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THE EFFECT OF INTEREST RATE SPREAD ON SAVINGS, INVESTMENT AND PRIVATE CONSUMPTION IN NIGERIA

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CERTIFICATION

Omeje Ukamaka Juliet, a post graduate student in the Department of Economics with Registration number PG/MSC/15/76694 has satisfactory completed the requirement for Master's degree in Economics. This work embodied in this project report is original and has not been submitted in part or in full for any other degree of this or to any other university.

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DEDICATION

This work is dedicated to God Almighty and to my parent Chief and Lolo Omeje, for their encouragement to further this study and for their indefatigable effort in caring for me during the course of my studies.

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First and foremost, I appreciate God's protection, guidance and caring during the course of this work. I whole-heartedly appreciate and acknowledge my supervisor, Dr E.O. Nwosu for his time reading through my work and given me the necessary corrections. I am most grateful to my parent, Chief and Lolo Omeje for their encouragement. I also want to appreciate my very good friends Godson and Obodoeze and all those who helped me in one way or another, may God bless you all

Omeje Ukamaka Juliet

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Abstract

The study investigates the effect of interest rate spread on savings, investment and private consumption expenditure in Nigeria from 1980-2015. The study adopted the Ordinary Lease Square (OLS) model. The study tested for descriptive statistics, unit root where all variables are integrated of order one I(1), the effect of interest rate spread on savings, investment and consumption and the short-run ECM model. The study found that interest rate spread has positive and significant effect on savings, investment and private consumption. For a percentage point change in interest rate spread, savings increases by 6.6 percent, investment increases by 8.4 percent and consumption by 1.1 percent. The study concluded that there is a significant relationship between interest rate spread on savings, investment and private consumption in Nigeria. Base on the findings, the study recommended that the Central Bank of Nigeria should put in place measures to monitoring interest rate spread related measures such as lending rate, deposit rate, operation efficiency, liquidity risk, provision and gross domestic rate to boost financial system in Nigeria. The study further recommends that government should strengthen collaboration with financial institution to put appropriate policies and strategies in place to reduce banks' lending rate.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The lending rate and deposit rates spread has been recognised in literature as a key indicator of the performance of the financial system. It is also generally accepted as a measure of intermediation efficiency both in developed and developing countries (Akinlo and Owoyemi 2012). A large spread works as a weakness to expansion and development of financial intermediation process. In other words, it indicates the level of inefficiency of the financial system. This is because, possible savers are not encouraged as a result of low return on deposit and thus financing for possible borrowers are limited (Akinlo and Owoyemi 2012). According to Kama (2009), the real economy is benefited by financial system that are more efficient by allowing expected returns that are high for savers or lowering lenders costs such that investment rises and the economy grows.

Globally, it is recognized that efficiency in intermediation process establishes a smooth mechanism for the mobilization of funds from the surplus sector and the transfer of these funds to the deficit sector of the economy for investment purposes (Nwachukwu, 2011). This is in line with Kendall (2000), who argued that mobilized resources (i.e., savings) provides developed and developing countries (including Nigeria) with the much needed capital for investment in productive activities which will lead to reduction in external borrowing of government, employment creation and increase the people's standard of living.

In the light of the above explanations, different countries have adopted different interest rate regimes to improve the efficiency of the intermediation process (i.e., minimize the gap between lending and deposit rates). In Nigeria for example, various regimes such as control deregulation, regulation and complete deregulation have been experimented at different periods, since the introduction of the Structural Adjustment Programme (SAP) in 1986. Prior to the deregulation of interest rates completion in Nigeria, the financial sector worked under the regulations of finance and rate of interest were said to be blocked. The resulting low interest (deposit) rates during this regime discouraged mobilization of savings and through financial system, the directing of savings was mobilized. As a result, the Nigerian government took steps to loosen interest rates (i.e., lending and deposit rates) as part of the reform of the entire financial system (CBN, 2007). The deregulation of the rate of interest was as a result of the financial sector reforms, which took effect from August 1987 (Ikhinde,

Obute and Adyorough 2012). The interest rate regime was liberalized by the Central Bank of Nigeria (CBN) and employed the policy of fixing only its minimum rediscount rate to indicate the anticipated direction of interest rate., the policy was improved in 1989 when the CBN issued further directives on the required spreads between deposit and lending rates. During this period, the deposit rate was 18.2% and the lending rate was 25%. In 1991, the government prescribed a maximum margin between each bank's average cost of funds and its maximum lending rates. Later, the maximum lending rate and the deposit rate of 14% and 20% and a respectively was prescribed by the CBN. A fractional of the deregulation was, however, restored in 1992 when financial institutions were required to only maintain a specified spread between their average cost of fund and maximum lending rate. The deposit and lending rates in this period were 16% and 32% respectively (CBN, 2010). Trends on various interest rate regimes, lending and deposit rates and savings as percentage of GDP are shown with the aid of table below:

Table 1: Average lending and deposit rates across various regimes

Variable	Pre SAP Period (1970-1985)	SAP Period (Deregulated period) (1986-1993)	SAP Period (Regulated Period) (1994-2005)
Lending Rate (%)	7.8	20.3	20.4
Deposit Rate (%)	4.7	15.7	12.7
Interest Rate Spread (%)	3.08	4.6	7.7
Private Savings (% of GDP)	24.4	27.2	17.4
Public Savings (% of GDP)	21.4	21.5	13.0
National Savings (% of GDP)	16.7	19.7	5.6
Investment (% of GDP)	24.5	13.07	7.83
Private Consumption (% of GDP)	61.27	65.92	72.90

Source: Statistical Bulletin of Central Bank of Nigeria (2010)

From the above table, it shows that average lending and deposit rates in 1981-1985 were 7.8% and 4.7% respectively. This corresponds to an average spread of 3.1% in the pre- SAP

period. During the SAP period (Deregulation period), average lending and deposit rates rose to 20.3% and 15.7% respectively. This resulted to high average interest rate spread of 4.6%. Interestingly, the spread during the SAP period (Deregulation period) was higher than the spread in the pre-SAP period (i.e., in 1970-1985). This implies that the deregulation exercise in the SAP period (Deregulation period), which was meant to reduce the gap in interest rate failed to achieve the intended objective. In the SAP period (Deregulation period), the private, public and national savings were 27.2%, 21.5% and 19.7% of the GDP respectively. These rates were higher than that of the private, public and national savings in the regulated period (i.e., in 1970-1985). This could be attributed to the rise in deposit rate during the SAP period as shown in the table above.

The table also shows that in 1994-2005 which was the SAP period (Regulation period), average lending rate rose to 20.4% from 20.3% while the deposit rate reduced to 12.7% from 15.7% during the same period. This corresponds to high average spread of 7.7% compared to the spread during the SAP period (Deregulation period). This can be attributed to the re-imposed control of interest rates by the government. Furthermore, the savings rate in 1994-2005 reduced to 17.4%, 13.0% and 5.6% from 27.2%, 21.5% and 19.7 during the SAP period for the private, public and national savings respectively. This can be attributed to the reduction in deposit rate from 15.7% during the SAP (Deregulation period), period to 12.7% in 1994-2005 (Regulation period), as shown on the table above. Also the average investment and private consumption in the pre-SAP period were 24.5% and 61.27% respectively, due to the increase of the interest rate spread in the SAP (deregulated and regulated) period, investment falls to 13.07% in SAP (deregulated) and 7.83% in SAP (regulated) while private consumption increase to 65.92% in SAP (deregulated) and 72.90% in SAP (regulated).

The key macroeconomic variables that determine aggregate output such as savings and investment and total consumption seems to be an output determining variable that has attracted a lot of attentions and studies (Ezeji and Ajudua, 2015). This is so because about two-thirds of aggregate expenditure was account for as consumption expenditure in virtually all economies (Branson, 1989). Thus, the level of consumption per individual is seen as a central measure of an economy's productive success. According to Mudit and Shamika (2009), one of the most relevant issues that is related to inter-temporal substitution is whether bring down interest rate paid on deposits will encourage consumers to increase consumption. This therefore suggests that the higher the spread, the higher will be the consumption expenditure. Therefore, a comprehensive study of its determinants such as the savings rate

could help an economy achieve stability, increase in aggregate income and high level of employment of factors of production. (Ezeji and Ajudua, 2015).

Thus, from the rate of interest regime that is unstable in Nigeria, the interest rate keeps changing such frequent changes could affect savings, investment and private consumption expenditures, which in sequence could impact on the general economy of the country (Ogunbiyi and Ihejirika, 2014). The foregoing however forms the basis of this study.

1.2 Statement of the Problem

Notwithstanding the huge financial sector reform programmes in the developing world been implemented, financial systems in developing countries (including Nigeria) typically show persistent gap in interest rate. This serves as a major constraint to savings and investment which in turn discourages economic growth and development. According to Obute et al (2012), interest rate deregulation in Nigeria was meant to encourage savings and investment by reducing the divergence in interest rate but this objective has not been achieved, since the difference between deposit and lending rates is still wide. The diagram below shows the degree of interest rate deviation in Nigeria from 1970q1 to 2010q1.

