Taylor (2008) line graphs on the housing boom-bust and counterfactual

Figure 2.1: The boom-bust in housing market and the counterfactual

2.3 World Economies and the Global Financial Crisis

The integration of financial markets increased the transmission effects of the crisis in developing countries. Controlling the transmission effects has been hindered as a result of the different

levels of developments and different structures to productive capacities in developing countries, as well as the different socioeconomic problems. Massa and Velde (2008) suggested that the effect of global financial crisis in developing countries will reduce investment flow of both portfolio and foreign direct investment. This would also reduce the flow of remittances from advanced economies to developing economies. Agbetsiafa (2011) for example opined that the remittance rates of Indians working in London were affected due to the global financial crisis. The private capital flow (Foreign Direct Investment, portfolio investment flows and international bank lending rates) represent the channel through which the global financial crisis affected developing countries. The effect of global financial crisis on Foreign Direct Investment varies across countries, which was worst in developing countries. Empirical evidence showed that Ghana and Republic of Benin were severely hit by the global financial crisis through outflows of Foreign Direct Investment and portfolio investment. For instance, Foreign Direct Investment in Ghana expressed in United States dollars experienced decline of 5,290 in 2007 to 4,440 in 2008 due to the global financial crisis (Velde *et al.* 2009).

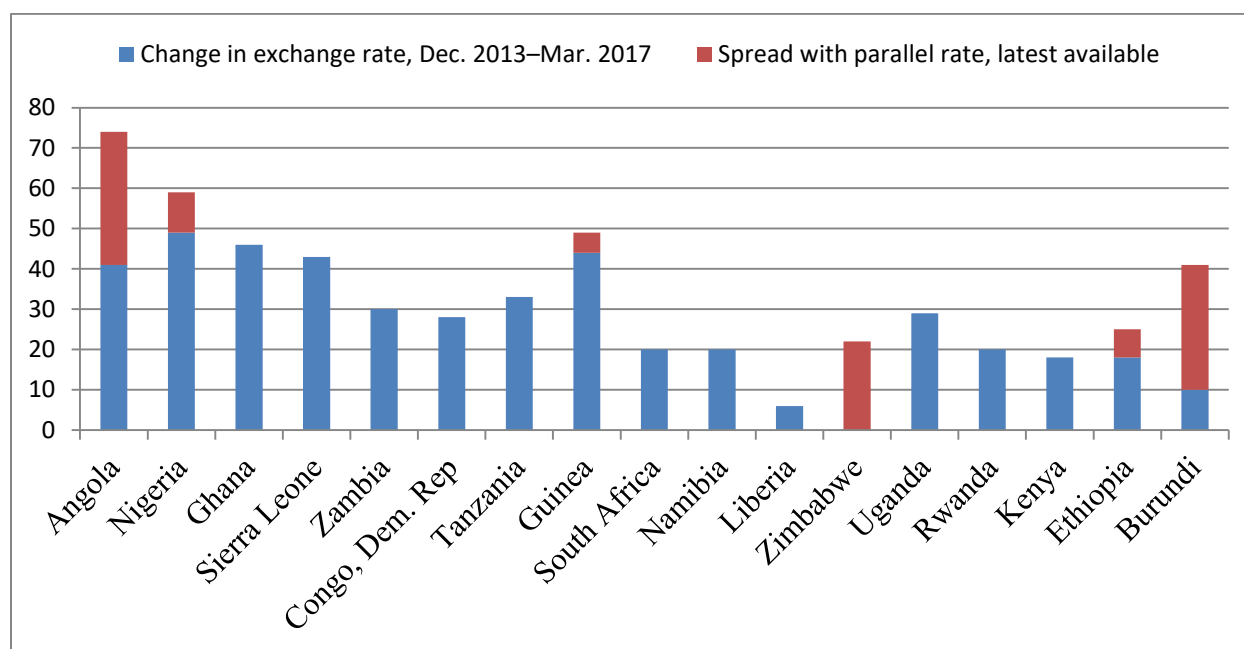
2.3.1 Global Exchange Rate

The global financial crisis had its effect on currencies across the World economies relatively to the United States dollar. However, between September 2008 and October 2008, the exchange rates to the dollar of the Brazilian real, the Korean won and the Mexican peso surged from 1.79 to 2.36 reals; 1,109 to 1,467 won; and 10.6 to 13.4 pesos respectively as a result of the global financial crisis (Chey, 2012). Hui and Liu (2011) affirmed that financial crisis can result to risk of serious shrinkage in the value of foreign exchange reserves. This was the situation faced by China's foreign exchange reserves with enormous exchange rate risks due to little depreciation of the United States dollar during the global financial crisis. The United States dollar maintained

a percentage value of -11.5% between March 2002 and April 2008 as against the value of 20.3% between January 1995 and February 2002 (Obstfeld & Rogoff, 2009). Since 2016, after the United States Presidential elections, the Japanese yen has depreciated against the dollar by 8%, due to prospects about divergent monetary policies among major advanced economies. The renminbi weakened to some extent against the United States dollar, which was less compared to most emerging market currencies. However, it was stable in effective terms due to increased foreign exchange intervention and capital controls, which prevented further depreciation of the renminbi (IMF, 2017).

Besides, the surge in currencies of developed and emerging economies to the United States dollar; countries like China had deliberately allowed their exchange rates to depreciate in order to help absorb external pressures. However, some of the severely hit developing countries such as Angola and Nigeria resorted to harmful exchange rate restrictions in order to stem the depletion of reserves. These restrictions by some countries, added to growing policy uncertainties, generated deep economic distortions, and have led to a widened spread in parallel markets. In such that Angola retained the priority list for foreign exchange access at the official rate, a special tax on service payments, and stricter limits on foreign currency for travel was introduced in 2015. The resulting scarcity of foreign currencies consequently widened the parallel market spread from 5% to 10% in mid 2014 to about 130% at the end of first quarter, 2017. In Nigeria, restrictions include the acquisition of foreign exchange in the domestic market for the importation of 40 categories of goods. Meanwhile, rationing of foreign exchange has deepened in Burundi; in Ethiopia, foreign exchange and import permit restrictions were introduced; while in Zimbabwe, different current and capital account restrictions came up, which

have resulted to the widening of exchange rate spread with the parallel market as shown in Figure 2.2 (IMF, 2017).



Source: International Monetary Fund (2017), *Change in exchange rate and spread with parallel rate, December, 2013 – March, 2017*

Figure 2.2: Depreciation of National Currencies against the United States Dollar in Sub-Saharan Africa

However, studies revealed that countries with floating exchange rates could be more resistant to currency crises because there are tendencies for continuous market adjustment when compared to fixed exchange rate regimes with greater vulnerability to financial crises (debt crises, sudden stop in capital inflows, and banking crises) for developing and emerging market countries with more open capital accounts (Ghosh, Ostry, & Tsangarides, 2010; Reuven & Hutchison, 2011). Calvo and Reinhart (2002) argued that most countries purportedly with floating exchange rates experienced currency crises. This may be attributable to the fact that countries are reluctant to allow their currencies to float due to the so-called fear of floating behaviour. The United Kingdom was another region that suffered currency crisis as a result of its inadequate reserves. In

1992, the UK authorities were forced to leave the European Exchange Rate Mechanism because they were unable to hold sterling in the Exchange Rate Mechanism (Smith & Nugee, 2015).

2.3.2 The Global Banking System

The United States subprime mortgage crisis initially seemed limited to the United States and some advanced economies in Europe. The collapse of the fourth largest United States investment bank, the Lehman Brothers in mid-September 2008, was suggested to have led to the unexpected deleverage in advanced economies. Hence the crisis advanced into the global financial crisis of 2007 and 2008. Some emerging market economies as a result of the crisis faced unexpected stops and significant capital flow reversals of United States dollar liquidity, thereby suffered unfavourable financial instability. The collapse of Lehman Brothers resulted to financial illiquidity in some Asian economies (Iceland, Pakistan, Hungary, Ukraine and Belarus) served as leverage for Asian countries who applied for bailouts from the International Monetary Fund. The gradual spread of the crisis to emerging market economies prompted the United States Federal Reserve to set up temporary reciprocal swap lines with Brazil, Mexico, South Korea and Singapore Central Banks as a lender of last resort for dollar liquidity (Chey, 2012).

The pressure on one economy due to financial crisis can be easily transmitted to another economy by process of globalization. This entails a global market place as a platform for interconnection of sovereign states for trade and capital flows with financial links (Abdul, 2009; Oke, 2012). The effect of the global financial crisis on developing countries depends on the extent of interdependence with international capital markets; extent of inflation and the budget deficit; extent of export trade diversification and of foreign direct investment; extent of liabilities in foreign currencies; extent of foreign currency reserves and trade deficit; diversification of local

economy and macroeconomic stability and performance of local institutions (Ajakaiye & Fakiyesi, 2009). Banks in developing countries that held assets contaminated by subprime mortgages were mostly affected by the crisis. Contraction of international bank lending rates mostly affected countries with large numbers of foreign owned banks. For example, the credit systems of issuing loans by banks in Cambodia, Ghana and Zambia were restricted. Also, the issuances of bond were halted in Ghana, Kenya and Uganda. Most banks in developing countries encountered reduced capital which affected cash in banks. This led to reduced lending in order to strengthen their capital. The reduced bank lending adversely affect investments, this resulted in increased unemployment and lower growth that depend on government revenue which determined government expenditures (Naude, 2009 & Sanusi, 2010).

However, Canada has been resilient to financial crisis for over 180 years. There has been no distress on any Canadian financial institutions neither has there been any request for government bailouts during the series of crises. Rather, Canadian banks had provided ample credit to the economy. The only failed bank during the Great Depression was owed to fraud. Canadian financial institutions tend to be tightly regulated with very high capital requirements, very great leverage restrictions, and very few off-balance sheet activities. The resilient of the Canadian financial institutions was traced to diversification and the ability of banks to print their own currency backed by general assets on demand for cash strengthened the confidence imposed on financial institutions by Canadians, hence preventing panic withdrawals by investors (Renee, 2013).

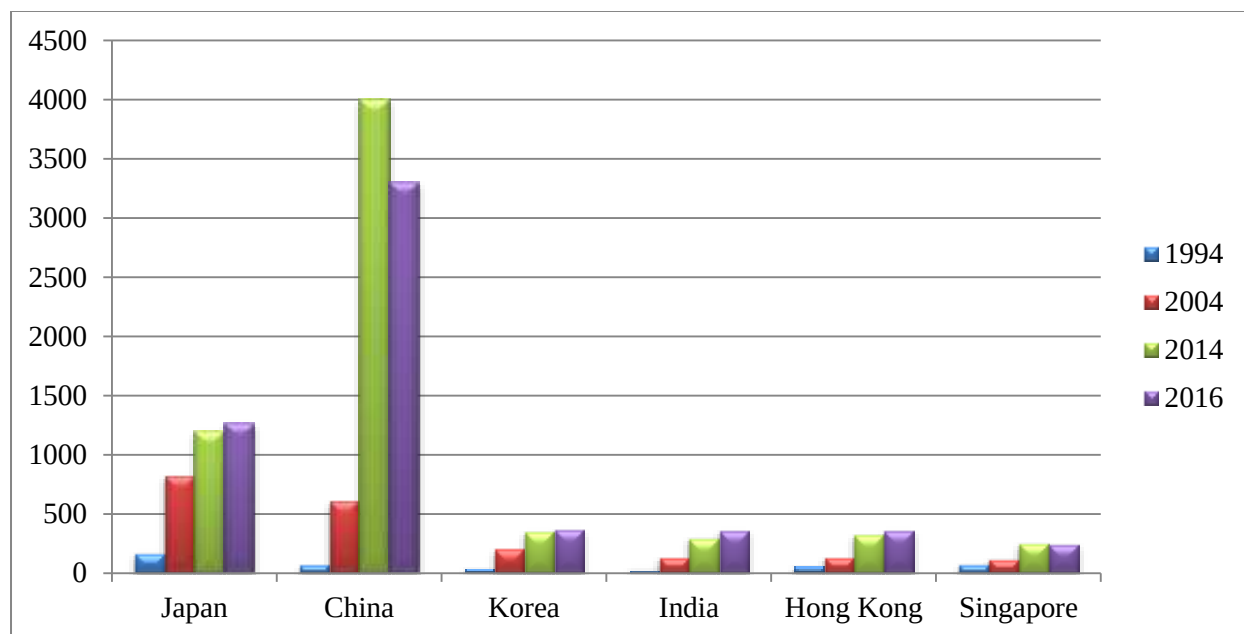
2.4 Financial Crises and External Reserves of Asian Economies

There has been an enormous growth in the foreign exchange reserves held by the Central Banks of Asian countries after the 1997 and 1998 financial crises. Asian countries have received large and persistent capital inflow through exports of more goods and services to the rest of the World than imports. This has led to large stockpile of foreign exchange reserves at the region's Central Banks. The underlying idea is that Asian Central Banks purchased foreign exchange to keep their currencies weak, thereby promoting exports to enhance reserves accumulation. The accumulation of high foreign reserves by some Asian countries sustained their economy through part of the global financial crisis (Islam, 2009; Donghyun & Gemma, 2009). The 1997 and 1998 Asian crises enlightened the region of the need for foreign exchange reserves accumulation for self-insurance to avoid prompt resort for International Monetary Fund assistance in the event of a financial storm (Leung, 2015). Gosselin and Parent (2005) opined that the accumulation of massive reserves by Asian Central Banks over the years have been through the purchases of United States Treasury bonds and agency securities. These market activities helped the United States to finance its current account deficit. The build-up by emerging market economies of Asia is to insure against the reoccurrence of the 1990s currency crisis (Summers, 2006).

The external reserves of Asian countries, especially China have played fundamental roles in the global macroeconomic imbalance from 2000 to 2015 after the bitter experience of the 1997 and 1998 crisis. The Asian currency crisis of 1997 was a cushion for the Chinese authorities and other Asian monetary authorities to maintain a relatively regulated international financial sector. The Chinese authority was recorded to have the World's largest foreign reserves of about US\$4 trillion in 2014. China's reserves have grown, not mainly as a conscious act of policy, but specifically as a drive for economic growth through exports, facilitated by a managed exchange

rate. The growing global imbalances has been due to China's increasing reserves, specifically the current account imbalance between the United States and China occasioned by the mercantilist trade policy and its consistency to keep the renminbi undervalued in the exchange rate markets. Furthermore, the accumulation of large war chests of foreign reserves in the periphery opened up a Pandora box of financial distortions in the world economy (Xiao & Kimball, 2006; Moritz, 2010; Nargiza, 2014; Gary & Nugee, 2015; Wildau, 2016). The global financial crisis did not severely affect China compared to the United States and the European Union. This was because of the strong accelerated real GDP growth in 2007 and the positive contribution of the emerging Asian economy in global growth through exports (Chong-Yah & Hui-Ying, 2011; Obstfeld & Rogoff, 2009).

However, Islam (2009) attributed reserves accumulation in Asia to an optimal insurance model which infers that reserves provide a steady source of liquidity in the event of a financial crisis. Relatively, Mendoza (2004) argued that the aftermath of the Asian financial crisis cushioned the majority of Asian countries to increase their level of reserves for self-insurance purposes. The Bangladesh reserve build-up was due to an investment drought in the country as trade balance of current account or capital flows led to surplus in the balance of payments which eventually ends up in reserves accumulation. This was partly due to its underdeveloped financial systems and difficulties in appropriately channelling of its savings to investments. The Asian foreign exchange reserves are purposely meant to preserve the domestic currency against speculative attack, as well as for prompt and strong response to financial needs after the experience of Asian currency crisis of 1997. Consequently on this, India had adopted a policy to build higher levels of foreign exchange reserves for reasons of safety and insurance against liquidity risk (Wen, 2011; Neely, 2017; Charan, 2005).



Source: Charan (2005); Smith and Nugee (2015); IMF (2017) foreign reserves for selected Asian countries

Figure 2.3: Foreign Exchange Reserves – Trend in Selected Countries

Figure 2.3 depicts that reserves accumulation by some Asian countries in 1994 and prior to the 1997 - 1998 crises were very low (Charan, 2005). This was occasioned by the fact that the Asian economies never saw the need for reserve accumulation as the lifejacket against financial risk. It is observed that reserves build-up became very high soon after the Asian crisis with Japan having the highest reserves up to 2004, followed by China (Smith & Nugee, 2015). Apart from China that had a drop in its foreign reserves between 2015 and 2016 after reaching a peak of \$4trillion in 2014, most Asian countries were reported to have a fairly stable foreign exchange reserves (IMF, 2017).

There were dependable relationship between the Asian crisis and the developed economies. However, the Asian crisis was as a result of the currency illiquidity in Thailand, which led to drop in the stock prices of the Malaysian stock market. The crisis also led to the deterioration of the liquidity levels for stocks in Hong Kong stock market. The Asian crisis had its impact based

on the economic and financial system in currency depreciation and stock market decline of emerging economics (Engkuchik & Kaya, 2012; Chutatong, Raja, & Yupana, 2006). Wiggles (2008) in his study, reported that the financial crisis affected Kuwait despite its ownership of 10% of global oil reserves. Kuwait is the only Gulf country to have been forced to publicly bail out a bank after the Gulf Bank lost US\$1.4bm through its reserves. Akperan and Awujola (2013) opined that China and India witnessed a huge drop in demand for oil due to the financial meltdown. It was also on record that the crisis affected the economies of other developing Asian countries that have no reliance on crude oil export. It was evident that electronic products in Indonesia had a 25% fall in value of its exports from January 2009. Cambodia suffered credit crunch during the crisis, as well as experienced decline of monthly average of \$250 million in 2008 to \$100 million in January 2009 in value of its export on garment (Agbetsiafa, 2011).

2.5 The Global Financial Crisis and Sub-Sahara African Reserves

The global financial crisis severely hit Africa against the belief that most African countries are insulated from the crisis based on the volume of external reserves of some African countries before the financial crisis. It was also of the opinion of some researchers that African financial institutions are irrelevant in terms of financial interaction in the global economy. The effects of the crisis were mainly transmitted through trade volumes and prices to developing countries which started experiencing the impact of the crisis as it deepened in developed countries. This was at a time the region was pushing hard to build on economic growth and development from policy errors of pre-crisis periods. The combined growth of real Gross Domestic Product for 53 African countries was almost at 6% before the crisis. The rate later dropped to 4% after the severe hit of the crisis. The slowdown in growth was mainly due to decline in trade flows. As a consequence, there was a shortfall in revenue of oil exporting African countries. These countries

were hit by the crisis with a shortfall of US\$220 billion in 2009 to US\$200 billion in 2010. The decline in export revenue due to low demand for oil as a subsequent reduction in foreign reserves resulted in low budget expenditure (Agbetsiafa, 2011; Velde *et al.* 2009; Soludo, 2008).

The period of the global financial crisis was a bad period for economic performance of oil exporting Sub-Sahara Africa countries in terms of real GDP growth rate, fiscal and current account balances (Bilal, Draper, & Velde, 2009). Table 2.1 showed GDP Growth rate, inflation, fiscal and current account balances in sub-Sahara Africa. The economic performance for most oil exporting sub-Sahara African countries grew bad in 2009 as a result of the global financial crisis. In 2009, annual growth rate of real GDP of oil exporting countries dropped to 6.7%; real GDP of middle income and low income countries reduced to 3.6% and 5.2% respectively; fiscal balance of oil exporters declined to -4.5%; and current account of oil exporters dropped to -2.8. Thus, inflation rate increased to 9.8% depicting a bad situation for sub-Sahara African countries as a result of the global financial crisis. The economic performance in 2016 of sub-Sahara African nations has been worst due to severe drop to -1.4%, 0.5%, 4.4%, -4.5% and -4.0% in annual growth rate of real GDP of oil exporting countries, real GDP of middle income countries, real GDP of low income countries, fiscal balance of oil exporters and current account of oil exporters respectively. While inflation rate increased to 11.4% indicating a downturn in sub-Sahara African economies (IMF, 2017).

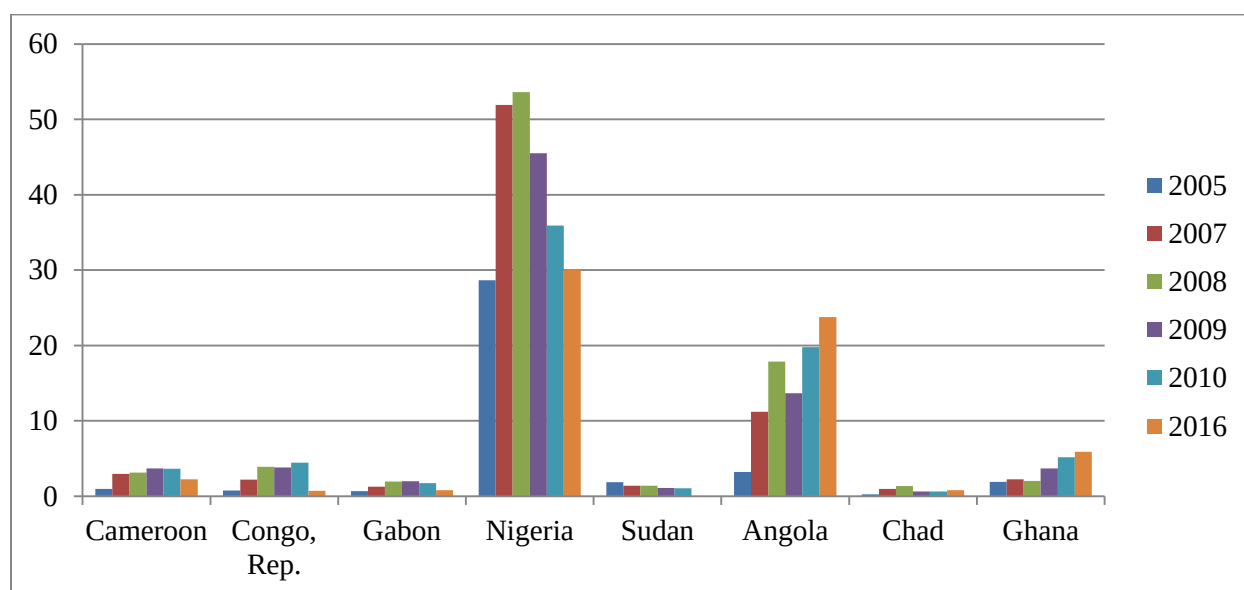
Table 2.1: Economic performance in Sub-Saharan Africa (Percentage change)

S/N	Variables	2004 - 2008	2009	2010	2011	2012	2013	2014	2015	2016
1	RGDP oil exporters (annual growth rate)	8.7	6.7	9.2	4.7	3.9	5.7	5.9	2.6	-1.4
2	Real GDP, middle income countries	6.6	3.6	6.9	4.5	4.3	4.7	4.6	2.7	0.5
3	RGDP, low income countries	6.3	5.2	7.2	6.9	4.5	7.2	6.8	5.6	4.4
4	Inflation	8.8	9.8	8.1	9.4	9.3	6.6	6.3	7	11.4
5	Fiscal balance (oil exporters)	1.7	-4.5	-3.4	-1.1	-1.8	-3.1	-3.5	-4.1	-4.5
6	Current account, oil exporters (GDP)	2.1	-2.8	-0.9	-0.8	-1.8	-2.4	-3.9	-6.0	-4.0

Source: International Monetary Fund (2017) Economic performance in sub-Sahara African countries

The global financial crisis resulted in the volatility of the oil futures markets. Thus, there were flows of large sums of money into the oil futures market as an alternative investment to equity funds, which spike-up crude oil prices. There were severe decline in the demand for global oil as a consequence of the rapidly deteriorating global economy occasioned by the financial crisis. In response to savage the declining oil prices, the Organization of Petroleum Exporting Countries (OPEC) in 2008 came up with the decision of cutting down crude oil production. The significant drop in oil consumption in the United States was the main cause of the decline in demand for oil. The decline in demand for oil in the United States affected the production of crude oil in developing oil exporting countries and as a consequence affected their foreign exchange reserves. However, drop in oil prices due to the reduction in demand for crude oil in the global market as a result of the global financial crisis affected oil exporting sub-Sahara African countries amongst which are Angola, Cameroon, Chad, Congo, Equatorial Guinea, Gabon and Nigeria (Oluseyi, 2008; Velde *et al.* 2009; Bilal, Draper, & Velde, 2009).

Besides, the share of oil sector to Gross Domestic Product of sub-Sahara African nations was severely hit by the crisis. Apart from Congo Republic that had a slight increase of 64.1% to 69.4% from 2005 to 2010. Angola had a share decrease of 62% to 45.3%; Cameroon 8.4% to 6.1%; Chad 46.8% to 36.9%; Equatorial Guinea 82.6% to 57.4%; Gabon 51.8% to 46.7%; and Nigeria 38.4% to 29.1% in 2005 and 2010 respectively. The share drop of oil sector in the overall Gross Domestic Product showed the effect of the global financial crisis on the foreign reserves of these countries in response to ameliorate the pressure on their economy as well as to salvage it from total financial collapse (Takebe & York, 2011).



Source: IMF (2017) and World Bank (2017) foreign reserves for selected sub-Sahara African countries

Figure 2.4: Foreign Exchange Reserves – Selected Sub-Sahara African Countries

It is shown in Figure 2.4 that Angola, Nigeria, Chad, Congo Democratic Republic and Sudan which are oil producing countries experienced drop in their foreign exchange reserves in 2009 as a result of the global financial crisis. This was the period Africa countries started to feel the consequential effect of the global financial crisis. Though, foreign reserves for Cameroon, Gabon and Ghana were relatively stable during this period (IMF, 2017; World Bank, 2017).

2.6 Policies and Remedies to Financial Crises in Global Economies

The series of past crises across World economies have served as lessons to many countries to accumulate high foreign reserves during favourable period of financial boom. Several meetings were held by World leaders with the intension to make policies and remedies to proffer solutions to prevent impending spread of a recession from degenerating into a worldwide depression, as well as to solve the financial crisis (Chong-Yah & Hui-Ying, 2011; Liang, 2012).

