

**THE IMPACT OF EXTERNAL DEBT ON ECONOMIC GROWTH IN NIGERIA  
(1980-2012)**

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## CERTIFICATION

It is hereby certified that this research project written by Utomi Ohunma Winifred, was supervised and submitted to the department of Economics and Development Studies, College of Development Studies, Covenant University, Ota, Ogun State.

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## **DEDICATION**

I dedicate this project to the Almighty and ever living God who has been my rock and refuge all through life and to my wonderful family for all the love, care and support they have given me. I am forever grateful.

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I will forever remain grateful to God Almighty for his grace and mercies that has seen me through every phase of my life since the very beginning. All the glory, honour, praise and adoration be unto his holy name.

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## **ABSTRACT**

*The study investigated the impact of external debt on economic growth in Nigeria for the period 1980-2012. Time series data on external debt stock and external debt service was used to capture external debt burden. The study set out to test for both a long run and causal relationship between external debt and economic growth in Nigeria. An empirical investigation was conducted using time series data on Real Gross Domestic Product, External Debt Stock, External Debt Payments and Exchange Rate from 1980-2012. The techniques of Estimation employed in the study include Augmented Dickey Fuller (ADF) test, Johansen Co-integration, Vector Error Correction Mechanism and Granger Causality Test. The results show an insignificant long run relationship and a bi-directional relationship between external debt and economic growth in Nigeria.*

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the Study

Sustainable economic growth is a major concern for any sovereign nation most especially the Less Developed Countries (LDCs) which are characterized by low capital formation due to low levels of domestic savings and investment (Adepoju, Salau and Obayelu, 2007). It is expected that these LDC's when facing a scarcity of capital would resort to borrowing from external sources so as to supplement domestic saving (Aluko and Arowolo, 2010; Safdari and Mehrizi, 2011; Sulaiman and Azeez, 2011). Soludo (2003) asserted that countries borrow for two broad reasons; macroeconomic reason that is to finance higher level of consumption and investment or to finance transitory balance of payment deficit and avoid budget constraint so as to boost economic growth and reduce poverty. The constant need for governments to borrow in order to finance budget deficit has led to the creation of external debt (Osinubi and Olaleru, 2006).

External debt is a major source of public receipts and financing capital accumulation in any economy (Adepoju *et al*, 2007). It is a medium used by countries to bridge their deficits and carry out economic projects that are able to increase the standard of living of the citizenry and promote sustainable growth and development. Hameed, Ashraf and Chaudary (2008) stated that external borrowing ought to accelerate economic growth especially when domestic financing is inadequate. External debt also improves total factor productivity through an increase in output which in turn enhances Gross Domestic product (GDP) growth of a nation. The importance of external debt cannot be

overemphasized as it is an ardent booster of growth and thus improves living standards thereby alleviating poverty.

It is widely recognized in the international community that excessive foreign indebtedness in most developing countries is a major impediment to their economic growth and stability (Audu, 2004; Mutasa, 2003). Developing countries like Nigeria have often contracted large amount of external debts that has led to the mounting of trade debt arrears at highly concessional interest rates. Gohar and Butt (2012) opined that accumulated debt service payments create a lot of problems for countries especially the developing nations reason being that a debt is actually serviced for more than the amount it was acquired and this slows down the growth process in such nations. The inability of the Nigerian economy to meet its debt service payments obligations has resulted in debt overhang or debt service burden that has militated against her growth and development (Audu, 2004). The genesis of Nigeria's debt service burden dates back to 1978 after a fall in world oil prices. Prior to this occurrence Nigeria had incurred some minor debts from World Bank in 1958 with a loan of US\$28million dollars for railway construction and the Paris Club debtor nations in 1964 from the Italian government with a loan of US\$13.1 million for the construction of the Niger dam. The first major borrowing of US\$1 billion known as the "Jumbo loan" was in 1978 from the International Capital Market (ICM) (Adesola, 2009).

External borrowing has a significant impact on the growth and investment of a nation up to a point where high levels of external debt servicing sets in and affects the growth as the focus moves from financing private investment to repayments of debts. Pattilo, Poirson and Ricci (2002) asserted that at low levels debt has positive effects on growth

but above particular points or thresholds accumulated debt begins to have a negative impact on growth. Furthermore Fosu (2009) observed that high debt service payments shifts spending away from health, educational and social sectors. This obscures the motive behind external borrowing which is to boost growth and development rather than get drowned in a pool of debt service payments which eats up most of the nation's resources and hinders growth due to high interest payments on external debt.

Nigeria as a developing nation has adopted a number of policies such as the Structural Adjustment Programme (SAP) of 1986 to liberalize her economy and boost Gross Domestic product (GDP) growth. In a bid to ensure the implementation of these policies the government embarked upon massive borrowings from multilateral sources which resulted in a high external debt service burden and by 1992 Nigeria was classified among the heavily indebted poor countries (HIPC) by the World Bank. According to (Omotoye, Sharma, Ngassam and Eseonu, 2006) Nigeria is the largest debtor nation in sub Saharan Africa. When compared with other sub Saharan nations such as South Africa, Nigeria's external debt stock follows an upward pattern over the years while the former is relatively stabilized (Ayad and Ayadi, 2008). Nigeria's external debt stock rose from US\$28454.8 million in 1997 to US\$31041.6 and US\$37883.1 million in 2001 and 2004 with 80.3, 64.67 and 52.58 percentages of GDP respectively. On the other hand South Africa's external debt stock stood at US\$25272.4 million, US\$24050 million and US\$27112.4 million in 1997, 2001 and 2004 with 16.98, 20.34 and 12.52 percentages of GDP respectively.

The unabated increase in the level of external debt service payments has led to huge imbalances in fiscal deficits and budgetary constraints that have militated against the

growth of the Nigerian economy. The resultant effect of the debt quagmire in Nigeria could create some unfavourable circumstances such as crowding out of private investment, poor GDP growth e.t.c (Ngonzi Okonjo Iweala, 2011).

## **1.2 Statement of the Research Problem**

“Huge external debt does not necessarily imply a slow economic growth; it is a nation’s inability to meet its debt service payments fueled by inadequate knowledge on the nature, structure and magnitude of the debt in question” (Were, 2011).

It is no exaggeration that this is the major challenge faced by the Nigerian economy. The inability of the Nigerian economy to effectively meet its debt servicing requirements has exposed the nation to a high debt service burden. The resultant effect of this debt service burden creates additional problems for the nation particularly the increasing fiscal deficit which is driven by higher levels of debt servicing. This poses a grave threat to the economy as a large chunk of the nation’s hard earned revenue is being eaten up. Nigeria’s external debt outstanding stood at US\$28.35 billion in 2001 which was about 59.4% of GDP from US\$8.5 billion in 1980 which was about 14.6% of GDP (WDI 2013). The debt crisis reached its maximum in 2003 when US\$2.3 billion was transferred to service Nigeria’s external debt. In the year 2005 the Paris Club group of creditor nations forgave 60% (US\$18 billion) of US\$30.85 billion debt owed by Nigeria. Despite the debt relief of US\$18 billion received by Nigeria from the Paris club in 2005 the situation remains the same (Bakare, 2010). The question then becomes why has external borrowing not accelerated the pace of growth of the Nigerian economy?

There are various empirical studies that have been conducted to investigate the impact of external debt burden on economic growth in Nigeria and have arrived at different results using the same scope of study (see Bhattacharya & Nguyen, 2003; Fosu, 2007; Hunt, 2007; Ayadi, 2008). My research study will focus on these issues in external debt to determine the long run relationship between external debt and economic growth by expanding the scope of study beyond what has been done in times past.

### **1.3 Research Questions**

This research seeks to investigate the impact of external debt on economic growth in Nigeria and therefore tries to answer the following research questions:

1. Does a long run relationship exist between external debt and economic growth in Nigeria?
2. Is there causality between external debt and economic growth in Nigeria?
3. What are the causes of Nigeria's external debt burden?

### **1.4 Objectives of Study**

The broad objective of this study is to ascertain the impact external debt burden has on economic growth in Nigeria. Other specific objectives include:

1. To determine long relationship between external debt and economic growth in Nigeria.
2. To examine causality between external debt and economic growth in Nigeria.
3. To identify the causes of external debt burden in Nigeria.

## **1.5 Research Hypotheses**

The hypotheses to be tested in the course of this study include:

### **HYPOTHESIS 1**

H<sub>0</sub>: There is no significant long run relationship between external debt and economic growth in Nigeria.

H<sub>1</sub>: There is a significant long run relationship between external debt and economic growth in Nigeria.

### **HYPOTHESIS 2**

H<sub>0</sub>: There is no causal relationship between external debt and economic growth in Nigeria.

H<sub>1</sub>: There is a causal relationship between external debt and economic growth in Nigeria.

## **1.6 Scope of Study**

The study seeks to analyze Nigeria's external debt and its impact on her economic growth. In order to fully capture its effect on the economy, a thorough empirical investigation will be conducted with data covering a period of 32 years i.e. 1980-2012. This period was chosen to cover the period after the oil collapse and also the post debt-relief era.



## **1.7 Significance of Study**

The burden of External debt has been a matter of great concern to the Government of Nigeria and the nation as a whole which has resulted in embarking upon drastic actions like dividing the nation's scarce resources in servicing of debts annually. This action has thus led to disinvestment in the economy, and as a result a fall in the domestic savings and the overall rate of growth.

This study seeks to investigate the direct impact of external debt burden on economic growth in Nigeria by finding a long run and causal relationship between external debt and economic growth. This study is significant as its findings will provide a basis which will aid policy makers in proffering polices aimed at managing the debt crisis situation in Nigeria.

## **1.8 Research Methodology**

The methodology adopted in this study is Co-integration analysis using the Augmented Dickey Fuller (ADF) unit root test, Johansen Co-integration and Vector Error Correction techniques of estimation which provides coefficient estimates of the time-series data used in analysis. It also carries out a causality test using Granger Causality test to check for a causal relationship between external debt and economic growth in Nigeria.

## **1.9 Data Sources**

This study makes use of mainly secondary data obtained from World Bank reports, CBN statistical bulletins and reports, journals, articles, newspapers and other statistical sources.

### **1.10 Outline of Study**

This study is divided into five chapters.

Chapter 1 contains the general introduction which provides the background to the study, statement of problem, scope of the study, significance of study, objectives of the study, research questions, research hypotheses, research methodology as well as the data sources.

Chapter two examines the works of other economists on the subject matter of external debt and it consists of conceptual and definitional issues, theoretical, empirical and methodological review and a summary of literature.

Chapter 3 provides the theoretical framework of the study and the methodology employed. It also contains the specification and estimation of the model.

Chapter four carries out a descriptive, trend and empirical analysis of the model estimated in chapter three.

Chapter five contains the summary, conclusion and recommendations.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The 1950's and 1960's are most often described as the "golden years" for developing countries in economic development literature because of the rate of economic growth which was not just high but also internally generated. In the above years these LDC's increased their investment reliance on external resources however most of the growth in the 1970s was "debt led" and this led to persistent current account deficits with massive borrowings from the international money and capital market (ICM) to bridge payment gaps. External debt has increased steadily over the years in developing countries and as such an analysis of the role external debt plays in economic growth and development is paramount. Aside from being an ardent booster of growth external debt has also been known to cause a number of problems for developing countries. The increases in external debt over the years in developing countries has brought the issue of external debt out of hiding and has become a matter of concern both to the international and local community. The need to constantly borrow as a means of financing has brought about an increasing literature among various economists.