Movements in deposit and lending interest rates from 1970q1 to 2010q4

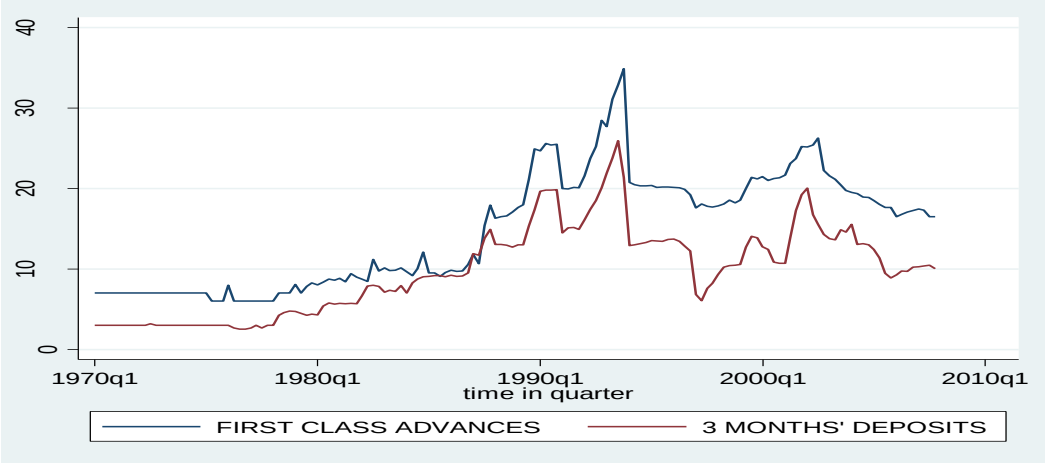

Figure 1.1

Source: Researcher's computation based on data from Central Bank of Nigeria Statistical Bulletin (2010)

Interest rate spread from 1970q1 to 2010q4

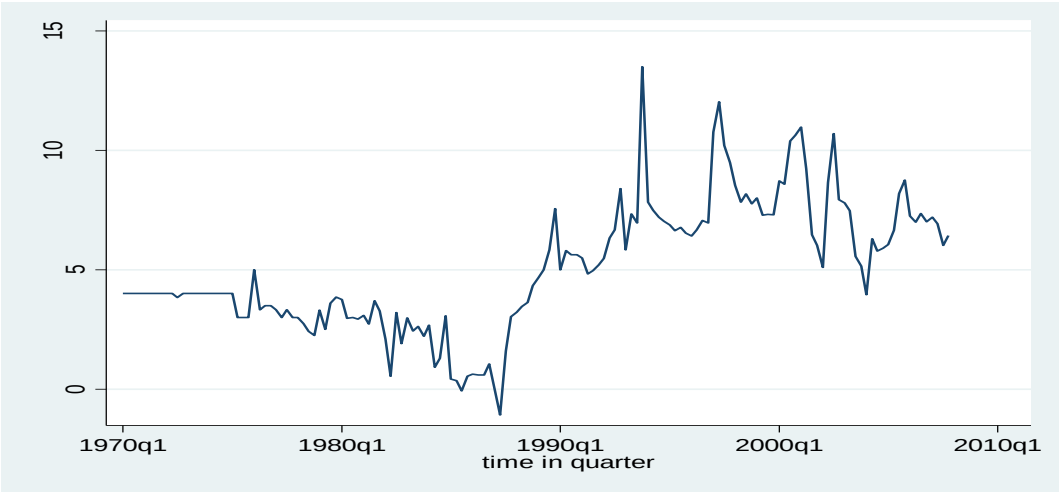

Fig 1.2

Source: Researcher's computation based on data from Central Bank of Nigeria Statistical Bulletin (2010)

The diagram above shows that the spread between deposit and lending rates has been rising and falling throughout the sample period. The spread in interest rate was high between 1970q1 and 1982q4 but fell in 1983q1-1988q4. This reduction can be attributed to the removal of interest rate control in 1986-1993. The gap in interest rate gradually rose again from the first quarter of 1989 to the last quarter of 1993, even though the deregulation program was still on within this period. The spread in interest rate grew much bigger between 1994q1 and 1996q4 following government re-imposed control of interest. It continued to rise in the subsequent periods until the first quarter of 2010 despite the regulation period.

The trend of the interest rate spreads is shown in Fig 1.2. It shows that the interest rate spreads from 1970 to 1985 falls from 4.00 to 0.32 which was the pre- SAP period. From 1986 to 1993 which was also the period of SAP (Deregulation), the spread of interest rate rose from 0.72 to 8.31 and from 1994 to 2005 which denote the period of SAP (Regulation), the interest rate spread also rises from 7.39 to 7.42. In 2010 it increased more to 11.6.

Interest rate developments in the Nigerian economy indicates that the problem of high borrowing rates, against the backdrop of declining deposit rates poses a key challenge to financial intermediation. The persistence of this problem had been observed by the Monetary Policy Committee in several communiques, particularly following the onset of the global financial crises of 2007/08, borrowing rates have remained positive in real terms hovering around 23 -26% while savings rates have largely remained negative in real terms. The

average savings rate between 2009 and 2014 was 2.13%. Savings rate, however, marginally increased following the increase in Cash Reserve Ratio on public sector deposits in the third quarter of 2013. The tight monetary policy forced banks to offer remunerative rates to mobilize private sector deposits. Notwithstanding, the emerging picture shows persistently high borrowing rates, declining deposit rates, and the widening of the interest rate spread. This clearly indicates inefficiencies in the intermediation process and instability in the financial system, which constrains savings and investment in Nigeria (Tule, Audu, Oji, Oboh, Iman and Ajayi 2015)

Financial instability in developing countries like Nigeria, has been associated with serious issues in the financial sector. These issues have been relatively large in terms of weak public confidence in financial markets and inefficient financial intermediation, posing great threat to savings and investment (Kama, 2009). Instability of financial system could be damaging to the economy, through a wide gap in interest rate.

Furthermore, there are various developmental finance schemes that have been introduced by CBN to specifically address problems of high rate of lending and access to credit in Nigeria. These measures include: Agricultural Credit Guarantee Scheme Fund (ACGS) in 1978, Interest rate drawback programme in 2002, the Commercial Agricultural Credit Scheme (CACS), Small and Medium enterprises Equity Investment Scheme (SMEIS) in 2001, and Microfinance policy in 2004.

In 2010, the Central Bank, injected N500 billion into the economy as a special intervention fund under a quantitative easing program to ensure the flow of liquidity to the real economy at reasonable interest rates. These measures were complemented by interventions to manage interbank liquidity and the use of treasury securities (Tule et al, 2015)

.

Studies such as Newman (2012); Umejiaku (2011); Tule et al (2015) and Jibrina, Iyaji and Ejura (2014) have argued that despite the policy measures put in place, the phenomenon of high lending rates still persists as reflected in the complaints of manufacturers, industrialists, and Small and Medium-sized Enterprises (SME) operators who consistently identify high lending rates as a key contributor to the unfavourable business and investment climate in Nigeria. A strong financial system with less spread in interest rate is still not in place, as most people still do not have access to commercial bank credits. From the point of view of those who seem to fully use the services of the financial sector are not finding it so easy. The result of incompetence in the system of banking together with continued limitation of success that

may have been recorded caused by corruption. According to Kama (2009), the banking system still leaves out certain people who should have been benefiting from the interaction created by the bridging of financial gap between lenders and borrowers of credit in the economy. This is indicative of inefficiency and poor performance of the financial system.

Financial sector intermediation inefficiency which could result from banking crisis, not only pose a barrier to savings and investment but also to consumption expenditure. This is because, it limits the amount of credit that goes to households for the purchase of durable goods (Damar, Gropp and Mordel 2014). For instance, the global financial crisis of 2007 and 2008 which spread towards developing countries and more particularly in Nigeria, negatively affected household consumption expenditures. This is reflected in available statistics from CBN (2010) which shows a sharp downward trend in private consumption spending. For instance, there was a drastic fall in private consumption expenditure as a percentage of total expenditure from 102.8% in 2003 to 58.5% in 2006. This continuously fell to 38.3% and 31.7% in the year 2008 and 2010 respectively.

The Central Bank of Nigeria has also adopted various measures aimed at solving the problems of bank inefficiency, financial sector crisis and to boost the performance of the banking system in terms of increase in savings mobilization. Some of these measures are issuance of prudential guidelines for proper coordination of banks, regular assessment of the banks' books and supervision of other banking operations (CBN, 2009).