2.6.1 Policies:

1. Monetary policies:

- Hong Kong successfully fended off a short speculative attack by raising interest rates. South Korea also raised its interest rates, thereby allowing the won to depreciate within its band in attempt to tackle financial crisis. Raising interest rates by these countries were meant to defend and stabilize their exchange rates (King, 2001).
- Several emerging economies eased their situations by introducing new foreign exchange credit instruments as well as domestic liquidity support instruments. For example, the Korean authorities eliminated regulatory restrictions on dollar financing from the offshore forward market, thereby introduced a competitive auction swap facility. They also took steps to ease foreign exchange financing to exporters. However, the Bank of Korea stepped up repo operations by broadening eligible collateral; expand the number of counterparties; hence contributed to bond stabilization fund (Yehoue, 2009).
- The United States Federal Reserve generally favoured the injection of liquidity by rapidly lowered interest rates as a response through the Term Auction Facility (TAF) in order to offer short-term liquidity. Permitting depository institutions to anonymously bid to

receive funds underwritten by a wide variety of collateral over a period of 28-35 days. This approach allowed many commercial banks to directly receive funds. The United States Federal Reserve also introduced the Term Securities Lending Facility (TSLF) in March 2008 to auction about US\$200bn in Treasury securities in an attempt to increase bank liquidity (Marshall, 2009; Thakor, 2015).

- The Open Market Operations were expanded by the United States Federal Reserves. The goal of these initiatives was to support the functioning of credit markets and put downward pressure on long-term interest rates. These initiatives involved the purchase of longer-term securities for the Federal Reserve's portfolio.
- The Brazilian Central Bank (BCB) increased the liquidity in the domestic financial system and sustained credit levels. These measures included incentives for the acquisition of small bank assets by medium and large-sized banks, tax reductions, reduction of compulsory deposit requirements, and an increase in deposit insurance for deposits of up to R\$20 million, in order to provide relief mainly for small and medium sized banks (Carvalho & Leal, 2013).
- The Central Bank of Russia set aside US\$50 billion in foreign exchange reserves to be used by banks and corporations to meet foreign liability obligations. Besides, the Central Bank of Russia expanded eligible collateral and gave banks immediate access to their own funds at the Central Bank, thus alleviating its stance of reserve requirements and reducing banks' reliance on the interbank market.
- The Central Bank of Brazil stepped up foreign exchange swaps, eased collateral requirements, and extended direct financing to private companies for debt repayment and capital investments.

2. Nationalisation policy:

- This policy helped to commit multinational investors in the country of their investments in order to prevent capital flight, hence to avoid financial crisis. South Korea nationalised the troubled carmaker (Kia Motors), which led the United States credit rating agency (Standard & Poor) to downgrade Korea's foreign debt, thus triggering an outflow of capital (King, 2001).

2.6.2 Remedies:

1. Several meetings were held by World leaders with the intention to prevent the financial crisis from degenerating into a worldwide depression. Such were the G-7 Countries meeting in Washington; the 21-Country Asia-Pacific Economic Co-operation meeting in Lima; the G-20 Summit meeting in London and the China Currency Bill which was an attempt by the Obama administration to pressure China's currency revaluation; the United States/China strategic and economic dialogue as well as the World Trade Organization (Chong-Yah & Hui-Ying, 2011; Liang, 2012).
2. Positive reversal of capital flows through proper and adequate diversification of economic resources into investments such as in agriculture, roads, energy and security for investors' friendly environment. Hence, Capital flows played a vital role in previous financial crises including the Great Depression. Consequently, emerging market reserve accumulation played a vital role in sustaining the global imbalances that made the financial crisis so devastating (Moritz, 2010).
3. The International Monetary Fund gave bail-out packages to countries under pressure of recession. Such assistance was given to Thailand, Indonesia and Korea during the 1997/1998 Asian crisis. The Mexico crisis (1994 - 1995) led to the first largest bail-out

which amounted to US\$50 billion. Thailand financial and currency crisis brought about the second largest bail-out of US\$17.2 billion; while Korea signed the third and largest IMF bail-out package in the region of \$57 billion (King, 2001).

4. During the global financial crisis, Interest rate was reduced by the People's Bank of China on October 8, 2008 by 0.27% to 6.93% from 7.2% in order to reduce borrowing costs, while the Government created a stimulus plan in November, 2008. The Bank of Japan injected 2 trillion yen (£11.67 billion) into the money market. Indonesia, as well reduced its repo rate by two percentage points to 10.25%. These were tasked to help to manage the crisis (Sanusi, 2010).
5. The World Bank Group increased lending for developing countries that were severely hit by the 2007 - 2008 global financial crisis from US\$13.5 billion in 2008 to US\$35 billion in 2009. However, grants and interest free long term loans were granted to 78 world's poorest nations out of which 39 were in Africa (Sanusi, 2010).

2.7 The Nigerian Foreign Exchange Reserve

The sales of crude oil form a major component of the external reserves in Nigeria. Though the Nigerian foreign exchange reserves are proceeds from both oil export and non-oil export. The proceeds from crude oil export are direct sales from the Nigerian National Petroleum Company (NNPC), Petroleum Profit Tax from Oil Companies, Royalties, Penalty for gas flaring and Rentals which are reflections of the circumstances prevailing in the international oil market. While proceeds from non-oil export consist of income from investing foreign reserves, repatriation of unutilized Wholesale Dutch Auction System (WDAS), Interest on Wholesale Dutch Auction System (WDAS) Accounts held by Deposit Money Banks, Wholesale Dutch Auction System Purchases, Inward Money Transfer, Value Added Tax (VAT), Education Tax,

Companies Income Tax and Customs & Excise Duties. The Dutch Auction System (DAS) was introduced in 2002 as a result of the excessive depletion of the Nigerian foreign exchange reserve (Olanipekun, 2016; Abiola & Adebayo, 2013; Osigwe, Okechukwu & Onoja, 2015).

Abiola and Adebayo (2013) opined that the proceeds from crude oil mainly accounts for Nigerian external reserves. Reserves are required to meet unexpected and temporary fluctuations in international payments. According to Nzotta (2004) and Umeora (2013), foreign reserves come about when foreign exchange disbursements are lower than foreign exchange receipts. The surplus gives rise to foreign reserves. Foreign reserves represent balance of foreign exchange surpluses of a country that accumulated over time. In the case of low income countries (LICs) and least developed countries (LDCs), most reserves come from donations and aids. Polterovich and Popov (2003) postulated that resource rich developing countries pursue policies to create a downward pressure on their currencies through building-up foreign exchange reserves in order to reduce consumption and imports as to stimulate exports, investment, and growth.

In a bid to increase and conserve the cost of holding reserve in Nigeria, Sanusi (2013) advocated for the implementation of the Treasury Single Account (TSA), which is the return of government accounts to the Central Bank in order to reduce the huge cost of government debt due to poor cash flow management. The optimal size of reserves depends on the balance between the macroeconomic adjustment costs that would result if reserves are exhausted and the opportunity cost of holding reserves. The higher the opportunity cost of holding reserves the lower the demand for reserves (Heller, 1979; Abdullateef & Waheed, 2010). The cost of holding reserves is the investment that nations must forgo in order to accumulate reserves. The cost of reserves holding is small compared to the economic consequences of exchange rate variations. Thus,

Onoja (2015) argued that the opportunity cost of holding large foreign reserves is small compared to the economic implication of severe devaluation of the currency.

Nigeria keeps reserves to control currency exchange rate and prevent devaluations by buying and selling the country's own currency in order to control its demand and supply. Consequently, to maintain a stable value in the international markets, as well as a lifejacket against currency crisis (Steiner, 2012). In support, Wang and Duncan (2013) opined that foreign exchange reserves play a vital role in reducing the risks of external debt and local currency crises. It mitigates the negative shocks of a sudden reduction of capital flow in the advent of a financial crisis. Mendoza (2004) stated that external reserves are needed to guard against possible financial crisis. Relatively, Fischer (2001) opined that, reserves matter because they are the main determinant of a country's ability to prevent economic and financial crisis. He stated that countries with robust foreign reserves did better in withstanding the effect of the financial crisis of the late 1990s and the most recent global financial crisis than those with smaller foreign reserves. However, higher foreign reserves provide a form of self insurance against the risk of rapid withdrawal of cross border investment that may result to deep recession as well as a tool to cushion financial crisis vulnerability (Mei-Yin, 2011; Doole, Folkerts-Landau & Garber, 2004; Osabuohien & Egwakhe, 2008). Furthermore, countries keep reserves in order to meet short and long terms international payment obligations such as sovereign and commercial debts, financing of imports, intervention in foreign currency markets during periods of instability. Above all, reserves help countries to meet its external obligations and unexpected capital movements (Osigwe, Okechukwu & Onoja, 2015).

The Nigerian foreign reserves are categorised into components which comprise of the Federation, the Federal Government and the Central Bank of Nigeria (CBN) portions. The

Federation component consists of funds not yet monetised for sharing by the federating unit held in the excess crude account and PPT/Royalty accounts with CBN, which belong to the three tiers of government in Nigeria. The Federal Government component consists of funds belonging to some government agencies such as the Nigerian National Petroleum Company (NNPC), Ministry of Defence, Custom and Immigration Department. The CBN portion is made up of funds that have been monetised and shared among the organs of government. These components are made up of Nigeria's gold tranche at the International Monetary Fund, foreign bank deposits/notes, treasury bills, allocation of special drawing rights made to Nigeria by the IMF and securities of/or guarantees by international financial institutions of which Nigeria is a member (Abiola & Adebayo, 2013; Osigwe, Okechukwu & Onoja, 2015).

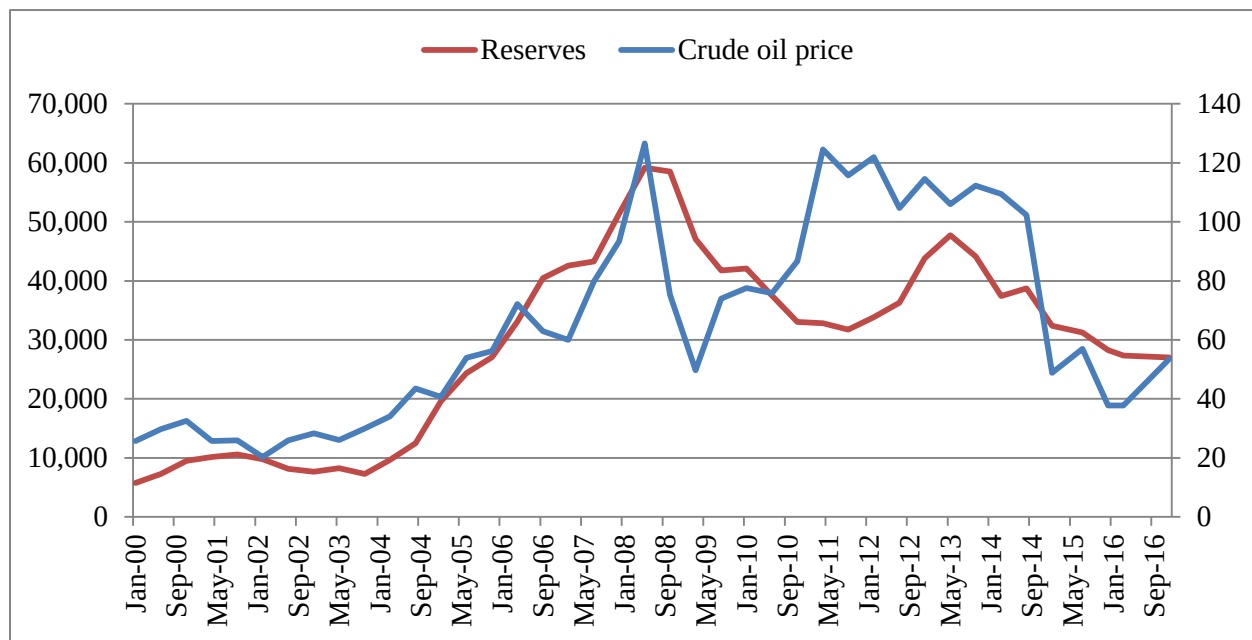
2.8 Financial Crisis, Crude Oil Price Shocks and Nigeria Foreign Exchange Reserves

The impact of the global financial crisis had diverse sectoral effects on the Nigerian economy. The crisis was mainly observed to have affected the oil sector, foreign exchange rates, banking sector, etc. The decline in oil prices has its effect on Nigeria because of its trade link with the United States on crude oil export. The price of oil is mainly dictated by market forces and to this effect; Nigeria has no control over the activities of investors on the oil market. The volume of oil that can be produced, exported and as well the price per barrel of oil is determined by the Organization of Petroleum-Exporting Countries (OPEC) and the international oil market. The effect of the crisis on crude oil led to the decline in external reserve as well as accruable revenue. The sharp decline in crude oil prices were strongly evident in 2009, as occasioned by the financial crisis which led to the depletion of the Nigerian foreign exchange reserves (Nkoro & Uko, 2012; Amba, 2011; Oke, 2012; Sanusi, 2010).

In support, Sascha, Maurizio, and Livio (2015) opined that oil exporting nations accumulated foreign reserves during period of oil price increase and reduction in foreign reserves holding in period of oil price reduction. Osuji (2015) stated that Nigeria experienced drastic drop in international oil prices during the global economic crisis of 2008 leading to low levels of accumulated foreign reserves for some OPEC economies. The decrease in crude oil prices was due to low demand, excess supply and exchange rate appreciation resulting to significant decrease in the level of foreign exchange inflows. Prior to the global financial crises, the price of crude oil was high but the advent of the crisis saw a crash in the crude oil price (Englama, Duke, Ogunleye & Isma'il, 2010; Uguru, 2015).

However, the external account is believed to be prone to fluctuation due to the World oil prices. The fluctuations in crude oil prices had diverse effects on different countries depending if the country produces oil or not. Increase in oil prices implies higher reserves for oil producers and lower reserves in oil-importing countries (Uguru, 2105). Abubakar (2015) and Stober (2016) stated that all aspects of the Nigeria's economy rely on crude oil as the major source of its foreign exchange reserves. The very high level of Nigeria's dependence on crude oil for its foreign exchange earnings makes its capital account vulnerable to the crude oil price shocks. The glut in the global oil market had contributed to the collapse in the price of crude oil subsequently drained the reserves. The significant increase in the Nigerian foreign exchange reserves was attributed to the oil boom of the mid-1970s, occasioned by the Middle East war, which created a surprising and unusual wealth for Nigeria (Adedipe, 2004; Ogundipe & Ogundipe, 2013; Olanipekun, 2016). The problem of depleting reserves in Nigeria was faced with reserve mismanagement occasioned by the global recession (Odozi, 2000; Akinwunmi & Adekoya, 2016). The collapse in the international price of oil, led to severe drop in foreign exchange

receipts, consequently contraction in government revenue resulting to unprecedented pressure on the Nigerian foreign reserves. The low accretion to foreign exchange reserves and demand pressure in the foreign exchange market led to volatility and considerable depreciation of the naira exchange rate (Sanusi, 2010).



Source: Stober (2016) and CBN Statistical Bulletin (2016) reserves and crude oil price movement

Figure 2.5: The External Reserves and Crude Oil Price Movement

Figure 2.5 depicts the volatility of the foreign exchange reserves as a result of the impact of crude oil price shocks due to the global financial crisis. The period from 2000 to 2008 indicates continuous increase in the Nigerian foreign reserve at the same period the country experienced increase in the price of crude oil. This was the period before the global financial crisis. However, continuous drop in foreign reserves was also observed from late 2008 – 2009. This was however, the time the global financial crisis hits the Nigerian economy through crude oil price. During the global financial crisis, the decline in crude oil price resulted to the decrease in the Nigerian foreign exchange reserves (Stober, 2016). Besides, the adverse continuous fluctuations of crude

oil into 2016 were also observed to cause adverse fluctuations in the Nigerian foreign reserves. This showed that the global financial crisis correlates with crude oil price shocks with a consequential effect on the foreign exchange reserves. Thus, the global financial crisis resulted to changes in the international oil market. These changes led to slow growth rate across the world's economies, especially the developing countries. The decline in demand for oil during the crisis posed hardship for the Nigerian economy. The effects of low demand for oil were diffused into the Nigerian economy through earnings and revenue from crude oil; depreciation in the naira exchange rate and the balance of payments through limiting the surplus on the current account balances (Stober, 2016; Ajakaiye & Fakiyesi, 2009). Udemé and Onuba (2009) posited that the global meltdown brought in its wake shortage in capital flows as well as Diaspora transfers which thereabout depleted the Nigerian foreign reserves.

Furthermore, Table 2.2 showed the percent (%) of crude oil prior to the global financial crisis which had a percentage contribution of 22.2% to GDP growth rate in 2006. Thus, crude oil had a declining percentage contribution of 19.7%, 17.3%, 16.0% and 15.4% to GDP growth rate from 2007, 2008, 2009 and 2010 respectively, depicting the significant effect of the global financial crisis on crude oil prices to economic growth. Also, from 2011 to 2016, the percentage contribution of crude oil to GDP growth rate continued to decline as a result of the lingering effect of the global financial crisis on crude oil prices as well as the economic recession (CBN statistical bulletin, 2016).

Table 2.2: Sectors Contribution to Growth Rates of GDP in Nigeria (Naira Billion)

Sector	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Agriculture	10223	10959	11645	12330	13049	13429	14330	14751	15380	15952	16607
Industry	11482	11332	11068	11353	12033	12874	13028	13015	13791	13319	12062
Crude oil	8875	8472	7948	7984	8403	8599	8173	7105	7011.8	6630	5672
Construction	981.5	1109	1254	1405	1571	1818	1990	2272	2568.5	2680	2521
Trade	5522	6361	7253	80854	8993	9650	9854	10508	11126	11698	11669
Services	11788	13162	14792	16682	18967	19749	20729	22673	24287	25375	25072
Total GDP	39996	42922	46013	49856	54612	57511	59930	63219	67153	69024	67931
% Crude oil to GDP	22.2 %	19.7 %	17.3 %	16.0 %	15.4 %	15.0 %	13.6 %	11.2 %	10.4%	9.6%	8.4%

Source: CBN annual economic report (2014); CBN statistical bulletin (2016) sectoral GDP growth rate

2.9 The Nigerian Foreign Exchange Rate

The global financial crisis of 2007 and 2008 resulted in fluctuations of the Nigerian currency (Naira) to the US dollar (\$). A drop in both crude oil price and share price in stock exchange market led to the depreciation of the exchange rate of the naira (₦). The exchange rate was volatile during the crisis. Thus, a reflection of the crisis period was seen in the severe depreciation of the Nigerian currency to the United States dollar. The exchange rate in 2004 stood at about ₦133 to US\$1 and dropped to about ₦125/US\$1 in 2007 before the crisis hits Nigeria in 2008. As at 2008 and 2009, the exchange rate depreciated to ₦131/US\$1 and ₦148/US\$1 respectively. The official exchange rate showed that the Naira depreciated against the dollar by 25.6% between 2008 and 2009, reflecting the demand pressure relative to supply with implications for the foreign reserves. Consequently, the depreciation of the Naira was attributed to the impact of the financial crisis on commodity (oil) prices, resulting to decline in foreign exchange reserves, dropping from \$67 billion in June 2008 to \$53 in December 2008, subsequently to about \$34billion in 2011. The adverse impact of the crisis was obvious and direct on international prices of oil. The depreciation of the naira (₦) as a result of the global

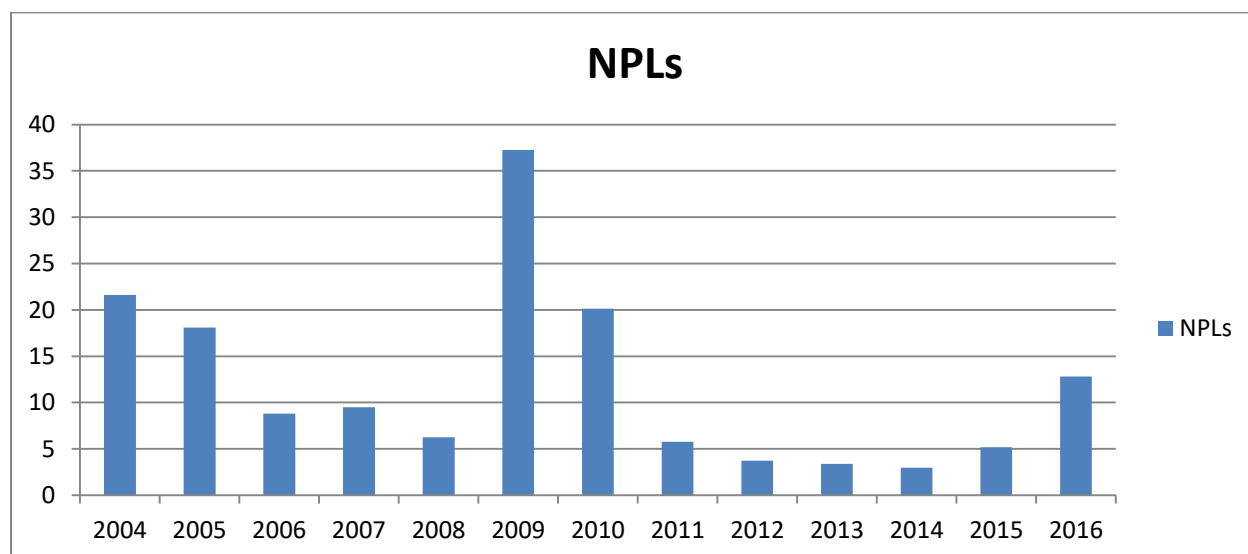
financial crisis imposed higher importation cost on manufacturing and was worsened by high cost of production as a result of lack of basic infrastructures. This rising production cost in Nigeria was eventually passed on to the consumers as prices increases thereby fuelling inflation and unemployment in Nigeria (Okonjo-Iweala, 2009; Oke, 2012).

2.10 The Nigerian Banking Sector

The world has over the past two decades headed towards liberalization and deregulation with the goal of integrating the world markets. The thought that African banking system was limited in terms of interrelationships with foreign banks, such that the banking system were not really integrated with the developed financial market during the global financial crisis was a misconstrued assurance that most developing countries like Nigeria, would be insulated from the crisis. Banks in developing countries that held assets contaminated by subprime mortgages were mostly affected by the crisis. Thus, contraction of international bank lending rates mostly affected countries with large numbers of foreign owned banks. Most banks in Nigeria encountered reduced capital which affected cash in banks. However, this led to reduced lending in attempt to strengthen their capital base. Thus, the reduced bank lending rate adversely affected investments, which brought about increased unemployment and lower growth that depended on government revenue which determines government expenditures (Naude, 2009; Sanusi, 2009 & 2010).

The banking sector in Nigeria was not adequately prepared to stand the storm of the global financial crisis in spite of the 2004 bank recapitalisation exercise (Sanusi, 2010). The consequential effect of the global financial crisis on the banking sector in mid 2008 in Nigeria was at the long-run. The Nigerian banking sector was exposed to the global financial crisis as a

result of its poor macroeconomic management and over reliance on foreign financial institutions thereby exposing the Nigerian banks to the tune of about ₦1.6 trillion as at December 2008 which led to banks distress (Amba, 2011). Nigeria's low level of banking sector integration meant that Nigerian banking sector was not affected directly by the global financial crisis. On like Ghana with 65%, Angola with 53%, and Botswana with 77% of their share of banking assets held by foreign banks. This showed how high the banking sectors of these economies were linked to external sources. The gravity and depth of the crisis in the banking sector was not fully evident until 2009. The main component considered is the Non-Performing Loans (NPLs) as a percentage (%) of total commercial bank loans. In Figure 2.6, the NPLs reduced from 21.60% in 2004 to 8.4% in 2007 and increased above 35.0% in 2009. This increase in NPLs was as a result of maturity of loans granted in 2008 which falls due in 2009 as a result of the consequential effects of the financial crisis through its margin loans to private individuals and stock broking firms that were into speculations (Olisaemeka, 2009).



Source: Olisaemeka (2009) and IMF global financial stability report on non-performing loan

Figure 2.6: Bank Non-Performing Loans of Total Commercial Bank Loans (%)

Figure 2.6 depicts that in 2007 when the world economy started experiencing financial crisis, Nigeria's banking sector was yet to experience the full impact because the margin loans were still performing until 2008 when the margin loans became doubtful and more toxic in 2009 (Olisaemeka, 2009). Nkoro and Uko (2012) stated that banks became violent on borrowers of funds used to acquire shares, compelling borrowers to sell their shares at very low prices which led to greater market crash. Thus, from 2011 to 2016, the margin loans re-established performance.

2.11 Nigerian Policies and the Global Financial Crisis

1. The Presidential Steering Committee on Global Economic Crisis was set up in 2009 in order to monitor the developments and subsequently to advise the government on appropriate measures to address the consequential effect of the crisis (Sanusi, 2010).
2. The Presidential Advisory Team on Capital Market inaugurated in 2008 was given the responsibility to deliberate on measures and ways to reverse the declining fortunes of the Nigerian capital market.
3. The Central Bank of Nigeria was motivated to adopt quantitative easing measures such as reduction of Monetary Policy Rate (MPR) from 10.25% to 9.75%, subsequently to 6% in July 2009. As well as the reduction of Cash Reserve Requirement (CRR) from 4.0% to 3.0%, subsequently to 1.0%.
4. The reduction of bank liquidity ratio by Central Bank of Nigeria from 40.0% to 30.0% in 2008, subsequently to 25% was to enable the country cope with the impact of the global financial crisis (Sanusi, 2010).