Nigeria, like most other less developed countries (LDCs) has been classified by the World Bank among the severely indebted low income countries since 1992. The nation's inability to meet all of its debt service payment constitutes one of the serious obstacles to the inflow of external resources into the economy. The accumulation of debt service arrears worsened by high interest payments has catapulted the external debt stock to

extremely high levels and all efforts to substantially reduce the debt has been unsuccessful. This chapter therefore carries out an extensive literature review on the subject matter of external debt and economic growth by looking at conceptual and definitional issues, theoretical issues, empirical and methodological issues and summary.

## **2.2 Review of Conceptual and Definitional Issues**

The act of borrowing creates debts and this debt may be domestic or external. The focus of this study is on external debt which refers to that part of a nation's debt that is owed to creditors outside the nation. Arnone *et al* (2005) defines external debt as that portion of a country's debt that is acquired from foreign sources such as foreign corporations, government or financial institutions. According to (Ogbeifin, 2007), external debt arises as a result of the gap between domestic savings and investment. As the gap widens, debt accumulates and this makes the country to continually borrow increasing amounts in order to stay afloat. He further defined Nigeria's external debt as the debt owed by the public and private sectors of the Nigerian economy to non-residents and citizens that is payable in foreign currency, goods and services.

Debt crisis occurs when a country has accumulated a huge amount of debt such that it can no longer effectively manage the debt which leads to several mishaps in the domestic political economy (Adejuwon *et al*). Mimiko (1997) defined debt crisis as a situation whereby a nation is severely indebted to external sources and is unable to repay the principal of the debt.

## **Origin of Debt Crisis in LDCs**

When we trace back countries with debt crises history, the origin can be attributed to the following time periods:

### **First Period (1973-1978)**

The quadrupling of crude-oil price following the Egypt –Israel war of October 1973 led to disorder in the international market. To neutralize the effect, producers in the industrialized world increased market price both in the domestic and international market. This created inflationary pressure around the industrialized world and left many of the developing countries with severe balance of payment issues. This was because the economies of these LDC's were not well developed to withstand the price shocks due to the increase in the price of crude oil and imported goods. The current account deficit in LDCs increased from 8.7 billion US\$ in 1973 to US\$ 42.9 billion in 1974 and US\$ 51.3 billion in 1975. As a result many of them resorted to borrowing from banks in the international capital market (ICM). This also created room for major banks to re-channel the funds generated from dollar-based oil exporting countries to budget deficit oil-importing countries and by 1978 foreign indebtedness had risen significantly from US\$130 billion in 1973 to US\$336 billion.

### **Second Period (1979-1982)**

The decision taken by the Organization of Petroleum Exporting Countries (OPEC) to increase the price of crude oil from US\$ 13 per barrel to US\$ 32 per barrel brought about the second oil price shock. The response from the industrial world for the second oil price shock was similar to that of the first period. At the end of 1979 the United

States of America adopted a tight monetary policy and was followed by other developed nations namely UK, Germany, France, Italy and Japan. This further worsened the condition of LDC that continued on their massive borrowing from the developed world at a higher interest rate. For instance the London Inter Bank Offered Rate (LIBOR) rose from 9.5 percent in mid 1978 to 16.6 percent in 1981. The corresponding increase in external debt outstanding rose from US\$336 billion in 1978 to US\$662 billion in 1982. The increase in interest rate along with other factors contributed to the severe world recession of 1981-1983. This posed additional problems for LDCs as it led to a fall in the price and volume of their exports which reduced their export earnings. Furthermore the recession made the developed economies to reduce the amount of imported goods which also reduced LDCs export earnings. Due to a USA's high interest Rate, bankers were willing to loan money to the US than the LDCs. The rapid appreciation of the US Dollar also made the situation worse for LDCs as their debt service payments increased as a result of this. The debt crisis situation is highly linked with the inability of most developing countries to meet their debt service payment obligations.

### **2.2.1 Why Countries Borrow**

Generally the need for public borrowing arises from the recognized role of capital in the developmental process of any nation as capital accumulation improves productivity which in turn enhances economic growth. There is abundant proof in the existing body of literature to indicate that foreign borrowing aids the growth and development of a nation. Soludo (2003) was of the opinion that countries borrow for major reasons. The first is of macroeconomic intent that is to bring about increased investment and human capital development while the other is to reduce budget constraint by financing fiscal

and balance of payment deficits. Furthermore (Obadan and Uga, 2007) stressed the fact that countries especially the less developed countries borrow to raise capital formation and investment which has been previously hampered by low level of domestic savings. Ultimately the reasons why countries borrow boils down to two major reasons which are to bridge the “savings-investment” gap and the “foreign exchange gap”. Chenery (1966) pointed out that the main reason why countries borrow is to supplement the lack of savings and investment in that country. The dual-gap analysis justifies the need for external borrowing as an attempt in trying to bridge the savings-investment gap in a nation. For development to take place it requires a level of investment which is a function of domestic savings and the level of domestic savings is not sufficient enough to ensure that development take place (Oloyede, 2002). The second reason for borrowing from overseas is also to fill the foreign exchange (imports-exports) gap. For many developing countries like Nigeria the constant balance of payment deficit have not allowed for capital inflow which will bring about growth and development. Since the foreign exchange earnings required to finance this investment is insufficient external borrowing may be the only means of gaining access to the resources needed to achieve rapid economic growth.

### **2.2.2 Origin of Nigeria’s External Debt**

Nigeria’s external indebtedness can be traced back to the pre-independence period when in 1958 a loan of US\$28 million dollars was contracted from the World Bank for railway construction. This debt did not pose a serious burden reason being that it was acquired on soft terms i.e. with no interest or below market rate of interest. After this period, the need for external aid was relatively low until in 1977/1978 when there was a

fall in world oil prices which in turn reduced the nation's oil receipts. Before this period Nigeria was experiencing abundance in oil receipts especially with the oil boom of 1973-1976. After crude oil was first discovered in 1956, it became a major source of foreign exchange earnings as there was a gradual drift from agriculture which had been the dominant provider of export earnings, employment e.t.c to near total dependence on oil as the mainstay of the economy. Following the fall in oil prices, it became necessary for the government to correct balance of payment difficulties and finance projects. This led to the first major borrowing of US\$1 billion which is referred to as the JUMBO LOAN in 1978 from the international capital market (ICM).

Although this loan was used to finance various medium and long term infrastructural projects, the returns obtained from these projects were not enough to amortize the nation's debts as many of the projects as included in the Fourth National Development Plans (1981-1985) involved mainly the use of imported materials. In 1979, there was a recovery in the oil market and oil was sold in Nigeria at US\$39.00 per barrel which led to the belief that the economy was bouncing back. But due to the fact that there was excessive importation, it resulted in over-invoicing of imports and under-invoicing of exports and in 1982 when there was another collapse in world oil prices it caused severe strains and stresses on the economy. Foreign exchange was declining rapidly and there were large amount of deficits in government financing. In the face of drastic oil downturn and dwindling oil reserves, the rate of borrowings increased from the international capital market (ICM).

At this point the nation's debt profile had begun rising astronomically due to the increasing external debt service payments. In 1980 external debt stood at US\$8.5 billion



and by 1985 it nearly reached US\$19 billion showing an increase of about 45.02%. The increasing in debt service payments interests resulted in mounting of trade debts arrears. By 1997 the nation's debt stock stood at US\$27.0878 billion; US\$18.9804 billion Paris Club debt; US\$4.3727 billion Multilateral debt; \$1.6125 billion Promissory notes and US\$0.7919 billion Non Paris Bilateral debt (Ministry of Finance, 1997). Due to the rise in external debt there was a corresponding increase in external debt servicing ratios; debt/GDP and debt/export earnings. As at December 31<sup>st</sup> 2001, the external debt stock stood at US\$28.35 billion which was about 59.4% of GDP and 153.9% of export earnings.

### **2.2.3 Causative Factors of Nigeria's External Debt**

According to (Sogo-Temi, 1999), the explanation for the growing debt burden of developing economies is of two-fold. Firstly, developing countries have become over-dependent on external borrowing. Secondly, the difficulties they experience in servicing external debt due to huge debt service payments. Ahmed (1984) asserted that the causes of debt problem relate to both the nature of the economy and the economic policies put in place by the government. He articulated that the developing economies are characterized by heavy dependence on one or few agricultural and mineral commodities and export trade is highly concentrated on the other. The manufacturing sector is mostly at the infant stage and relies heavily on imported inputs. He stated that they are dependent on the developed countries for supply of other input and finance needed for economic development which makes them vulnerable to external shocks.

Aluko and Arowolo (2010) pointed out that the major cause of the debt crisis situation in Nigeria is the fact that these foreign loans are not being used for developmental purposes.

Instead of being ventured into capital projects that will better the economy, they are shrouded in secrecy. According to (Debt Management Office of Nigeria, 2012), the factors that led to Nigeria's external debt burden can be grouped into six areas;

- **Inefficient trade and exchange rate policies**

Both the trade and exchange rate (monetary) policies were not quick enough to respond to show the external value of the naira at a time when there was a downturn in the oil market which led to a reduction in the flow of resources into the economy. This led to embarking upon foreign borrowing and in turn the accumulation of external debt.

- **Adverse exchange rate movements**

Due to the inefficient exchange rate policies, Nigeria's exchange rate system was not flexible enough to adjust to fluctuations (upward and downwards movements) in the foreign exchange market which led to continuous external borrowing.

- **Adverse interest rate movements.**

Also the debt quagmire in Nigeria can be attributed to external borrowing at higher interest rates. This will in turn lead to high interest payments of external debt and as such rapid debt accumulation.

- **Poor lending and inefficient loan utilization.**

Also the government of Nigeria rather than invest into capital projects that will lead to the development of the economy and also amortize the nation's debts poorly utilized the foreign loans and as such led to continuous borrowing.

- **Poor debt management practices.**

In terms of debt sustainability and debt management Nigeria has performed poorly. The lack of understanding of the nature, structure and magnitude of external debt has not allowed for the Nigerian economy to effectively meet her debt service obligations and manage the debt stock appropriately.

- **Accumulation of arrears and penalties.**

Also accumulation of trade arrears and penalties with foreign nations due to high interest payments on external debt has led to the astronomical rise in Nigeria's external debt profile.

#### **2.2.4 Nigeria's External Debt Profile**

Nigeria has two major categories of external creditors; official and private creditors. Her official creditors include the International Fund for Agricultural Development (IFAD), African Development Fund (ADF), the International Bank for reconstruction and development (IBRD), the African Development Bank (AFDB), Economic Community of West African States (ECOWAS) fund and the European Investment Bank. The above listed are Nigeria's multilateral creditors which also include the World bank and International Monetary Fund (IMF) which were very active lenders in the 1970s/1980s. The bilateral creditors include the Paris Club and Non-Paris Club creditors. The Paris Club is an informal group of official creditors which was created to aid debtor countries going through payment difficulties by finding sustainable and lasting solutions. Also part of Nigeria's debt profile are private creditors which are made up of promissory note holders and the London Club group.

The total debt outstanding as at 31<sup>st</sup> December 2004 stood at US\$35.94 billion with Paris Club (85.82%), multilateral creditors (7.86%), London Club (4.01%), Non-Paris Club (0.13%) and Promissory notes (2.18%) (DMO, 2012). This clearly shows that the largest proportion of Nigeria's external debt is accrued to the Paris Club group of creditors.