Studies of various kind have been done on the effects of interest rate on definite areas. These studies among others include; Udonsah (2012), Okeke (2005), Olowolaju (2008), Ekwem (2012), Udeh and Nwachuku (2016) and Acha (2011), who studied the effect of interest rates on investment and economic growth. Studies like Nwachukwu (2009), Ajakaye and Odusola (1995), Sayinbola, Sobande, and Adedeji (2012), Douglas (1996), Sakaria and Nyambe (2015), and Adeyemi and Alege (2013) have exploited interest rate relationship with savings, interest rate and consumption expenditure both in Nigeria and outside Nigeria. However, no existing study to the best of our knowledge has dealt with the effect of interest rate spread on savings, investment and private or household consumption. From the above studies, this study thus pursues to fill this knowledge gap that currently exists and discover how interest rate spread affects savings, investment and private consumption in Nigeria.

1.3 Research Questions

1. How has interest rate spread impacted savings in Nigeria?

2. What is the impact of interest rate spread on investment in Nigeria?

3. What is the effect of interest rate spread on private consumption expenditure in Nigeria?

1.4 Research Objectives

The general objective is to investigate the impact of interest rate spread on savings, investment, and private consumption in Nigeria.

Specific objective are as follows

1. To ascertain the impact of interest rate spread on savings in Nigeria

2. To investigate the impact of interest rate spread on investment in Nigeria

3. To ascertain the effect of interest rate spread on private consumption expenditure in Nigeria

1.5 Research Hypotheses

H_{01}: Interest rate spread does not significantly impact on savings in Nigeria.

H_{02}: Interest rate spread does not significantly impact on investment in Nigeria.

H_{03}: Interest rate spread does not significantly impact on private consumption expenditure in Nigeria.

1.6 Significance of the Study

This study investigates the current position of interest rate spread on investment, savings and private consumption. This research work will be of immense help to the Federal Government of Nigeria through the Central Bank of Nigeria on the need to introduce an interest rate regime that will help to reduce the wide spread in interest rate in Nigeria with the aim of achieving social optimum resource allocation; engendering a systematic development of the financial sector; curbing inflation and reducing the burden of internal debt serving by government and Deregulated Regime under the Structural Adjustment Program (SAP). The deregulation interest rate allowed banks to determine their deposit and lending rates according to market conditions through negotiations with their customers. It will provide information to the government on the need for the provision of enabling environment which will help to boost the level of savings and investment in Nigeria.

This investigation will also serve as a stepping stones for researchers who develop interest in carrying out empirical analysis on the concept of interest rate spread on investment, saving and private consumption in Nigeria

Finally, student will find this piece highly relevant as it will undeniably increase their knowledge and horizon on the concept of interest rate spread and its impact on investment, savings and private consumption. The education sector is also considered as one of the significant beneficiaries because it is believed that this research will serve as a reference point to future researchers in this subject matter. Above all, it will add to existing stock of knowledge, thereby filling up the knowledge gap.

1.7 Scope of the study

This study is focused on the effect of interest rate spread on savings, investment and private consumption expenditure in Nigeria. The study is principally limited to the analysis of the Nigerian economy. In measuring interest rate spread, savings, investment, and private consumption expenditure in Nigeria. The data to be used for analysis are time series data ranging from 1981 to 2015. The data would be sourced from the Central Bank of Nigeria Statistical Bulletin, (2015). The choice of the period length is based on data availability.

CHAPTER TWO

REVIEW OF LITERATURE

2.1 Conceptual Literature Review

2.1.1 Interest Rate Spread

An interest rate is seen as an amount of interest that is due per period, as a proportion of the amount lent, deposited or borrowed which is called principal sum. The total interest on an amount lent or borrowed depends on the interest rate, the principal sum, the compounding frequency, and the length of time over which it is lent, deposited or borrowed. Interest rate can be seen as the fraction of an amount loaned which a lender charges as interest to the borrower, normally expressed as an annual expressed as an annual percentage.

According to Ojo (2001) in Onwumere, Okere and Ibe (2012), Interest rate is seen as a payment for rent by the borrowers for credit use or lenders return for parting with liquidity. The rate of interest like every others is a price which performs a rationing function by allocating the limited supply of financial resources among the numerous competing demands for such resource. The (CBN) in 1987 liberalized the interest rate regime and adopted the policy of fixed only its minimum rediscount rate to include the desired direction of the rate of interest. In 1989, the discharge was adjusted when the CBN issued further directives on the required spreads between deposit and lending rates.

CBN government in the year 1991 approved a maximum margin average cost of funds and its maximum lending rates of various banks, later they recommended a maximum lending rate and a savings deposit.

Interest rate spread is the amount earned by an investment which exceed or do not exceed its own interest rate, and its own interest liability. Interest rate spread can be seen if an interest rate is paid to a depositor by a bank, and the money of the depositors is lend out at an increasing rate, the interest rate differences is called spread in interest rate. The spread of interest rate can also be seen as the extent to which the capacity of interest earning of an entity or a firm exceed or falls short of its interest cost.

Interest rate targets can be seen as a very important tool of monetary policy and are considered when dealing with variables like unemployment, investment, and inflation. The

various countries central bank generally tends to reduce interest rates when they wish to increase investment and consumption in the country's economy

According to Brocks and Rojas in Irungu (2012), interest rate is defined as the border between expense of interest and interest on income as total earning assets percentage. In the growth and development of an economy interest rate spread as an important implication, according to some authors, they propose a link that is very serious between economic growth and the efficiency of intermediation of a bank.

Spread in Lending

Lending rate is the interest banks charge when they give out loans to customers which varies according to perceived risks, the time period of the loan (short, medium or long term), loanable funds cost and lensing margins. The lending rate spread can either be prime or maximum. Prime lending rate can be seen as rate charged by banks to their, more secure, largest and most customers that are creditworthy on short-term loans while the maximum rate of lending is the charging rate's by banks for lending to the customers with a low credit rating.

The interest rate spread for a business that wants to lend money, compared to its cost of money is the charges on a loan by the company. A bank runs on interest rate spreads, paying a certain money on savings of the depositors and CD deposits and making loans at higher rates than it pays to savers or depositors.

The financial intermediation spread is an indicator that is very important for the banking system and the intermediation process. Judgement can come through the spread in interest rate between lending rate and deposit rate on banks' efficiency in case of overall spread of banking system. According to IMF (2004), the profitability and pricing behaviour of banks can be assessed through the overall spread of banking system, while the early indication of change in risk perception can be through the spread between high and low of inter-bank rates.

Quaden in Irungu (2012), argued banking system that are more efficient benefits the real economy when savers are allowed of high expected returns with an additional finance, and a small cost of borrowing in new projects investment that need finance externally. As a result, if there is a large spread of interest rate in the banking sector's, potential savers will be discouraged as a result deposits of low returns and thus restrict finance for possible borrowers. Valverde (2004) clarify by stating that because of the costs involves

intermediating between savers and borrowers, only a proportion of the savings organized by banks can be finally be directed into investments. The intermediate cost is increase as a result of the inefficiency of the bank, and rise as a result of the portion of lost savings in intermediation process. This eventually makes lending, investment and economic growth to fall.

2.1.2 Savings and Investment

Saving can be seen as those incomes earned not spent, or deferred consumption. Reduction in expenditure can also be termed savings, such as cost decrease. Through personal finance, saving stipulates low-risk conservation of money generally. Broadly, in economics, it means income that are not used for instant or immediate consumption. Savings is also seen as the factor of production that the economy does not put towards consumption. In the national income accounting, savings is cash income saved and investment refers to expenditure on real capital goods

An investment can also be seen as an items or asset that can be bought either the hope that it will create income or will grow in the future. In an economic sense, it is seen as those goods are been purchased that are not for immediate consumption but create wealth tomorrow or in the future.

Investment and savings are not determinants of the system but are the determinates. They are seen as results that are twins of the system's determinants, namely: the schedule of the marginal efficiency of capital, the propensity to consume and the rate of interest. These determinants are bigger in themselves and each of them through changes are likely to be affected by others. But they remain independent in the sense that their values cannot be inferred from one another. The analysis from the traditional said that saving depends on income but it has ignored the fact that income depends on investment, in such manner that, when investment changes there will definitely be a change in income, in just that degree which is needed to make the change in saving equal to the change in investment.

Savings rate have largely remained negative in real terms. The average savings deposite rate between 2009 and 2014, was 2.13%, while the 3-month deposit rate was 8.4%, indicating negative real rates. Deposit rates, however, marginally increased into the positive territory following the increase in CRR on public sectors deposits in the third quarter of 2013. The tight monetary policy forces bank to offer remunerative rates to mobilize private sector deposits.

Wondwesen (2011) opined that Keynesian theory helps investment to play a role that is so serious both as a aggregate demand component as well as a creation of productive vehicle capacity on the supply side and in determining medium run growth rates. Savings and investment are the basic requirements for economic growth and development in any nation. Savings and investment have been accepted as two macro-economic variables for achieving stability of price and employment opportunities promotion thereby contributing to growth sustainability in economy. (Shimelis, 2014). Whether savings and investment cause economic growth or get caused by economic growth has been a severe empirical as well as theoretical debate among researchers. In classical theory, an increase in savings and investment will lead to output increase. (Ramakrishna and Rao, 2012).