5. The reduction in government foreign exchange financed expenditure e.g. overseas trips by government officials as well as putting hold on some capital projects, tightening bank credits and stock market fund raising, as well as curbing the import of big-ticket items.
6. The Securities and Exchange Commission, the Nigerian Stock Exchange and all capital market operators were mandated to reduce their transaction fees by 50%.
7. The Central Bank of Nigeria expanded the lending facilities to banks up to 180 and 360 days. The CBN opened expanded discount window operations, gave implicit guarantee of bank deposits to all interbank's transactions.
8. The central government resorted to withdrawals from excess crude oil account in order to augment monthly revenue to the three tiers of government. This was to mitigate the adverse effect of substantially lower current revenue receipts (Sanusi, 2010).
9. Liquidity injection by the Central Bank through the introduction of an expanded discount window and repayment of maturing Open Market bills was to inject ₦150 billion into the system and improve the liquidity in the economy.
10. The International Monetary Fund, through the Nigerian government provided some technical support to Nigeria during the financial crisis with respect to the Nigerian banking industry.
11. The World Bank assisted Nigeria in the 2009 budget with the sum of US\$500 million.
12. The African Development Bank disbursed grants in Nigeria of US\$1 million as technical aid to microfinance banks in Nigeria; US\$30 million as support for mobile telecommunication; and US\$78 million as loan for water and sanitation project. Furthermore, US\$150 million to United Bank for Africa; US\$50 million to Zenith Bank;

US\$100 million to Intercontinental Bank of Nigeria and US\$100 million to Guarantee Trust Bank (Sanusi, 2010).

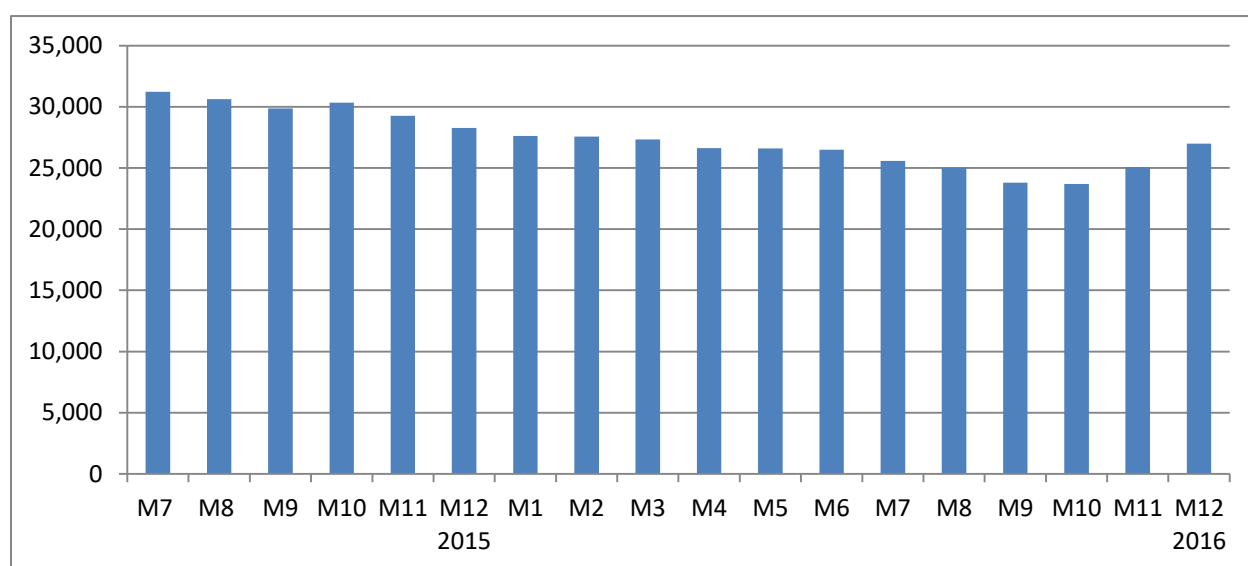
2.12 Nigerian Economy and Recession: Outlook Since 2015

The ongoing recession in Nigeria has resulted to inadequate investment. Consequently, this has led to the continuous increase in unemployment with low productivity especially in the non-oil sectors (solid minerals, manufacturing, and services), heavy fiscal burden at all levels of government, insecurity, severely depreciated currency and exchange rate uncertainties, continuous degeneration of energy base and inefficient transport systems (Resources & Trust Company research, 2016).

Since 2015, the rapid and largely sustained slump in the economy has continued till the second quarter of 2016, almost all major economic sectors are in recession. The real growth rate in the manufacturing sector declined to -3.36%; industrial real growth rate was reduced to -10.42%; construction real growth rate reduced to -6.28%; trade real growth rate reduced to -0.03%; transport real growth rate reduced to -5.34%; accommodation and food services real growth rate reduced to -6.39%; finance and insurance real growth reduced to -10.82%; real estate real growth rate reduced to -5.27% and government real growth rate reduced to -6.13%. However, agriculture and telecommunication were the only sectors that were minimally affected by the ongoing recession with real growth rates of 4.53% and 1.35% respectively. These statistics showed that the recession is severe on the Nigerian economy (Business day, 2017; Resources & Trust Company research, 2016).

The consequences of the degrading real growth rate of major economic sectors ends up with the Nigerian foreign exchange reserves. The pressure of the recession depleted the foreign exchange

reserve. Figure 2.7 portrays the depletion of the foreign reserve on a monthly basis due to the ongoing recession since 2015. However, the reserve has been seen to steadily increase since the last quarter of 2016 but has not reached the peak of the beginning of the third quarter in 2015 (Resources & Trust Company research, 2016).



Source: Resources and Trust Company research (2016) and CBN statistical database (2016), value of Nigerian monthly Reserves

Figure 2.7: Monthly Value of the Nigerian External Reserves (US\$ Million)

2.13 Factors Responsible for the Nigerian Economic Recession

The Nigerian economy is in recession because of the undiversified structure of government revenue and exports revenue as well as wrong policy formulations. The cause for the Nigerian economy being in recession could be explained through the following factors (Resources & Trust Company research, 2016).

1. Legacy Factors

The severe drop in oil prices has caused the reduction in government revenue through export as a result of over dependence on oil revenue. The collapse of crude oil prices brought about low

sovereign savings, subsequently reduction in foreign reserves. However, there were reductions in foreign direct investment (FDI) and Gross Domestic Product (GDP) growth due to fear of political unrest anticipated by foreign investors in 2015 general elections. Furthermore, alleged illegal money laundering and theft of public fund in government ministries through corrupt practices has reduced value-for-money from government spending.

2. Policy Factors

This factor was partly another contributing cause of the recession. Economic policies are major determinants of successful governance. It is on record that after the general elections in 2015, Nigeria was without executive cabinet for about 7 months. Thus, wrong policy choices were made (especially foreign exchange policy) as well as no clear economic policy were enacted which was occasioned by a weak economic cabinet till 2016, thereby allegedly the beginning of the wind of the recession. The weakness of the financial sector is a clear contribution to the recession. Consequently, policy factors have resulted in low investor and market confidence from both domestic and foreign investors, affecting foreign exchange inflows, FDI, new domestic investment, capital markets, employment and economic growth.

Besides, the recession was also attributed to the inconsistencies in monetary policies such as the Treasury Single Account (TSA), raising Cash Reserve Requirement (CRR) and Monetary Policy Rate (MPR) for banks.

3. Political/Security Factors

The budget relies exclusively on borrowing for fiscal stimulus in the absence of private capital strategy forcing debt services above 25% of budget and up to 40% of government revenue. The

cause of the recession was also attributed to the political class who allegedly loot public funds meant for development.

Also, was the impact of Niger-Delta militancy on oil production as about 800,000 barrels of oil per day was lost. Besides are the impacts of Boko Haram activities as well as the gradual growing activities of Herdsmen/Farmer conflicts on agricultural production and grazing across the country, particularly in the North Central zone.

4. Banking factor

The banking sector is the major lender of credit in terms of loans, overdraft, letter of credit, etc., for economic growth and investments. The banking sector in Nigeria through granting of loans majorly for importation has continually contributed to the lingering recession. Loans are mostly given out for importation instead for internal investments such as in agriculture. Loans that are mainly given out for importation has not meaningfully contributed to the growth of the Nigerian economy, rather to the country from which goods and services are imported, hence contribute to the depletion of the Nigerian foreign exchange reserves.

2.14 Government Responses to the on-going Recession in Nigeria since 2015

1. The Central Bank of Nigeria collaborated with the Securities and Exchange Commission (SEC) as well as the Nigerian Stock Exchange (NSE) to reduce the cost of transactions, particularly bond issuance so as to diversify funding sources away from banks, so as to attract more foreign portfolio investors into the sector.
2. The naira was devalued by monetary authorities due to the continuous depletion of the external reserves. The naira was devalued from ₦155/USD to ₦198.6/USD from

November 2014 to March 2015, and was above ₦250 per US dollar from 2016 to March 2017. This was to reduce the demand for foreign exchange by the end users.

3. Nigeria came up with an Economic Recovery and Growth Plan 2017 - 2020 (ERGP) which however not backed by any legislation. The plan however blurs the line between what the governments had intended to do before the recession due to devaluation of the naira which is an urgent crisis response package that is required to confront the recession to take Nigeria out of the crisis.
4. The Nigerian government injected US\$210 million into the financial market to solve the problem of illiquidity in order to stabilise the Naira-dollar exchange rate.
5. The Central Bank of Nigeria placed a ban on the importation of forty-one categories of goods (private jets, rice, toothpick, Indian incense, etc) in order to cushion the effect of the pressures on external reserves. However, importers or investors purchasing the listed items would do so using their own funds without support from the Central Bank of Nigeria. This is to encourage industrialisation as to prevent excess capital outflows.
6. The Central Bank of Nigeria also stopped Nigerians from using the interbank market to buy Eurobonds and foreign shares (Stober, 2016; IMF, 2017; Punch News Paper 2018, April 19).

2.15 Theoretical Review

In this research work, three theories were considered and analysed. These theories acknowledged the relevance of financial crises as well as the fluctuations in crude oil prices and foreign exchange reserves. However, this study would particularly be anchored on the Minsky's Financial Instability Hypothesis, in spite of the similarities of the theorems. Reinhard (2012)

opined that theories lies on what past thinkers actually said and their opinion about the analytical concepts, the theoretical approach, and the language used.

2.15.1 The Minsky's Financial Instability Hypothesis

Hyman Minsky developed his Financial Instability Hypothesis in the 1960s from an explicit model of financial crises in the context of Keynesian thinking after World War II. Thus, this theory emphasized on the occurrence of financial instability and financial crisis as inherent features of capitalist economies while relating income-debt relations to economic units as hedge, speculative and ultra-speculative/Ponzi units. The hedge units have sufficient expected cash flows, that can serve all future payment commitments (interest and capital) when there is a shock. Cash receipts from speculative units are only sufficient to cover interest payment in a sudden shock, but capital are roll over to be paid back only at the long-run. The units may be troubled if the roll over capital cannot be paid back after distortions in the financial market. The cash inflows of Ponzi units which depend more on financial market conditions are not expected to be sufficient to cover the interest payments in the current period, but only at the final periods when large cash flows are expected, which would allow repayment.

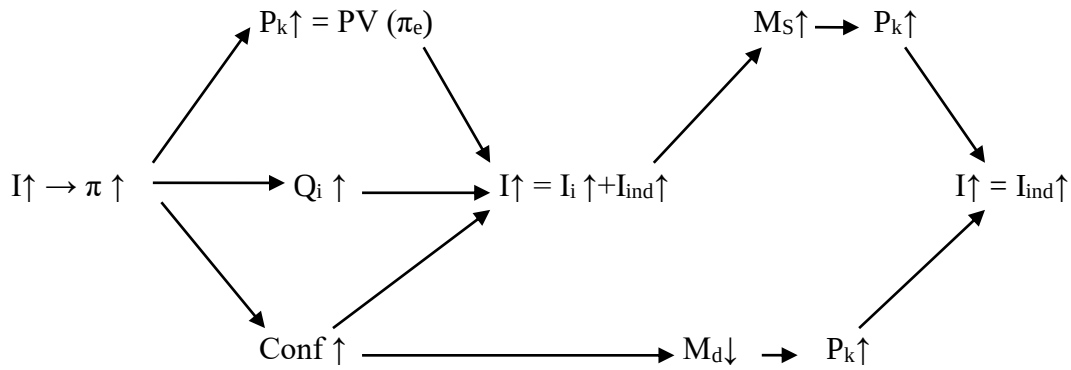
Minsky's positioned his theory on two key theorems. He considered an economy with stable financing regimes and unstable financing regimes. Subsequently, an economy can move from stable financing regimes such as in periods of exchange rate stability and stable increases in crude oil prices, resulting to surplus in foreign exchange reserve. This situation is normally during period of economic boom to unstable regimes which could be due to the effect of financial crisis. Thus, result to exchange rate instability and adverse shocks in crude oil prices, consequently leading to pressure on the foreign reserves. Apparently, Minsky's stipulates that an

economy could move from stability to instability when there is a rising exchange rate which tends to have a deteriorating effect on the foreign reserves. In his hypothesis, the depreciation of exchange rate could have a dampening effect on productivity and investment. The overall impact reduces output. A reduction in output means low productive capacity of the economy. Low productive capacity of the economy implies lower foreign exchange earnings.

Minsky from Keynes and Schumpeter thoughts was able to ascertain how an economic system can create a boom, and subsequently, how it moves in period of boom from financial stability to financial fragility. Thus, a bust in commodity prices (crude oil prices) could result due to increase in interest rates which may result to foreign reserve depletion. This he attributed to the bottleneck in the financial system which would lead to increased interest rate, or inflationary pressures due to the boom and subsequently persuade the central bank to adopt tight monetary policy. Minsky's vital part of its hypothesis on financial instability hypothesis is the relationship between profits and investment expenditures of the Kaleckian theory, in which during an investment boom, the margins of safety are reduced. Such that the expected receipts exceed payment commitments as the relative weight of Ponzi and speculative units' increases during the boom, hence a net trade surplus occurs. Besides, a net trade increase would lead to reserve accumulation when receipts exceed payment resulting to increase in investment due to surplus in internal liquidity. However, a net trade deficit to reserve depletion will occur when payment exceed receipts, consequently resulting to reduction in investment due to shortage in internal liquidity. This would lead to the gradual distress in the financial market thereby result to commodity price drop. According to Toporowski (2007) this relationship is the key argument to make financial fragility endogenous. He assumed an economy that has just gone through a crisis, whereby most speculative units have been wiped out. Thus, all financial market participants are

very conservative regarding finance after their recent crisis experience. Lenders and Borrowers evaluate the safety prospects of the financial markets, trying to bring back stability. This conservative debt structure leads to a phase of stability and subsequently to market confidence.

Detzer and Herr (2014) used the self amplifying investment loops to further buttress the Minsky's financial instability hypothesis in Figure 2.8.



Source: Detzer and Herr (2014) buttressing the Minsky's Financial Instability Hypothesis

Figure 2.8: Detzer and Herr Self Amplifying Investment Loops

Where: Conf = Confidence, I = Investment, I_i = Investment internally financed, I_{ind} = Investment debt financed, M_s = Money supply, M_d = Money demand, π = Profits, P_k = Asset prices, $PV(\pi_e)$ = Present value of expected profits, Q_i = Internal funds

When the interest rate increases, hence the meltdown begins. The mechanisms described in Figure 2.8 would work in reverse. The increase in the interest rate would raise the supply price of investment. Therefore, investment would decline as a result of shortage of liquidity as asset value fall, leading to the gradual distress in the financial market (Minsky, 1982, 1986 & 1992; Detzer & Herr, 2014).

2.15.2 The Keynes' Theory of Uncertainty and Expectations

John Maynard Keynes proposed his theory in 20th century in the early 1930s following the Great Depression. He followed to a certain extent the Wicksell theory. He proposed a model of a money supply in an economy, such that money plays a key role and penetrates all facets of the economy, although cash flows in turn are uncertain and depend on conditions in the product markets. From national accounting, Keynes deducted his fundamental equations of the value of money. He assumed the economy to be closed as such represent net domestic product or national income (Y) which is equal to wages (W), plus normal profit (Q_N) and undistributed profits (Q_E). Where 'P' is the price level and Y_r as real income ($Y = Y_r P$),

$$Y = Y_r P = W + Q_N + Q_E \dots\dots\dots (1)$$

if the price level is isolated, the equation of the value of money becomes

$$P = (W/Y_r) + (Q_N / Y_r) + (Q_E / Y_r) \dots\dots\dots (2)$$

The term (W/Y_r) expressed as unit per labour costs. The term (Q_N / Y_r) was considered as normal profits per unit of output or unit per profit costs represent interest costs, normal dividends and other profits flowing to households. Keynes implicitly assumed that in a monopolistic competition, increased in unit per labour costs and profit costs are rolled over by firms and increased price level as falling costs lead to declining price level. The cost and price level changes are independent of the demand collection as a result of changes in nominal wages. This indicates that in the framework of a closed economy firms are able to roll-over costs without excess demand. For instance, if all firms in an industry needs oil as an input and are confronted with higher oil prices, they will increase their output prices.

He argued that instabilities and financial crises are all developed within the framework of money supply in an economy. Keynes' analyses in many aspects covered instability processes, but he did not develop elaborated models of financial crises. However, systemic financial crises deflationary developments are vital. A falling price level directly increased the real debt burden of all debtors in domestic currency. The combination of goods market deflation and high debt irrevocably led to a systemic financial crisis. This point was made very clear by Irwin (1933) who developed his real debt theory of deflations under the impression of the Great Depression. Keynes did not discuss financial crises explicitly, but he noted that falling nominal wages are disaster. Hence, nominal wages should not be flexible and nominal wages never should decrease. He attributed a capitalist economy as a nucleus which can be expressed by $M - C - (M + \Delta M)$ with M as money, C commodities and ΔM as profit. He showed the credit relationship with the formula

$$(M_{Fin} - M) - C - (M + \Delta M) - (M_{Fin} + \Delta M_{Int}) \dots \dots \dots (3)$$

where $(M_{Fin} - M)$ indicates that management gets funds from financial institutions and private wealth owners (M_{Fin}) to invest in productive capital. Consequently, loans collected by investors have to be paid back to creditors including interest, which is represented by

$$(M + \Delta M) - (M_{Fin} + \Delta M_{Int}) \dots \dots \dots (4)$$

The vital issue is that credit given to firms and investment in productive capital must be measured as a potentially unstable process which may result to a situation where credit could not be paid back due to unstable economic trends such as fluctuations in price level. If 'P' is the price level and 'M' is the economic trend, then the equation would be

$$P = \frac{M_1 P_1 + M_2 P_2}{M_1 + M_2}, \dots \dots \dots (5)$$

$$P = \frac{P(M_1 + M_2)}{M_1 + M_2}, \dots \dots \dots (6)$$

The position of this in equations (5 and 6) is that the downward or upward fluctuations in P imply changes in $\frac{M_2}{M_1}$ indicating the unstable nature of the economy. However, an economic recession can get out of control and grow worst like the Great Depression in the 1930s. The difference between a normal crisis and a disaster leading to a systemic financial crisis with deep repercussions for production and employment is a goods market deflation (Detzer & Herr, 2014).

2.15.3 The Knut Wicksell's Theory on Cumulative Process

Knut Wicksell theory was proposed in the late 19th century. He based his theory on the dynamics of capitalist economies by the interaction of natural rate of interest and the money interest rate. He argued that the natural rate of interest is the interest rate which would be realised if the neoclassical capital market actually existed, savings and investment would directly interact and there would be no money. However, he referred to the money interest rate as interest rate on loans which is neutral in respect to commodity prices. According to Wicksell, the money rate of interest is determined in the monetary sphere mainly by the central bank. He affirmed that a cumulative investment process is triggered when money interest rate is lower than the natural interest rate which would abnormally increase the number of entrepreneurs. The expansionary consequences of entrepreneurs would lead to an inflationary process. Thus, he argued that for a deflationary contraction to occur, money interest rate must be above the natural interest rate. In

Wicksell's context, changes in price level, real production and employment are not severely distinguished as they occur at the same time.

Wicksell's theoretical approach serves as a suitable model to explain financial crises. It encompasses the nature of capitalist development as a sequence of cumulative expansion and contractions which affect the whole economy. He tried to develop and visualised an economy which switches from cumulative expansion to cumulative contraction in which a severe contraction would lead to systemic problems in the financial system. He used the velocity of circulation of money to further buttress the cumulative expansion and contraction to pure cash push on the economy. The velocity of circulation of money is somewhat elastic quantity, which possesses sufficient powers of resistance against expansion or contraction for the Quantity Theory to retain the appearance of substantial validity if it is possible to calculate the amount of money in circulation.

Wicksell assumed entrepreneurs' capital is mainly from the banks, in the form of a sum of money 'K' which is equal to the value of the total amount of available real capital. This money capital is paid out in the process of demand and supply which recycled back to the banks. If the contractual rate of interest is 'i'. Then the entrepreneurs would have at the end of a financial year to repay to the banks the sum $K(1 + \frac{i}{100})$ which represents debt to the bank owed by the entrepreneur. The interest rate paid on deposits is always lower than the rate charged by banks on loans. The difference between these two rates remunerates the banks, for the financial risk involved for holding liquid securities which carry only a moderate rate of interest as $K(1 + \frac{i}{100})$ which represent assets and liabilities.

Furthermore, Wicksell position was also that difference would arise between the natural rate of interest and the contractual rate of interest which may be due to a fall in the level of wages brought about by a relative increase in the productivity of labour and natural forces due to technical progress or to a fall in the rent of land. He assumed that the natural rate is raised to $i + 1$ percent, while banks maintain a customer's rate of discount is ' i '. If the entrepreneurs pay an amount $K(1 + \frac{i+1}{100})$, owe only $K(1 + \frac{i}{100})$, thus they would obtained a surplus profit of $\frac{K}{100}$. It followed that if wages and rents remain unaltered; supply and demand continue to be equated at the existing level of prices (Wicksell, 1898; Detzer & Herr, 2014).

2.16 Empirical Review

There are empirical studies that assessed the effect of financial crises on macroeconomic factors such as crude oil price and exchange rate, which consequently had adverse pressures on the Nigerian foreign exchange reserves over the years. Thus, the effect of financial crises were both on the reserves of oil and non-oil exporting economies (Edun, 2012; Ogiri, Amadi, Uddin & Dubon, 2013).

2.16.1 Crude Oil Price and Foreign Exchange Reserves

Nwoba, Nwonu, and Agbaeze (2017) empirically investigated the effect of decline in oil prices on the Nigerian economy. Secondary data for a period of 2011 and 2015 were considered. The methods adopted in analyzing the data were simple regression analysis, Pearson Product Moment Correlation and Chi-Square to examine the effect as well as the relationship between oil price and economic growth indicators (Foreign exchange earnings, aggregate expenditure, budget servicing and public sector employment rate). The results of their test showed that oil price has a

significant effect on foreign exchange earnings. This indicated that an increase in oil price led to severe increase in foreign exchange earnings.

Osuji and Ebiringa (2012) investigated the long run relationship between external reserve management and macroeconomic factors in Nigeria. They applied Vector Auto-regression and the Granger causality test to regressed secondary data for external reserve (dependent variable), gross domestic product, crude oil price, exchange rate, capital goods and non-capital goods (independent variables) from 1981 to 2010. The result of the VAR analysis showed significance between gross domestic product, crude oil price, exchange rate, capital goods, non-capital goods and external reserves. However, the causality of these variables showed most influencing factors that determine the values of external reserves in Nigeria.

Imarhiagbe (2015) studied the impact of crude oil price on the conditional mean and volatility of external reserves in Nigeria. He used monthly data from 1995 to 2013 for external reserves and crude oil price which was modelled using the GARCH-M and EGARCH-M. The results of Augmented Dickey-Fuller and Phillips-Perron statistical tests for unit root suggested that the variables were stationary at first difference. Besides, each variable showed evidence of ARCH effect. The GARCH estimate was observed to have persistent shock to volatility of external reserves. However, from his findings, volatility of external reserves was statistically significant in the mean equations which implied that the mean is not constant but changes with volatility. In conclusion, oil price fluctuation has positive impact on the volatility of external reserves. Chuku, Akpan, Ndifreke and Effiong (2011) examined the correlation between oil price shocks and the current account balances in Nigeria. Their result showed evidence of oil price shocks having significant short-run effect on current account balances.

Stober (2016) examined the interaction of oil price and exchange rate on external reserves from 1970-2014. The study used long-run vector error correction model and short run granger causality/block exogeneity Wald tests to find the relationship and the time of convergent among the variables. The result of his test predicted that crude oil price would converge in approximately 4 years, resulting to external reserves to converge to stability in 5 years. However, the stability of external reserves in 5 years would result to foreign exchange rate to be stable in 96 years. This he suggested was due to Nigeria's over-dependent on imported products, foreign medical tourism, and the effect of declining oil price, stock market speculation and capital flight.

However, in another study carried out by Stober (2016), he used linear regression for the same period as in his previous study ranging from 1970 – 2014 to estimate the relationship between crude oil price and total external reserves. The result of the linear regression showed a strong positive relationship between the two variables, such that increase in crude oil price led to an increase in foreign reserves during the period of analyses. He concluded that foreign exchange reserves have significantly experienced volatile increase after the financial crisis across the globe as a result of exchange rate shock in crude oil producing countries. He apparently stated that when crude oil price rose above \$100 per barrel before the global financial crisis, foreign exchange reserve was \$62.08bn. However, when crude oil price declined severely below \$100 per barrel, external reserve was \$40bn as at April 2010 due to the global financial crisis. The continuous drop in crude oil price in the post crisis left the external reserves at about \$37 billion as at 2014.

In a study done by Abiola and Adebayo (2013), it was their view that the proceeds from crude oil mainly accounts for Nigeria's external reserves. They stated that the external reserves of Nigeria as at 1995 was about US\$1.295 billion, thereafter increased to US\$62.08 billion in September

2008, but decreased to a balance of US\$42.54 billion in December 2013. These periods correspond to periods of significant high world crude oil prices. Consequently, during the global financial crisis, the decrease in crude oil price depleted the external reserves to an average of \$46.5 billion. Osigwe, Okechukwu and Onoja (2015) in their investigation noted that the Nigerian external reserve has been dwindling at the rate of about ₦5 billion monthly since the severe decline in crude oil price at the international market.