### **2.2.5 Nigeria's External Debt Relief**

M. C. Ekperiware *et al* (2012) defined debt relief as an agreement by a creditor or a country to accept reduced or postponed interest and redemption payments from the debtor. Nigeria's debt relief deal with the Paris Club is widely recognized in external debt literature and will be discussed here in detail. The Paris Club was formed in 1956 and its role is to provide help to the debt payment challenges faced by debtor nations. It comprises of 14 member nations (United Kingdom, France, Germany, Japan, Italy, United States of America, Belgium, Netherlands, Denmark, Austria, Spain, Switzerland, Russia and Finland).

Nigeria's first loan from the Paris Club of Creditor Nations was a US\$13.1 million obtained from the Italian government in 1964 for the building of the Niger Dam. However the oil boom of 1971-1981 introduced the era of massive borrowings in Nigeria. Loans were acquired by various tiers of government as Nigeria embarked on major development and reconstruction projects in the wake of the civil war. The borrowing continued well into the civilian era, as the Federal Government embarked on the guaranteeing of many unviable loans taken by private banks, state governments and government parastatals. In 1982, when oil prices crashed, Nigeria was unable to pay off the loans it borrowed. This resulted in rising interest payments and mounting of trade arrears and their penalties. A

critical point was reached in 1986 when creditors refused to open new credit lines for imports to Nigeria. The government therefore approached the creditors for debt relief leading to the restructuring arrangements with the Paris Club in 1986, 1989, 1991 and 2000. However this did not stop the “leaps” and “jumps” in the external debt stock which led to Nigeria to stop paying its debts to the Paris Club altogether, after the Paris Club refused to substantially reduce Nigeria’s debt. With the return to civilian rule in 1999 under the President Olusegun Obasanjo administration, Nigeria embarked on a relentless campaign for debt relief. The major concern was that Nigeria’s spends more on debt service payments than it does on healthcare and education and as such with the high level of debt servicing could not achieve the millennium development goals.

The campaign efforts finally paid off in 2005 when the Paris Club group of creditors agreed to cancel 60% (US\$18 billion) of the US\$30.85 billion owed to it by Nigeria. This debt relief freed the nation from the yearly US\$2.3 billion (N345 billion) debt service burden.

## **2.3 Review of Theoretical Issues**

Several theoretical contributions have been made as regards the subject matter of external debt and economic growth. These theories are of relevance to this study as they serve as a building block to this research work and as such the following theories will be discussed; the dual-gap theory, debt overhang theory, crowding-out effect theory, dependency theory and the Solow-growth model

### **2.3.1 The Dual-gap theory**

Omoruyi (2005) stated that most economies have experienced a shortfall in trying to bridge the gap between the level of savings and investment and have resorted to external borrowing in order to fill this gap. This gap provides the motive behind external debt as pointed out by (Chenery, 1966) which is to fulfill the lack of savings and investment in a nation as increases in savings and investment would vis-à-vis lead to a rise in economic growth (Hunt, 2007). The dual-gap analysis provides a framework that shows that the development of any nation is a function of investment and that such investment requires domestic savings which is not sufficient to ensure that development take place (Oloyede, 2002). The dual-gap theory is coined from a national income accounting identity which connotes that excess investment expenditure (investment-savings gap) is equivalent to the surplus of imports over exports (foreign exchange gap).

### **2.3.2 External debt and Economic growth**

The matter of external debt has become a major impediment to the growth and stability of developing countries. Economists have therefore chosen to explore the channels through which the effects of external debt burden are realized and have come up with two competing theories namely the debt overhang theory and the crowding-out effect theory.

Debt-overhang occurs when a nation's debt is more than its debt repayment ability. Krugman (1982) explains debt overhang as one whereby the expected repayment amount of debt exceeds the actual amount at which it was contracted. Borensztein (1990) also defined debt overhang as one where the debtor nation benefits very little from the returns on additional investment due to huge debt service obligations. The "debt overhang effect" comes into play when accumulated debt stock discourages investors from investing in the

private sector for fear of heavy tax placed on them by government. This is known as tax disincentive. The tax disincentive here implies that because of the high debt and as such huge debt service payments, it is assumed that any future income accrued to potential investors would be taxed heavily by government so as to reduce the amount of debt service and this scares off the investors thereby leading to disinvestment in the overall economy and as such a fall in the rate of growth (Ayadi and Ayadi, 2008). In addition, Clement *et al* (2003) stated that external debt accumulation can promote investment up to a certain point where debt overhang sets in and the willingness of investors to provide capital starts to deteriorate. Audu (2004) relates the concept of debt overhang to Nigeria's debt situation. He stated that the debt service burden has prevented rapid growth and development and has worsened the social issues. Nigeria's expected debt service is seen to be an increasing function of her output and as such resources that are to be used for developing the economy are indirectly taxed away by foreign creditors in form of debt service payments (Ekperiware *et al*, 2005). This has further increased uncertainty in the Nigerian economy which discourages foreign investors and also reduces the level of private investment in the economy.

Cohen (1993) and Clement *et al* (2003) observe that aside from the effect of high debt stock on investment, external debt can also affect growth through accumulated debt service payments which are likely to "crowd out" investment (private or public) in the economy. The crowding-out effect refers to a situation whereby a nation's revenue which is obtained from foreign exchange earnings is used to pay up debt service payments. This limits the resources available for use for the domestic economy as most of it is soaked up by external debt service burden which reduces the level of investment. Tayo (1993)

opined that the impact of debt servicing of growth is damaging as a result of debt-induced liquidity constraints which reduces government expenditure in the economy. These liquidity constraints arise as a result of debt service requirements which shift the focus from developing the domestic economy to repayments of the debt. Public expenditure on social infrastructure is reduced substantially and this affects the level of public investment in the economy.

Furthermore, some researchers have come up with other ways through which external debt may affect economic growth. According to (Borenstein, 1990) external debt affects growth through the credit rationing effect which is a condition faced by countries that are unable to contract new loans based on their previous inability to pay.

### **2.3.3 The Dependency Theory**

The dependency theory seeks to outline the factors that have contributed to the development of the underdeveloped countries. This theory is based on the assumption that resources flow from a “periphery” of poor and underdeveloped states to a “core” of wealthy states thereby enriching the latter at the expense of the former. The phenomenon associated with the dependency theory is that poor states are impoverished while rich ones are enriched by the way poor states are integrated into the world system (Todaro, 2003; Amin, 1976).

Dependency theory states that the poverty of the countries in the periphery is not because they are not integrated or fully integrated into the world system as is often argued by free market economists, but because of how they are integrated into the system. From this standpoint a common school of thought is the bourgeoisie scholars. To them the state of



underdevelopment and the constant dependence of less developed countries on developed countries is as a result of their domestic mishaps. They believe this issue can be explained by their lack of close integration, diffusion of capital, low level of technology, poor institutional framework, bad leadership, corruption, mismanagement, etc. (Momoh and Hundeyin, 1999). They see the under-development and dependency of the third world countries as being internally inflicted rather than externally afflicted. To this school of thought, a way out of the problem is for third world countries to seek foreign assistance in terms of aid, loan, investment, etc, and allow uninterrupted operations of the Multinational Corporations (MNCs). Due to the underdeveloped nature of most LDC's, they are dependent on the developed nations for virtually everything ranging from technology, aid, technical assistance, to culture, etc. The dependent position of most underdeveloped countries has made them vulnerable to the products of the Western metropolitan countries and Breton Woods institutions (Ajayi, 2000). The dependency theory gives a detailed account of the factors responsible for the position of the developing countries and their constant and continuous reliance on external for their economic growth and development.

### **2.3.3 The Solow Growth Model**

The Solow-growth model was published in 1956 as a seminar paper on economic growth and development under the title, "A contribution to the theory of economic growth". Like most economic growth theories, Solow growth model is built upon some assumptions:

- Countries will produce and consume only a single homogenous good.
- Technology is exogenous in the short run.

The Solow growth model is developed based on a Cobb - Douglas production function given by the form:

$$Y = F (K, L) = K^\alpha L^{1-\alpha}$$

Where

Y = output

K = Capital input

L = Labor input

$\alpha$  and  $1-\alpha$  are output elasticities of capital and labor respectively and  $\alpha$  is a number between 0 and 1.

The other important equation from the Solow growth model is the capital accumulation equation expressed in the form:

$$\dot{K} = sY - dK$$

Where:

$\dot{K}$  = change in capital stock

$sY$  = gross investment

$dK$  = depreciation during the production process

With mathematical manipulation Solow derives the capital accumulation equation in terms of per worker i.e.  $\dot{k} = sy - (n+d)k$ . This implies that the change in capital per worker is a function of investment per worker, depreciation per worker and population growth. Of

these three variables only investment per worker is positively related with change in capital per worker.

#### **2.3.4 Solow Growth Model and External Debt**

The Solow growth model is built on a closed economy which makes use of labour and capital as its means of production. Under this scenario the implication of external debt on growth can be seen through its effect on the domestic saving which in turn used as investment in a closed model. The general effect of external debt on the Solow growth model can be analyzed by looking at the individual effects of the debt overhang and debt crowding theories on the Solow growth model. According to the debt overhang hypothesis, the government in an attempt to amortize the accumulated debt, will increase tax rate on the private sector (as means of transferring resources to the public sector). This will discourage private sector investment and also reduce government expenditure on infrastructure as the resources are used to pay up huge debt service payments instead of being put into good use. This will lead to a reduction of total (private and public) investment in the economy and a shift downward of both the investment and production function curves in Solow growth model. On the other hand in the case of debt crowding out, in a bid to clear their outstanding debts use their revenue from export earnings and in some cases transfer resources including foreign aid and foreign exchange resources to service their forthcoming debt. Those countries which transfer revenue from export earnings which can be used in investment in the economy to avoid huge debt payments will discourage public investment. This in turn will decrease economic growth and will shift both the investment and production function curves in Solow growth model downward (Dereje, 2013).

## **2.4 Review of Empirical and Methodological Issues**

The motive behind external debt is to boost economic growth and development of any nation but as a result of future high debt service payments, it poses a serious threat to the economy of that nation. Economic researchers have therefore sought out to investigate the implication of external debt burden on the economies of debtor nations and have come up with diverse views.

Suliman *et al* (2012) carried out a study on the effect of external debt on the economic growth of Nigeria. Annual time series data covering the period from 1970-2010 was used. The empirical analysis was carried out using econometric techniques of Ordinary least squares (OLS), Augmented Dickey-Fuller unit root test, Johansen Co-integration test and error correction method. The co-integration test shows long-run relationship amongst the variables and findings from the error correction model revealed that external debt has contribute positively to the growth of the Nigerian economy. In addition the study recommends that the Nigerian should ensure political and economic stability so as to ensure effective debt management. An empirical investigation conducted by (Audu, 2004) examines the impact of external debt on the economic growth and public investment of Nigeria. The study carried out its analysis using time series data covering the period from 1970-2002. The Johansen Co-integration test and Vector Error correction method econometric techniques of estimation were employed in the study. The study concluded that Nigeria's debt service burden has had a significant adverse effect on the growth process and also negatively affected public investment. Another study by Ogunmuyiwa (2011) examined whether external debt promotes economic growth in Nigeria using time-series data from 1970-2007. The regression

equation was estimated using econometric techniques such as Augmented Dickey-Fuller test, Granger causality test, Johansen co-integration test and Vector Error Correction Method (VECM). The results revealed that causality does not exist between external debt and economic growth in Nigeria.