The evaluation of the influence of savings and investment on growth in the economy in Nigeria is very important because it will provide useful information on which the macro-economic variables will be used to monitor the level of economic growth through savings and investment. The major problem of this study is to know whether or not the traditional view of growth that gross domestic savings and gross domestic investment promotes economic growth is valid? This is because the level of economic growth may itself affect the savings and investment rate. According to Romer (1990) and Barro (1991) stated that human capital investment and labour force also acts a special part in the growth of the economy. Human capital investment and labour force are the key input which generate new ideas that leads to faster economic growth. Human capital investment is an important source of long-term economic growth (Mohamed, 2014).

2.1.3 Private Consumption

Consumption is seen as the quantity of goods and services in aggregate that people in the country wish to buy for the main reason of consuming them immediately. Consumption seen as one of the key determinants of an economy's aggregate demand (summation of all intended expenditures in the economy) others include investment and government expenditure.

Private consumption is also known as personal consumption or consumer expenditure. The sum total of goods and services consumed by household, individuals that are attained through private sectors are termed private consumption. As a result of these, there is an assumption that all consumptions can be assigned to individuals. This assumes away pure public goods, economies of scale and other important features of consumption and production.

Private consumption is also seen as the all goods and services of market values which include long lasting goods. E.g., home computers, washing machines, cars, etc., bought by households. Disregarding purchase of residences but includes imputed rent for owner-occupied dwellings.

Higher personal incomes allow more spending. Experiences have shown that during the period of high inflation, consumers consume less and save more. If consumers expect a unique increase in prices as a result of inflation or higher indirect (sales) taxes, they will tend to bring spending forward. Higher rate of interest pushes up the cost of existing loans and discourage borrowing and, perhaps, encourage savings, all of which depress spending. However, higher rate of interest also redistribute income from fresh mortgage payers to their seniors whose deposits are larger than their borrowings and who may spend their additional interest income.

Private consumption is the largest or main component of aggregate demand and therefore plays a vital role in macroeconomic policy both in the classical and the Keynesian sense. The level of the wellbeing of citizens is shown by the level of consumption of that society. Looking at the survey of the trend in the Nigerian consumption expenditure, it shows that the average percentage change of the Nigerian private consumption expenditure showed a decrease of 0.86% between 1981 and 1995 but between the period of 1996 and 2012, there was an increased by 6.5%.

2.2 Theoretical Literature

2.2.1 Theories of Interest Rate and Savings

The Classical Theory of Interest Rate and savings

From the classical point of view, in real terms, the reward for using capital productivity is interest, which is very much equal to the marginal productivity of physical capital. According to Keynes, the savings investment theory is the true classical theory of interest rate in which scholars like Taussing, Marshall and Pigyo presented it in a way that is very much distinguished

Mostly, that the intersection of the demand and supply of capital is a determinant of the rate of interest which is as a result of the theory that grasps the propositions built on the general equilibrium theory. Equilibrium interest rate is seen at a point where the supply of capital is

equal to the demand for that capital. Demand for capital stems from investment decisions of the entrepreneur class. The investment decision is as a result of demand for capital while savings in the community is also as a result of supply. The supply of capital is represented by savings schedule. It follows that savings and investment is a determinant of interest rate

In the classical system, all three concepts of aggregate domestic expenditure, the expenditure of the government, investment and consumption plays a role in determining the equilibrium of the rate of interest The equilibrium rate of interest rate was the one which equals the supply of loanable funds (originating from the household sector) to the demand from loanable funds (originating from what businesses and governments desire to borrow). Interest is seen as the price paid for saving of capital which is determined by its demand for savings and supply of savings.

Demand Side: In businesses, capital demand comes more. Most people borrow for the purpose of consumption, religions or social and litigation ceremonies. Entrepreneurs this day demand most of the capital for the purpose of productivity. In no case will the entrepreneur pay a higher rate with its productivity at the margin. In the demand side, as more and more capital is added or employed in the industry the output produced will keep on diminishing. The borrowers in this side also compare the prevailing rate of interest with productivity of capital marginally, i.e., the amount added to the total output by the use of the last instalment of capital. When the interest rate falls, it becomes necessary to use capital in occupations of lower productivity. Thus demand for its expansions. All these are seen to be true of borrowers in general. Thus, it is clear that demand curve for capital or demand for savings to buy the capital will slope demands towards the right. When the interest rate rises investment demand expands and it contrast. Thus, the inverse function of the rate of interest is seen as investment demand.

$I = f(r)$, in which $\Delta I/\Delta r < 0$

Where, I=investment demand, r = rate of interest, and f = functional relationship

Supply Side: According to the classical theory, the money to be use for the purchase of capital goods is from the savers of current income. The resources that is used is been released for production is delayed through consumption of a part of their income. The more people saves, the more consumption they will have to defer, and the greater must be the interest rate they will ask to make such a deferment. A high rate of interest must be offered to induce people to save more.

Moreover, if savings have to come from those persons whose rates of time preference are relatively more strongly weighted in favour of the present satisfactions, higher rate of interest has also to be paid.

$S = f(r)$, in which $\Delta S/\Delta r > 0$

The Theory of Loanable Funds of Interest Rate and Savings

This theory of interest was originated by a Swedish economist Wicksell and contributed by a British economists Robertson, Ohlin, Myrdal, Lindahl and Viner. Loanable fund is a theory of the market interest rate. The interest rate is determined by the demand for and supply of loanable fund which includes all forms of credits, such as loans, bounds, or savings deposit. The loanable fund theory is an extension of the classical theory, which determined the rate of interest solely by savings and investment, given that it adds bank credit. In the economy, the total amount available can exceed private savings because the bank system is in position to create credit out of thin air. Hence, the market interest rate is not only influenced by the propensities to save and invest but also by the creation or destruction of fiat money and credit.

Demand for Loanable Funds

Investment is seen as the main source of loanable funds, which is the expenditure for the purchase of marking of new capital goods including inventories. In which the price obtain from such funds for the purpose of investment is the interest rate. If the rate of interest is low, the demand for loanable funds for investment purpose will be very high and if the interest rate is high, the demand for loanable funds will be low. This shows that there is an inverse relationship between rate of interest and demand for loanable funds. Those people who want to hoard it as idle cash balance to satisfy their desire for liquidity are made of demand for loanable funds. The demand for loanable funds for hoarding purpose is seen as a decreasing function of rate of interest. At a high interest rate demand for loanable funds for hording will be few and at low interest rate, demand funds for hoarding will be more. Dissaving is the

decision not to save, it comes from the people that want to spend beyond their current income. Dissaving is also a decreasing function of the rate of interest.

Supply of Loanable Funds:

The supply of loanable funds is also gotten from savings. Dishoarding, disinvestment and bank credit which is the opposite of demand for loanable funds Savings is the most important source of the supply of loanable funds, which is the difference between the income and consumption. Since the income is assumed to be constant, the amount of savings changes with the rate of interest. Individual or business will save more if the rate of interest on savings is high and save less when the rate of interest on savings low.

The opposite of investment which happens when the existing stock of capital is allowed to wear out without being replaced by new capital equipment. Disinvestment will be high when the present interest rate provides better returns in comparison to present earning. High rate of interest encourage disinvestment. It is also an important source of the supply of loanable funds. At higher interest rate, idle cash balances of the past become the active balances at present and become available for investment. Dishoarding will be negligible if the interest rate is low. The bank advance loans to the businessmen through the process of credit creation. The money created by banks add to the supply of loanable funds.

Rational Expectations Theory of Interest Rate

Jonh F. Muth, originated the theory of rational expectations theory of interest rate in 1961 and Robert Lucas, Jr and others used the theory it, which made the theory to be popular. This kind of theory presumed systematically that outcomes that are being prediction do not differ from the result of the equilibrium in the market. The theory of rational expectations also adopts that the errors people make are not systematically when the future is being predicted, and aberrations from prefect anticipation are random only. In a model of economic, this is classically modelled by assuming that the values of the variables which are equal are expected to the expected value which is predicted by the model. According to Keynes, he sees this theory as waves of optimism and pessimism that will determine the activities in the economy. But proponents of the rational expectations theory are more thorough in their analysis of expectations.

The rational expectation economists base their belief on the standard economic assumption that people behave in ways that maximize their satisfaction (life enjoyment) or profits

Economist have used the concept of rational expectations to understand a variety of situations in which speculation about the future is a crucial factor in determining current action.

Theory of Interest Rate Determination of Keynes's Liquidity Preference

In 1936 the theory of liquidity preference of interest rate determination was first formulated by Keynes in his book. His book, termed the General Theory of Employment, Interest and Money try to explain how the supply and demand for money is a determinant of the rate of interest. The interest forgone by not holding bonds depends on the theory of the demand for money as an asset. According to Keynes, money is the most liquid asset. Liquidity is an asset. The more quickly an asset is converted into money, the more liquidity it is said to be.