Audu and Okumoko (2013) empirically examined the implications and determinants of foreign reserves on Nigerian economy, adopting annual time series data from 1970 to 2012. They applied econometric analysis technique by modelling real reserves and testing for stability on the model. The estimated long-run VECM model showed that crude oil price among other variables was statistically insignificant with negative effect on real foreign reserve in Nigeria.

Shuaibu and Mohammed (2014) examined the short-run and long-run relationship between international reserves and variability of export earnings, opportunity cost of holding reserves, degree of openness of the economy, oil price, GDP per capita, political stability index and water emission from 1970 and 2010 in Nigeria. The study adopted error correction mechanism and the Auto-Regressive Distributed Lag (ARDL) bounds for testing the existence of co-integrating relationship. Based on the results of co-integration, long run relationship exists among the variables. The results further indicated that variability of export earnings, GDP per capita, water emission and the one period lagged value of international reserves positively affected reserve accumulation in Nigeria at the long run. While oil price negatively affected international reserves accumulation at the long-run but was positive in the short-run.

Olanipekun (2016) empirically examined the relationship between oil price shocks, exchange rate, real GDP and external reserve in Nigeria, using data ranging from first quarter of 1971 to fourth quarter of 2014. The Structural Vector Autoregressive (SVAR) model was employed to obtain results for impulse response functions and variance decomposition analyses. The results obtained revealed that oil price shocks had negative effect on external reserves. While exchange rate and economic growth, proved to be more significant in the long run for external reserves. In his conclusion, oil price shocks had severe effect on the macroeconomic performance of Nigeria. Hence, suggested that an effective macroeconomic management was needed to reduce the negative effect of oil price shocks on the foreign exchange reserves.

Osuji (2015) examined the effect of oil price movements on USD-Naira exchange rate in regard to the foreign exchange reserves using granger causality for monthly time series data from January 2008 to December 2014. The granger causality test was used as control for the effect of foreign reserves. The result of the granger test indicated that unidirectional causality run in each case from oil prices to exchange rate and from oil prices to foreign reserves. This implied that oil prices granger caused foreign reserves.

In the study of Ajakaiye and Fakiyesi (2009), they used computable general equilibrium methodology to examine the impact of global financial crisis on the Nigerian economy which was transmitted through decrease in the prices of crude oil exported to the international market. Their test results showed that negative oil price shocks had negative impact both in the short and medium term growth of the economy. Based on their results, the oil price shocks had a negative stagflation effect on the level of domestic investment and worsened government account and income position in Nigeria.

Papapetrou (2009) examined the relationship between oil prices and economic activities in Greece during the period ranging from 1982 to 2008. Applying a regime-switching model (RS-R) and a threshold regression modelling (TA-R), he obtained empirical evidence which suggest that the degree of negative correlation between oil prices and economic activity strengthened during periods of rapid oil price changes and high oil price change volatility.

Furthermore, Abdullateef and Waheed (2010) applied the ordinary least square and the vector error correction techniques to investigate the effect of variation in external reserve positions of Nigeria on domestic investment, price level, and exchange rate during the period ranging from 1986 to 2006. They found that change in foreign exchange reserves affected only foreign direct investment (FDI) and exchange rates but had no effect on local investment and price level. The results as well as revealed the need for comprehensive foreign reserve management strategies that will focus on maximizing the benefits from oil export revenue, using more of these resources to improve local investment.

Uguru (2015) examined the effects of oil price instability, demand for foreign exchange rate instability and external reserves in Nigeria using monthly data for the period 1999 to 2009. The study reaffirms the direct nexus between oil price changes and exchange rate instability. In which a nation's external account is believed to be prone to fluctuations in the global world oil prices. The fluctuations in crude oil price had different effects on different countries depending if the country produces oil or not. Increase in oil price implied higher revenues for oil producers and lower savings in oil-importing countries.

2.16.2 Exchange rate and Foreign Exchange Reserves

Nations of developed, developing and emerging economies are more conscious about the stability of their exchange rates following the collapse of the Bretton Woods system of fixed exchange rates in the early 1970s as a result of global economic and financial crises. This was emphasised by Ahmad and Pentecost (2009), who attributed the introduction of flexible exchange rates in the 1970s, motivated most countries to accumulate the adequate level of external reserves that should be held in order to protect their economies from currency crises. In view of this, many researchers have attempted to investigate the relationship between exchange rate and external reserves in both country-specific and cross-country studies. For instance, Calvo and Reinhart (2002) stated that developing countries believed to always focus in maintaining exchange rate instability at the detriment of external reserves fluctuations such that countries relatively intervene to maintain stability in the foreign exchange market using their stock of external reserves. Hence, several empirical works were considered on reserve volatility and exchange rate.

Umeora (2013) investigated the relationship between exchange rate, inflation, gross domestic product and foreign exchange reserves in Nigeria during the period ranging from 1986 - 2011. He applied adjusted dickey-fuller test for unit root, Johansen test for co-integration and error correction model. The results of the tests showed positive and significant relationship between exchange rate, GDP and foreign exchange reserves. Thus, inflation showed negative and insignificant relationship with foreign exchange reserves.

Ahmad and Pentecost (2009) examined the long-run relationship between exchange rate and international reserves in a sample of African countries for 1st quarter of 1980 to 4th quarter in

2004, using the threshold co-integration technique. Co-integration occurred when the divergence between the two was above the threshold point estimate. The result of the threshold co-integration technique showed the presence of long-run dynamics between exchange rate and international reserves which varied from country to country, reflecting the country's exchange rate regimes. The floating regimes seem to have higher threshold than the peg regimes and the exchange rates adjusted more than the reserves.

Nwachukwu, Ali, Abdullahi, Shettima, Zirra, Falade, and Alenyi (2016) modelled the long-run connection between the bureau de change exchange rate and external reserves in Nigeria, using threshold vector error correction model framework on daily data from January 1st, 2014 to July 31st, 2015. The test results indicated non-linear long-run relationship between bureau de change exchange rate and external reserves. This occurred when the deviation between the two variables was above the estimated threshold point. Besides, the error correction coefficient for bureau de change exchange rate and external reserves equations were reportedly not statistically significant at the 5% significant level, but was statistically significant at 10 per cent significant level. This indicated that the adjustment mechanism between the two variables flow from external reserves to bureau de change exchange rate.

Ajibola, Udoette, Omotosho and Muhammad (2015) examined the long-run correlation between exchange rate and external reserves for the period 1990Q1 to 2012Q4 in Nigeria using the 2-regime threshold vector error correction model through maximum likelihood method. Their results affirmed co-integration between the two variables which occurred when the equilibrium error exceeded the estimated threshold parameter of 0.52. Based on the threshold, the result showed that the error correction coefficients of the exchange rate in the two regimes were not significant, indicating that exchange rates do not react to equilibrium error during the estimation

period. Besides, external reserves adjusted to correct past deviation when the equilibrium error exceeds the threshold parameter. Furthermore, external reserves adjusted to sustain long run equilibrium, while exchange rates do not. As a consequence, external reserves were deployed to sustain exchange rate stability in Nigeria.

Olokoyo, Osabuohien, and Salami (2009) examined the interactive influence of foreign reserve on economic size as measured by GDP, trade, level of capital inflows, exchange rate and inflation. They analysed secondary data ranging from 1970–2007, using co-integration test and vector error correction within the framework of autoregressive distributed lags. Their econometric results revealed the existence of long-run relationship between the variables. Also, there was evidence of convergence of the variables from the short run to the long run with slow speed of adjustment. Besides, they concluded that the accumulation of large foreign reserves was not very productive in Nigeria due to its inability to induce some of the macroeconomic variables.

Abdullateef and Waheed (2010) applied the ordinary least square and the vector error correction techniques to investigate the effect of variation in external reserve positions of Nigeria on domestic investment, price level, and exchange rate during the period ranging from 1986 to 2006. They found that change in foreign exchange reserves in Nigeria was affected by foreign direct investment (FDI), while exchange rates had no effect on foreign exchange reserves in Nigeria. In a survey of literature, Kaminsky, Lizondo, and Reinhart (1998) empirically concluded that international reserves and real exchange rate are very useful in anticipating currency crises. Their results showed that depleting international reserves indicate that balance of payment problems could lead to currency crisis.

Osigwe, Okechukwu and Onoja (2015) modelled the determinants of foreign reserves in Nigeria using the Johansen co-integration approach. They observed that real gross domestic product, foreign direct inflows and oil exports had positive and significant determinants on foreign reserve in Nigeria. However, exchange rate was found to be significant but with negative determinant on foreign exchange reserves. While lending rate and inflation rate were discovered to be negative and insignificant. Furthermore, the coefficient of non-oil exports, though positive, was not a significant determinant of foreign reserve. Besides, Nteegah and Okpoi (2016) studied to determine how trade has influenced the Nigerian foreign reserves. They applied the co-integration and vector error correction model on data for foreign reserves, oil imports, non-oil imports, oil export, non-oil exports and exchange rate during the period 1980 – 2015. Their findings revealed that foreign trade impacted significantly on foreign exchange reserves in Nigeria during the period covered by their study.

Ibrahim (2011) examined the impact of change in external reserves position of Nigeria on domestic investment, inflation and exchange rate between 1986 and 2006, using ordinary least square and vector error correction models. It was observed that fluctuations in external reserve were not significantly influenced by exchange rate but by foreign direct investment and inflation rates. Stober (2016) investigated the interaction of oil price and exchange rate on external reserves from 1970-2014. The study used long-run VECM and short run granger causality/block exogeneity Wald tests to find the relationship and the time of convergent among the variables. The result of his test predicted that crude oil price would converge in approximately 4 years, which would result to external reserves converging to stability in 5 years. However, the stability of external reserves in 5 years would result to foreign exchange rate to be stable in 96 years. This

he suggested that would be due to Nigeria's over-dependent on imported products, foreign medical tourism, and the effect of declining oil price, stock market speculation and capital flight.

Audu and Okumoko (2013) considered the implications and determinants of foreign reserves on Nigerian economy, adopting annual time series data from 1970 to 2012. They applied econometric analysis technique by modelling real reserves and testing for stability on the model. The empirical analysis of Johansen maximum likelihood co-integration procedure indicated a long-run relationship between Nigeria's real foreign reserves and real exchange rate among other economic determinants. The results of their study showed that real exchange rate was statistically significant with positive effect on real foreign reserve in Nigeria due to the stability of the model.

Osuji and Ebiringa (2012) investigated the long run relationship between external reserve management factors and macroeconomic variables in Nigeria. They used econometric analysis to regressed secondary data for external reserve, gross domestic product, export oil, exchange rate, capital goods and non-capital goods from 1981 to 2010 using the vector auto-regression and the granger causality test. The results of the VAR analysis showed significance between gross domestic product, export oil, exchange rate, capital goods, non-capital goods and external reserves. Thus, the causality of these variables showed most influencing factors that determine the values of external reserves in Nigeria.

Romero (2005) in his study on China and India used ordinary least squares regression to empirically examine the dynamics of foreign currency reserves. He modelled reserves holding as a function of current account balance for dependent variable and average propensity to import as well as exchange rate which were the independent variables. The result of his regression showed

exchange rate to be statistically significant in determining external reserves in India, while exchange rate was not significant determinant of external reserves for China.

In a related work by Fang-Yuan and Jun-Guo (2013) who adopted the quantile regression model to empirically examine the effect of GDP and exchange rate on foreign exchange reserve in China for data ranging from 1985 to 2010. It was observed from their results that GDP and exchange rate had positive and significant influence on the size of foreign exchange reserve in China. However, the effect of exchange rate on foreign exchange reserve was higher than GDP at the mean place, median and lower quantiles, but smaller than GDP at the higher quantile.

Gosselin and Parent (2005) used the Pedroni's panel co-integration tests in respect to Phillips-Perron or Augmented Dickey-Fuller, panel error-correction model and ordinary least squares for estimating the long-run foreign reserve demand function for China, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, and Thailand emerging-market economies for period ranging from 1980 to 2003. The variables adopted by Gosselin and Parent were total reserves minus gold divided by nominal GDP, import propensity as imports divided by GDP, volatility of export receipts, ratio of short-term external debt to GDP, ratio of broad money to GDP, exchange rate volatility and opportunity cost. The results of their findings showed evidence of co-integration, with a strong significant error-correction term. However, the negative coefficient of exchange rate volatility plays an increasingly important role in determining reserve holdings in emerging Asia.

Gokhale and Raju (2013) adopted the unit root test, Johansen co-integration test and vector autoregression (VAR) to analyse the causal relationship between exchange rate and foreign exchange reserves in the context of India. They used time series data from 1980 and 2010 for foreign

exchange reserves as dependent variable and exchange rate as independent variable. Their result portrayed that there is no long and short term connection between exchange rate and Indian foreign exchange reserves. In a similar study, Bhullar and Dhameja (2016) analysed the long run equilibrium between exchange rate and Indian foreign exchange reserve. The data for Indian foreign exchange reserve and exchange rate adopted were for a period ranging from 2005 to 2016. The regression methods used were the ADF unit root test, Johansson co-integration test and vector auto regression test on E-views software for statistical interference. Their results conclusively revealed the existence of long run equilibrium between foreign exchange reserve and exchange rate.

Lane and Burke (2001) studied the determinants of cross-country variation in the level of international reserves over sample period from 1981 – 1995 in which data set consists of 102 countries. They estimated reserves to GDP ratio (dependent variable); output per capita, trade openness, country size, export volatility, financial development, capital controls, exchange rate regime, oil dummy and external debt variables (independent variables) using cross sectional regressions by OLS, with heteroscedasticity consistent standard errors. They found out that there was no evidence that exchange rate regime, export volatility, capital controls or oil dependence independently influences the level of reserves.

Tariq, Haq, Jan, Jehangir and Aamir (2014) examined and analysed the interaction between real exchange rate and foreign exchange reserves in the framework of the Mercantilist approach within sample period from 1973 - 2008 of Pakistan. The results of their findings showed that reserves accumulation in Pakistan is the consequence of export led growth approach through real exchange rate depreciation. Also, Khan (2013) modelled the correlation and causality between foreign exchange reserves and exchange rate as measured by nominal and real exchange rate for

Pakistan economy, using co-integration and granger causality analyses. Annual time series data from 1983 to 2009 were used for the variables. The results indicated long run relationship between foreign exchange reserves and exchange rate. Besides, the granger causality test showed causality from nominal effective exchange rate and real effective exchange rate towards foreign exchange reserves. This portrayed that exchange rate affected foreign exchange reserves in Pakistan.

Eliza, Azali, Siong-Hook and Chin (2008) examined the demand for foreign exchange reserves in Indonesia, Malaysia, the Philippines, Singapore and Thailand over period of 1970 - 2005. The ARDL bounds testing approach was adopted to test for co-integrating relationship between GDP per capita, average propensity to import relating to exchange rate, export volatility, current account balance to GDP, total external debt to GDP and demand for international reserves. The empirical test results portrayed long run relationship between demand for international reserves and its determinants in the five ASEAN economies.

Chin-Hong, Mohamad, Affendy and Oi-Khim (2011) used co-integration test technique to analyse the nexus between foreign exchange reserves and income level, exchange rate, balance of payments and the real cost of foreign exchange reserves aggregation in Malaysia for the period ranging from 1975 to 2007. The results showed that foreign exchange reserves and other variables that were used had long-run co-integration. The study of Elhiraika and Ndikumana (2007) used panel data from 21 African countries for period of 1979 - 2005 to examine the sources, motivation and economic implications of reserve accumulation considering its relationship with exchange rate, inflation, public and private investment. The results of the tests showed that nominal exchange rate strongly responds to changes in international reserves both on the short-run and the long-run.

Obstfeld, Shambaugh and Taylor (2008) examined the determinants of reserve growth in a broad panel estimation of developing, emerging and developed economies of 134 countries ranging from 1980 to 2004. The variables employed were international reserves to GDP (dependent variable), log of population, log ratio of foreign trade to GDP, exchange rate volatility, log of real GDP per person and log of M_2 to GDP (independent variables). The estimated results showed that the variables were all positive and statistically significant with the level of foreign reserve as well as significant predictors of reserve stocks.

Aizenman and Marion (2004) developed an estimation equation to predict the level of reserves over the 1980-1996 period based on the buffer-stock theory developed in the 1970s as well as applied a panel data analysis for sample of 64 countries. They investigated the significance of political considerations, real export receipts, effective exchange rate volatility, external shocks vulnerability and population size to real GDP per capita in determining international reserve holdings. From their results, real export receipts have no significant variation in the observed reserve holdings. While effective exchange rate volatility was significant and accounted for about 70% of the variation in the observed reserve holdings with other variables. However, it was their conclusion that external reserve holdings decreased with the economy's growing vulnerability with greater exchange-rate flexibility.

Dominguez, Fatum, and Vacek (2013) investigated the implication of systematic reserve sales, intended to mitigate valuation losses on domestic currency movements. They employed the baseline estimations, using the Weighted Least Square (WLS) as developed by Anderson and Bollerslev (1998). The reserve sales data covered all Czech National Banks and CZK to EUR intraday exchange rate from January 1st, 2004 to November 23rd, 2007. From the baseline results, it was observed that there was no evidence that reserve sales influenced exchange rate

when carried out irregularly. But there was evidence of statistical significant appreciation of the domestic currency for reserve sales on daily basis. They concluded that foreign exchange reserves sales can be carried out with no obvious influence on the foreign exchange market.

In addition to the empirical studies, Chowdhury, Uddin and Islam (2014) conducted an empirical analysis of the factors influencing foreign exchange reserves in Bangladesh. They applied Augmented Dicky-Fuller unit root test, ordinary least square and Engle and Granger residual based co-integration test to examine the long run relationship between remittance (% of GDP), exchange rate, Inflation rate differential, unit price index of imports, unit price index of exports, home interest rate, broad money (% of GDP), foreign aid (% of GDP), per capita GDP in PPP dollar and foreign exchange reserves for the period of 1972 - 2011. The results of their analyses showed stationary among the variables except inflation rate differential. Basically, they carried out co-integration test analysis on the variables adopted. Apart from inflation rate that had no order of integration, they observed long-run equilibrium relationship among the variables. The results further indicated that exchange rate and money supply were negative but had significant effect on the foreign exchange reserves in Bangladesh.

2.16.3 Money Supply to Gross Domestic Product and Foreign Exchange Reserves

Financial deepening referred to the method of enhancing and broadening financial systems by increasing the depth, liquidity, efficiency, and volumes of financial institutions and markets, hence diversifying domestic sources of finance, and extending access to banking and other financial services (Dabla-Norris, 2012). Ndebbio (2004) infer that financial deepening refers to increase in the supply of financial assets, subsequently providing adequate financial services to

the economy and ascribe the Sub-Saharan Africa financial markets to be underdeveloped in terms of currency liquidation.

Empirical studies argued that financial deepening have different effects on economic growth in terms of the applied financial deepening indicator, length of study and the data sets that may vary from panel data across countries, sub-regions to individual countries. In most empirical studies, money supply to GDP has been used as proxy to financial deepening, financial depth and financial development. Empirical evidence opined that the global financial crisis was a by-product of central banks appetite for reserves accumulation which increases the vulnerability of the reserve currency (Steiner, 2012).

Lane and Burke (2001) studied the determinants of cross-country variation in the level of international reserves over sample period from 1981 – 1995 in which data set consisted of 102 countries. They estimated reserves to GDP ratio (dependent variable); output per capita, trade openness, country size, export volatility, financial depth, capital controls, the exchange rate regime, oil dummy and external debt variables (independent variables) using cross sectional regressions by OLS, with heteroscedasticity consistent standard errors. Besides the surge in reserves, they found out that financial depth, measured by M_2 to GDP was observed to significantly increased reserves. This they attributed to the possibility that some liabilities in the domestic financial system are denominated in foreign currency, directly generating a potential need for more reserves.

Nzotta and Okereke (2009) did an empirical investigation on financial deepening and economic development in Nigeria between 1986 and 2007. In their analysis, financial deepening was measured by ratio of money supply to GDP, as a function of cheques value cleared to GDP,

value of cheques to money supply, ratio of private sector credit to GDP, financial savings to GDP as reserves, rate of inflation, real lending rates, deposit money bank assets to GDP and currency outside banks to money supply. The results of the analyses indicated low financial deepening index in Nigeria over the period of study. Besides, lending rates, financial savings ratio, cheques value cleared to GDP and the deposit money banks to GDP ratio had significant relationship with financial deepening. The study concluded that the financial system had not sustained an effective financial intermediation, especially credit allocation and a high level of monetization of the economy.

Obstfeld, Shambaugh and Taylor (2008) studied the determinants of reserve growth in a broad panel estimation of developing, emerging and advanced economies of 134 countries ranging from 1980 to 2004. The variables employed were international reserves to GDP (dependent variable), log of population, log ratio of foreign trade to GDP, exchange rate volatility, log of real GDP per person and log of M_2 to GDP (independent variables). The estimated results showed that the variables were all positive and statistically significant with the level of foreign reserve as well as significant predictors of reserve stocks.

Gupta, Mishra, and Sahay (2003) analysed the behaviour of output for a sample of 195 episodes of currency crisis in developing countries during 1970 - 1998. They observed that there were contractions in over 117 of the crises in the sample. The output contraction was likely greater in large and more developing economies than in small and less developing economies, and crises in countries preceded by large capital inflows were more likely to be associated with contraction during crises. Ke (2007) adopted the Cross-Section, based on Pooled analysis to ascertain the relationship between foreign reserves (dependent variable) and money supply to GDP

(Independent variable). He concluded from his result that China's accumulation of reserves exceeded the estimated adequate level due to money supply to GDP.

Gosselin and Parent (2005) used the Pedroni's panel co-integration tests (Phillips-Perron or augmented dickey-fuller, panel error-correction model and ordinary least squares) for estimating the long-run foreign reserve demand function for China, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, and Thailand emerging market economies for period ranging from 1980 to 2003. The variables adopted by Gosselin and Parent were total reserves minus gold divided by nominal GDP, import propensity as imports divided by GDP, volatility of export receipts, ratio of short-term external debt to GDP, ratio of broad money to GDP, exchange rate volatility and opportunity cost. The results of their findings showed evidence of co-integration, with a strong significant error-correction term. Positive coefficient of imports ratio to GDP, export receipts volatility and the ratio of broad money to GDP was also observed to play increasingly important role in determining reserve holdings in emerging Asia.

Goldstein and Xie (2009) examined across sample of 21 emerging economies, with regards to standard measures of reserve adequacy in ratio of reserves to money supply. Korea showed the largest decline in reserves during the crisis, thereafter, Malaysia. They found out increases in reserves of other emerging Asia economies, with particularly large percentage increase recorded by Thailand, China, the Philippines, and Hong Kong. However, emerging Asia had a ratio of reserves to short-term external debt that was about twice as high as in Latin America and six times as high as in Central and Eastern Europe. However, Aizenman and Marion (2004) examined the relatively high demand for reserves by emerging Asian economies and the relatively low demand by some developing countries in Latin America. Using a theoretical model, they considered the role of political uncertainty and corruption as determinants of reserve

holdings. They concluded that accumulation of international reserves in emerging Asian economies was stimulated by the consequences of the Asian crisis.

Chowdhury, Uddin and Islam (2014) conducted an empirical analysis of the factors influencing foreign exchange reserves in Bangladesh. They applied Augmented Dicky-Fuller unit root test, ordinary least square and Engle and Granger residual based co-integration test to examine the long run relationship between remittance (% of GDP), exchange rate, Inflation rate differential, unit price index of imports, unit price index of exports, home interest rate, broad money (% of GDP), foreign aid (% of GDP), per capita GDP in PPP dollar and foreign exchange reserves for the period of 1972 - 2011. The results of the analyses showed stationarity among the variables except inflation rate with no order of integration. Thus, their co-integration tests analysis on the variables apart from inflation rate, observed long-run equilibrium relationship among other variables. The results further indicated that exchange rate and money supply were negative but had significant effect on the foreign exchange reserves in Bangladesh.

Rizvi, Naqvi, Ramzan and Rizavi (2011) examined the accumulation of Pakistan's foreign exchange reserves from 2001 - 2006. They employed econometric analysis to regress data on foreign exchange reserves liquidity as a percentage of GDP, broad money to GDP, short term debt to GDP and imports to GDP. The results showed that broad money to GDP had significant positive impact on Pakistan's foreign exchange reserves which indicated excesses between 2001 and 2006. However import to Gross Domestic Product in terms of trade shocks had negative and insignificant relationship on Pakistan's foreign exchange reserves.

From a sub-regional African perspective, Ndebbio (2004) investigated the relationship between financial deepening, economic growth and development in 34 selected sub-Saharan African

countries. Financial deepening was captured by two variables such as the degree of financial intermediation (M_2/Y) and the growth rate in per capita real money balances. Ordinary least squares multiple regression was adopted to examine the relationship among the variables. Two policy implications were derived from the study. First was that sub-Saharan African countries should strive hard to make real money balances grow. Secondly, sub-Saharan African countries should come up with policies to improve financial development/intermediation.

Nguena and Abimbola (2013) investigated the implication of financial deepening dynamics for financial policy coordination in the West African economic and monetary union sub-region countries of Benin, Burkina Faso, Ivory Coast, Guinea Bissau, Mali, Senegal and Togo over the period 1980 - 2011. They adopted a hypothetical deductive theoretical approach and empirical investigation in both static and dynamic panel data econometrics to determine the relationship between trade openness, financial openness, inflation, interest rate, GDP per capita growth rate, savings rate, population density, real exchange rate, reserves, transfers and financial deepening. The results showed stationarity of the variables around a deterministic trend. Besides, reserves proved to be significant but have negative impact on financial deepening in the sub-region.