Ayadi and Ayadi (2008) examined the impact of the huge external debt, with its servicing requirements on economic growth of the Nigerian and South African economies. The Neoclassical growth model which incorporates external debt, debt indicators, and some macroeconomic variables was employed and analyzed using both Ordinary Least Square (OLS) and Generalized Least Square (GLS) techniques of estimation. Their findings revealed that debt and its servicing requirement has a negative impact on the economic growth of Nigeria and South Africa. Faraji and Makame (2013) investigated the impact of external debt on the economic growth of Tanzania using time series data on external debt and economic performance covering the period 1990-2010. It was observed through the Johansen co-integration test that no long-run relationship between external debt and GDP. However the findings show that external debt and debt service both have significant impact on GDP growth with the total external debt stock having a positive effect of about 0.36939 and debt service payment having a negative effect of about 28.517. The study also identified the need for further research on the impact of external debt on foreign direct investments (FDIs) and domestic revenues. (Safdari and Mehrizi, 2011) analyzed external debt and economic growth in Iran by observing the balance and long term relation of five variables (GDP, private investment, public investment, external debt and imports). Time series data covering the period 1974-2007 was used and the vector autoregressive model (VAR) technique of estimation

was employed. Their findings revealed that external that has a negative effect on GDP and private investment and public investment has a positive relationship with private investment.

Ejigayehu (2013) also analyzed the effect of external debt on the economic growth of eight selected heavily indebted African countries (Benin, Ethiopia, Mali, Madagascar, Mozambique, Senegal, Tanzania and Uganda) through the debt overhang and debt crowding out effect with ratio of external debt to gross national income as a proxy for debt overhang and debt service export ratio as a proxy for debt crowding out. Panel data covering the period 1991-2010 was used. The empirical investigation was carried out on a cross-sectional regression model with tests for stationarity using Augmented Dickey Fuller tests, heteroskedasticity and ordinary regression. The concluding result from estimation showed that external debt affects economic growth through debt crowding out rather than debt overhang.

In their study on external debt relief and economic growth in Nigeria, (Ekperiware and Oladeji, 2012) examined the structural break relationship between external debt and economic growth in Nigeria. The study employed the set of quarterly time series data of external debt, external debt service and real GDP from 1980-2009. An empirical investigation was conducted using the chow test technique of estimation to determine the structural break effect of external debt on economic growth in Nigeria as a result of the 2005 Paris Club debt relief. The result of their findings revealed that the 2005 external debt relief caused a structural break effect in the relationship between external debt and economic growth. Based on these findings they concluded that the external debt relief made available resources for growth-enhancing projects.

## **CHAPTER THREE**

### **THEORETICAL FRAMEWORK & RESEARCH METHODOLOGY**

#### **3.1 Introduction**

The aim of this research study is to examine the impact of external debt on the growth of the Nigerian economy. This chapter consists of the theoretical framework which provides the theoretical basis of this study and the research methodology which throws more light into the empirical investigation conducted. Also in order to fully assess the impact of the external debt burden, a model with dependent and explanatory variables to be estimated is specified, a priori expectations of these variables, techniques of estimation and method of data analysis are all treated in this chapter.

#### **3.2 Theoretical Framework**

The constant need to borrow from foreign sources arises from the recognized role of capital in developmental process of any nation. Sustainable economic growth requires a given level of savings and investment and in a case where it is not sufficient, it results in external borrowing. Herein lays the basis for the dual-gap analysis. The dual-gap theory postulates that for development to occur it requires investment and this investment is a function of savings and investment which requires domestic savings is not sufficient enough to ensure that development takes place. The dual-gap framework is coined from a national income accounting identity which states that excess investment expenditure over domestic savings is equivalent to the surplus of imports over exports. Thus at equilibrium the following identities hold;

$$I - S = m - X \dots\dots\dots (1)$$

$$S - M = x - m \dots\dots\dots (2)$$

Where: I = Investment

S = Savings

M = Import

X = Export

The above equations show that the domestic resource gap ( $S - I$ ) is equal to foreign exchange gap ( $x - m$ ). An excess of import over export implies an excess of resources used by an economy over resources generated by it. This further implies that the need for foreign borrowing is determined overtime by the rate of investment in relation to domestic savings.

### **3.3 Research Methodology**

The methodology adopted in this study is Co-integration analysis using the Augmented Dickey Fuller (ADF) unit root test, Johansen co-integration and Vector Error Correction techniques of estimation which provides coefficient estimates of the time-series data used in analysis. Also a test for causality between external debt and economic growth using Granger Causality Test is carried out.

#### **3.3.1 Model Specification**

The main aim of this study is to examine the Impact of External Debt on Economic Growth in Nigeria. The model is adopted from a simple open macroeconomic debt



growth model employed by (Boboye and Ojo, 2012). The model is specified of the functional form:

$$RGDP = f (EDS, DSP, EXR)$$

Where:

RGDP = Real Gross Domestic Product

EDS = External Debt Stock

DSP = External Debt Service Payments

EXR = Official Exchange Rate

The model is specified of its stochastic form:

$$RGDP = \alpha_0 + \alpha_1 EDS + \alpha_2 DSP + \alpha_3 EXR + \mu \dots \dots \dots (1)$$

Where:

$\mu$  = Error term

The model is specified of its log-linear form:

$$\text{Log RGDP} = \alpha_0 + \alpha_1 \text{Log EDS} + \alpha_2 \text{Log DSP} + \text{EXR} + \mu$$

$$\alpha_1, \alpha_2 < 0, \alpha_3 > 0$$

Real Gross Domestic Product is a measure that reflects the value of goods and services produced in a given year. It is used to capture economic growth in this study because it is adjusted for inflation and as such provides a more accurate figure.

External Debt Stock is the amount at which the debt was contracted and it is used as a proxy for capturing external debt burden. The a priori expectation is a negative relationship between Real Gross Domestic Product and External Debt Stock i.e. the higher the external debt stock, the lower the economic growth.

External Debt Service Payments is the amount used in repaying the external debt. It is also used as a proxy for capturing external debt burden. The a priori expectation is a negative relationship between Real Gross Domestic Product and External Debt Service Payments i.e. the higher the debt service payments, the lower the economic growth.

Exchange rate is the price of a nation's currency in terms of another currency. It is included in the model because it is a macroeconomic indicator and it is also a monetary aggregate in the open economy. The a priori expectation is a positive relationship between Real Gross Domestic Product and Exchange Rate i.e. the higher the exchange rate, the higher the economic growth.

Real Gross Domestic Product (RGDP), External Debt Stock (EDS) and External Debt Service Payment (DSP) were logged due to the large nature of their values. Exchange Rate (EXR) was not logged because it is a rate.

### **3.3.2 Techniques of Estimation**

Time series data covering a period of 32 years will be estimated using Co-integration technique of analysis which is an improvement on the classical ordinary least square technique (OLS). This technique was chosen as it depicts long-run economic growth. The following techniques of estimation are employed in carrying out the co-integration analysis:

- **Unit Root Test**

This is the pre Co-integration test. It is used to determine the order of integration of a variable that is how many times it has to be differenced or not to become stationary. It is to check for the presence of a unit root in the variable i.e whether the variable is stationary or not. The null hypothesis is that there is no unit root. This test is carried out using the Augmented Dickey Fuller (ADF) technique of estimation. The rule is that if the ADF test statistic is greater than the 5 percent critical value we accept the null hypothesis i.e the variable is stationary but if the ADF test statistic is less than the 5 percent critical value i.e the variable is non-stationary we reject the null hypothesis and go ahead to difference once. If the variable does not become stationary at first difference we difference twice. However it is expected that the variable becomes stationary at first difference.

- **Co-integration**

After the test for the order of integration, the next step is to test for co-integration. This test is used to check if long run relationship exists among the variables in the model (Ogundipe and Alege, 2013). This will be carried out using the Johansen technique.

- **Vector Error Correction Model**

The Vector Error Correction Model (VECM) shows the speed of adjustment from short-run to long run equilibrium. The a priori expectation is that the VECM coefficient must be negative and significant for errors to be corrected in the long run. The higher the VECM, the more the speed of adjustment.

- **Causality Test**

This is used to check for causality between two variables. In this case our aim is to test for a causal relationship between external debt and economic growth. The rule states that if the probability value is between 0 and 0.05 there is a causal relationship.

### **3.4 Data Sources, Definitions and Measurements**

#### **3.4.1 Data Sources**

This study makes use of secondary data covering a period of 32 years i.e. 1980 – 2012 gotten from World Bank Statistical Database (WDI, 2014).

#### **3.4.2 Data Definitions**

In analyzing the results obtained as regards to the validity of the variables used in terms of their statistical significance, decision making will be made based on the following criteria:

1. **Signs and magnitude of the parameter:** The signs (+ or -) are the economic a priori condition set by economic theory and usually refers to sign and size of parameters of economic relationships. Thus they should conform to the a priori expectations stated in table 1 above. Parameters in the model are expected to have signs and sizes that conform to economic theory, if they do they are accepted, otherwise they are rejected. Unless there is an explanation to believe that in this instance the principles of economic theory do not hold.

2. **Coefficient of Determination ( $R^2$ ):** This shows the percentage of the total variation of the dependent variable that can be explained by the independent variable(s). It shows the extent to which the independent variable(s) influences the dependent variable. It is a measure of the goodness of fit of the model; the closer the  $R^2$  is to zero the worse the fit.
3. **Adjusted Coefficient of Determination:** Also the adjusted  $R^2$  is needed because it gives a better measure of the goodness of fit having been adjusted for loss of degree of freedom as more explanatory values are added. It lies between zero and one and the closer it is to one the better the goodness of fit.
4. **The t-test:** It is used to determine the statistical significance of the parameters in the model. They will be tested at 1%, 5% and 10% levels of significance. The rule of thumb states that  $t \geq 2$  is statistically significant. Any value below this is insignificant.
5. **F-statistic:** It is meant to test the overall significance of the entire model as regards the dependent variable. It checks the joint variance of the explanatory variables. The level of significance to be used is 5%. Hence, if the probability is  $\leq 0.05$ , the explanatory variables' parameter estimates will be jointly statistically significant. Any value greater than 5% makes them jointly statistically insignificant.
6. **The Durbin-Watson statistic:** The D.W. test is used to test for the presence of positive or negative autocorrelation in a model. The simple correlation matrix of the variables would be used as a guide in determining what combinations of the explanatory variables are responsible for multi-collinearity. It is a simple guide used to specify the right combination of the explanatory variables.

7. **Standard Error:** The standard error of estimates (SEE) will be used to measure the standard error of the stochastic term. If the standard error of the estimates is small relative to the mean value of the dependent variable, the model equation is preferred and vice versa.