Demand for Money: According to Keynes theory of liquidity preference theory of interest rate under the money demand that there is a difference between demand for money and demand for commodity consumed by people.But since money is not consumed, the demand for money is a demand to hold an asset. The need of cash or demand for money for the current transactions of individual and business exchange. Individuals hold cash in order to bridge the gap between the receipt of income and its expenditure (income motive) while businessmen holds money to meet their current needs like payments for raw materials, transport, wages etc. (business motive). Individual also hold some cash or demand for money for unforeseen conditions like accident, illness, etc. and for businessmen, the reason for keeping cash in reserve is to be able to control conditions that are not favourable or that deals that are not expected will be gained at the end of the period. Keynes holds that the precautionary and transaction motive are quite interest inelastic, but are highly income elastic.

To take advantage of the future changes in the rate of interest or prices of bond is one of the desire to hold one's money in liquid form or in cash. If the rate interest is expected to fall, i.e., bond prices are expected to rise, people will buy bonds to sell when the price later rises and vice versa.

The Hicks-Hanson IS-LM Theory.

The modern economist make synthesis between the classical or loanable funds theory on the one hand and the Keynesian theory on the other hand to give an adequate and the determinate interest theory. According to Hansen, the classical formulated and together with the

Keynesian formulation, an adequate theory of the rate of interest was supply. The loanable fund saving schedule at several income level and the investment demand schedule together gives us the Hicksian IS curve which comes from the loanable funds formulation. At formulation of the Keynesian, the Hisks-Hanson IS-LM theory got a family of liquidity preference schedules at several levels of income, these together with the supply of money fixed the LM curve tells us what the various rates of interest will be given the quantity of money and the family of liquidity preference curves at difference level of income.

The interest rate cannot be told what it will be by the liquidity schedule alone. It is the intersection between the IS curve and LM curve which determine the rate of interest. The variables income and rate of interest determine together at the point of intersection, i.e., point of equilibrium rate of interest.

Expectations Theory

This theory state that interest rate in the long-term hold a forecast for the interest rate in the short-term that is why it is also called the unbiased expectations theory of interest rate. From the theory it was postulated that when an investors invest in one year bone it earn the same amount of interest in the present and rolling the investment into a different one-year bond after one year as compared to purchasing a two-year bond in the present. From the expectation theory also ,the expected hypothesis of the term structure of interest rates whose graphical representation is known as the yield curve is the preposition that the long-term rate is determined purely by current and future expected short-run rates, in such a way that the expected final value of wealth from investing in a sequences of short-term bonds equals the final value of wealth from investing in long-term bonds.

Assumptions from the hypothesis is that various maturities are perfect substitutes and suggests that the shape of the yield curve depends on market participants' expectations of future interest rates. These expected rates, along with an assumption that arbitrage opportunities will be minimal, is enough information to construct a complete yield curve. For example, if at one year an investors has an expectation of what will become of interest rate in the next year, The investor can calculate two year rate of interest as the compounding of this year's interest rate by next year's interest rate. More generally, returns (1 + yield) on a long-

term instrument are equal to the geometric mean of the returns on a series of short-term instruments, as given by

$$(1+i_{lt})^n = (1+i_{st}^{\text{year 1}})(1+i_{st}^{\text{year 2}})\cdots(1+i_{st}^{\text{year n}}),$$

where *lt* and *st* respectively refer to long-term and short-term bonds, and where interest rates *i* for future years are expected values. This theory is consistent with the observation that yields usually move together. However, it fails to explain the persistence in the non-horizontal shape of the yield curve.

Fishers Theory of Interest Rate

In the short term interest rate, the theory of Fishers interest rate opine that changes occur mainly because of the changes in expected inflation rate. Pushing forward, the theory of interest rate by fishers assume that the market agent's expectations about inflation rate are mainly correct. The changes in the inflation rate becomes a typical reason for the changes in the rate of interest. The Fishers theory of interest rate was named after the American Economist Fisher (1930), The theory forms the foundation of the standard recommendation on real interest rate and a well-known theory of interest rate. He argues the nominal interest rate on deposits was establish by the competitive markets on real terms positivity, this is possible because rather than real assets savers must be encouraged to hold financial and on average, at the rate of inflation real assets grow in nominal terms. Therefore, the nominal interest must equal the expected inflation rate with additional small core real rate. Since Fisher's theory of interest rate are based on the deposits cost with addition of intermediate cost will a little margin covering it, administration costs of risk and taxes, reserve requirement cost, lending rate will in turn be positive in real terms (Davies, 1986). Therefore, it was suggested by a lot of economist that inflation must be kept squat if nominal interest rate will be kept low. According to Mishkin, (2010), Fisher's theory was criticised that it has a deficiency because theory has incomplete equilibrium that limits itself to capital markets analysis and the prices of goods and services are already determined according to the assumptions it worked with

2.2.2 Theories of Investment

Keynesian Theory of investment

According to Keynes, investment decisions are taken by comparing the marginal efficiency of capital (MEC) or the yield with the real interest rate (r) so long the MEC is greater than rate of interest, new investment in plant, equipment and machinery will take place. However, in the production process as more and more capital is used, the MEC will fall due to diminishing marginal product of capital. As soon as MEC equate to interest rate, no new investment will be made in any income-earning asset. The MEC is the rate of return at which a project is expected to breakeven.

This depends on the instant profits (cash flows) expected from operating project and the rate at which these are expected to decline through reduction in the price of output, or increases in the real wages or cost of raw materials and fuel. Arranging all possible project in an economy in descending order of their marginal efficiency of capital, investors will accept those with the MEC higher than the interest rate and reject those MEC lower than interest rate. The MEC is not the exactly as the marginal product of capital which is concerned only with the direct effect of additional capital on possible output and not with how long the resulting profits can be expected to persist.

Both the expected returns and the cost of capital which is the rate of interest is the determinant of the amount of investment. The equilibrium marginal efficiency of capital Investment and the cost of capital will be a point where investment will be profitable. An increase in the amount of investment profitability will be a point where there will be a fall in the rate of interest. According to Keynes, there is a link between the monetary side of the economy and the real economy fall in interest rates will stimulates more investment, which in turn, will results in a higher level of national income.

The theory of Neoclassical Investment

This theory of Neoclassical investment can be traced to the neoclassical theory of optimal capital accumulation which is determined by relative prices of factors of production. Neoclassical theory of investment looks into the causes of variations in investment which causes business cycle to happen in a free market system.

The neoclassical theory of investment tries to find out how much stock a firm desire to achieve at a particular time. From this theory it can be seen that the speed by which firms adjust their capital stocks towards the desired level is a determinant of investment rate. Marginal product of capital (MPK) and user cost of capital which is also called real rental cost of capital is a determinant of investment as an additional stock of capital to the economy.

Marginal product of capital (MPK) measures the addition to the production by using the additional unit of capital, labour and technology.

The Theory of Profit Investment

From the point of view of the theory of profit investment, it can be seen that profit is a determinant of investment which in turn depend on income. In this theory, Investment relate to the level of both past and current profit. If total income and total profit are low, there will also be a low retained earnings of firms and if there is a high total profit, the retained earnings will also be high. This theory of profit investment in which total profits changes directly as income changes was developed by Edward Shapiro. There is an optimal capital stock from each level of profit. The optima capital stock directly changes with the level of profits.

The level of the optimal capital is also a determinant of the level of profit and interest rate. For any particular level of profits, the higher the interest rate, the smaller will be the optimal capital stock, and the smaller the interest rate, the higher will be the optimal capital stock.

The Theory Financial Investment

This theory is also known as the cost of capital theory of investment which was developed by James Duesenberry. From the assumptions of this theory market rate of interest represents the cost of capital to the firm which does not change with the amount of investment it makes. It means that funds that are available are unlimited to the firm at the market rate of interest.

The more funds are needed for investment spending, there will be an increase in the cost of fund, i.e., the rate of interest will rise also. For firms to finance investment spending, they need to borrow from the market at whatever interest rate funds will be available. The firms borrow from the bank when it needed more funds more than the retained earnings, or they can also borrow from the bond market. The cost borrowed (rate of interest) rises with the amount of borrowing. From these, as the ratio of debt services earning from investment of funds rises, there will also be a rise in the marginal cost of borrowed funds. This is because the opportunity cost (risk) of not repaying debt increases.

2.2.4 Theories of Private Consumption Expenditure

Keynes' Consumption Hypothesis

The determination of consumption expenditure is central to Keynesian macro-economic theory. Keynes based his theory of consumer behaviour on the observation that consumption increases when income increases, but not to the same. His theory of consumption is also referred to as the absolute-income hypothesis, in order to emphasise that consumption decisions are based on the current income of individuals and relative interest rate. According to the theory, consumption in total is a stable function of the total disposable income, which implies that the propensity to consume is a fairly function. When income increase, consumption will increase but not the same as increase in income (positive MPC) which will decline the average propensity to consume (APC). The marginal propensity to consume can be influenced by interest rate changes. An increase in interest rate may lead consumers to increase savings thereby decreasing consumption, since they can receive higher rates of return.