2.17 Summary of Empirical Literature Reviewed

Literature summarised by this study were empirically based on the effect and relationship of some macroeconomic factors such as financial crisis (proxy as money supply to gross domestic product), crude oil price shocks and exchange rate on foreign exchange reserves.

Osuji and Ebiringa (2012) result showed significance between oil export prices, exchange rate and Nigerian external reserves using Vector Auto-regression and the Granger causality test. Imarhiagbe (2015) used GARCH-M and EGARCH-M to obtain positive effect of crude oil price

on the volatility of external reserves in Nigeria. Chuku, Akpan, Ndifreke and Effiong (2011) showed significant short-run evidence of crude oil price shocks on current account balances in Nigeria. Stober (2016) used linear regression to obtain significant positive relationship between crude oil price, exchange rate and Nigerian external reserves. The result of Nwoba, Nwonu, and Agbaeze (2017) showed that oil price had significant effect on foreign exchange earnings when they applied simple regression analysis. Umeora (2013) observed positive and significant relationship between exchange rate and Nigerian foreign exchange reserves using Johansen co-integration test and ECM. Ahmad and Pentecost (2009) used the threshold co-integration technique to obtain long-run relationship between exchange rate and international reserves in a sample of African countries.

The result obtained by Osuji (2015) implied that crude oil prices granger caused foreign reserves. Uguru (2015) reaffirmed the direct nexus between oil price changes and exchange rate instability in terms of a nation's external account. Audu and Okumoko (2013) results showed that real exchange rate was significant with positive effect on real foreign reserve in Nigeria. Osuji and Ebiringa (2012) used VAR and granger causality test. Their results showed significance between exchange rate and external reserves as well as causality influence on Nigerian external reserves. Fang-Yuan and Jun-Guo (2013) who adopted the quantile regression model observed that exchange rate had positive and significant influence on the size of China's foreign reserves. Gosselin and Parent (2005) used the Pedroni's panel co-integration tests for China, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, and Thailand. They obtained that exchange rate volatility was significant but with negative long run relationship to reserve holdings while ratio of broad money to GDP was positive and significant to international holdings.

Romero (2005) using OLS found that exchange rate was significant in determining external reserves in India, but was not significant determinant of external reserves for China. Khan (2013) in his study portrayed that exchange rate affected foreign exchange reserves in Pakistan. Eliza, Azali, Siong-Hook and Chin (2008) found long run relationship between demand for international reserves and import relating to exchange rate and other determinants in five ASEAN economies. Obstfeld, Shambaugh and Taylor (2008) observed positive and significant relationship between exchange rate volatility, M_2 to GDP and international reserve in a broad panel estimation of developing, emerging and developed economies of 134 countries. Aizenman and Marion (2004) observed that exchange rate volatility significantly accounted for the variation in international reserve holdings when panel data was applied for sample of 64 countries. Chin-Hong, Mohamad, Affendy and Oi-Khim (2011) results using co-integration test technique showed long-run co-integrating relationship between exchange rate and foreign exchange reserves in Malaysia. Elhiraika and Ndikumana (2007) panel data test results for 21 African countries showed that nominal exchange rate significantly responds to changes in international reserves.

Rizvi, Naqvi, Ramzan and Rizavi (2011) showed that broad money to GDP had positive and significant effect on Pakistan's foreign exchange reserves. Goldstein and Xie (2009) results showed decline in Korea and Malaysia reserves, while increases were observed in Thailand, China, the Philippines, and Hong Kong reserves during the crisis. Olanipekun (2016) used Structural Vector Autoregressive model, found negative effect of oil price shocks on Nigerian external reserves. While exchange rate showed more significance with negative effect on Nigerian external reserves. The results of Shuaibu and Mohammed (2014) indicate that oil price negatively affected international reserves accumulation in Nigeria at the long-run but was

positive in the short-run, using the error correction mechanism and the Auto-Regressive Distributed Lag (ARDL). Ajakaiye and Fakiyesi (2009) with computable general equilibrium methodology found that oil price shocks had negative stagflation effect on domestic investment and the income position in Nigeria. Osigwe, Okechukwu and Onoja (2015) used Johansen co-integration approach, observed exchange rate to be significant but with negative determinant on foreign exchange reserves in Nigeria.

The results of Chowdhury, Uddin and Islam (2014) when ADF, OLS and co-integration tests were applied, indicated that exchange rate and money supply were negative but had significant effect on the Bangladesh foreign reserves. Nguena and Abimbola (2013) observed significant and negative relationship between reserves and financial deepening in union of Benin, Burkina Faso, Ivory Coast, Guinea Bissau, Mali, Senegal and Togo, when data analysis was applied. Audu and Okumoko (2013) results showed that crude oil price was insignificant with negative effect on foreign reserve in Nigeria. Ajibola, Udoette, Omotosho and Muhammad (2015) showed insignificant long-run relationship between exchange rate and external reserves in Nigeria using the 2-regime threshold vector error correction model through maximum likelihood method. Nteegah and Okpoi (2016) used co-integration and VECM, observed that exchange rate insignificantly affected foreign exchange reserves in Nigeria. Ibrahim (2011) observed that fluctuations in external reserve were not significantly influenced by exchange rate using OLS and VECM. Bhullar and Dhameja (2016) in their critical analysis using ADF, Johansen and VAR tests, they observed long run equilibrium relationship between exchange rate and Indian foreign exchange reserve.

A close study on these literature revealed divergent views in empirical findings by scholars. For instance, some of these studies reported positive and significant relationship between financial

crisis, crude oil price shocks, exchange rate and foreign exchange reserves (Imarhiagbe, 2015; Stober, 2016; Gosselin & Parent, 2005; Umeora, 2013; Rizvi, Naqvi, Ramzan & Rizavi, 2011; Audu & Okumoko, 2013). Besides, some studies showed negative but significant relationship (Fang-Yuan & Jun-Guo, 2013; Nguena & Abimbola, 2013; Chowdhury, Uddin & Islam, 2014; Gosselin & Parent, 2005; Olanipekun, 2016; Osigwe, Okechukwu & Onoja, 2015), hence creating a gap which this study seeks to cover.

It was also observed from these related studies (Chuku, Akpan, Ndifreke & Ekpeno, 2011; Imarhiagbe, 2015; Ajao & Festus, 2011; Odularu, 2007; Polterovich & Popov, 2003; Umeora, 2013) especially on Nigeria, had empirically used macroeconomic variables such as financial crisis (proxy as money supply to gross domestic product), crude oil price shocks, exchange rate, remittances, domestic interest rate, per capita income, volume of crude oil production, inflation, real gross domestic product, foreign direct investment on foreign exchange reserves, but did not include net trade of crude oil apart from Hillard (2015) who considered 91 countries, did not ineptly examined the relationship between net trade of crude oil and foreign reserves. Besides, no Nigerian researchers that were considered for this study had used net trade of crude oil as a control variable to determine its relationship on Nigeria foreign exchange reserves. This has absolutely created a central gap in knowledge; thus instigating a robust study to be undertaken by this present study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

Research design is the logical model of proof that allows a researcher to draw conclusions concerning an investigation. Kotler and Andreasen (1996) noted that research design calls for decision on the data sources, research approaches, sampling plan, research instruments and contact methods. This study adopts the *ex post facto* research design, in which Simon and Goes (2013) opined that the *ex post facto* research design is ideal for conducting research when it is impossible to manipulate the characteristics of human participants. The *ex post facto* research design uses secondary data not necessarily amassed for research purposes. The *ex post facto* design is considered suitable for this study because it is a substitute for true experimental research and can be used to test hypotheses about cause, effect and relationship. E-views software version 7.0 was employed in processing the data.

3.2 Sources of Data

The data used for our study are secondary data sourced from various sources: Central Bank of Nigeria Statistical Bulletin, World Bank data base, Index mundi data base, Organisation of Petroleum Exporting Countries data base and International Monetary Fund data base. The data are based on annual time series data for 24 years ranging from 1993 to 2016.

3.3 Data Analytical Techniques

The research work executed Diagnostic Tests on the models, global utility of the models statistics and evaluated the relative inferential statistics of the variables studied.

3.3.1 Diagnostic Descriptive Statistics

The descriptive statistics described the variables used in the model and give idea of the characteristics of the variables. It states if the data are normally distributed. The mean and the standard deviation of any set of data in descriptive statistics are usually reported together. Though standard deviation in most cases is a measure of uncertainty and the mean determines the returns of the sector as they are collectively measures of dispersion. They measure how spread out a trend is in a set of data. A high standard deviation of any given set of data indicates that the data points are far from the mean and a low standard deviation indicates that data points tends to be very close to the mean. Besides, the data are normally distributed when the values of skewness and kurtosis are 0 and 3 respectively. But if the skewness coefficient is in excess of unity, it is considered fairly extreme and the low (high) kurtosis value indicates extreme platykurtic that is extreme leptokurtic. Basically, the probability value of the Jarque-Bera test is used to draw inference on the descriptive statistics (Naik & Padhi, 2012).

3.3.2 Diagnostic Normality Test

The normality test was used to ascertain the behaviour of the regression variable. It enables us to determine if the regression variables conform to the normal standard distribution. This test is the Jarque-Bera test for departures from normality which test data normality. The Jarque-Bera criterion has been extensively used in the test of normality of economic and financial data in a

number of studies. If the probability value coefficient of the Jarque-Bera statistic is insignificant (insignificant $\rightarrow p > 0.05$), that is reasonably high, which will happen if the value of the statistic is close to zero, one do not reject the normality assumption that the frequency distributions of the series are normally distributed. However, if the probability value of the Jarque-Bera statistic is significant (significant $\rightarrow p < 0.05$), that is sufficiently low, which will happen if the value of the statistic is very different from 0, one can reject the hypothesis that the residuals are normally distributed which indicate that the frequency distributions of the series are not normally distributed. Basically, to completely eliminate abnormality in the data to be generated, and to avoid heteroskedasticity of the data, the variables will be transformed into logarithm in which the models will be specified in there log linear forms (Gujarati, 2004; Kolvereid & Bullrag, 1996; Omoye & Eriki, 2013).

3.3.3 Augmented Dickey-Fuller Unit Root Test

The test for order of integration in this research was carried out using the Augmented Dickey-Fuller (ADF) approach. The Augmented Dickey Fuller (ADF) test determines whether the series has a unit root which is a fundamental test to show order of integration. Also as a crucial means for setting up an econometric model for inference. The reason for using the Augmented Dickey-Fuller test is because there is no consistently better test for stationarity. However, this is not a criterion that other types of unit root tests: Dickey-Fuller GLS (ERS); Philips Perron test; Kwiatkowski-Philip-Schmidt-Shin; Elliott-Rothenberg-Stock Point-Optimal and Ng-Perron are not valid. Unit root tests are mainly a descriptive tool performed to classify series as stationary and non-stationary. Economic theory suggests that certain variables should be integrated. Basically, the outcome of unit root test does not deter the ordinary least square regression test (Paresh & Russell, 2004; Saunders, Biswas & Mohapatra, 1999; Bo Sj'o, 2008).

The ADF test is to determine whether the data series need to be differentiated, and how many times this must be done in order to induce their stationary when the data is non-stationary due to unit roots. If the ADF test fails to reject the test in levels but rejects the test in first differences, then the series contains one unit root and is of integrated order one, $I(1)$. If the test fails to reject the test in levels and first differences but rejects the test in second differences, then the series contains two unit roots and is of integrated order two, $I(2)$. In a situation of $I(2)$, the VAR or VECM is adopted to determine the long-run equilibrium relationship. However, once variables had been classify as integrated, stationary or perhaps deterministic trend stationary of $I(1)$, it is necessary to determine the long-run and short-run effects in the model through co-integration and error correction mechanism (Paresh & Russell, 2004; Saunders, Biswas & Mohapatra, 1999; Bo Sjö, 2008)..

Testing for order of integration is mainly a test for the numbers of unit roots which is typically based upon the Markov AR (1) model as: $Y_t = \beta_1 Y_{t-1} + \varepsilon_t \dots\dots\dots (7)$

Where ε_t is a white-noise process and $\beta \geq -1$ and at the same time $\beta \leq 1$. Hence the process of a unit root test for Y_t is to ascertain if it is stationary. $Y_t \sim I(0)$ means there is stationarity at the level and $Y_t \sim I(n)$, where $n > 0$ means there is no stationarity at the level. It is likely that there may be unit root at the level which will lead to testing for the first and second differences. Testing stationarity at first difference for Y_t written as $\Delta Y_t \sim I(1)$, means that there is stationarity after differencing Y_t ones and $\Delta Y_t \sim I(n)$; $n > 0$, means no stationarity. However, at second difference of Y_t as $\Delta^2 Y_t \sim I(2)$, means that there is stationarity after differencing Y_t two times and $\Delta^2 Y_t \sim I(n)$; $n > 0$, means there is no stationarity.

The tests are conducted with the addition of a deterministic trend (t) for the series such as a constant term, β_0 as:

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \varepsilon_t \dots\dots\dots (8)$$

If the error term, ε_t is not white noise, the test equation needs to be augmented with lagged dependent variables to remove autocorrelation. The Augmented Dickey Fuller (ADF) models to be estimated from equation (8) after choosing the appropriate number of lagged dependent variables (n) are given as equations (9) as intercept and (10) stochastic trend. These equations are considered to be Augmented Dickey-Fuller because $n > 0$.

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \sum_{i=1}^n \beta_1 \Delta y_i + \varepsilon_t \dots\dots\dots (9)$$

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \sum_{i=1}^n \beta_2 \Delta y_i + \delta_t + \varepsilon_t \dots\dots\dots (10)$$

The difference between the two equations (9 and 10) is the presence of the deterministic element as δ_t . It should be noted that Y is time series; t is a linear time trend, β_0 is a constant, β_1 is the first coefficient difference operator, n is the optimum number of lags in the dependent variable chosen to make ε_t (error term showing the adjustment of Y_t towards the long-run equilibrium) the white noise. This can be achieved by testing for autocorrelation and $\sum$ is the summation symbol (Paresh & Russell, 2004; Saunders, Biswas & Mohapatra, 1999; Bo Sjo, 2008).

3.3.4 Johansen Co-integration Test

The fundamental tests for co-integration are the Engle and Granger (1987) test and the Johansen's test. Adopting the Johansen Co-integration test in this research is to establish whether there is a long run relationship between the dependent and independent variables. The Johansen

co-integration is useful because it allows testing for the restricted forms of the co-integrating vectors. The Johansen approach can as well as identifies multiple equilibria among systems with more than two variables. It can also account for the short run dynamics when estimating the long-run relation with a greater power on ADF test for co-integration. However, the Johansen approach analyses test for co-integration, though similar to Engle and Granger approach, but have more unique statistical properties (Bo Sjö, 2008; Engle & Granger, 1987; Paresh & Russell, 2004).

Co-integration is a statistical technique use for time series data that is defined by the concepts of stationarity and the order of integration of the series. The necessary criteria for stationarity among non-stationary variables are called co-integration. The concept of co-integration has been extensively used to model economic equilibrium relationships. The notion of co-integration can in principle be extended to series with trends, such that co-integrating vector will be required to reduce the series to stationarity. Co-integration is a necessary step to confirm if the model has long run empirical relationships. This involves investigating the existence of a long-run equilibrium. It helps to separate short and long-run relationship among variables which entail common stochastic trend. Co-integration introduces one additional causal channel (error correction mechanism) for one variable to affect the other variables. If co-integration is not achieved, it is necessary to continue to work with variables in differences till co-integration is derived. If the variables co-integrate, they will share a common trend and form a stationary relationship in the long run (Bo Sjö, 2008; Engle & Granger, 1987; Paresh & Russell, 2004).

3.3.5 Error Correction Mechanism (ECM)

Adopting the error correction model in this research is to establish whether there is short run relationship between the dependent and independent variables. The error correction formulation basically relies on the idea of a long run relationship between variables and a mechanism correcting for short run departures from the long run relationship. The ECM coefficient portrays the speed adjustment factor; it shows how fast the system adjusts to restore equilibrium. It captures the reconciliation of the variables over time from the point of disequilibrium to the period of equilibrium. The Error correction model (ECM) is classified as a multiple time series model where the underlying variables have a long-run stochastic trend, known as co-integration. However, the ECM assesses directly the speed at which a dependent variable returns to equilibrium after a change in other variables. Hence, the ECM determines whether a portion of the disequilibrium from one period is corrected in the next period. Equilibrium relationships in turn have implications for short-run behaviour as one or more time series move to restore equilibrium. A short-run change is necessary to maintain the long-run relationship. The error correction model tells us the degree to which the equilibrium behaviour drives short-run dynamics (Erik & Hiloe, 1986; Mencet, Firat & Cengiz, 2006; Boef, 2000; Ogundipe & Ogundipe, 2013).

3.3.6 Ordinary Least-Squares (OLS)

The Ordinary Least Square was used to analyse the relationship between the dependent variable and the independent variables as well as to conform the a-priori expectation through the statistical coefficients of the independent variables. Ordinary least-squares (OLS) regression is a comprehensive linear modelling technique that can be use to perform single and multiple linear

regressions, both the values of estimated parameters and computed values of some statistical tests such as coefficient of determination and Fisher test, as influenced by collinearity (Pavelescu, 2010).

3.3.7 Cochrane-Orcutt Iterative Procedure

The Cochrane-Orcutt Iterative Procedure was used for correlative and significant analysis when the Ordinary Least Square result is spurious due to the presence of autocorrelation which was not adequate for inference. The Durbin Watson statistic is a measure of autocorrelation. The Cochrane-Orcutt Iterative Procedure would not be necessary when Durbin Watson statistic is approximately equal to 2. However, in this study, the Cochrane-Orcutt Iterative Procedure was used for correcting autocorrelation when it was observed that Durbin Watson was not approximately equal to 2 from the Ordinary Least-Squares regression.

3.3.8 Structural Analysis - Granger Causality Test

The Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another, as first proposed by Granger. Granger (1969) proposed a time-series data based approach in order to establish causality. He argued that causality in economics could be tested for by measuring the ability to predict the future values of a time series using prior values of another time series. A time series X is said to granger-cause Y if it is useful in forecasting Y through a series of T-test and F-tests on lagged values of X and with lagged values of Y . This means that X is able to increase the accuracy of the prediction of Y with respect to a forecast, considering only past values of Y . Hence the future cannot cause the past rather the past causes the present or future.

However, the Granger Causality test was used to determine whether a specific variable or group of variables plays any role in the determination of other variables in the vector error correction. It tests whether an endogenous variable can be treated as exogenous. This was carried out by evaluating the statistical significance of the lagged error correction terms through separate t-tests on the adjustment coefficients. The granger causality test in this study was used to determine whether financial crisis, crude oil price shocks, exchange rate, net trade of crude oil caused changes on foreign exchange reserves and vice versa.

3.4 Model Specification

The Model specification shows the mathematical and economic effect as well as the relationship that exist between the dependent (FORES) and the independent variables (FINCRS, COILPSH, EXRATE and NETRADE). This research work followed the method used by Umeora (2013) to ascertain the relationship between the endogenous and exogenous variables in the time series data. Umeora (2013) used two simple regression models in which foreign exchange reserves served as dependent variable and exchange rate as one of the independent variables. His models specified thus; $FER = \alpha_0 + \alpha_1 EXR + e_i$; and $FER = \beta_0 + \beta_1 INF + m_i$

The model specification for this work explained the variables and how they interact. Four models were specified as:

Model 1: $FORES_t = F \{FINCRS_t\}$ (i)

Model 2: $FORES_t = F \{COILPSH_t\}$ (ii)

Model 3: $FORES_t = F \{EXRATE_t\}$ (iii)

Model 4: $FORES_t = F \{NETRADE_t\}$ (iv)

In order to eliminate abnormality in the data to be generated, and to avoid heteroskedasticity of the data, as well as to carry out simple econometric regressions, the variables were transformed into logarithm after the descriptive statistics were carried out. The models were specified in their log linear forms as:

Equation 1: $LFORES_t = \beta_0 + \beta_1 LFINCRS_t + U_t$ (v)

Equation 2: $LFORES_t = \beta_0 + \beta_2 LCOILPSH_t + U_t$ (vi)

Equation 3: $LFORES_t = \beta_0 + \beta_3 LEXRATE_t + U_t$ (vii)

Equation 4: $LFORES_t = \beta_0 + \beta_4 LNETRADE_t + U_t$ (viii)

Where;

β_0 = constant

$\beta_1, \beta_2, \beta_3$ and β_4 = coefficients of the variables

$LFORES_t$ = log of total Nigerian foreign exchange reserves (Dependent variable)

$LFINCRS_t$ = log of financial crisis as proxy for money supply to gross domestic product (financial deepening)

$LCOILPSH_t$ = log of crude oil price shocks expressed in United States dollar per barrel of oil

$LEXRATE_t$ = log of official exchange rate of the naira to the United States dollar

$LNETRADE_t$ = log of total net trade of crude oil which is total export minus total import (Independent variables) and

U_t = error term with a zero mean showing the adjustment on $LFORES_t$ towards the long-run equilibrium.

The a-priori expectations would imply $\beta_1, \beta_3 < 0$ and $\beta_2, \beta_4 > 0$, which can be further analysed in Table 3.1.

Table 3.1: The A-Priori Expectation

Dependent Variable	Independent Variables	Relationship
LFORES	LFINCRS	-
LFORES	LCOILPSH	+
LFORES	LEXRATE	-
LFORES	LNETRADE	+

Source: Author's Computation

Table 3.1 showed that any parameter estimates with a positive sign (+) will indicate that the independent variable in question has a direct or positive relationship with the dependent variable. This implies that, increase in a particular independent variable, will as well led to an increase in the dependent variable. Thus, the dependent and independent variables move in the same direction. However, a negative sign (-) will simply imply an inverse or negative relationship which means that an increase in a particular independent variable, will result to a decrease in the dependent variable, and vice versa. Thus, the dependent and independent variables move in opposite directions.

3.5 Decision Rule

A decision rule specifies when the null hypothesis (H_0) should be rejected. A very common one specifies that H_0 should be rejected if the calculated value of a statistic says z-statistic or t-statistic equal or is more positive than the positive critical value, or the value of a statistic is equal to or more negative than the negative critical value of the statistic. Thus the decision rule is to reject the null hypothesis and accept the alternative if $p < 0.05$, otherwise accept the null hypothesis if $p > 0.05$.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

4.1 Data Presentation

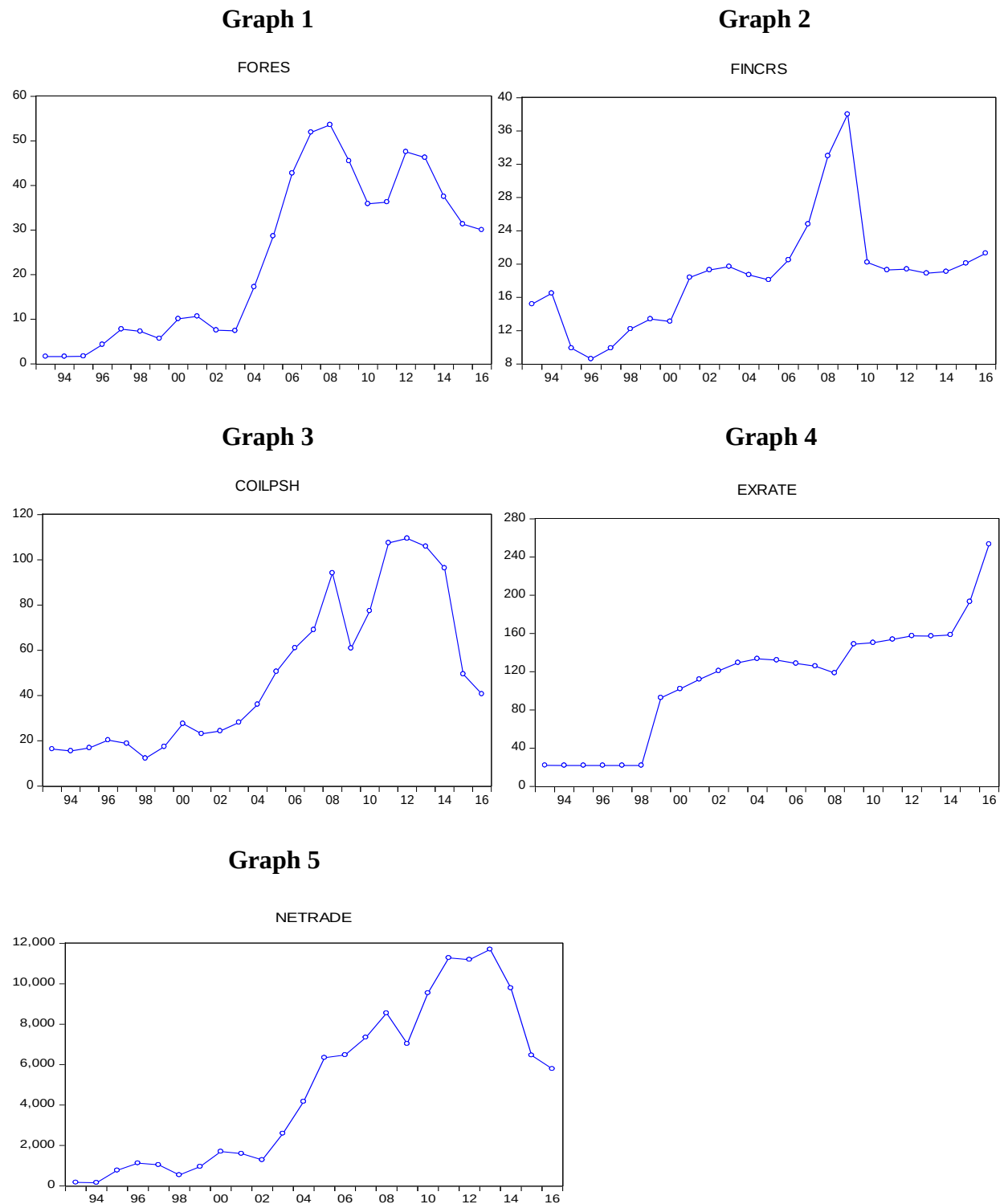
This chapter focused on the presentation and empirical analyses of results derived from the estimated empirical model. Data for financial crisis (proxy for money supply to gross domestic product), crude oil price shocks, official exchange rate and net trade of crude oil were used to capture the effect and relationship on Nigerian foreign exchange reserves as shown in Table 4.1.