### 3.4.3 Data Measurements

**Table 3.1 Data Measurements**

<b>Variable</b>	<b>Description</b>	<b>source</b>	<b>measurement</b>
Rgdp	gross domestic product at constant us\$, 2005	wdi 2014	us dollars
Eds	external debt stock at current us\$	wdi 2014	us dollars
Dsp	debt service payments on external debt total at current us\$	wdi 2014	us dollars
Exr	official exchange rate at lcu per us\$	wdi 2014	lcu per us\$

Source: Author's Compilation

## CHAPTER FOUR

### DATA ANALYSIS & INTERPRETATION

#### 4.1 Introduction

This research seeks to examine the impact of external debt on economic growth in Nigeria. This chapter therefore comprises of the data presentation, estimation and results of the empirical investigation carried out. It also addresses the relationship between external debt and economic growth in Nigeria in the long run. This chapter is further divided into trend analysis which shows the trend of the time series data used from 1980-2012, descriptive analysis which contains the measures of central tendency which include mean, mode, median as well as measures of variation and other statistical characteristics of the variables and econometric analysis which focuses on test for unit root, Johansen test for Co-integration and the Vector Error Correction Model.

#### 4.2 Descriptive Analysis

**Table 4.1 Summary Statistics**

	LOGRGDP	LOGEDS	LOGDSP	EXR
Mean	25.01779	23.64674	21.20781	60.35574
Median	24.84953	24.09121	21.32917	21.89526
Maximum	25.92126	24.32575	22.89883	156.8097
Minimum	24.50055	22.07466	19.52813	0.546781
Std. Dev.	0.426032	0.702388	0.801066	61.32168
Skewness	0.89271	-1.021253	-0.423066	0.386206
Kurtosis	2.356233	2.726036	3.181802	1.343738
Jarque-Bera	4.95297	5.839469	1.029861	4.592259
Probability	0.084038	0.053948	0.597542	0.100648
Sum	825.587	780.3424	699.8578	1991.739
Sum Sq. Dev.	5.808109	15.78718	20.5346	120331.2
Observations	33	33	33	33

Source: Author's Compilation Using Eviews 7

Mean is the average value of the series which is gotten by dividing the total value of the series by the number of observations. From the above table we see that the mean for LOGRGDP (Real Gross Domestic Product), LOGEDS (External Debt Stock), LOGDSP (Debt Service Payments) and EXR (Exchange Rate) are 25.01779, 23.64674, 2120781 and 60.35574 respectively.

Median is the middle value of the series when the values are arranged in an ascending order. From the table the median for LOGRGDP, LOGEDS, LOGDSP and EXR are 24.84953, 24.09121, 21.32917 and 21.89526 respectively.

Maximum and minimum are the maximum and minimum values of the series the series in the current sample. The maximum and minimum values for LOGRGDP, LOGEDS, LOGDSP and EXR are 25.92126 & 24.50055, 24.32575 & 22.07466, 22.89883 & 19.52813 and 156.8097 & 0.546781 respectively.

Standard Deviation is a measure of spread or dispersion in the series. From table above the standard deviation for LOGRGDP, LOGEDS, LOGDSP and EXR is 0.426032, 0.702388, 0.801066 and 61.32168 respectively.

Skewness is a measure of assymetry of the distribution of the series around its mean. The skewness of a normal distribution is zero. Positive skewness implies that the distribution has a long right tail and negative skewness implies that the distribution has a long left tail. From the above table we observe that LOGRGDP and EXR both have positive skewness and as such they have long right tails whereas LOGEDS and LOGDSP have negative skewness therefore they have long left tails.

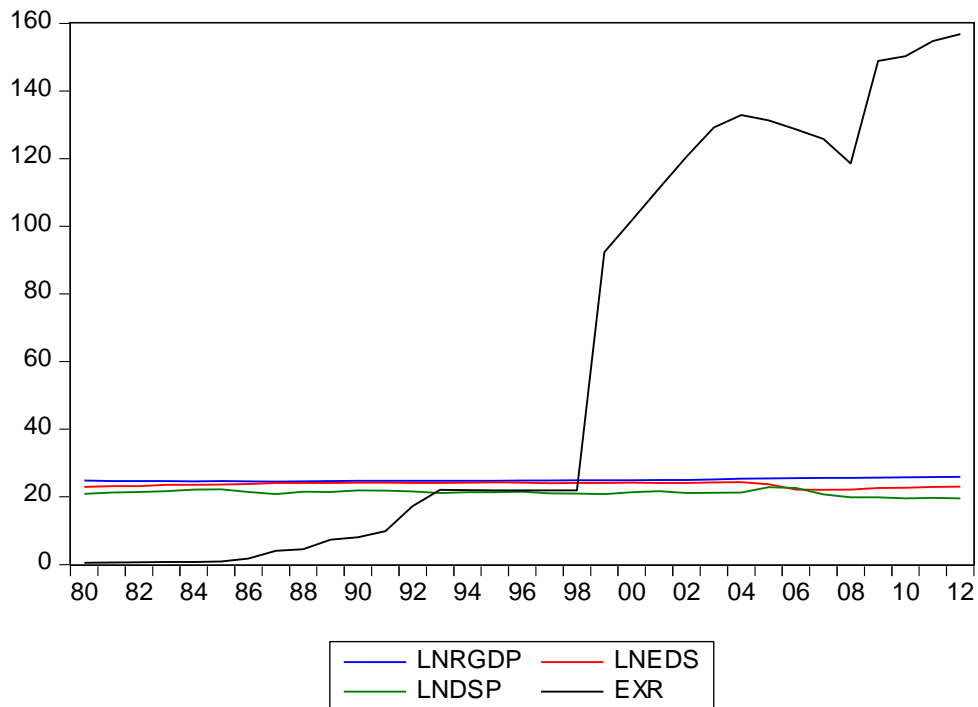


Kurtosis measures the peakedness or flatness of the distribution of the series. If the kurtosis is above three, the distribution is peaked or leptokurtic relative to the normal and if the kurtosis is less than three, the distribution is flat or platykurtic relative to normal. From table 4.1 above only LDSP exceeds three therefore it is peaked or leptokurtic while LOGRGDP, LOGEDS and EXR are below three therefore they are flat or platykurtic.

Jarque-bera is a test statistic to test for normal distribution of the series. It measures the difference of the skewness and kurtosis of the series with those with normal distribution. From the table above the Jarque-bera for LOGRGDP, LOGEDS, LOGDSP and EXR are 4.95297, 5.839469, 1.029861 and 4.592259.

### 4.3 Trend Analysis

**Figure 4.1 Graphical Trend Analysis of Variables**



The graph above depicts a trend analysis of Real Gross Domestic Product (LRGDP), External Debt Stock (LEDS), Debt service payments (LDSP) and Exchange Rate (EXR) from 1980-2012. From the graph above we see that LRGDP, LDSP and LRGDP maintain a relative stable trend while EXR starts out very low and then continues to increase maintaining an upward trend.

#### 4.4 Econometric Analysis

##### 4.4.1 Unit Root Test

This test tries to examine the property of the variables. It is used to check for the presence of a unit root i.e. no stationarity of the variables. This test is carried out using the Augmented Dickey Fuller (ADF) test. This is the first test carried out in the Co-integration analysis and is known as the pre Co-integration test. The ADF is carried out using Eviews software package and the results from the test are tabulated below:

**Table 4.2 Test for Stationarity**

	AT LEVELS				At 1 <sup>st</sup> DIFFERENCE				
Variables	ADF Test statistic	Critical Value at 5%	Lag	Remarks	ADF Test Statistic	Critical Value at 5%	Lag	Remarks	Order of Integration
LRGDP	1.972910	-2.957110	0	NS	-4.544087	-2.960411	0	S	I(1)
LEDS	-1.950507	-2.960411	1	NS	-3.890507	-2.960411	0	S	I(1)
LDSP	-1.642663	-2.957110	0	NS	-4.851131	-2.963972	1	S	I(1)
EXR	-5304134	-2960411	0						I(0)

Source: Author's Compilation from Eviews 7

The a priori expectation when using the ADF test is that a variable is stationary when the value of the ADF test statistic is greater than the critical value at 5%. None of the

variables used met this a priori expectation at levels except exchange rate (EXR) as they were non-stationary (NS) and as such were differenced once to become stationary (S). Thus LRGDP, LEDS and LDSP integrated of order one while EXR is integrated of order zero.

#### 4.4.2 Johansen Co-integration test

The co-integration test is used to check for long run relationship between the dependent and independent variables (Ogundipe and Amaghionyeodiwe, 2013). The co-integration test was carried out using the Johansen technique also using Eviews software package and it produced the following results:

**Table 4.3 Test for Johansen Co-integration Using Trace Statistic**

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.808381	86.82273	63.87610	0.0002
At most 1	0.466610	35.60317	42.91525	0.2211
At most 2	0.306475	16.11962	25.87211	0.4830
At most 3	0.142745	4.774616	12.51798	0.6290

Source: Author's Compilation from Eviews 7

From the above table the trace indicates one co-integrating equation at 5 percent level.

**Table 4.4 Test for Johansen Co-integration Using Max-Eigen Value**

Hypothesized No. of CE(s)	Eigen Value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.808381	51.21956	32.11832	0.001
At most 1	0.466610	19.48355	25.82321	0.2740
At most 2	0.306475	11.34501	19.38704	0.4784
At most 3	0.142745	4.774616	12.51798	0.6290

Source: Author's Compilation from Eviews 7

From the above table the Max-Eigen value indicates one co-integrating equation at 5 percent level. Based on the above tables we reject the null hypothesis of no co-integrating equations.

**Table 4.5 Long run Normalized Co-integration Estimates**

<b>LRGDP</b>	<b>LEDS</b>	<b>LDSP</b>	<b>EXR</b>
1.000000	0.060263	0.723011	-0.006284
	(0.05932)	(0.08449)	(0.00146)
	[1.01589]	[8.55736]	[4.30411]

Source: Author's Compilation from Eviews 7

The above table shows the normalized co-integration co-efficients with the standard error and t-statistic in parentheses ( ) and [ ].

There is an inelastic relationship between LRGDP and LEDS. A unit change in LEDS will bring about a less than proportionate change in LRGDP. The t-statistic shows the significance of the independent variable with respect to the dependent variable in the long run. The rule of thumb for t-statistics states that  $t \geq 2$  is significant. Therefore LEDS is statistically insignificant at 1.01589.

There is an inelastic relationship between LRGDP and LDSP. A unit change in LDSP will bring about a less than proportionate change in LRGDP. The rule of thumb states that  $t \geq 2$  is significant. Therefore LDS is statistically significant at 8.55736.

There is positive relationship between LRGDP and EXR. A unit increase in EXR will bring about a 0.006284 increase in LRGDP. This meets a priori expectation of a positive relationship between exchange rate and economic growth. The rule of thumb states that  $t \geq 2$ . Therefore EXR is statistically significant at 4.30411.

#### 4.4.3 Error Correction Estimates Using Vector Error Correction Model

**Table 4.6 Table Showing Vector Error Correction Estimates**

<b>Error Correction</b>	<b>D(RGDP)</b>	<b>D(LEDS)</b>	<b>D(LDSP)</b>	<b>D(EXR)</b>
CointEq <sub>1</sub>	-0.292245	-0.221313	0.999894	-16.97928
	(0.10918)	(0.37499)	(0.80216)	(25.6926)
	[-2.67664]	[-0.59018]	[1.24649]	[-0.66086]

Source: Author's Compilation from Eviews 7

The above table contains the vector error coefficient estimates and standard and t-statistic are in parentheses. The a priori for the vector error correction coefficient (alpha) is that it must be negative. The alpha meets this expectation and this implies that 29.2245 percent of the errors are corrected in the long run.