The Permanent-income Hypothesis

Another important contribution to aggregate consumption theory is the permanent-income hypothesis, developed by Milton Friedman in the mid 1950's. The basic notion underlying the concept of the permanent-income hypothesis is the proportionality between permanent consumption and permanent income (the level of income that can be expected to persist in the long-run). Friedman argues that consumption has two components: a permanent or planned component based on budget planning, habits and current needs; and a transitory erratic component based on caprice, chance occurrence and random phenomena. The transitory component fluctuates around zero, while the permanent component of consumption is a constant fraction of the household's permanent income. Permanent income is usually approximated as a weighted average of current and past income levels. Current income will normally have the highest weight and lower weights will be assigned to historical levels of income.

Form Friedman point of view, for a consumer unit to spend more or to spend less on consumption, it involves two main motive: One of the motive is for the consumer consumption expenditure to be smoothen through correct timing or borrowing and lending; the second motive is either for the consumer to realize interest earnings to deposit if the relevant rate of interest is positive, or to benefit from borrowing if the interest rate is negative.

Life-cycle Hypothesis

A theory of consumer behaviour which has had strong influence on economic thinking over the past three decades was developed by Modigliani and Ando (1963). Like Friedman and Duesenbery, they used the analysis of individual consumer behaviour as a basis for their aggregate consumption function. They assumed that the horizons over which consumers make their spending choice stretches over the expected lifetime of the consumer. The basic premise of Life-Cycle theory is that utility is maximised by smoothing consumption over time. Assumptions on lifetime income are used to make rational consumption choices. Labour income normally increases during the early part of the life cycle, levels off during the workers mature working years and then drop bat retirement.

The life-cycle hypothesis states that earning will be allocated in such a manner that an even flow of consumption can be sustained over the course of the consumer's life. Savings in the middle years must be sufficient to pay back any borrowing for consumption early in the life-cycle and to provide income for consumption during retirement. The marginal propensity to consume (MPC) for the entire economy will hinge on inter alia on the preferences and age of consumers on interest rates. Interest rate determine the growth of wealth and the allocation of income between current and future consumption.

Assumptions from the lifecycle model says that people are open-minded when making choice of their current consumption and savings, considering not only their current incomes and wants, but their income in the future and desires as well. Specifically, the model postulates that a person chooses consumption at different point in his or her life to increase lifetime well-being (utility) subjected to the constraint impose by lifetime income (the intertemporal budget constraint).

Relative-income Hypothesis

Duesenberry postulated his relative income hypothesis on two observations; that household consumption behaviour is influenced by the spending habits and spending levels of other families and consumption behaviour tends to be habitual, that is, once people become used to certain standard of living they try to maintain that standard, despite a decline in income. The theory formed on these notions states that consumption hinge on both income that is current and the highest income attained by the consumer function is stable only in the short run. In the long run, other factors on which consumption depends may change, thus violating the stable relationship between consumption and income.

Duesenberry believes that consumers respond differently to income increases than to income decreases; families find it difficult to lower their standards of living and may experience difficulties to adjust to a decrease in income. On the other hand, if household income falls below its previous peak, consumption will react more gradually to change in income and will fall less than proportionately to the reduction in income.

2.3 Empirical Literature

2.3.1 Nigeria Empirical Literature

Interest Rate, Investment and Economic Growth

A number of studies have found relationship that is negeative between rate of interest and investment in Nigeria; while some other studies have found relationship that is also negeative between rate of interest and the growth of the economy. Among the studies that have found a negative relationship between interest rate and investment include; Udonsah (2012), Udude and Nwachukwu (2016), Acha (2011), Okeke (2005), Olowolaju (2008), Ekwem (2005), Adebiyi and Babatope (2004), Naveed and Muhamed (2015), Luis (2008), Muhammad et al (2013), Bader and Malawi (2010), Chetty (2007). Time series data were used in these studies but these studies differ in methods of analyses. For instance, Udude and Nwachukwu (2016), employed the error correction model and they found that the variables are cointegrated either or that there is a long run relationship between interest rate and investment in Nigeria, they also found that the sign of the coefficient of interest rate conformed to theoretical expectation which implies that interest rate affects investment negatively. Muhammad et al (2013) also employed the error correction model and discovered a negative relationship between interest rate and investment but the effect was not statistically significant. Udonsah (2012), Olowolaju (2008), Adebiyi and Babatope (2004), Naveed and Muhamed (2015), used ordinary least square regression technique and also found a negative relationship between interest rate and investment in Nigeria but their results were statistically significant. One interesting thing about these studies is that apart from employing different method, they made similar findings.

There is growing literature on the relationship between interest rate and economic growth. Most studies found a positive relationship interest rate and economic growth in Nigeria. These studies includes; Obansa et al (2013), Obamuyi (2009), and Owuso and Odiambo (2016), all of these studies employed the time series data in their analyses but made use of different methods; for instance, Obansa et al (2013), employed the vector autoregressive

technique in their analyses and they discovered that interest rate has a significant positive relationship with economic growth in Nigeria. But Obayunmi (2009), made use of error correction model in his own analyses and found out a result similar to that of Obansa et al (2013), which is, that interest rate has a positive and significant impact on economic growth in Nigeria. On the other hand, Owuso and Odiambo (2001) used the autoregressive distributed lag bounds testing technique and found that there is a positive and significant relationship between interest rate and economic growth in Nigeria. The conclusion is that all of the above mentioned studies used different methods in their analyses but discovered similar results, which is, that there exist a positive and significant relationship between interest rate and economic growth in Nigeria.

On the other hand, other studies have found a positive relationship between interest rate and investment; these studies include chris (2015), Agu and Mba (2013), and Pradeep (2006). All of these studies employed time series data in their analyses but they differ in the use of methods of analyses; For instance, Chris and Udonsah (2015),and Pradeep (2010) made use of ordinary least square technique, while Agu and Mbah (2013) made use of error correction model. Acha (2011) used correlation coefficient in his own analyses. Interestingly, all of these studies found a significant and positive relationship between interest rate and investment in Nigeria.

Interest Rate and Savings in Nigeria

The literature on the relationship between interest rate and savings is vast within this plethora of literature, a number of studies has found positive relationship between interest rate and savings in Nigeria; these studies include, Udude (2015), Ojeaga and Odejimi (2014), Nwachukwu (2009), Ajakaye and Odusola (1995), Sayinbola, Sobande, and Adedeji (2012), Austry and Reinhart (1995), Ndukwe (1991), Gilles and Denis (2000), Kwath and Bathia (1993), Nnamdi (2007), Davidson and Gabriel (2009), Fawowe (2010), Okere and Ndugbu (2015), and Davis (2013) these studies employed time series data in the analysis of the relationship between interest rate and savings. The studies differ in methods of analysis. For instance, Udede (2015) used the VAR model in his study and discovered a significant result. Ojeaga (2014) employed the quantile regression method in his analysis and he discovered an insignificant result; while Nwachukwu , Gilles and Denis (2000), Okere and Ndugbu (2015) employed the error correction model in their analysis and their results were significant. Austry and Reinhart (1995) used intertemporal elasticity of consumption in their analysis and

found out an insignificant result. Kendall (2009) employed two stage least square in his analysis and found out an insignificant result. Nnamdi (2007), Davidson and Gabriel (2009) employed ordinary least square method and they discovered a positive and significant relationship between interest rate and savings in Nigeria.

The conclusion is that the above mentioned studies used time series data in their analyses, they employed different methods and found out different results in their analysis of the relationship between interest rate and savings in Nigeria. Hence, the relationship between interest rate and savings is inconclusive in Nigeria.

Some other studies discovered negative relationship between interest rate and savings. These studies include; Olayemi (2013), Onwumere, Okere and Ibe (2012), Edwin (2014), Olayami and Jolaosho (2013), Soyibo and Adekanye (1992), Wafure (2012), Uremadu (2007), andOgwumike and Ofoegbu (2012). These studies employed time series data in the analyses of savings and interest rate relationship, but the studies differ in terms of methodology, For instance Olayemi (2013) employed the VAR model in his analysis and found a significant relationship between interest rate and savings in Nigeria He also discovered that the sign of the coefficient of interest rate was negative which implies that there exists a negative relationship between interest rate and savings in Nigeria.

On the other hand, Onwumere, Okere and Ibe (2012), Wafure (2012) Gobna and Nurudeen (2009), and Uremadu (2007) used the ordinary least square regression model in their analyses and found an insignificant and negative result. Edwin (2014) employed the two stage least square technique and discovered that there is a significant negative relationship between interest rate and savings in Nigeria. Olayami and Jolaosho (2013) employed the vector Auto regressive model in their analysis and discovered a significant negative result. Wafure (2012) employed the error correction model approach in his analysis and also found a significant negative result. Ogwumike and Ofoegbu (2012) used Autoregressive Distributed lagged regression technique but their own result was insignificant.