Table 4.1: Data for Financial Crisis, Crude Oil Price Shocks, Exchange Rate, Net Trade of Crude Oil and Nigerian Foreign Exchange Reserves

YEAR	FORES	FINCRS	COILPSH	EXRATE	NETRADE
	(\$'Billion)	(%, ₦'Billion)	(\$)	(₦/\$)	(₦'Billion)
1993	1.64	15.2	16.33	22.0511	172.7
1994	1.649	16.5	15.53	21.8861	158.4
1995	1.709	9.9	16.86	21.8861	771.8
1996	4.329	8.6	20.29	21.8861	1124
1997	7.781	9.9	18.86	21.8861	1045.6
1998	7.299	12.2	12.28	21.8861	541.9
1999	5.65	13.4	17.44	92.6934	957.8
2000	10.099	13.1	27.6	102.105	1700.1
2001	10.647	18.4	23.12	111.943	1602.8
2002	7.567	19.3	24.36	120.97	1287.7
2003	7.415	19.7	28.1	129.357	2594.2
2004	17.257	18.7	36.05	133.5	4171.4
2005	28.632	18.1	50.59	132.147	6343.3
2006	42.735	20.5	61	128.652	6480.4
2007	51.907	24.8	69.04	125.833	7342.3
2008	53.599	33	94.1	118.567	8546.3
2009	45.51	38	60.86	148.88	7036.8
2010	35.885	20.2	77.38	150.298	9543.4
2011	36.264	19.3	107.46	153.862	11279.6
2012	47.548	19.4	109.45	157.499	11195.7
2013	46.255	18.9	105.87	157.311	11702.4
2014	37.497	19.1	96.29	158.553	9792
2015	31.335	20.1	49.49	193.279	6459.3
2016	30.03	21.3	40.68	253.492	5794.4

Source: Central Bank of Nigeria Statistical Bulletin (2016), Organisation of Petroleum Exporting Countries Data (2016), International Monetary Fund Data (2017), World Bank Data (2017) and Index Mundi Data (2017)

4.1.2 Graphical Representation of the Input Variables in Table 4.1



Source: Researcher's Computation (2018) using E-view 7.0

Figure 4.1: Graphical (1 – 5) Representation of the Input Variables

Comments:

Table 4.1 showed trend in the various variables for Nigeria. These variables were used to measure the trend between financial crisis as proxy for money supply to gross domestic product (FINCRS), crude oil price shocks (COILPSH), exchange rate (EXRATE), net trade of crude oil (NETRADE) and foreign reserves (FORES) from 1993 to 2016. It is observed in Figure 4.1 (Graph 1, Graph 2, Graph 3 and Graph 5) that foreign exchange reserves, financial crisis, crude oil price shocks and net trade of crude oil have the same strong directional trend when compared to Graph 4 for exchange rate. This infers that the period of significant increase and decrease in financial crisis, crude oil price shocks and net trade of crude oil collaborate with the same period of increase and decrease with the Nigerian Foreign exchange reserves.

However, beginning from 1993 (the base year for data collection for this study) to 1995, slight fluctuations were observed in the Nigerian foreign exchange reserves which were between \$1.64 billion and \$1.709. 1993 was considered as the base year due to the series of significant political activities (election was annulled and rescheduled) in Nigeria. These same slight changes were also observed in COILPSH of \$16.33 and \$16.86 per barrel and a favourable EXRATE of ₦22.0511 and ₦21.8861 respectively. Within these periods, the average percent for FINCRS was 14%, and NETRADE had an average rate of ₦3308.7billion.

Apparently, 1996 and 1997 recorded an increase in foreign reserves of \$4.329 billion and \$7.781 billion respectively in which a low percent in FINCRS was observed (average rate; 9.3%) regardless of the decline in COILPSH (average rate; \$19.6 per barrel), coupled with the adverse situation in EXRATE (average rate; ₦21.8861 to a dollar) and NETRADE (average rate;

₦1084.8 billion). Invariably, Figure 4.1; Graph 4 for exchange rate showed no trend from 1994 to 1998 when compared to (Graph 1) Foreign exchange reserves in Nigeria.

Hence, the foreign reserves grew from \$42.735 billion to \$53.599 billion between 2006 and 2008 despite it was the period of the global financial crisis, recorded at 26% with a steady increase in COILPSH from \$61 per barrel to \$94.1 per barrel. However, 2009 and 2010 recorded a severe decline in FORES from \$45.51 billion to \$35.885 billion respectively with a high inverse in EXRATE (average rate; ₦150 to a dollar) and NETRADE (average rate; ₦8,290 billion). Furthermore, Figure 4.1 (Graph 1, Graph 2, Graph 3 and Graph 5) showed increase in crude oil price and net trade of crude oil from early 2002 to mid 2007. This led to increase in foreign exchange reserves from early 2003 to mid 2007. However, decrease in crude oil price and net trade of crude oil from mid 2007 to 2009 due to the global financial crisis led to decrease in foreign exchange reserves from 2008 to 2010. Thus, increase (decrease) in net trade of crude oil led to increase (decrease) in the Nigerian foreign exchange reserves in the same periods confirming to a-priori expectation.

Finally, a steady drop in FORES was observed in 2014 to 2016 from \$37.497 billion to \$30.03 billion respectively with a corresponding drop in COILPSH from \$96.29 per barrel to \$40.68 per barrel respectively coupled with highly adverse EXRATE and NETRADE. This trend is consistent with our a-prior expectation and findings of some of the reviewed literature.

4.2 Data Analysis

Table 4.2: Descriptive Statistics

		Model 1	Model 2	Model 3	Model 4
	FORES	FINCRS	COILPSH	EXRATE	NETRADE
Mean	23.75996	18.65000	49.12625	112.5177	4901.846
Median	22.94450	19.00000	38.36500	127.2424	4982.900
Maximum	53.59900	38.00000	109.4500	253.4923	11702.40
Minimum	1.640000	8.600000	12.28000	21.88610	158.4000
Std. Dev.	18.44690	6.616449	33.47720	62.00117	4006.879
Skewness	0.212938	1.146407	0.633464	-0.123552	0.315663
Kurtosis	1.468104	4.962541	1.959052	2.646022	1.653865
Jarque-Bera	2.528076	9.108562	2.688677	0.186361	2.210652
Probability	0.282511	0.010522	0.260712	0.911029	0.331103
Sum	570.2390	447.6000	1179.030	2700.424	117644.3
Sum Sq. Dev.	7826.628	1006.880	25776.62	88415.34	3.69E+08
Observations	24	24	24	24	24

Source: Researcher's Computation (2018) using E-view 7.0

Model 1: Financial Crisis and Foreign Exchange Reserves

From Table 4.2, (model 1) the mean; standard deviation of FORES and FINCRS are 23.75996; 18.44690 and 18.65000; 6.616449 respectively. The mean values and standard deviation of the variables revealed positive averages over the period of study, indicating that the variables are positively skewed. The Skewness value of 1.146407 which is greater than zero (0) is in excess of unity which is considered to be in extreme and the Kurtosis of 4.962541 showed a high leptokurtic situation, considered extreme. The value of Skewness and Kurtosis indicate the lack of symmetric situation in the distribution. The Jarque-Bera value of 9.108562 with probability value of 0.010522 ($p < 0.05$) showed significant value at 5% level for Jarque-Bera statistic. Thus, the test results ascertained that the distribution is not normally distributed. Hence, further diagnostic normality test would be carried out.

Model 2: Crude Oil Price Shocks and Foreign Exchange Reserves

In Table 4.2, (model 2) the coefficient values of 23.75996; 18.44690 and 49.12625; 33.47720 represent the mean and standard deviation of FORES; COILPSH respectively. The mean values and standard deviation of the variables established positive averages in the result, depicting that the skewness of the variables are positive. The value of Skewness for COILPSH is 0.633464 which is a leptokurtic situation not equal to zero and the value of Kurtosis (1.959052) implies platykurtic, invariably not equal to 3. This showed lack of symmetric situation in the distribution due to the inconsistencies exhibited by the Skewness and Kurtosis values. The probability value of 0.260712 ($p > 0.05$) show insignificant value at 5% level for Jarque-Bera statistic of 2.688677. Thus, the test results for the probability value of the Jarque-Bera statistic established that there is normality in the distribution.

Model 3: Exchange Rate and Foreign Exchange Reserves

Table 4.2, model 3 showed the mean and standard deviation of FORES as 23.75996 and 18.44690 respectively; the mean and standard deviation of EXRATE is given as 112.5177 and 62.00117 respectively. The coefficient values of the mean and standard deviation of the variables were observed to show positive averages ascertaining that the variables are positively skewed over the period of study. The value of Skewness for EXRATE (-0.123552) is skewed to the left in log levels though not greater than zero. This depicts that the distribution is platykurtic relative to be normal. Apparently, the Kurtosis of 2.646022 is approximately equal to 3, showed symmetric situation in the distribution. Besides, the EXRATE probability value of 0.911029 ($p > 0.05$) and the Jarque-Bera statistic of 0.186361 established that the data is normally distributed from the descriptive statistics test.

Model 4: Net Trade of Crude Oil and Foreign Exchange Reserves

The FORES and NETRADE showed mean; standard deviation values of 23.75996; 18.44690 and 4901.846; 4006.879 respectively as shown in Table 4.2, model 4. These depict positive averages, indicating that the variables are positively skewed. The Skewness value (0.315663) showed that the variable is equal to zero, which relates to normality. Thus, the Kurtosis value of 1.653865 entails a platykurtic situation, which is not equal to 3. This showed that there is lack of symmetric in the distribution. The Jarque-Bera value of 2.210652 with probability value of 0.331103 ($p > 0.05$) showed insignificant value at 5% level for Jarque-Bera statistic. Thus, the test results ascertained that the frequency distributions of the series are normally distributed.

4.3 Inferential Analyses

4.3.1 The Jarque-Bera Test for Departures from Normality

The Jarque-Bera test in Appendix 1, further test to ascertain if the series in the result of the descriptive statistics for Model 1 is apparently normally distributed as against the result of the descriptive statistics which could not established normality in data distribution. Thus, the value of the Jarque-Bera statistic and the probability value in Appendix 1 are 4.072549 (not high) and 0.130514 (insignificant) respectively. Apparently, it is inferred that the Jarque-Bera result showed that the frequency data distribution is normally distributed.

Appendix 2 is also a necessary Jarque-Bera test to confirm if actually the series is normally distributed as established by the descriptive statistics for Model 2. The value of the Jarque-Bera statistic and the probability value in Appendix 2, apparently were observed to be 0.863521 (not high) and 0.649365 (insignificant) respectively. Therefore, it is inferred that the distribution is normally distributed.

Ascertaining the normality distribution result for Model 3 as established by the descriptive statistics, Appendix 3 showed that the Jarque-Bera normality test for EXRATE as 1.777237 (not high) with a probability value of 0.411223 ($p > 0.05$) which is insignificant at 5% level. Therefore, this test (Jarque-Bera) re-established the finding of the descriptive statistics that the distribution is normally distributed for Model 3.

Also, the Jarque-Bera statistic in Appendix 4 dependably ascertained if the frequency distributions of the series are normally distributed as established by the descriptive statistics for Model 4. Appendix 4 showed that the probability value of 0.200864 ($p > 0.05$) for the Jarque-Bera statistic of 3.210256 is insignificant at 5% level. Therefore, the Jarque-Bera test statistic reliably established the finding of the descriptive statistics for Model 4 that the distribution is normally distributed.

4.3.2 Stationarity Test Analysis

Table 4.3: Stationarity Test Result Using Augmented Dickey Fuller Unit Root Test

Variables	At Level	Prob.*	At First Difference	Prob.*	Order of Integration	Remark
LFORES	-1.90416	0.323	-3.283837	0.0283	I(1)	stationary
LFINCRS	-1.465908	0.5324	-3.983545	0.0062	I(1)	stationary
LCOILPSH	-1.31482	0.6047	-3.92898	0.007	I(1)	stationary
LEXRATE	-1.213487	0.6504	-4.528124	0.0018	I(1)	stationary
LNETRADE	-2.333279	0.1707	-4.178869	0.004	I(1)	stationary

Source: Researcher's Computation (2018) using E-views7.0

From Table 4.3, it was revealed that LFORES, LFINCRS, LCOILPSH, LEXRATE and LNETRADE clearly demonstrate order of integration at order one, I(1). Apparently, the critical values at 1%, 5% and 10% are greater than the coefficients of the Augmented Dickey-Fuller test statistic of the variables at first difference in Appendices 6, 8, 10, 12 and 14. Invariably, the

critical value at 1% was not greater than the coefficient of the Augmented Dickey-Fuller test statistic of LFORES at first difference in Appendix 6. Since all the variables indicate stationarity at 5% levels of significant. Thus, we infer that the variables are stationary at first difference given the probability value of less than 0.05. This shows that the variables do not have a unit root problem at 5%. Thus, test for long run relationship can be carried out.

4.3.3 Johansen Co-integration Test Results

The long-run relationships between the input variables were examined using the Johansen co-integration test.

Table 4.4: Johansen Co-integration Test Results

Model 1: Financial Crisis				
Hypothesized No. of CE(s)	Eigenvalue	Trace /Max- Eigen Statistics	0.05 Critical Value	Prob.**
None	0.071099	1.622570	3.841466	0.2027
Trace test and Max-eigenvalue test indicate no cointegration at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level				
Model 2: Crude Oil Price Shocks				
Hypothesized No. of CE(s)	Eigenvalue	Trace /Max- Eigen Statistics	0.05 Critical Value	Prob.**
None *	0.508162	15.61131	3.841466	0.0001
Model 3: Exchange Rate				
Hypothesized No. of CE(s)	Eigenvalue	Trace /Max- Eigen Statistics	0.05 Critical Value	Prob.**
None *	0.184218	4.479390	3.841466	0.0343
Model 4: Net Trade of Crude Oil				
Hypothesized No. of CE(s)	Eigenvalue	Trace /Max- Eigen Statistics	0.05 Critical Value	Prob.**
None *	0.651606	23.19728	3.841466	0.0000
Trace test and Max-eigenvalue test indicate 1 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level				
Source: Researcher's Computation (2018) using E-views 7.0				

The result for Model 1 in Table 4.4 indicates that there is no co-integration between LFORES and LFINCRS. Consequently, there is no long-run equilibrium relationship between LFORES and LFINCRS such that the Trace and Max-Eigen statistic test have no co-integrating equations and their probability values are greater than the test of significance at 5%. Thus, the short run empirical estimate is relied on for policy perspective.

Besides, the results for Model 2, Model 3 and Model 4 in Table 4.4 showed co-integration between LFORES and LCOILPSH; LFORES and LEXRATE; LFORES and LNETRADE respectively. Apparently, there is long-run equilibrium relationship between these variables such that the Trace and Max-Eigen statistic test have co-integrating equations and their probability values are less than the test of significance at 5%.

4.3.4 Error Correction Model

The short-run relationships between the input variables were evaluated using the Error Correction Model. The output data is shown in Table 4.5.

Table 4.5: Short Run Estimates

	Variable	Coefficient	Std. Error	t-Statistic	Prob.	
Model 1	ECM (-2)	-0.521612	0.166564	-3.131595	0.0055	after Lag Adjustment
Model 2	ECM (-1)	-0.304215	0.132605	-2.294141	0.0327	No Lag Adjustment
Model 3	ECM (-2)	-0.490108	0.171270	-2.861613	0.0100	after Lag Adjustment
Model 4	ECM (-1)	-0.730711	0.124395	-5.874100	0.0000	No Lag Adjustment

Source: Researcher's Computation (2018) using E-views 7.0

In Appendices 15a and 17a, the ECM results for Model 1 and Model 3 did not meet the required criteria of ECM validity, such that their coefficients were not negative, but however less than 1

as well as with an insignificant probability values greater than 5%. Invariably, lag adjustments were carried out and the results became consonant with the expected criteria for ECM as shown in Table 4.5, Appendix 15b and Appendix 17b. The ECM for Model 1 and Model 3 were appropriately negatively less than 1 in consonance to theoretical expectation and were significant at the 5% level. The coefficients of -0.521 and -0.49 for Model 1 and Model 3 respectively imply that the contemporaneous adjustment to long run equilibrium after a temporary disequilibrium is about 52 percent and 49 percent respectively. Invariably, 52 percent and 49 percent of the adjustment to long run equilibrium for foreign reserves is covered in the first year respectively, implying however, the speed of adjustment from short run disequilibrium to long run equilibrium. Hence, there is short run equilibrium relationship between LFINCRS, LEXRATE and LFORES.

Apparently, in Table 4.5, Appendices 16 and 18, the ECM results for Model 2 and Model 4 with no lag adjustments meet the required criteria of ECM validity, as their coefficients were less than -1, with significant probability value of 5%. The ECM for Model 2 and Model 4 were appropriately negative in consonance to theoretical expectation and were significant at the 5% level. The coefficients of -0.30 and -0.73 for Model 2 and Model 4 respectively imply that the contemporaneous adjustment to long run equilibrium after a temporary disequilibrium is about 30 percent and 73 percent respectively. Invariably, 30 percent and 73 percent of the adjustment to long run equilibrium for foreign reserves is covered in the first year respectively, implying however, the speed of adjustment from short run disequilibrium to long run equilibrium. Hence, there is a slow adjustment process for Model 2 and a fast adjustment process for Model 4. This implied that there is short run equilibrium relationship between LCOILPSH, LNETRADE and LFORES.

4.3.5 Ordinary Least Square Result without Correction for Autocorrelation

The models of this study were estimated using the Ordinary Least Square techniques in which output are shown in Appendices 19, 20, 21 and 22.

In Appendices 19, 20 and 21; the OLS results showed Durbin Watson statistic to be 0.540855, 0.684524 and 0.677665 for LFINCRS, LCOILPSH and LEXRATE respectively. The OLS results for LFINCRS, LCOILPSH and LEXRATE indicate the presence of autocorrelation. This indicates that the Ordinary Least Square (OLS) results are spurious which are not adequate for inference. Besides, the Durbin Watson statistic of 1.452648 from the OLS result for LNETRADE in Appendix 22 falls in grey region – the region of indecision (neither presence nor absence of autocorrelation). However, the Cochrane-Orcutt Iterative analysis would still be carried out despite it is adequate for inference. Apparently, correction for autocorrelation was carried out as shown in Appendices 23, 24, 25 and 26 using the Cochrane-Orcutt Iterative procedure.

4.3.6 Ordinary Least Square Result after Cochrane-Orcutt Iterative Estimation

The test result of Appendix 23 is used for analysis due to the correction of autocorrelation which is considered adequate for inference despite the Durbin Watson statistic of 1.470776 which falls in grey region – the region of indecision (Neither presence nor absence of autocorrelation). However, the result is adequate for analysis. The specified model has a high coefficient of determination. This is indicated by R-squared of 91 percent as well as the adjusted R-squared of 90 percent in which the fitness of every regression result is based on its R-squared. The R-squared shows the percentage of variation in the dependent variable (LFORES) that was accounted for by variations in the explanatory variable (LFINCRS). This means that the

explanatory variable LFINCRS simultaneously explain the variations in LFORES. The result derived from the Cochrane-Orcutt Iterative estimation shows positive coefficient of 0.065661 (LFINCRS) and positive t-statistic of 0.177736 with a probability value of $0.8607 > 0.05$, which showed no conformity to our a-priori expectation and as well contradict the economic theory of this study. Thus, the positive coefficient and insignificant probability value of LFINCRS indicate a weak contraction in money supply to the economy with positive influence on the Nigerian foreign reserves.

The regression result of Appendix 24 is considered adequate for analysis due to the correction of autocorrelation. The Durbin Watson statistic showed that the Cochrane-Orcutt Iterative estimation is free from the problem of serial correlation due to its value of 1.688778 which is approximately equal to 2. As a result of this, our estimated model can be confidently relied upon for analyses. The specified model has a high coefficient of determination. This is indicated by R-squared of 92 percent as well as the adjusted R-squared of 91 percent. The R-squared shows the percentage of variation in LFORES that was accounted for by variations in LCOILPSH. The result obtained from the Cochrane-Orcutt Iterative estimation in Appendix 24 showed positive coefficient of 0.510644 and positive t- statistic of 2.037999 with a probability value of $0.0550 < 0.05$ for (LCOILPSH). This is in line with our a-priori expectation and agrees with our economic hypothesis. Thus, the positive coefficient and significant probability value of LCOILPSH indicates positive and significant relationship with LFORES.

Though, the Durbin Watson statistic of the Cochrane-ortcutt iterative estimation in Appendix 25 was given as 1.477842 which falls in grey region; however, the result is apparently valid for analyses. The R-squared of 92 percent and the adjusted R-squared of 91 percent indicate that the specified model has a high coefficient of determination which justifies the percentage variation

in LFORES due to variations in LEXRATE. This means that the explanatory variable LEXRATE simultaneously explain the variations in LFORES. The result obtained from the Cochrane-Orcutt Iterative estimation in Appendix 25 showed negative coefficient of -0.378731 and negative t- statistic of -1.599733 with a probability value of $0.1253 > 0.05$. This is in conformity with our a-priori expectation and in line with our economic hypothesis. Hence, the negative coefficient and insignificant probability value of LEXRATE indicates exchange rate depreciation with a weak effect of depletion on LFORES.

Finally, the Cochrane-ortcutt iterative estimation result in Appendix 26 is adequately dependable for inference due to the correction of autocorrelation such that the Durbin Watson statistic of 1.796038 is approximately 2. Further reliability of the result is depicted in the high coefficient of determination given by R-squared of 89 percent and the adjusted R-squared of 88 percent. The R-squared showed variation in LFORES caused by variations in LNETRADE. This validates that LNETRADE simultaneously explains the variations in LFORES. The obtained Cochrane-Orcutt Iterative estimation from Appendix 26, showed positive coefficient of 0.792986 and positive t- statistic of 7.647497 with a probability value of $0.0000 < 0.05$. Hence, this conforms to our a-priori expectation and in line with our economic hypothesis. Thus, the positive coefficient and significant probability value of LNETRADE is proof that favourable trade will result to a strong increase in LFORES.

4.3.7 Test of Hypotheses

The first four hypotheses of this study were tested using the coefficient, t-statistic and probability value (Prob.*) at 5 % level of significance. The fifth hypothesis was tested using the granger causality test.

4.3.7.1 Hypothesis 1

H_0 : There is no positive effect of the financial crisis on foreign exchange reserves in Nigeria.

The decision rule is to reject the null hypothesis and accept the alternative if $p < 0.05$, otherwise accept the null hypothesis if $p > 0.05$.

From Table 4.3 and appendices 6 and 8, LFINCRS showed order of integration at order one, $I(1)$. Hence, the critical value at 5% (-3.004861) was greater than the coefficients of the Augmented Dickey-Fuller test statistic of LFORES (-3.283837) and LFINCRS (-3.983545) at first difference. The resulted hypothesis implied that there is stationarity at first difference, which indicate that the variables do not have unit root problem at 5%.

Model 1 in Table 4.4 indicates that there is no co-integration between LFORES and LFINCRS. Invariably, there is no long-run equilibrium relationship between LFORES and LFINCRS such that the Trace and Max-Eigen statistic test has no co-integrating equation and their probability value is greater than the test of significance at 5%.

In Table 4.5 and Appendix 15b, the ECM for Model 1 is appropriately negative in consonance to theoretical expectation and it is significant at the 5% level after lag adjustment. The coefficient of -0.521 implied that the contemporaneous adjustment to long run equilibrium after a temporary disequilibrium is about 52 percent. Invariably, 52 percent of the adjustment to long run equilibrium foreign reserves was covered in the first year, implying the speed of adjustment from short run disequilibrium to long run equilibrium. Thus, there is short run equilibrium relationship between LFINCRS and LFORES at 5% level.

From Appendix 23, the model showed a high coefficient of determination which is indicated by R-squared of 91 percent with adjusted R-squared of 90 percent. This shows the percentage rate of variation in LFORES that was accounted for by variations in the LFINCRS. The result derived from the Cochrane-Orcutt Iterative estimation shows positive coefficient of 0.065661 (LFINCRS) and positive t- statistic of 0.177736, with a probability value of $0.8607 > 0.05$. This implied that there is no conformity to our a-priori expectation and as well contradicts the economic theory of the study. Hence the positive coefficient and insignificant probability value of LFINCRS indicate a weak contraction in money supply to the economy with positive influence on the Nigerian foreign reserves.

4.3.7.2 Hypothesis 2

H_0 : There is no positive significant relationship between crude oil price shocks and foreign exchange reserves in Nigeria.

The decision rule is to reject the null hypothesis and accept the alternative if $p < 0.05$, otherwise accept the null hypothesis if $p > 0.05$.

Table 4.3 and appendices 6 and 10 showed order of integration for LCOILPSH at order one, $I(1)$. Thus, the critical value at 5% (-3.004861) was greater than the coefficients of the Augmented Dickey-Fuller test statistic of LFORES (-3.283837) and LCOILPSH (-3.928980) at first difference. The result hypothesis implies that there is stationarity at first difference, indicating that the variables do not have unit root problem at 5% level.

The result for Model 2 in Table 4.4 showed co-integration between LFORES and LCOILPSH. Apparently, there is long-run equilibrium relationship between the variables such that the Trace

and Max-Eigen statistic test have co-integrating equations and their probability values were less than the test of significance at 5% level.

The ECM result for Model 2 in Table 4.5 and Appendix 16 is appropriately negative in consonance to theoretical expectation and it is significant at the 5% level. The coefficient of -0.30 implies that the contemporaneous adjustment to long run equilibrium after a temporary disequilibrium is about 30 percent. Invariably, 30 percent of the adjustment to long run equilibrium foreign reserves is covered in the first year, implying that there is a slow adjustment process for Model 2. This implies that there is short run equilibrium relationship between LCOILPSH and LFORES at 5% level.