#### 4.4.4 Granger Causality Test

**Table 4.7 Test for Causality**

<b>Null Hypothesis</b>	<b>Observations</b>	<b>F-Statistic</b>	<b>Prob</b>
LEDS does not Granger cause LRGDP LRGDP does not Granger cause LEDS	32	5.65990 6.91967	0.0242 0.0135
LDSP does not Granger cause LRGDP LRGDP does not Granger cause LDSP	32	0.04306 5.75002	0.8371 0.0231
EXR does not Granger cause LRGDP LRGDP does not Granger cause EXR	32	13.5768 0.07278	0.0009 0.7892
LDSP does not Granger cause LEDS LEDS does not Granger cause LDSP	32	7.11542 13.9911	0.0124 0.0008
EXR does not Granger cause LEDS LEDS does not Granger cause EXR	32	4.93139 0.22009	0.0343 0.6425
EXR does not Granger cause LDSP LDSP does not Granger cause EXR	32	1.89008 1.68736	0.1797 0.2042

Source: Author's Compilation from Eviews 7

Our focus is on the causal relationship between external debt and economic growth (LRGDP). The null hypothesis states that LEDS does not Granger cause LRGDP and LRGDP does not Granger cause LEDS. The rule of thumb states that the probability of F-statistic must be less than 0.5 to show causal relationship. The probabilities for our causal variables Real Gross Domestic Product and External Debt Stock are 0.0242 and 0.0135. Therefore we reject the null hypothesis and conclude that a bi-directional causal relationship exists between external debt and economic growth in Nigeria.

#### **4.5 Conclusion**

This chapter focused on the data analysis and interpretation. It began with a graphical trend analysis of all the variables used in the study from 1980-2012. It then moved on to the descriptive analysis which contained a summary of data statistics. Next was the empirical analysis where unit root, co-integration and vector error correction tests were carried out. The Augmented Dickey Fuller (ADF) test was used to check for stationarity (presence of a unit root) and to what degree. The test revealed that all the variables were stationary at first difference except exchange rate which was stationary at levels. The Johansen Co-integration test showed long run relationship among the variables and as such the normalized coefficients were interpreted. There is an inelastic relationship between External Debt Stock and Real Gross Domestic Product, External Debt Services Payments and Real Gross Domestic Product and a positive relationship between Exchange Rate and Real Gross Domestic Product which met the a priori expectation. The t-statistic revealed a significant relationship between Real Gross Domestic Product and Debt Service Payments, Exchange Rate and an insignificant relationship between External Debt and Real Gross Domestic Product. The Vector Error Coefficient of

concern showed that about 29.2245 percent of the errors will be corrected in the long run and as such there is a convergence. Also the Granger Causality test revealed that there External Debt Stock causes Economic Growth and vice versa thus a bi-directional relationship exists between them.

## **CHAPTER FIVE**

### **SUMMARY, RECOMMENDATIONS & CONCLUSION**

#### **5.1 Summary of Study**

The aim of this study is to examine the impact of external debt on economic growth in Nigeria. This is done by examining the long-run and causal relationship between external debt and economic growth. The study carries out an empirical analysis to determine the relationship between the variables. This brought about a number of findings and these findings will provide recommendations for managing the debt situation in Nigeria all of which are outlined in this chapter.

#### **5.2 Summary of Findings**

##### **5.2.1 Summary of Empirical Findings**

The empirical analysis carried out revealed a significant long run relationship between real gross domestic product (LRGDP) and external debt service payments (LDSP) and Real Gross Domestic Product exchange rate (EXR) and an insignificant long run relationship between LRGDP and external debt stock (LEDS). Also the Granger causality test showed that external debt (LEDS) Granger causes economic growth (LRGDP) and economic growth (LRGDP) Granger causes external debt (LEDS).

##### **5.2.2 Theoretical Findings**

The result shows an inelastic relationship between Real Gross Domestic Product and External Debt Stock. A unit change in external debt will bring about a less than proportionate change in real gross domestic product.



There is an inelastic relationship between Real Gross Domestic Product and External debt service Payments. A unit change in external debt service payments will bring about a less than proportionate change in real gross domestic product.

There is a positive relationship between Real Gross Domestic Product and Exchange rate. A unit crease in exchange rate will bring about a 0.006284 increase in real gross domestic product.

### **5.3 Recommendations**

Based on the above findings, the following recommendations are given:

Firstly, external debts should be contracted solely for economic reasons and not for social or political reasons. This is to avoid accumulation of external debt stock overtime and prevent an obscuring of the motive behind external debt.

Secondly, the authorities responsible for managing Nigeria's external debt should adequately keep track of the debt payment obligations and the debt should not be allowed to pass a maximum limit so as to avoid debt overhang.

Lastly the Nigerian government should promote exportation of domestic products as a high exchange rate will make our goods more attractive in the foreign market and will increase foreign exchange earnings.

### **5.4 Conclusion**

This study examined the impact of external debt on economic growth in Nigeria. The study sought out to find a significant long run and causal relationship between external debt and economic growth. Real gross domestic product was used as a proxy for

economic growth which is the dependent variable while external debt stock, external debt service payments and exchange rate were the independent variables. External debt stock and external debt service payments were used to capture the external debt burden in Nigeria.

The Johansen co-integration test was used to test the first hypothesis of no long run relationship between external debt and economic growth. The null hypothesis was accepted as the results showed no long run relationship between external debt and economic growth. The Granger causality test was used to test the second null hypothesis of no causal relationship between external debt and economic growth in Nigeria. The null hypothesis is rejected as the results show that there exist bi-directional causal relationship between external debt and economic growth. Based on these findings recommendations were given.

#### **5.4.1 Limitations of Study**

The researcher faced challenges in acquiring secondary data on some variables for Nigeria and as such these variables were exempted from the model.

#### **5.4.2 Suggestions for further research**

Further research should be done on the channels through which external debt may affect economic growth in Nigeria.

## REFERENCES

- Adejuwon, K.D., James K.S. and Soneye, O.A. (2010). "Debt Burden and Nigerian Development". *Journal of Business and Organisational Development*. Vol.2.
- Adepoju, A.A, Salau, A.S and Obayelu, A.E (2007). "The Effects of External Debt Management on Sustainable Economic Growth and Development: Lessons from Nigeria". *Munich Personal RePEc Achieve (MPRA)*. Paper No. 2147.
- Adesola, W.A. (2009). "Debt Servicing and Economic Growth and Public Investment: The Case of Nigeria". *Journal of Social Sciences*. 8(2).
- Ahmed, A. (1984). "Short and Medium Term Approaches to Solving African Debt Problems". *Central Bank of Nigeria Bullion*. 12(22).
- Ajayi, K (2000). "The Feasibility of Democracy in Africa". *Dakar: CODESRIA Books*.
- Aluko, F. and Arowolo, D. (2010). "Foreign Aid, the Third World Debt Crisis and the Implication for Economic Development: The Nigerian Experience". *African Journal of Political Science and International Relations*. 4(4), 120-127.
- Amin, S. (1976). "Unequal Development: An Essay on the Social Formations of Peripheral Capitalism". New York: *Monthly Review Press*.
- Audu, Isa (2004). "The Impact of External Debt on Economic Growth and Public Investment: The Case of Nigeria". *African Institute for Economic Development and Planning (IDEP) Dakar Senegal*. <http://www.unidep.org>.
- Ayadi, F.S (2009). The Impact of Debt Servicing Requirements on Nigeria's Economic Development. *A dissertation submitted to the University of Lagos, in Partial Fulfilment of Masters of Science Degree, Lagos, Nigeria*.
- Ayadi, F.S and Ayadi, F.O (2008). "The Impact of External Debt on Economic Growth: A Comparative Study of Nigeria and South Africa". *Journal of Sustainable Development in Africa*. 10 (3).
- Chenery, H.B. and Strout, A. (1966). "Foreign Assistance and Economic Development". *American Economic Review*. Vol.56, 679-733.
- Clements, B., Bhattacharya, R. and Nguyen, T.Q. (2003). "External Debt, Public Investment and Growth in Low Income Countries". *IMF Working Paper No. 03/249*.
- Cohen, D. (1993). Low Investment and Large LCD Debt in the 1980's. *The American Economic Review*. 18 (3).
- Debt Management Office of Nigeria (DMO) (2012). [www.dmo.gov.ng](http://www.dmo.gov.ng)
- Ejigayehu, D.A. (2013). "The Effect of External Debt in Economic Growth". *Journal of the Department of Economics Sodertorn University*.
- Ekperiware, M.C. and Oladeji, S.I. (2012). "External Debt Relief and Economic Growth in Nigeria". *American Journal of Economics*. 2(7).
- Faraji Kasidi and Makame Said, A. (2013). "Impact of External Debt on Economic Growth: A Case Study of Tanzania". *Advances in Management and Applied Economics*. 3(4), 59-82.
- Folorunso, S. Ayadi and Felix, O. Ayadi (2012). "The Impact of External Debt Economic Growth: a Comparative Study of Nigeria and South Africa". *Journal of Sustainable Development in Africa*, 10 (3).

- Fosu, A.K (2007). "The External Debt Servicing Constraint and Public Expenditure Composition: Evidence from African Economies". *UNU-WIDER*. Research Paper No. 2007/36.
- Gohar, M., Bhutto N.A and Butt F. (2012). "The Impact of External Debt Servicing on the Growth of Low-Income Countries". *Sukkur Institute of Business Administration*.
- Greene, J. (1989). "The External Debt Problem of sub-Saharan Africa". *IMF Staff Papers*. 36 (4), 836-74.
- Hameed, H. , Ashraf and Chaudary, M.A. (2008). "External Debt and its Impact on Economic and Business Growth in Pakistan". *International Research Journal of Finance and Economics*. Issue 20, 132-140.
- Hunt, S.D. (2007). "Economic Growth: Should Policy Focus on Investment on Dynamic Competition?" *European Business Review*. 19(4), 279-291.
- Iyoha, M.A. (1997). "An Economic Study of Debt Overhang, Debt Reduction, Investment and Economic Growth in Nigeria". *NCEMA Monograph Series, No. 8*.
- Krugman, P.R (1988). "Financing Versus Forgiving a Debt Overhang". *Journal of Development Economics*. Vol 29, 253-268
- Malik S., Hayat M.K. and Hayat M.U. (2010). "External Debt and Economic Growth: Empirical Evidence from Pakistan". *International Research Journal of Finance and Economics*. Issue 44, 88-97
- Mimiko, O.M. (1997). "The Global Village: Selected Topics on International Relations". Akure: *ABM Research and Services*.
- Momoh, A. and Hundeyin, T (1999). "Perspectives on Political Economy" in Anifowose, R. & Enemu, F. eds *Elements of Politics*. Lagos, Malthouse Press Limited.
- Mutasa, C. (2003). "Regional Integration and Debt in Africa: A Comparative Report of Africa's Regional Groupings". *AFRODAD Research Series*.
- Obadan, M.I (2004). "Foreign Capital Flows and External Debt: Perspectives on Nigeria and the LDCs Group". *Ibadan University Press*.
- Ogbeifun, M.I. (2007). "The Politics of External Debt Relief: Nigeria's Unique Experience". *African Journal of Stability and Development*. 1(1).
- Ogundipe, Adeyemi A. and Philip O. Alege. (2013) "Interest Rate Pass-Through to Macroeconomic Variables: The Nigerian Experience." *International Journal of Economics and Finance* 5.10, p18.
- Ogundipe, A., & Amaghionyeodiwe, L. (2013). *Transnational Trade In Ecowas: Does Export Content Matter?* (No. 51617). University Library of Munich, Germany.
- Ogunmuyiwa, M.S. (2011). "Does External Debt Promote Economic Growth?" *Current Research Journal of Economic Theory*. 3(1), 29-35
- Okonjo-Iweala, N., Soludo, C. and Muhtar, M. (eds.) (2003). "The Debt Trap in Nigeria". Trenton NJ: *Africa World Press Inc*.
- Oloyede, B. (2002). "Principles of International Finance". Forthright Educational Publishers, Lagos.
- Omoruyi, S.E. (2005). "Debt Burden (Sustainability) Indicators". *Presentation Paper at Regional Course on Debt Recording and Statistical Analysis*.