One of the most absorbing thing about this studies is that the above mentioned studies used the same type of data which is time series data; they employed different techniques in their analyses of the relationship between interest rate and savings in Nigeria, and they made similar findings in terms of the sign of the coefficient of interest; but they discovered varying results in terms of significance. For instance; Onwumere, Okere and Ibe (2012), Wafure (2012) Gobna and Nurudeen (2009), and Uremadu (2007) found out an insignificant result; a

result that differs from the result of Olayami and Jolaosho (2013) and similar to the result of Ogwumike and Ofoegbu (2012).

Interest Rate and Consumption Expenditure in Nigeria

The literature on the relationship between interest rate and consumption expenditure is enormous within this surfeit of literature, Some studies have found a negative relationship between interest rate and consumption expenditures; these studies include: Lacy (2012), Ezeji and Ajudua (2015), Ajayi et al (1974), Adayemi and Alege (2013), Olusegun (2015), Marco et al (2014), souleles et al (2006), Adetotun (1978), Forgha (2008), Orazio and weber (1999), Akekere and Yousuo (2012), and Onudje (2009). These studies made use of different methods in their analyses, For instance; Ezeji and Ajudua (2015), Onudje (2009), and Olusegun (2015) employed the ordinary least square method in their analysis and they found significant relationship between interest rate and consumption expenditures in Nigeria. While Orazio and Weber (1999) employed the error correction method in their analysis of the relationship between interest rate and consumption expenditure and they found out a significant negative relationship between interest and savings in Nigeria.

The conclusion is that, the above mentioned studies employed different method in their analysis of the relationship between interest and savings in Nigeria but they discovered the same results; which is: there is a negative and significant relationship between interest rate and consumption expenditure in Nigeria.

2.3.2 Foreign Empirical Literature

Interest Rate, Investment and Economic growth

Some studies have found a negative relationship between interest rate and investment; some other studies have found a negative relationship between interest rate and economic growth through investment expenditures; studies that have found a negative relationship between interest rate and investment include Sener and Savrul (2009), Baillie and Mcmahon (1981), Aysan et al (2005), Wuhan (2015),and Wang and Yu (2007); studies that have found a negative relationship between interest rate and economic growth include; Omar et al (2007), Oshikoya (1992), and Gylych et al (2016); these studies differ in terms of method of analyses. For instance; Omar et al (2007), Gylych et al (2016) and Oshikoya (1992) employed the error correction model in their analyses; Omar et al (2007) discovered that

there is a significant relationship between interest rate and economic growth in Bangladesh and also that there is a negative relationship between the variables; Oshikoya (1992), in his own analysis discovered a significant relationship between the variables and also that the coefficient of interest rate has a negative sign which implies that there exists a negative relationship between interest and economic growth in Kenya. Gylych et al (2016), in their own analyses, obtained a result similar to that of Omar et al (2007), and Oshikoya (1992) in Turkey. The conclusion is that the results of the three studies are indeed similar.

Studies that have found a negative relationship between interest rate and investment include; Naveed and Muhamed (2015), Munir et al (2010), and Syed et al (2014) they all used time series data but different methods in their analyses of the relationship between interest rate and investment and they found out similar results; For instance; Naveed and Muhamed (2015) used error correction model and found out that the is a negative significant long run relationship between interest and investment in Pakistan. Also Munir et al (2010) used the error correction model in their analyses and they discovered a similar result with that of Naveed and Muhamed (2015), But on the other hand, Syed et al (2014) used ordinary least square technique in their analyses and discovered a negative relationship between interest rate and investment in Pakistan.

Interest rate, Savings and economic growth

Some studies have found a positive relationship between interest rate and savings. These studies include Irfan et al (2014), Douglas, W.E (1996), Ashfaque and Lubna (1998), and Ayalew (2013), these studies used different type of data and different approaches, but found similar results

Douglas, W.E (1996) used survey data and employed an indirect approach that combines models of individual behaviour with estimates of certain features of individual preferences. He discovered positive and significant relationship between interest rate and savings. On the other hand, Irfan et al (2014), used descriptive statistics and error correction model in their analyses, they also discovered a positive and significant relationship between interest rate and savings in Pakistan. Ashfaque and Lubna (1998) employed the cointegration technique and discovered a positive and significant relationship between interest rate and savings in parkistan. Ayalew (2013), used Autoregressive distributed lag model (ADRL), he also discovered a significant positive relationship between interest rate and savings in Ethiopia.

The conclusion is that, even though, the above mentioned studies employed different techniques, they still found out similar results.

Interest rate and consumption expenditure

Some studies have found a positive relationship between interest rate and consumption expenditures; these studies include Mudit and Shamika (2009), Sakaria and Nyambe (2015) and Mudit and Shamika (2009), these studies used different types of data in their analysis and also used different method of analyses; for instance, Sakaria and Nyambe (2015), used time series data for their own analyses and error correction technique as a method of analyses, they discovered a significant and positive relationship between interest rate and consumption expenditures in Namibia. On the other hand, Mudit and Shamika (2009) Indian national sample survey to calculate regression discontinuity estimates based on age cut-offs, they discovered that a 50 basis point increase interest rate on deposits leads to an immediate decline of consumption expenditure by 12%, therefore there is a negative and significant relationship between interest rate and consumption expenditures in India.

The conclusion is that the above mentioned studies differ in terms of type of data and in terms of method of analyses and they also differ in term of result; For instance, Sakaria and Nyambe (2015), found out a positive result while Mudit and Shamika (2009) found out a negative result.

2.4 Limitation of Previous studies and Value Added

From the empirical findings, most researchers found that there is a negative relationship between interest rate and investment in Nigeria while some others found out that there is a negative relationship between interest rate and economic growth. A number of studies have found that there is a positive relationship between interest rate and savings and others found a negative relationship between savings and interest rate.

A number of researchers have also research on the relationship between interest rate and consumption expenditure in Nigeria and outside Nigeria, they found out that there is a negative relationship between Interest rate and consumption expenditure in Nigeria and a positive relationship of interest rate and consumption expenditure outside Nigeria.

From the above review, none of the researchers both in Nigeria and outside Nigeria has looked at interest rate spread on savings, investment and private consumption expenditure. It is against this backdrop that this study intends to fill gap created by investigating the impact of interest rate spread on savings, investment and private consumption expenditure in Nigeria.

2.5 CBN Monetary Policy Strategies

Monetary policy refers to any conscious or deliberate actions of the monetary authorities, mostly central banks, to control or change the quantity, availability or cost of money in an economy in order to achieve laid down goals/ objectives. It can also be seen as a combination of policy measures designed by a central bank to control the quantity of money and cost of credit in the economy in consonance with the expected level of economic activity. The goals the CBN seek to achieve is in line with the macroeconomic objective which include low unemployment, high output, growth rate, low inflation rate and stable exchange rate. Of all these goals, the price stability has become the most prominent in recent times.

To achieve these ultimate monetary policy goals, the CBN often adopt certain strategies. The CBN will choose a goal such as inflation, nominal GDP, exchange rate etc., or an intermediate variable such as money supply and market interest rate and also setting a desirable value or target of the variables the central bank needs to achieve. The target of the CBN in the interest rate is mostly the short-term interest rate or the interbank rate. The strategy involves setting minimum interest rate, usually the overnight inter-bank rate at a level considered good enough to achieve monetary policy objective. To keep the macroeconomic variables healthy, the money policy is influence by the interest rate when it is appropriately set. Other interest rates that can be targeted depending on the country. Open Market Operation (OMO) is the common instrument used by the central bank to achieve the monetary policy strategy.

Changes in the central bank's policy are directly reflected in the short-term market rates. When policies are changed by the central bank, it is expected that other rates in the short end of the money market would be affected. This is as a result of the policy rate at which central banks lend money to deposit money banks or commercial banks. Also a rise in the policy rate will pass through to long-term interest rate, such as the bond market rates. Subsequenttly, with the rise in the nominal interest rates, the real interest rates also rise causing reduction in borrowing and spending by economic agents such as households and businesses.

The Monetary Policy Rate (MPR) remained the prime instrument for monetary policy management. The MPR was retained at 13.0% throughout the review period with the symmetric corridor of +/-200 basis points around the midpoint The purpose of these was to rein-in inflation and manage the liquidity surfeit in the banking system. With the MPR at 13.0% and headline inflation rate of 9.2%, the real interest rate is positive, which encourage capital inflow.

Chapter There

Research Methodology

3.1 Theoretical Framework

Studies that seek to explain the Interest Rate Spread (IRSs) on savings, investment and private consumption in most cases run into contentious theoretical situation. Many economists have studied the rate of interest determination intensively. John, M. Keynes developed the classical loanable fund approach and the theory of liquidity preference and these theories was later extended by I, Fisher., they are the two well-known brave studies of

the theory of interest rate. According to Fabozzi, Modigliany, Ferri, (1988), interest rate is seen as borrower or debtor price to a creditor or a lender in other to use the resources for a certain period of time. Interest rate is also seen from the point of view of Mishkin, (2001). as no one or single measure in the economy and produce to maturity on an asset is accepted by most economists as a measure of the rate of interest.