In Appendix 24, the model showed a high coefficient of determination which was indicated by R-squared of 92 percent with adjusted R-squared of 91 percent. This depicts the percentage rate of variation in LFORES that was accounted for by variations in the LCOILPSH. This means that LCOILPSH simultaneously explain the variations in LFORES. The Cochrane-Orcutt Iterative estimation showed positive coefficient of 0.510644 and positive t- statistic of 2.037999 with a probability value of $0.0550 < 0.05$ for (LCOILPSH). This result is in line with our a-priori expectation and also corresponds with our economic hypothesis. Thus, the positive coefficient and significant probability value of LCOILPSH indicates positive significant relationship between LCOILPSH and LFORES at 5% level of significance.

4.3.7.3 Hypothesis 3

H_0 : There is no positive significant relationship between exchange rate and foreign exchange reserves in Nigeria.

The decision rule is to reject the null hypothesis and accept the alternative if $p < 0.05$, otherwise accept the null hypothesis if $p > 0.05$.

Table 4.3 and appendices 6 and 12 showed order of integration for LEXRATE at order one, $I(1)$. Thus, the critical value at 5% (-3.004861) was greater than the coefficients of the Augmented Dickey-Fuller test statistic of LFORES (-3.283837) and LEXRATE (-4.528124) at first difference. The result hypothesis implies that there is stationarity at first difference, indicating that the variables do not have unit root problem at 5% level.

Model 3 in Table 4.4 indicates co-integration between LFORES and LEXRATE. Consequently, there is long-run equilibrium relationship between the variables such that the Trace and Max-Eigen statistic test have co-integrating equations and their probability values are less than the test of significance at 5% level.

In Table 4.5 and Appendix 17b, the ECM for Model 3 is appropriately negatively less than 1 in consonance to theoretical expectation and was significant at the 5% level after lag adjustment. The coefficient of -0.49 implies that the contemporaneous adjustment to long run equilibrium after a temporary disequilibrium is about 49 percent. Thus, 49 percent of the adjustment to long run equilibrium foreign reserves is covered in the first year, implying the speed of adjustment from short run disequilibrium to long run equilibrium. Apparently, there is short run equilibrium relationship between LEXRATE and LFORES at 5% level.

A high coefficient of determination in Appendix 25 was indicated in the model by R-squared of 92 percent with adjusted R-squared of 91 percent. This showed the percentage rate of variation in LFORES that was accounted for by variations in the LEXRATE. This means that LEXRATE simultaneously explain the variations in LFORES. The Cochrane-Orcutt Iterative estimation

showed negative coefficient of -0.378731 and negative t- statistic of -1.599733 with a probability value of $0.1253 > 0.05$. This result conforms to our a-priori expectation and in line with our economic hypothesis. Thus, the negative coefficient and insignificant probability value of LEXRATE indicates exchange rate depreciation with a weak effect of depletion on LFORES.

4.3.7.4 Hypothesis 4

H_0 : There is no positive significant relationship between net trade of crude oil and foreign exchange reserves in Nigeria.

The decision rule is to reject the null hypothesis and accept the alternative if $p < 0.05$, otherwise accept the null hypothesis if $p > 0.05$.

Table 4.3 and appendices 6 and 14 showed order of integration for LNETRADE at order one, $I(1)$. Apparently, the critical value at 5% (-3.004861) was greater than the coefficients of the Augmented Dickey-Fuller test statistic of LFORES (-3.283837) and LNETRADE (-4.178869) at first difference. The result hypothesis implies that there is stationarity at first difference, indicating that the variables do not have unit root problem at 5% level.

Model 4 in Table 4.4 indicates co-integration between LFORES and LNETRADE. Consequently, there is long-run equilibrium relationship between the variables such that the Trace and Max-Eigen statistic test have co-integrating equations and their probability values are less than the test of significance at 5% level.

The ECM result for Model 4 in Table 4.5 and Appendix 18 is appropriately negatively less than 1 in consonance to theoretical expectation and was significant at the 5% level. The coefficient of -0.73 implied that the contemporaneous adjustment to long run equilibrium after a temporary

disequilibrium is about 73 percent. Thus, 73 percent of the adjustment to long run equilibrium foreign reserves was covered in the first year, implying a fast adjustment from short run disequilibrium to long run equilibrium. This however implies that there is short run equilibrium relationship between LNETRADE and LFORES.

The result in Appendix 26 showed that R-square explained about 89% of the variations in LFORES. The adjusted R-square of about 88% also affirmed that the variations in LFORES were as a result of the variations in LNETRADE. This validates that LNETRADE simultaneously explains the variations in LFORES. The Cochrane-Orcutt Iterative estimation showed positive coefficient of 0.792986 and positive t- statistic of 7.647497 with a probability value of $0.0000 < 0.05$. Apparently, this conforms to our a-priori expectation and it is in line with our economic hypothesis. Thus, the positive coefficient and significant probability value at 5% level of LNETRADE is proof that favourable trade will result to a strong increase in LFORES.

4.3.7.5 Hypothesis 5

The fifth hypothesis was tested using granger causality test. The result of the hypothesis is shown in Table 4.6.

H_0 : Foreign exchange reserves has not significantly granger caused financial crisis, crude oil price shocks, exchange rate and net trade of crude oil in Nigeria and vice versa

The decision rule is to reject the null hypothesis and accept the alternative if $p < 0.05$, otherwise accept the null hypothesis if $p > 0.05$.

Table 4.6: Granger Causality Test Result

Null Hypothesis:	Obs	F-Statistic	Prob.
LFINCRS does not Granger Cause LFORES	22	2.98288	0.0776
LFORES does not Granger Cause LFINCRS		7.46810	0.0047
LCOILPSH does not Granger Cause LFORES	22	3.04095	0.0743
LFORES does not Granger Cause LCOILPSH		1.36389	0.2823
LEXRATE does not Granger Cause LFORES	22	2.15109	0.1470
LFORES does not Granger Cause LEXRATE		2.40624	0.1202
LNETRADE does not Granger Cause LFORES	22	15.8446	0.0001
LFORES does not Granger Cause LNETRADE		1.67176	0.2174

Source: Researcher's Computation (2018) using E-view 7.0

The granger causality test result in Table 4.6 indicates that LFINCRS does not granger causes LFORES and LFORES granger causes LFINCRS. However, LCOILPSH and LFORES do not granger cause each other. Also, LEXRATE and LFORES do not granger cause each other. Apparently, LNETRADE granger causes LFORES; while LFORES does not granger causes LNETRADE. Thus, the study accepts that there are variations between financial crisis, net trade of crude oil and the Nigeria foreign reserves because their probability values are such that $p < 0.05$ which is significant at 5% level. Furthermore, there are no variations between crude oil price shocks, exchange rate and the Nigeria foreign reserves because their probability values are such that $p > 0.05$.

4.4 Discussion of Findings

This study used variables such as financial crisis (proxy for money supply to gross domestic product), crude oil price shocks (proxy for annual crude oil prices), exchange rate and net trade of crude oil to examine their correlative effects on Nigerian foreign exchange reserves. The findings of the data were discussed as:

4.4.1 The effect of financial crisis on the Nigerian foreign exchange reserves

Financial crisis which is proxy for money supply to gross domestic product, referred to as financial deepening can have economic effect on a country. This effect could be of economic illiquidity which can consequently affect the foreign reserves as regulated by monetary authorities. The effect of financial crisis on the Nigerian foreign exchange reserves was determined from the results of the econometric regressions using e-views. The findings revealed evidence of positive and insignificant statistical effect of financial crisis on the Nigerian foreign exchange reserves. Apparently, we infer that the coefficient of financial crisis which is positive contradicts the Minsky's financial instability hypothesis which stipulates that an economy could transcend from stability to instability when there is significant negative contraction in money supply to an economy. However, the impact of the contradiction to the Minsky's hypothesis was insignificant, implying that the deterioration of the foreign exchange reserves was not caused by the financial crisis but induced by other factors such as crude oil price shocks and net trade of crude oil. Conclusively, fluctuations in the foreign exchange reserves during the period under study were not caused by the financial crisis. This result does not conform to our a-priori expectation. The result of these findings is in line with the studies of Obstfeld, Shambaugh and Taylor (2008); Gosselin and Parent (2005); Rizvi, Naqvi, Ramzan and Rizavi (2011) as they revealed positive effects of financial on foreign reserves.

4.4.2 The relationship between crude oil price shocks and the Nigerian foreign exchange reserves

Modern civilisation had been made possible through crude oil. This has subsequently revolutionised the means of transportation as it formed the basis of petrochemical industries that

produces a host of end-products as the propelling force behind the Nigerian economy. Crude oil price refers to the spot price of a barrel of crude oil at the international market. The finding of the result on the relationship between crude oil price shocks and the Nigerian foreign reserves revealed evidence of positive and significant statistical relationship of crude oil price shocks on foreign reserves in Nigeria. Thus, we infer that the positive and significant relationship of crude oil price shocks on the Nigerian foreign reserves is in line with the Minsky's financial instability hypothesis. This hypothesis infer that there could be stable increase in foreign reserves when there is a period of boom in crude oil price and that an economy should possibly hedge for a bust in crude oil price. This implies that changes in foreign reserves in Nigeria during the period under study was caused by crude oil price shocks being that Nigeria is a mono-cultural economy that depend mainly on crude oil. This result conforms to our a-priori expectation and agrees with the studies of Ekesiobi, Maduka, Onwuteaka and Akamobi (2016); Chuku, Akpan, Ndifreke and Ekpeno (2011); Imarhiagbe (2015) and Stober (2016) that obtained positive significant relationship in their empirical findings. However, the study does not conform to the study of Inyama and Ikechukwu (2015) such that their findings revealed positive insignificant relationship between crude oil price and foreign exchange reserves.

4.4.3 The relationship between exchange rate and Nigerian foreign exchange reserves

Exchange rates are determined in the foreign exchange market. In finance, exchange rate is referred to as the rate at which a particular country's currency can be exchanged for another. The relationship between exchange rate and foreign reserves in Nigeria was determined from the results of the econometric regressions using e-views. The findings of this study equally revealed evidence of negative and insignificant statistical relationship between exchange rate and the Nigerian foreign exchange reserves. The findings is in line with the Minsky's financial instability

hypothesis which stipulates that an economy could move from stability to instability when there is a rising exchange rate which tend to have a deteriorating effect on the foreign reserves. In theory, the depreciation of exchange rate has a dampening effect on productivity and investment. The overall impact reduces output. A reduction in output means low productive capacity of the economy. Low productive capacity of the economy implies lower foreign exchange earnings. Given the findings, it can be inferred that though exchange rate adversely relates to the Nigerian foreign exchange reserves but is a weak determinant (influencing variable) of the foreign reserves. Apparently, other factors as well influence foreign reserves in Nigeria. This result does conform to our a-priori expectation and consistent with the findings of Irefin and Yaaba (2012); Akinwunmi and Adekoya (2016); Onoja (2015) whose findings were negative with insignificant relationship between exchange rate and the Nigerian foreign exchange reserves. Thus, contradicts the results of Usman and Adejare (2012); Umeora (2013) which showed positive and significant results in their findings. However, Osigwe, Okechukwu and Onoja (2015) findings was significant with a negative coefficient.

4.4.4 The relationship between net trade of crude oil and Nigerian foreign exchange reserves

Net trade of crude oil is referred to as the total export of unrefined crude oil minus total import of refined crude oil products. The relationship between net trade of crude oil and foreign reserves in Nigeria was determined from the results of the econometric regressions using e-views. The findings of this study equally revealed evidence of positive and significant statistical relationship between net trade of crude oil and foreign reserves in Nigeria. This finding is in line with the Minsky's financial instability hypothesis which states that reserve accumulation will occur when receipt exceed payment resulting to increase in investment due to surplus in internal liquidity.

However, reserve depletion will occur when payment exceed receipts consequently resulting to reduction in investment due to shortage in internal liquidity. Given the findings, our study conclusively implies that the relatively increase in the Nigerian foreign reserves was due to a strong determinant (influencing variable) of net trade of crude oil. This result also satisfies our a-priori expectation and it is consistent with the finding of Hillard (2015) whose empirical findings had positive and significant relationship between net trade of crude oil and foreign reserves in Nigeria.

4.4.5 Causalities between financial crisis, crude oil price shocks, exchange rate, net trade of crude oil and Nigerian foreign exchange reserves, vice versa

Finally, the findings of the study from the granger causality test results indicated that there is positive (F-statistic) and significant (probability) causality between financial crisis; net trade of crude oil and foreign reserves which validate unidirectional causality. Thus, foreign reserves granger causes financial crisis; and financial crisis does not granger causes foreign reserves in which the result is not in line with the Minsky's financial instability hypothesis which states that foreign reserves do not cause financial crisis rather financial crisis does. Net trade of crude oil granger causes foreign reserves; while foreign reserves does not granger causes net trade of crude oil which affirms to the Minsky's financial instability hypothesis that increase in trade result to increase in foreign reserves. However, crude oil price shocks do not granger cause foreign reserves, vice versa; as well as exchange rate does not granger cause foreign reserves, vice versa. Invariably, foreign reserves and crude oil price shocks; as well as exchange rate and foreign reserves do not granger cause each other. These results are not in line with the Minsky's financial instability hypothesis which states that crude oil price shocks and exchange rate relatively cause variations in the Nigerian foreign exchange reserves. It is therefore inferred that

only net trade of crude oil relatively granger causes foreign reserves in Nigeria; while financial crisis; crude oil price shocks; as well as exchange rate do not relatively granger cause foreign reserves in Nigeria. This result is in line with the study of Osuji (2015).

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

This chapter provides a summary of the study which encompasses empirical findings, followed by concluding remarks. Besides, it also comprises recommendations, contributions to knowledge as well as possible suggestions for further studies. The motivation to this study was based on the instability in the economy which collaborated with the wide fluctuations in the Nigerian foreign exchange reserves between 1993 and 2016. As well as the inconsistencies and contradictions portrayed by most of the studies undertaken by researchers in developed, developing and emerging market economies on financial crisis, crude oil price, exchange rate and foreign exchange reserves. The study has primarily focused and comprehensively analysed financial crisis, crude oil price shocks and the Nigerian foreign exchange reserves: 1993 - 2016. The study used four variables (financial crisis, crude oil price shocks, exchange rate, net trade of crude oil) to examine the correlative effect on foreign reserves in Nigeria using econometric techniques on E-views in line with the model specifications.

5.1 Summary of Findings

Based on the results of the tests of hypotheses, the following findings were observed:

1. The study showed evidence of positive insignificant statistical effect of financial crisis on foreign exchange reserves in Nigerian.
2. The study revealed evidence of positive significant statistical relationship between crude oil price shocks and foreign reserves in Nigeria.

3. The study equally revealed evidence of negative insignificant statistical relationship between exchange rate and the Nigerian foreign exchange reserves.
4. There was empirical evidence of positive significant statistical relationship between net trade of crude oil and foreign reserves in Nigeria.
5. Finally, the study showed that financial crisis, crude oil price shocks and exchange rate do not significantly at 5% level granger cause the Nigerian foreign reserves; while net trade of crude oil significantly granger causes the Nigerian foreign reserves.

5.2 Conclusion

This study showed that financial crisis has positive insignificant effect on foreign exchange reserves in Nigeria. Thus, the fluctuations in the foreign exchange reserves during the period under study were not caused by the financial crisis but induced by other factors. The results also revealed positive significant relationship between crude oil price shocks and the Nigeria foreign exchange reserves. Apparently, net trade of crude oil caused the significant instability in the foreign exchange reserves in Nigeria. Thus, it is inferred that there are evidence of relative instability in the Nigerian economy as efforts to diversify the economy and block leakages in the economy should be the aspirations of all in Nigeria project.

5.3 Recommendations

Based on the empirical results obtained, the study recommends that:

1. The result showed positive insignificant effect of financial crisis on foreign exchange reserves in Nigerian. It is therefore the recommendation of this study for the Nigerian Government to develop foreign reserve diversification policy geared towards increasing

the sources of foreign reserves for Nigeria from other areas (Agriculture, solid minerals, information technology) so as to reduce over dependence on revenue from crude oil sales which is one of the factors affecting foreign reserves depletion during a financial crisis.

2. The stability of the model validates that crude oil price shocks positively and significantly relate to the Nigerian foreign reserves, hence conforming to our a-priori expectation. We therefore recommend that monetary authority and the National Assembly in Nigeria should pursue foreign reserve control and management policy/law, such that standard and limit should be placed on foreign travels such as tourism and medical vacations for government officials including the presidency.
3. The study equally revealed evidence of negative insignificant statistical relationship between exchange rate and the Nigerian foreign exchange reserves. In line with this finding, it is recommended that monetary authorities such as the Central Bank of Nigeria should sign a currency Swap deal with their trading partners such as China.
4. The result of the model validates that net trade of crude oil positively and significantly relate to the Nigerian foreign reserves, which is in conformity to our a-priori expectation. This study recommends that since the government could not properly repair or build new refineries, it should come up with modular oil refinery policy that will enable the government to partner with illegal oil refineries with the aim to help reduce the importation of refined crude oil products thereby to curb financial leakages to the foreign reserves.
5. Since, the study validates that net trade of crude oil significantly granger causes the Nigerian foreign reserves. We therefore recommend that government should genuinely remove oil subsidy to prevent excess capital leakages from the foreign reserves.

5.4 Contribution to Knowledge

The considered related studies that were carried out by Nigerian researchers did not use net trade of crude oil as part of their variables. Thus, this study has contributed to knowledge in such that, the inclusion of net trade of crude oil which proved to have caused the significant instability in the foreign exchange reserves in Nigeria is a reliable contribution.

5.5 Suggestions for Further Studies

This study was carried out to consider financial crisis, crude oil price shocks and the Nigerian foreign exchange reserves: 1993 – 2016. Thus, it is expected that further studies be carried out in the following areas:

1. A cross country samples using panel data with the same sets of input variables should be employed to further test and ascertain the results if foreign reserves would be significantly influenced by crude oil price and net trade of crude oil in selected countries including Nigeria.
2. More input variables for measuring foreign exchange reserves should be adopted and the study should be extended beyond 2016.
3. Event study of empirical analyses should be carried out on financial crisis, crude oil price shocks and foreign exchange reserves using the same variables for this study.
4. Finally, other statistical software such as STATA should be employed, to as well as ascertain the reliability and validity of the results obtained for this study.

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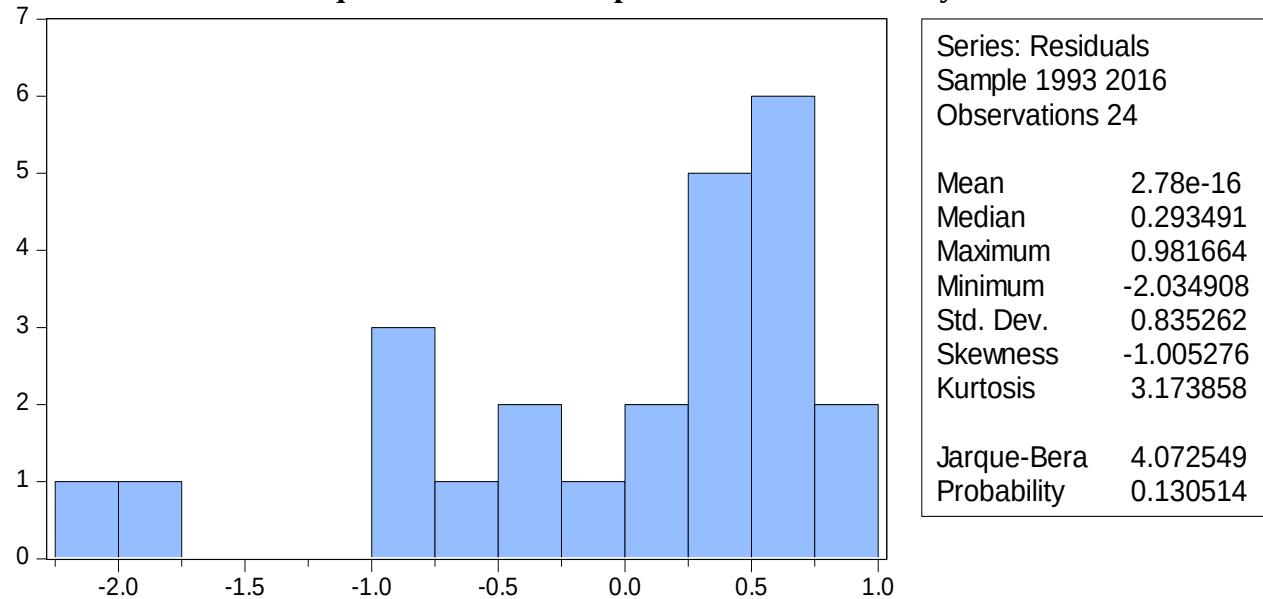
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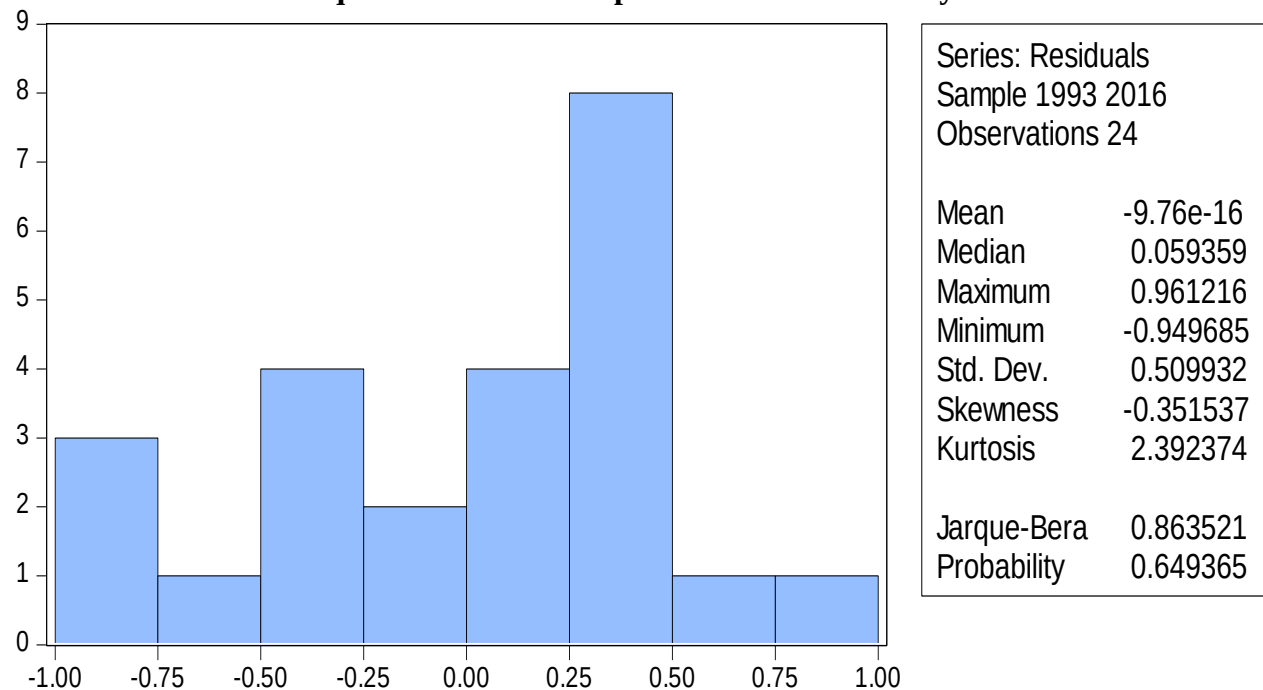
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APPENDICES

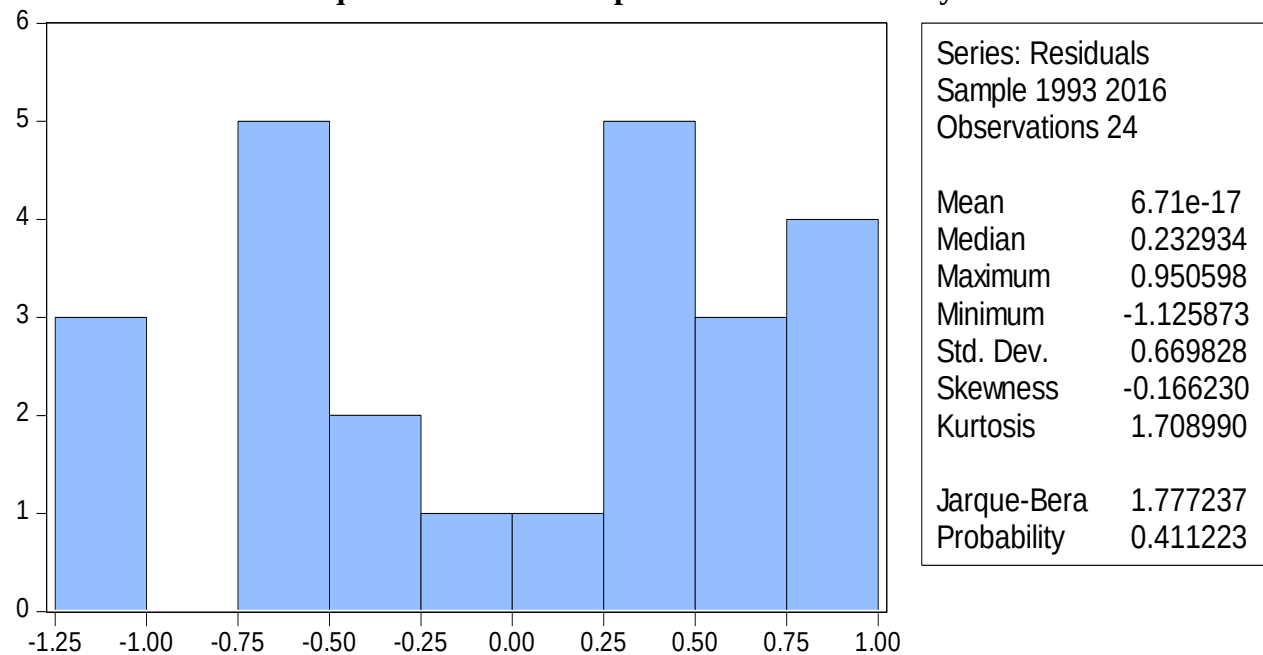
APPENDIX 1: The Jarque-Bera Test for Departures from Normality