- Omotoye, O. Richard, Sharma, H.P, Ngassam, C. and Eseonu, M. (2006). Sub-Saharan Africa's Debt Crisis: Analysis and Forecast Based on Nigeria's Managerial Finance". 32 (7), 606-620.
- Osinubi, T.S. and Olaleru, O.E. (2006). "Budget Deficits, External Debt and Economic Growth in Nigeria". *Applied Econometrics and International Development*. 6(3).
- Patillo, L. Ricci and H. Poirson (2004). "What are the Channels Through Which External Debt Affects Economic Growth?" *IMF Working Paper*. No. W04/15
- Sachs, J.D. (2002). "Resolving the Debt Crisis of Low Income Countries". *Brooking Papers on Economic Activity*. 1-28
- Safdari, M. and Mehrizi, M.A. (2011). "External Debt and Economic Growth in Iran". *Journal of Economic and International Finance*. 3(5).
- Sogo-Temi, J.S (1999). "Indebtedness and Nigeria's Development" in Saliu, H.A. (ed). *Issues in Contemporary Political Economy of Nigeria*, Ilorin: Sally and Associates.
- Sulaiman, L.A. and Azeez, B.A. (2012). "Effect of External Debt on Economic Growth of Nigeria". *Journal of Economic and Sustainable Development*. 3(8).
- Today, MP (2003). "Economic Development, Eight Low Prize Edition, New Delhi: Pearson Education".
- Were, M (2001). "The Impact of External Debt on Economic Growth in Kenya: An Empirical Assessment". *World Institute for Economic Research*. Paper No. 116.
- World Bank Statistics (WDI 2013 & 2014).

## APPENDICES

### Appendix 1: Table of Data

YEAR	RGDP	EDS	DSP	EXR
1980	61946106738	8938206000	1150772000	0.546781
1981	53813895881	11445508000	1790651000	0.617708
1982	53247135431	11992472000	2090346000	0.673461
1983	50557914889	17576994000	2565377000	0.72441
1984	49535867646	17783310000	4067500000	0.766527
1985	53658653550	18655380000	4428669000	0.893774
1986	48961280054	22215776000	2050757000	1.754523
1987	43697110037	29024888000	1106408000	4.016037
1988	46992974187	29624122000	2210434000	4.536967
1989	50032099652	30121999000	2117490000	7.364735
1990	56419202083	33438924000	3335543000	8.038285
1991	56070615711	33527205000	2944753000	9.909492
1992	56313808189	29018714000	2414572000	17.29843
1993	57490979534	30735623000	1490998000	22.0654
1994	58014011386	33092286000	1871671000	21.996
1995	57835636304	34094442000	1832904000	21.89526
1996	60723777676	31414751000	2228630000	21.88443
1997	62425413646	28467541000	1415896000	21.88605
1998	64120663260	30313711000	1331989000	21.886
1999	64424747539	29368025000	1072055000	92.3381
2000	67850915773	31581804000	1854816000	101.6973
2001	70843863904	30031742000	2524307000	111.2313
2002	73525054912	29918232000	1476880000	120.5782
2003	81137974799	34136659000	1631344000	129.2224
2004	1.09E+11	36689358000	1710307000	132.888
2005	1.12E+11	20475927000	8807116000	131.2743
2006	1.21E+11	4065417000	6710138000	128.6517
2007	1.30E+11	3862818000	1010498000	125.8081
2008	1.38E+11	4143915000	429497000	118.546
2009	1.47E+11	6847795000	432345000	148.9017
2010	1.59E+11	7271144000	315097000	150.298
2011	1.70E+11	9008773000	373161000	154.7403
2012	1.81E+11	10076546000	302664000	156.8097

## Appendix 2: Table of Logged Data

YEAR	LNRGDP	LNEDS	LNDSP
1980	24.84953	22.9136	20.8637
1981	24.7088	23.16086	21.30585
1982	24.69821	23.20754	21.4606
1983	24.64639	23.58986	21.66537
1984	24.62596	23.60153	22.12629
1985	24.70591	23.6494	22.21136
1986	24.6143	23.82407	21.44147
1987	24.50055	24.09142	20.82438
1988	24.57326	24.11185	21.51645
1989	24.63593	24.12852	21.4735
1990	24.75608	24.23299	21.9279
1991	24.74988	24.23562	21.80329
1992	24.75421	24.09121	21.60479
1993	24.77489	24.14869	21.12271
1994	24.78395	24.22257	21.3501
1995	24.78087	24.2524	21.32917
1996	24.8296	24.17054	21.52465
1997	24.85724	24.07203	21.07103
1998	24.88403	24.13487	21.00994
1999	24.88876	24.10317	20.79284
2000	24.94058	24.17585	21.34105
2001	24.98374	24.12552	21.64923
2002	25.02089	24.12173	21.1132
2003	25.11942	24.25364	21.21267
2004	25.41011	24.32575	21.25994
2005	25.44398	23.74252	22.89883
2006	25.52289	22.12578	22.62689
2007	25.58894	22.07466	20.73371
2008	25.64976	22.14491	19.87813
2009	25.71681	22.64719	19.88473
2010	25.79228	22.70718	19.56839
2011	25.85799	22.92146	19.73752
2012	25.92126	23.03348	19.52813

### Appendix 3: Estimated Results

#### Augmented Dickey Fuller Test for Stationarity

Null Hypothesis: LOGDSP has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.642663	0.4498
Test critical values:		
1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

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

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(LOGDSP)  
 Method: Least Squares  
 Date: 03/28/14 Time: 00:17  
 Sample (adjusted): 1981 2012  
 Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGDSP(-1)	-0.223450	0.136029	-1.642663	0.1109
C	4.708881	2.893783	1.627241	0.1141
R-squared	0.082522	Mean dependent var		-0.041736
Adjusted R-squared	0.051940	S.D. dependent var		0.586516
S.E. of regression	0.571081	Akaike info criterion		1.777892
Sum squared resid	9.784019	Schwarz criterion		1.869500
Log likelihood	-26.44626	Hannan-Quinn criter.		1.808257
F-statistic	2.698343	Durbin-Watson stat		1.484370
Prob(F-	0.110895			



statistic)

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Null Hypothesis: D(LOGDSP) has a unit root  
 Exogenous: Constant  
 Lag Length: 1 (Automatic - based on SIC, maxlag=2)

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	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.851131	0.0005
Test critical values:		
1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(LOGDSP,2)  
 Method: Least Squares  
 Date: 03/28/14 Time: 00:17  
 Sample (adjusted): 1983 2012  
 Included observations: 30 after adjustments

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGDSP (-1))	-1.145888	0.236210	-4.851131	0.0000
D(LOGDSP (-1),2)	0.329338	0.179967	1.829989	0.0783
C	-0.069045	0.106385	-0.649009	0.5218
R-squared	0.495724	Mean dependent var	-0.012138	
Adjusted R-squared	0.458370	S.D. dependent var	0.787232	
S.E. of regression	0.579367	Akaike info criterion	1.840880	
Sum squared resid	9.062997	Schwarz criterion	1.980999	
Log likelihood	-24.61319	Hannan-Quinn criter.	1.885705	
F-statistic	13.27103	Durbin-Watson stat	2.127873	
Prob(F-statistic)	0.000097			

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Null Hypothesis: LOGEDS has a unit root  
 Exogenous: Constant  
 Lag Length: 1 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.950507	0.3060
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(LOGEDS)  
 Method: Least Squares  
 Date: 03/28/14 Time: 00:18  
 Sample (adjusted): 1982 2012  
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGEDS(-1)	-0.167066	0.085652	-1.950507	0.0612
D(LOGEDS(-1))	0.404131	0.172064	2.348718	0.0261
C	3.953600	2.029919	1.947664	0.0615
R-squared	0.211494	Mean dependent var	-0.004109	
Adjusted R-squared	0.155172	S.D. dependent var	0.347469	
S.E. of regression	0.319374	Akaike info criterion	0.646859	
Sum squared resid	2.855996	Schwarz criterion	0.785632	
Log likelihood	-7.026313	Hannan-Quinn criter.	0.692095	
F-statistic	3.755099	Durbin-Watson stat	1.971696	
Prob(F-statistic)	0.035914			

Null Hypothesis: D(LOGEDS) has a unit root

Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.890507	0.0057
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(LOGEDS,2)  
 Method: Least Squares  
 Date: 03/28/14 Time: 00:18  
 Sample (adjusted): 1982 2012  
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGEDS(-1))	-0.679126	0.174560	-3.890507	0.0005
C	-0.004191	0.060071	-0.069762	0.9449
R-squared	0.342941	Mean dependent var	-0.004363	
Adjusted R-squared	0.320283	S.D. dependent var	0.405678	
S.E. of regression	0.334461	Akaike info criterion	0.709745	
Sum squared resid	3.244052	Schwarz criterion	0.802261	
Log likelihood	-9.001054	Hannan-Quinn criter.	0.739903	
F-statistic	15.13604	Durbin-Watson stat	1.905025	
Prob(F-statistic)	0.000538			

Null Hypothesis: EXR has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=2)

t-Statistic	Prob.*
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Augmented Dickey-Fuller test		
statistic		0.025970 0.9542
Test critical values:		
1% level		-3.653730
5% level		-2.957110
10% level		-2.617434

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

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(EXR)  
 Method: Least Squares  
 Date: 03/28/14 Time: 00:19  
 Sample (adjusted): 1981 2012  
 Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR(-1)	0.001073	0.041304	0.025970	0.9795
C	4.821708	3.393089	1.421038	0.1656
R-squared	0.000022	Mean dependent var		4.883216
Adjusted R-squared	-0.033310	S.D. dependent var		13.52135
S.E. of regression	13.74470	Akaike info criterion		8.139645
Sum squared resid	5667.504	Schwarz criterion		8.231254
Log likelihood	-128.2343	Hannan-Quinn criter.		8.170011
F-statistic	0.000674	Durbin-Watson stat		1.963455
Prob(F-statistic)	0.979453			

Null Hypothesis: D(EXR) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test		
statistic	-5.304134	0.0001
Test critical values:		
1% level		-3.661661

5% level	-2.960411
10% level	-2.619160

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(EXR,2)

Method: Least Squares

Date: 03/28/14 Time: 00:19

Sample (adjusted): 1982 2012

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR(-1))	-0.983448	0.185412	-5.304134	0.0000
C	4.956121	2.669564	1.856528	0.0736
R-squared	0.492420	Mean dependent var		0.064466
Adjusted R-squared	0.474917	S.D. dependent var		19.24910
S.E. of regression	13.94840	Akaike info criterion		8.170947
Sum squared resid	5642.176	Schwarz criterion		8.263463
Log likelihood	-124.6497	Hannan-Quinn criter.		8.201105
F-statistic	28.13384	Durbin-Watson stat		2.003771
Prob(F-statistic)	0.000011			

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LOGRGDP)

Method: Least Squares

Date: 03/28/14 Time: 00:21

Sample (adjusted): 1981 2012

Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGRGDP(-1)	0.063984	0.032431	1.972910	0.0578
C	-1.565448	0.810548	-1.931345	0.0629
R-squared	0.114845	Mean dependent var		0.033492

Adjusted R-squared	0.085340	S.D. dependent var	0.075571
S.E. of regression	0.072274	Akaike info criterion	-2.356232
Sum squared resid	0.156708	Schwarz criterion	-2.264624
Log likelihood	39.69972	Hannan-Quinn criter.	-2.325867
F-statistic	3.892373	Durbin-Watson stat	1.569777
Prob(F-statistic)	0.057782		

Null Hypothesis: D(LOGRGDP) has a unit root  
Exogenous: Constant  
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.544087	0.0011
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation  
Dependent Variable: D(LOGRGDP,2)  
Method: Least Squares  
Date: 03/28/14 Time: 00:21  
Sample (adjusted): 1982 2012  
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGRGD				
P(-1))	-0.733924	0.161512	-4.544087	0.0001
C	0.030456	0.013259	2.296936	0.0290
R-squared	0.415896	Mean dependent var	0.006581	
Adjusted R-squared	0.395755	S.D. dependent var	0.087198	
S.E. of regression	0.067782	Akaike info criterion	-2.482700	

Sum squared			
resid	0.133237	Schwarz criterion	-2.390185
Log			
likelihood	40.48185	Hannan-Quinn criter.	-2.452543
F-statistic	20.64873	Durbin-Watson stat	2.056804
Prob(F-			
statistic)	0.000090		

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## Johansen Test for Co-integration

Date: 03/28/14 Time: 00:53  
 Sample (adjusted): 1982 2012  
 Included observations: 31 after adjustments  
 Trend assumption: Linear deterministic trend (restricted)  
 Series: LOGRGDP LOGEDS  
 LOGDSP EXR  
 Lags interval (in first differences): 1 to 1

### Unrestricted Cointegration Rank Test (Trace)

Hypot hesize d		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None				
*	0.808381	86.82273	63.87610	0.0002
At				
most 1	0.466610	35.60317	42.91525	0.2211
At				
most 2	0.306475	16.11962	25.87211	0.4830
At				
most 3	0.142745	4.774616	12.51798	0.6290

Trace test indicates 1 cointegratingeqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

### Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypot hesize d		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None				
*	0.808381	51.21956	32.11832	0.0001
At				
most 1	0.466610	19.48355	25.82321	0.2740
At				
most 2	0.306475	11.34501	19.38704	0.4784
At				
most 3	0.142745	4.774616	12.51798	0.6290



Max-eigenvalue test indicates 1 cointegrating equation(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'S11\*b=D):

LOGR GDP	LOGEDS	LOGDSP	EXR	@TREND(81 )
3.798				
522	0.228911	2.746372	-0.023870	0.221044
11.47				
492	2.558987	0.747160	-0.009929	-0.376778
3.719				
173	2.928376	-0.874929	0.035181	-0.269757
-				
3.1729				
45	-1.436166	0.660012	0.039337	-0.116559

Unrestricted Adjustment Coefficients (alpha):

D(LO GRGD P)	0.002064	-0.032177	0.020711	0.008819
D(LO GEDS )	-0.174005	-0.057019	-0.081168	0.012947
D(LO GDSP)	-0.169844	0.082272	0.196667	-0.046573
D(EX R)	0.519343	-4.717055	-1.251551	-4.247989

1 Cointegrating Equation(s): Log likelihood -76.63286

Normalized cointegrating coefficients (standard error in parentheses)

LOGR GDP	LOGEDS	LOGDSP	EXR	@TREND(81 )
1.000				
000	0.060263 (0.05932)	0.723011 (0.08449)	-0.006284 (0.00146)	0.058192 (0.01081)

Adjustment coefficients (standard error in

parentheses)  
D(LO  
GRGD  
P) 0.007839  
(0.04902)  
D(LO  
GEDS  
) -0.660962  
(0.14577)  
D(LO  
GDSP) -0.645157  
(0.30647)  
D(EX  
R) 1.972735  
(10.1720)

---

2 Cointegrating                      Log  
Equation(s):                      likelihood                      -66.89109

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Normalized cointegrating coefficients (standard error in  
parentheses)

LOGR				@TREND(81 )
GDP	LOGEDS	LOGDSP	EXR	
1.000				
000	0.000000	0.966626 (0.10387)	-0.008290 (0.00173)	0.091899 (0.01364)
0.000				
000	1.000000	-4.042540 (0.56504)	0.033296 (0.00939)	-0.559328 (0.07421)

Adjustment coefficients (standard error in  
parentheses)

D(LO GRGD P)	-0.361384 (0.13523)	-0.081867 (0.02874)
D(LO GEDS )	-1.315251 (0.44290)	-0.185743 (0.09414)
D(LO GDSP)	0.298908 (0.95474)	0.171654 (0.20293)
D(EX R)	-52.15512 (30.2933)	-11.95200 (6.43896)

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3 Cointegrating	Log			
Equation(s):	likelihood	-61.21858		

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Normalized cointegrating coefficients (standard error in parentheses)

LOGR				@TREND(81)
GDP	LOGEDS	LOGDSP	EXR	)
1.000				
000	0.000000	0.000000	-0.004159	-0.042752
			(0.00252)	(0.01723)
0.000				
000	1.000000	0.000000	0.016020	0.003798
			(0.00843)	(0.05760)
0.000				
000	0.000000	1.000000	-0.004274	0.139300
			(0.00354)	(0.02419)

Adjustment coefficients (standard error in parentheses)

D(LO			
GRGD			
P)	-0.284358	-0.021218	-0.036494
	(0.13143)	(0.04049)	(0.03094)
D(LO			
GEDS			
)	-1.617129	-0.423433	-0.449468
	(0.41543)	(0.12797)	(0.09781)
D(LO			
GDSP)	1.030347	0.747569	-0.577055
	(0.86625)	(0.26684)	(0.20396)
D(EX			
R)	-56.80985	-15.61701	-1.003067
	(31.5364)	(9.71453)	(7.42526)

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## Vector Error Correction Model

Vector Error Correction Estimates

Date: 03/28/14 Time: 00:54

Sample (adjusted): 1983 2012

Included observations: 30 after adjustments

Standard errors in ( ) & t-statistics in [ ]

CointegratingE	
q:	CointEq1
LOGRGDP(-1)	1.000000
LOGEDS(-1)	0.197084 (0.07846) [ 2.51198]
LOGDSP(-1)	-0.135526 (0.16222) [-0.83545]
EXR(-1)	-0.001197 (0.00193) [-0.61973]
@TREND(80)	-0.054900 (0.01970) [-2.78657]
C	-25.75918

Error Correction:	D(LOGRGD P)	D(LOGEDS)	D(LOGDSP)	D(EXR)
CointEq1	-0.292245 (0.10918) [-2.67664]	-0.221313 (0.37499) [-0.59018]	0.999894 (0.80216) [ 1.24649]	-16.97928 (25.6926) [-0.66086]
D(LOGRGDP(-1))	0.101752 (0.18878) [ 0.53899]	0.157345 (0.64838) [ 0.24268]	2.577302 (1.38698) [ 1.85821]	-12.75172 (44.4238) [-0.28705]
D(LOGRGDP(-2))	-0.205454 (0.19452)	-2.415750 (0.66807)	0.867593 (1.42910)	-7.408905 (45.7728)

		[-1.05623]	[-3.61604]	[ 0.60709]	[-0.16186]
D(LOGEDS(-1))	0.075571 (0.06806) [ 1.11038]	0.191064 (0.23375) [ 0.81739]	0.337744 (0.50003) [ 0.67545]	0.056062 (16.0153) [ 0.00350]	
D(LOGEDS(-2))	0.046275 (0.05375) [ 0.86092]	0.300252 (0.18461) [ 1.62643]	0.489148 (0.39491) [ 1.23865]	9.508239 (12.6485) [ 0.75173]	
D(LOGDSP(-1))	0.011219 (0.02863) [ 0.39183]	-0.405215 (0.09833) [-4.12087]	-0.137209 (0.21035) [-0.65229]	-2.309847 (6.73728) [-0.34285]	
D(LOGDSP(-2))	-0.002612 (0.02898) [-0.09011]	0.048344 (0.09953) [ 0.48570]	-0.130452 (0.21292) [-0.61269]	-7.413376 (6.81955) [-1.08708]	
D(EXR(-1))	-0.000480 (0.00101) [-0.47357]	-0.000552 (0.00348) [-0.15838]	0.008921 (0.00745) [ 1.19705]	-0.079262 (0.23870) [-0.33206]	
D(EXR(-2))	-0.000886 (0.00101) [-0.87377]	0.000300 (0.00348) [ 0.08596]	0.009716 (0.00745) [ 1.30351]	-0.031874 (0.23873) [-0.13351]	
C	0.051615 (0.01887) [ 2.73486]	0.049920 (0.06482) [ 0.77013]	-0.291481 (0.13866) [-2.10214]	6.117177 (4.44112) [ 1.37740]	
R-squared	0.404515	0.722176	0.556529	0.159784	
Adj. R-squared	0.136546	0.597156	0.356967	-0.218313	
Sum sq. resids	0.085246	1.005546	4.601391	4720.394	
S.E. equation	0.065286	0.224226	0.479656	15.36293	
F-statistic	1.509561	5.776460	2.788756	0.422600	
Log likelihood	45.38299	8.366844	-14.44558	-118.4449	
Akaike AIC	-2.358866	0.108877	1.629705	8.562994	
Schwarz SC	-1.891800	0.575943	2.096771	9.030060	
Mean dependent	0.040768	-0.005802	-0.064415	5.204541	
S.D. dependent	0.070259	0.353279	0.598154	13.91857	
Determinant resid		0.004820			

covariance (dof adj.)	
Determinant resid	
covariance	0.000952
Log likelihood	-65.91975
Akaike information criterion	7.394650
Schwarz criterion	9.496446

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## Granger Causality Test

Pairwise Granger Causality Tests

Date: 03/28/14 Time: 01:03

Sample: 1980 2012

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
LOGEDS does not Granger Cause LOGRGDP	32	5.65990	0.0242
LOGRGDP does not Granger Cause LOGEDS		6.91967	0.0135
LOGDSP does not Granger Cause LOGRGDP	32	0.04306	0.8371
LOGRGDP does not Granger Cause LOGDSP		5.75002	0.0231
EXR does not Granger Cause LOGRGDP	32	13.5768	0.0009
LOGRGDP does not Granger Cause EXR		0.07278	0.7892
LOGDSP does not Granger Cause LOGEDS	32	7.11542	0.0124
LOGEDS does not Granger Cause LOGDSP		13.9911	0.0008
EXR does not Granger Cause LOGEDS	32	4.93139	0.0343
LOGEDS does not Granger Cause EXR		0.22009	0.6425
EXR does not Granger Cause LOGDSP	32	1.89008	0.1797
LOGDSP does not Granger Cause EXR		1.68736	0.2042