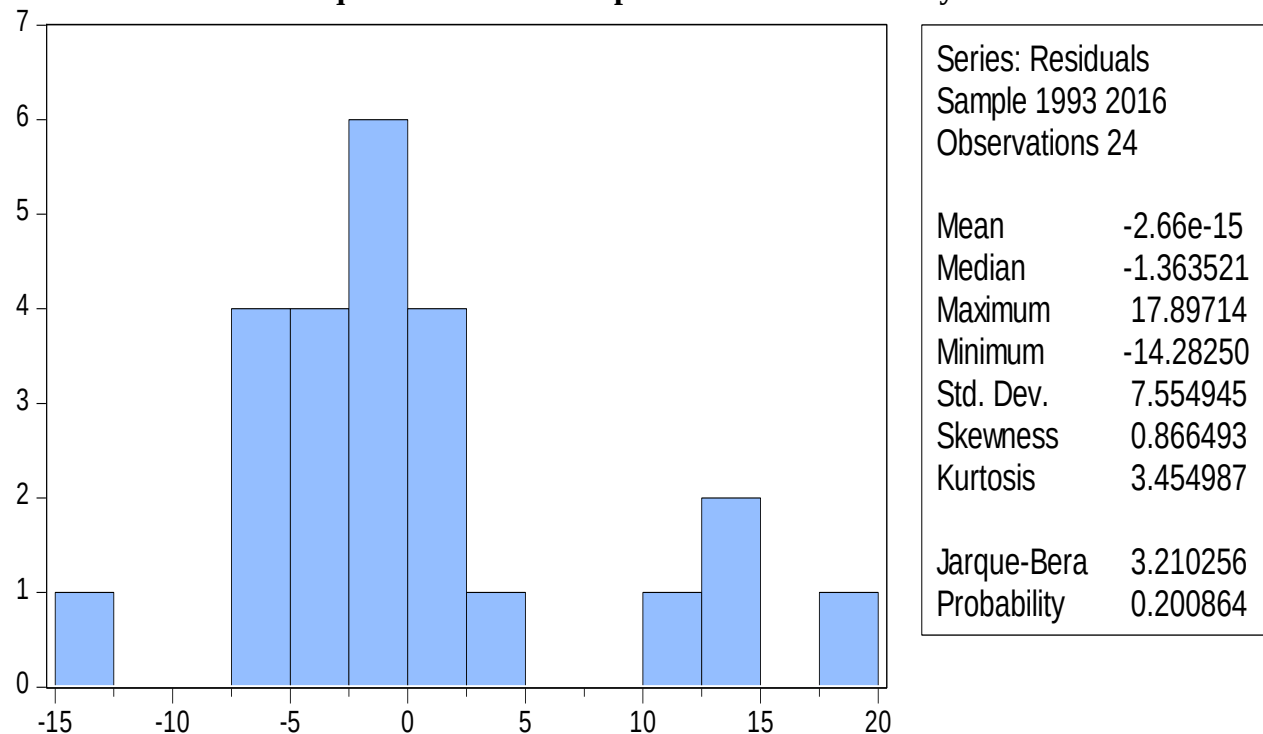
APPENDIX 2: The Jarque-Bera Test for Departures from Normality



APPENDIX 3: The Jarque-Bera Test for Departures from Normality



APPENDIX 4: The Jarque-Bera Test for Departures from Normality



APPENDIX 5: LFORES AT LEVEL

Null Hypothesis: LFORES has a unit root

Exogenous: Constant

Lag Length: 5 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.904160	0.3230
Test critical values: 1% level	-3.857386	
5% level	-3.040391	
10% level	-2.660551	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 18

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LFORES)

Method: Least Squares

Date: 06/03/18 Time: 01:38

Sample (adjusted): 1999 2016

Included observations: 18 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFORES(-1)	-0.144398	0.075833	-1.904160	0.0834
D(LFORES(-1))	0.550315	0.216602	2.540677	0.0274
D(LFORES(-2))	-0.240781	0.239684	-1.004577	0.3367
D(LFORES(-3))	-0.191691	0.229122	-0.836633	0.4206
D(LFORES(-4))	0.332165	0.205212	1.618645	0.1338
D(LFORES(-5))	-0.522753	0.188790	-2.768960	0.0183
C	0.577658	0.256439	2.252617	0.0457
R-squared	0.636582	Mean dependent var		0.078581
Adjusted R-squared	0.438354	S.D. dependent var		0.326862
S.E. of regression	0.244960	Akaike info criterion		0.309857
Sum squared resid	0.660059	Schwarz criterion		0.656113
Log likelihood	4.211287	Hannan-Quinn criter.		0.357601
F-statistic	3.211364	Durbin-Watson stat		1.679382
Prob(F-statistic)	0.044883			

APPENDIX 6: LFORES AT FIRST DIFFERENCE

Null Hypothesis: D(LFORES) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.283837	0.0283
Test critical values: 1% level	-3.769597	
5% level	-3.004861	
10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LFORES,2)
 Method: Least Squares
 Date: 06/03/18 Time: 01:41
 Sample (adjusted): 1995 2016
 Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFORES(-1))	-0.703249	0.214155	-3.283837	0.0037
C	0.092118	0.080888	1.138831	0.2682
R-squared	0.350303	Mean dependent var		-0.002182
Adjusted R-squared	0.317818	S.D. dependent var		0.429432
S.E. of regression	0.354686	Akaike info criterion		0.851342
Sum squared resid	2.516046	Schwarz criterion		0.950527
Log likelihood	-7.364757	Hannan-Quinn criter.		0.874707
F-statistic	10.78359	Durbin-Watson stat		1.746539
Prob(F-statistic)	0.003711			

APPENDIX 7: LFINCRS AT LEVEL

Null Hypothesis: LFINCRS has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.465908	0.5324
Test critical values: 1% level	-3.752946	
5% level	-2.998064	
10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LFINCRS)

Method: Least Squares

Date: 06/03/18 Time: 01:44

Sample (adjusted): 1994 2016

Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFINCRS(-1)	-0.188356	0.128491	-1.465908	0.1575
C	0.553484	0.370208	1.495064	0.1498
R-squared	0.092829	Mean dependent var		0.014670
Adjusted R-squared	0.049630	S.D. dependent var		0.217282
S.E. of regression	0.211821	Akaike info criterion		-0.183205
Sum squared resid	0.942235	Schwarz criterion		-0.084466
Log likelihood	4.106853	Hannan-Quinn criter.		-0.158372
F-statistic	2.148886	Durbin-Watson stat		1.614014
Prob(F-statistic)	0.157488			

APPENDIX 8: LFINCRS AT FIRST DIFFERENCE

Null Hypothesis: D(LFINCRS) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.983545	0.0062
Test critical values:		
1% level	-3.769597	
5% level	-3.004861	
10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LFINCRS,2)

Method: Least Squares

Date: 06/03/18 Time: 01:46

Sample (adjusted): 1995 2016

Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFINCRS(-1))	-0.883473	0.221781	-3.983545	0.0007
C	0.010127	0.048226	0.209984	0.8358
R-squared	0.442410	Mean dependent var		-0.001094
Adjusted R-squared	0.414530	S.D. dependent var		0.295118
S.E. of regression	0.225813	Akaike info criterion		-0.051714
Sum squared resid	1.019827	Schwarz criterion		0.047471
Log likelihood	2.568859	Hannan-Quinn criter.		-0.028349
F-statistic	15.86863	Durbin-Watson stat		1.595775
Prob(F-statistic)	0.000731			

APPENDIX 9: LCOILPSH AT LEVEL

Null Hypothesis: LCOILPSH has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.314820	0.6047
Test critical values:		
1% level	-3.752946	
5% level	-2.998064	
10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LCOILPSH)

Method: Least Squares

Date: 06/03/18 Time: 02:20

Sample (adjusted): 1994 2016

Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LCOILPSH(-1)	-0.105605	0.080319	-1.314820	0.2027
C	0.425470	0.299081	1.422589	0.1695
R-squared	0.076060	Mean dependent var		0.039684
Adjusted R-squared	0.032063	S.D. dependent var		0.282481
S.E. of regression	0.277916	Akaike info criterion		0.359943
Sum squared resid	1.621979	Schwarz criterion		0.458682
Log likelihood	-2.139345	Hannan-Quinn criter.		0.384776
F-statistic	1.728751	Durbin-Watson stat		1.700156
Prob(F-statistic)	0.202749			

APPENDIX 10: LCOILPSH AT FIRST DIFFERENCE

Null Hypothesis: D(LCOILPSH) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.928980	0.0070
Test critical values: 1% level	-3.769597	
5% level	-3.004861	
10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LCOILPSH,2)

Method: Least Squares

Date: 06/03/18 Time: 02:22

Sample (adjusted): 1995 2016

Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LCOILPSH(-1))	-0.885616	0.225406	-3.928980	0.0008
C	0.038006	0.063633	0.597274	0.5570
R-squared	0.435616	Mean dependent var		-0.006627
Adjusted R-squared	0.407397	S.D. dependent var		0.381485
S.E. of regression	0.293670	Akaike info criterion		0.473789
Sum squared resid	1.724843	Schwarz criterion		0.572974
Log likelihood	-3.211674	Hannan-Quinn criter.		0.497154
F-statistic	15.43688	Durbin-Watson stat		1.933451
Prob(F-statistic)	0.000831			

APPENDIX 11: LEXRATE AT LEVEL

Null Hypothesis: LEXRATE has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.213487	0.6504
Test critical values:		
1% level	-3.752946	
5% level	-2.998064	
10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LEXRATE)
 Method: Least Squares
 Date: 06/03/18 Time: 02:49
 Sample (adjusted): 1994 2016
 Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXRATE(-1)	-0.093771	0.077274	-1.213487	0.2384
C	0.521210	0.347699	1.499027	0.1488
R-squared	0.065527	Mean dependent var		0.106173
Adjusted R-squared	0.021028	S.D. dependent var		0.303340
S.E. of regression	0.300134	Akaike info criterion		0.513767
Sum squared resid	1.891690	Schwarz criterion		0.612505
Log likelihood	-3.908316	Hannan-Quinn criter.		0.538599
F-statistic	1.472551	Durbin-Watson stat		1.965975
Prob(F-statistic)	0.238416			

APPENDIX 12: LEXRATE AT FIRST DIFFERENCE

Null Hypothesis: D(LEXRATE) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.528124	0.0018
Test critical values: 1% level	-3.769597	
5% level	-3.004861	
10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LEXRATE,2)
 Method: Least Squares
 Date: 06/03/18 Time: 02:49
 Sample (adjusted): 1995 2016
 Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEXRATE(-1))	-1.016175	0.224414	-4.528124	0.0002
C	0.112936	0.071128	1.587785	0.1280
R-squared	0.506220	Mean dependent var		0.012669
Adjusted R-squared	0.481531	S.D. dependent var		0.440306
S.E. of regression	0.317041	Akaike info criterion		0.626939
Sum squared resid	2.010305	Schwarz criterion		0.726125
Log likelihood	-4.896331	Hannan-Quinn criter.		0.650304
F-statistic	20.50391	Durbin-Watson stat		1.995332
Prob(F-statistic)	0.000205			

APPENDIX 13: LNETRADE AT LEVEL

Null Hypothesis: LNETRADE has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.333279	0.1707
Test critical values:		
1% level	-3.752946	
5% level	-2.998064	
10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LNETRADE)
 Method: Least Squares
 Date: 06/03/18 Time: 03:22
 Sample (adjusted): 1994 2016
 Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNETRADE(-1)	-0.155948	0.066836	-2.333279	0.0297
C	1.384531	0.534991	2.587952	0.0172
R-squared	0.205875	Mean dependent var		0.152743
Adjusted R-squared	0.168059	S.D. dependent var		0.455793
S.E. of regression	0.415733	Akaike info criterion		1.165392
Sum squared resid	3.629505	Schwarz criterion		1.264131
Log likelihood	-11.40201	Hannan-Quinn criter.		1.190225
F-statistic	5.444192	Durbin-Watson stat		1.990545
Prob(F-statistic)	0.029655			

APPENDIX 14: LNETRADE AT FIRST DIFFERENCE

Null Hypothesis: D(LNETRADE) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.178869	0.0040
Test critical values: 1% level	-3.769597	
5% level	-3.004861	
10% level	-2.642242	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LNETRADE,2)
 Method: Least Squares
 Date: 06/03/18 Time: 03:23
 Sample (adjusted): 1995 2016
 Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNETRADE(-1))	-0.933567	0.223402	-4.178869	0.0005
C	0.152678	0.107512	1.420101	0.1710
R-squared	0.466139	Mean dependent var		-0.001009
Adjusted R-squared	0.439446	S.D. dependent var		0.632903
S.E. of regression	0.473856	Akaike info criterion		1.430680
Sum squared resid	4.490784	Schwarz criterion		1.529866
Log likelihood	-13.73748	Hannan-Quinn criter.		1.454045
F-statistic	17.46295	Durbin-Watson stat		1.332837
Prob(F-statistic)	0.000463			

APPENDIX 15a: ERROR CORRECTION MODEL (ECM) FOR MODEL 1 (LFINCRS)

Dependent Variable: DLFORES

Method: Least Squares

Date: 06/03/18 Time: 01:58

Sample (adjusted): 1994 2016

Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.122910	0.076726	1.601940	0.1248
DLFINCRS	0.169525	0.421445	0.402248	0.6918
ECM(-1)	-0.086492	0.107479	-0.804734	0.4304
R-squared	0.031384	Mean dependent var		0.126413
Adjusted R-squared	-0.065478	S.D. dependent var		0.355022
S.E. of regression	0.366461	Akaike info criterion		0.951257
Sum squared resid	2.685870	Schwarz criterion		1.099365
Log likelihood	-7.939458	Hannan-Quinn criter.		0.988506
F-statistic	0.324008	Durbin-Watson stat		1.433550
Prob(F-statistic)	0.726970			

APPENDIX 15b: ERROR CORRECTION MODEL (ECM) FOR LFINCRS AFTER LAG ADJUSTMENT

Dependent Variable: DLFORES

Method: Least Squares

Date: 06/03/18 Time: 02:04

Sample (adjusted): 1995 2016

Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.228669	0.107011	2.136878	0.0458
DLFINCRS	0.834981	0.434702	1.920810	0.0699
ECM(-2)	-0.521612	0.166564	-3.131595	0.0055
R-squared	0.341263	Mean dependent var		0.266003
Adjusted R-squared	0.271922	S.D. dependent var		0.582632
S.E. of regression	0.497145	Akaike info criterion		1.566255
Sum squared resid	4.695918	Schwarz criterion		1.715034
Log likelihood	-14.22881	Hannan-Quinn criter.		1.601303
F-statistic	4.921531	Durbin-Watson stat		1.161516
Prob(F-statistic)	0.018957			

APPENDIX 16: ERROR CORRECTION MODEL (ECM) FOR MODEL 2 (LCOILPSH)

Dependent Variable: DLFORES

Method: Least Squares

Date: 06/03/18 Time: 02:32

Sample (adjusted): 1994 2016

Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.094164	0.064612	1.457382	0.1605
DLCOILPSH	0.599004	0.235823	2.540062	0.0195
ECM(-1)	-0.304215	0.132605	-2.294141	0.0327
R-squared	0.326643	Mean dependent var		0.126413
Adjusted R-squared	0.259307	S.D. dependent var		0.355022
S.E. of regression	0.305545	Akaike info criterion		0.587665
Sum squared resid	1.867149	Schwarz criterion		0.735773
Log likelihood	-3.758148	Hannan-Quinn criter.		0.624914
F-statistic	4.850956	Durbin-Watson stat		1.376363
Prob(F-statistic)	0.019163			

APPENDIX 17a: ERROR CORRECTION MODEL (ECM) FOR MODEL 3 (LEXRATE)

Dependent Variable: DLFORES

Method: Least Squares

Date: 06/03/18 Time: 02:59

Sample (adjusted): 1994 2016

Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.156864	0.072017	2.178159	0.0415
DLEXRATE	-0.245486	0.235180	-1.043823	0.3090
ECM(-1)	-0.206923	0.105438	-1.962501	0.0638
R-squared	0.239410	Mean dependent var		0.126413
Adjusted R-squared	0.163351	S.D. dependent var		0.355022
S.E. of regression	0.324733	Akaike info criterion		0.709483
Sum squared resid	2.109036	Schwarz criterion		0.857591
Log likelihood	-5.159057	Hannan-Quinn criter.		0.746732
F-statistic	3.147690	Durbin-Watson stat		1.226681
Prob(F-statistic)	0.064790			

APPENDIX 17b: ERROR CORRECTION MODEL (ECM) FOR LEXRATE AFTER LAG ADJUSTMENT

Dependent Variable: DLFORES

Method: Least Squares

Date: 06/03/18 Time: 03:03

Sample (adjusted): 1995 2016

Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.287639	0.118865	2.419873	0.0257
DLEXRATE	-0.036600	0.273390	-0.133875	0.8949
ECM(-2)	-0.490108	0.171270	-2.861613	0.0100
R-squared	0.352467	Mean dependent var		0.266003
Adjusted R-squared	0.284306	S.D. dependent var		0.582632
S.E. of regression	0.492899	Akaike info criterion		1.549100
Sum squared resid	4.616046	Schwarz criterion		1.697879
Log likelihood	-14.04010	Hannan-Quinn criter.		1.584148
F-statistic	5.171066	Durbin-Watson stat		1.011890
Prob(F-statistic)	0.016106			

APPENDIX 18: ERROR CORRECTION MODEL (ECM) FOR MODEL 4 (LNETRADE)

Dependent Variable: DLFORES

Method: Least Squares

Date: 06/03/18 Time: 03:33

Sample (adjusted): 1994 2016

Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.092259	0.047985	1.922639	0.0689
DLNETRADE	0.204110	0.101827	2.004479	0.0587
ECM(-1)	-0.730711	0.124395	-5.874100	0.0000
R-squared	0.658193	Mean dependent var		0.126413
Adjusted R-squared	0.624012	S.D. dependent var		0.355022
S.E. of regression	0.217692	Akaike info criterion		-0.090363
Sum squared resid	0.947796	Schwarz criterion		0.057744
Log likelihood	4.039180	Hannan-Quinn criter.		-0.053115
F-statistic	19.25624	Durbin-Watson stat		0.913660
Prob(F-statistic)	0.000022			

APPENDIX 19: ORDINARY LEAST SQUARE FOR LFINCRS

Dependent Variable: LFORES

Method: Least Squares

Date: 06/03/18 Time: 01:31

Sample: 1993 2016

Included observations: 24

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.017616	1.486322	-2.703060	0.0130
LFINCRS	2.337442	0.514509	4.543052	0.0002
R-squared	0.484044	Mean dependent var		2.688214
Adjusted R-squared	0.460592	S.D. dependent var		1.162831
S.E. of regression	0.854034	Akaike info criterion		2.601965
Sum squared resid	16.04624	Schwarz criterion		2.700136
Log likelihood	-29.22358	Hannan-Quinn criter.		2.628009
F-statistic	20.63932	Durbin-Watson stat		0.540855
Prob(F-statistic)	0.000160			

APPENDIX 20: ORDINARY LEAST SQUARE FOR LCOILPSH

Dependent Variable: LFORES

Method: Least Squares

Date: 06/03/18 Time: 02:14

Sample: 1993 2016

Included observations: 24

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.605783	0.560926	-4.645499	0.0001
LCOILPSH	1.448303	0.150668	9.612568	0.0000
R-squared	0.807695	Mean dependent var		2.688214
Adjusted R-squared	0.798954	S.D. dependent var		1.162831
S.E. of regression	0.521392	Akaike info criterion		1.615028
Sum squared resid	5.980700	Schwarz criterion		1.713199
Log likelihood	-17.38033	Hannan-Quinn criter.		1.641072
F-statistic	92.40147	Durbin-Watson stat		0.684524
Prob(F-statistic)	0.000000			

APPENDIX 21: ORDINARY LEAST SQUARE FOR LEXRATE

Dependent Variable: LFORES

Method: Least Squares

Date: 06/03/18 Time: 02:45

Sample: 1993 2016

Included observations: 24

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.366936	0.772247	-3.064997	0.0057
LEXRATE	1.130331	0.169821	6.655999	0.0000
R-squared	0.668187	Mean dependent var		2.688214
Adjusted R-squared	0.653104	S.D. dependent var		1.162831
S.E. of regression	0.684883	Akaike info criterion		2.160517
Sum squared resid	10.31941	Schwarz criterion		2.258688
Log likelihood	-23.92620	Hannan-Quinn criter.		2.186561
F-statistic	44.30232	Durbin-Watson stat		0.677665
Prob(F-statistic)	0.000001			

APPENDIX 22: ORDINARY LEAST SQUARE FOR LNETRADE

Dependent Variable: LFORES

Method: Least Squares

Date: 06/03/18 Time: 03:16

Sample: 1993 2016

Included observations: 24

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.013297	0.479098	-8.376773	0.0000
LNTRADE	0.845015	0.059641	14.16846	0.0000
R-squared	0.901232	Mean dependent var		2.688214
Adjusted R-squared	0.896743	S.D. dependent var		1.162831
S.E. of regression	0.373660	Akaike info criterion		0.948712
Sum squared resid	3.071673	Schwarz criterion		1.046884
Log likelihood	-9.384548	Hannan-Quinn criter.		0.974757
F-statistic	200.7453	Durbin-Watson stat		1.452648
Prob(F-statistic)	0.000000			

APPENDIX 23: OLS RESULT AFTER COCHRANE-ORCUTT ITERATIVE ESTIMATION FOR LFINCRS

Dependent Variable: LFORES
Method: Least Squares
Date: 06/03/18 Time: 01:52
Sample (adjusted): 1994 2016
Included observations: 23 after adjustments
Convergence achieved after 8 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.500222	1.505169	2.325467	0.0307
LFINCRS	0.065661	0.369428	0.177736	0.8607
AR(1)	0.878308	0.066163	13.27500	0.0000
R-squared	0.910359	Mean dependent var		2.783584
Adjusted R-squared	0.901395	S.D. dependent var		1.088772
S.E. of regression	0.341890	Akaike info criterion		0.812452
Sum squared resid	2.337774	Schwarz criterion		0.960560
Log likelihood	-6.343194	Hannan-Quinn criter.		0.849700
F-statistic	101.5562	Durbin-Watson stat		1.470776
Prob(F-statistic)	0.000000			
Inverted AR Roots	.88			

APPENDIX 24: OLS RESULT AFTER COCHRANE-ORCUTT ITERATIVE ESTIMATION FOR LCOILPSH

Dependent Variable: LFORES
Method: Least Squares
Date: 06/03/18 Time: 02:27
Sample (adjusted): 1994 2016
Included observations: 23 after adjustments
Convergence achieved after 8 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.461991	1.184589	1.234176	0.2314
LCOILPSH	0.510644	0.250561	2.037999	0.0550
AR(1)	0.841631	0.080555	10.44795	0.0000
R-squared	0.924925	Mean dependent var		2.783584
Adjusted R-squared	0.917418	S.D. dependent var		1.088772
S.E. of regression	0.312882	Akaike info criterion		0.635127
Sum squared resid	1.957905	Schwarz criterion		0.783235
Log likelihood	-4.303963	Hannan-Quinn criter.		0.672376
F-statistic	123.2002	Durbin-Watson stat		1.688778
Prob(F-statistic)	0.000000			
Inverted AR Roots	.84			

APPENDIX 25: OLS RESULT AFTER COCHRANE-ORCUTT ITERATIVE ESTIMATION FOR LEXRATE

Dependent Variable: LFORES
Method: Least Squares
Date: 06/03/18 Time: 02:52
Sample (adjusted): 1994 2016
Included observations: 23 after adjustments
Convergence achieved after 7 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.055862	1.792647	3.378168	0.0030
LEXRATE	-0.378731	0.236746	-1.599733	0.1253
AR(1)	0.903261	0.047981	18.82521	0.0000
R-squared	0.920047	Mean dependent var		2.783584
Adjusted R-squared	0.912052	S.D. dependent var		1.088772
S.E. of regression	0.322887	Akaike info criterion		0.698078
Sum squared resid	2.085119	Schwarz criterion		0.846186
Log likelihood	-5.027902	Hannan-Quinn criter.		0.735327
F-statistic	115.0735	Durbin-Watson stat		1.477842
Prob(F-statistic)	0.000000			
Inverted AR Roots	.90			

APPENDIX 26: OLS RESULT AFTER COCHRANE-ORCUTT ITERATIVE ESTIMATION FOR LNETRADE

Dependent Variable: LFORES
Method: Least Squares
Date: 06/03/18 Time: 03:27
Sample (adjusted): 1994 2016
Included observations: 23 after adjustments
Convergence achieved after 25 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.598356	0.851872	-4.224057	0.0004
LNETRADE	0.792986	0.103692	7.647497	0.0000
AR(1)	0.343115	0.213069	1.610342	0.1230
R-squared	0.892411	Mean dependent var		2.783584
Adjusted R-squared	0.881652	S.D. dependent var		1.088772
S.E. of regression	0.374557	Akaike info criterion		0.994960
Sum squared resid	2.805853	Schwarz criterion		1.143068
Log likelihood	-8.442042	Hannan-Quinn criter.		1.032209
F-statistic	82.94614	Durbin-Watson stat		1.796038
Prob(F-statistic)	0.000000			
Inverted AR Roots	.34			