This study will be guided by the popular Irving Fisher's theory of the rate of interest. From Fishers point of view, to save or consume is a decision an individual has to make. When individual sees that the future is best, they will prefer to save than current consumption, they will prefer to consume small today and save more for future consumption. According to him, two factors influence different individual to save, invest and consume; one is the income, when there is high income individual may save more and the other is compensation individual obtained for lending his savings to another individual, who needs extral funds and ready to pay for their use. The rate of interest is the reward or use of funds payment. When the interest is low, the less individual's opportunity consumption cost, and the will dis-save vice versa.

According to the theory of interest rate developed by Fisher, the interaction of demand and supply for savings is the determinant of the interest rate in the long-run, and also depend on productivity of capital marginally and MPS, respectively. From the expression of Fishers law, the relationship between nominal and real interests is as follows:

$(1 + i_t) = (1 + r_t) * (1 + \pi_t^e)$ …… (1)

The ex-post facto research was also adopted to enable the researchers make use of secondary data to determine the cause-effect relationship of the interest rate spread on savings, investment and private consumption in Nigeria, and to determine the relationship between the independent and dependent variables with a view to establishing a causal link between them. Interest rate used are the commercial banks deposit and lending rates sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin. The study will rely on historical accounting data obtained from the financial statements of commercial banks in Nigeria.

Hence, in line with existing studies in this area of finance, for instance, the work of Mckinnon (1973); Shaw (1973); Fry (1980); Giovannini (1985); Mwega and Ngola (1991) and Onwumere (2009), the linear regression model was adopted. According to Onwumere (2009), regression is a statistical technique used in measuring the impact of one or more variables on another variable.

3.2 Model Specifications

Model one for objective one

The premise of objective one (1) is to determine the effect of interest rate spread on savings in Nigeria. Following and modifying the specification of Udude (2015) with the multiple regression on mind, this study adopts savings as a function of the specified explanatory variables.

The econometric specification is as follows

, $SAV = \beta_1 + \beta_2 INRS + \beta_3 INF + \beta_4 GDPgrwt + \beta_5 SAV\_INT + \beta_6 EXR + \mu$……(2)

Where SAV = Savings

INRS = Interest rate spread

INF Inflation

GDPgrwt = Gross Domestic Product Growth Rate

SAV_INT =Savings_Interest rate

EXR = Exchange Rate

Where the β_1 β_2 β_3 β_4 β_5 β_6 are parameters for estimate and μ is the stochastic error term.

Model two for objective two

The premise of objective two (2) is to investigate the effect of interest rate spread on investment in Nigeria. Following and modifying the specification of Onwumere (2009) with the multiple regression on mind, this study adopts investment as a function of the specified explanatory variables.

The econometric specification is as follows

$INV = \beta_1 + \beta_2 INRS + \beta_3 SAV\_INT + \beta_4 INF + \beta_5 EXR + \beta_5 GDPgrwt + \mu$…… (3)

Where INV = Investment

SAV_INT = Savings_Interest Rate

INRS = Interest rate spread

INF= Inflation

EXR = Exchange rate

Where the β_1 β_2 β_3 β_4 β_5 are parameters for estimate and μ is the stochastic error term.

Model Three for objective Three

The premise of objective 3 is to ascertain the effect of interest rate spread on private consumption expenditure in Nigeria. Following and modifying the specification of Ezeji and Ajudua (2015) with the multiple regression on mind, this study adopts Interest rate spread as a function of the specified explanatory variables.

The econometric specification as follows

$$PCE = \beta_1 + \beta_2 INRS + \beta_3 SAV\_INT + \beta_4 INF + \beta_5 EXR + \beta_6 GDPgrwt \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where PCE = Private Consumption Expenditure

INRS = Interest Rate Spread

SAV = Savings_Interest rate

INF = Inflation

EXR = Exchange rate

GDPgrwt = Gross Domestic Product Growth Rate

Where the β_1 β_2 β_3 β_4 β_5 β_6 are parameters for estimate and μ is the stochastic error term.

3.3 DIAGNOSTIC TEST

3.3.1 Stationarity/Unit Root Test

In time series analysis, there is every tendency for estimations to be estimated to be spurious which violates the reliability of the coefficient for policy prescription and formulation. This calls for carrying out a unit root test on various series and establishing their order of integration.

In order not to run a spurious regression, a time series data should be examined for stationarity. Using the Dickey-Fuller (ADF) Test, all variables were tested at levels. The test is based on the following model.

$$Y_t = \alpha y_{t-1} + ut \qquad (4)$$

Instead of Dickey-Fuller (1979) formulation, expanded by Mckinnon (1991), we shall make use of the Augumented Dickey Fuller (ADF) test (i.e. to have constant variance and constant covariance). In other words, that the time series data are stationary.

The general form is as stated below:

$$\Delta Y_t = \beta_1 + \beta_{2t} + \delta yt + \sum_{i=1}^{m} \alpha 1 \Delta y_{t-1} + ut \qquad (5)$$

Where, ut is a pure white pure noise error term, Δ is the difference operator, t-1 is the unknown lags to be estimated. Therefore

The null hypothesis is Ho: $\delta = 0$ and the alternate is Ha: $\delta < 0$.

If the ADF test statistics is less than the critical value, we reject the null hypothesis and conclude the series is stationary (has no unit root).

3.3.2 Cointegration Test

Once variables have been classified as integrated of order I(0), I(1), I(2) etc. is possible to set up models that lead to stationary relations among the variables, and where standard inference is possible. The necessary criteria for stationarity among non-stationary variables is called co-integration. Testing for co-integration is a necessary step to check if your modelling has an empirically meaningful relationship. If variables have different trends processes, they cannot stay in fixed long-run relation to each other, implying that one cannot model the long-run, and there is no valid base on standard distribution.

There are several tests for co-integration. The Johansen test is the most fundamental test. Engel and Granger (1987) formulated one of the first test of co-integration. This test has the advantage that it is intuitive and easy to perform. Johansen procedure are used to test for co-integration among the variables, this verifies the existence of an underlying long-run

stationary steady state relationship between the dependent and explanatory variables. Thus, the co-integrated equation is stated below as

$$Z_t = AZ_{t-1} + A_2Z_{t-2} + AKZ_{k-1} + U_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(7)$$

3.3.3 Autocorrelation Test

Autocorrelation is the correlation between members of chains of observations ordered in cross-sectional data or time series data. The classical linear regression model assumes that such autocorrelation does not exist in the disturbances U_t.

$$\text{cov}(u_i, u_j / x_i, x_j) = E(u_i, u_j) = 0 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(8)$$

However, if there is such a dependence, we have autocorrelation.

$$E(ui, uj) \neq 0 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(9)$$

To test for the presence of serial correlation of the error terms in the model, The Bresuch-Godfrey (BG) statistic will be adopted

3.3.4 Error correction model (ECM)

An error correction model belongs to a category of multiple time series models most commonly for data where the underlying variables have a long-run stochastic trend, also known as co-integration. ECMs are a theoretically-driven approach use for estimating both short-term and long-term effects of onetime series on another.

If, then, Y_t and X_t are co-integrated, by definition ut~I(0). Thus, we can express the relationship between Y_t and X_t with an ECM specification as

$$\Delta Y_t = ao + b_1\Delta X_t - \Pi u_{t-1} + Y_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(10)$$

3.4 Estimation Procedure

The modelling procedures adopted include determining the integration order of the variables employed using Augmented Dickey Fuller (ADF) unit root test obtaining the co-integration regression from the normalized coefficient of the model generated from the co-integration vector; and should co-integration exist then the need for an Error Correction Mechanism (ECM) model. Also, the variables are tested for autocorrelation to known whether the data are ordered in chronological order and are serial independence.

3.5 Model Justification

The choice of the variables and model for this study is informed by the objectives and theoretical framework of the study. This research work employed Ordinary Least Square (OLS) estimation because of its reliable traits as the Best Linear Unbiased Estimator (BLUE). The Study aims at examining the impacts of interest rate spread on savings, investment and private consumption expenditure in Nigeria. The techniques is widely used for its ability to dictate the extent to which one variable impact on another besides, the Error Correction Model is wonderful for its ability to correct the problem of co-integration amongst the variables to be estimated.

3.6 Data Sources

The data for this work are an annual time series secondary data covering the period of 1981-2013 in Nigeria. Data for this study are sourced from the Central Bank of Nigeria (CBN) 2015 and the World Bank Development indicator 2015. The variables to be used in this study are as followings: interest rate spread (difference between lending rate and deposit rate), investment proxy by gross capital formation, savings, income proxy by gross domestic product (GDP), lending rate, deposit rate, private consumption expenditure (PCE), exchange rate and inflation. Variables like lending and deposit rate, investment (gross capital formation) are sourced from WDI (2015), because it contains more detailed data, while the rest variables are sourced from the CBN (2015).

3.7 ECONOMETRIC PACKAGE AND SOFTWARE FOR ANALYSIS

E-views software 9 will be used for analysing the data and estimating the specified models.

CHAPTER FOUR

PRESENTATION OF RESULTS AND INTERPETATIONS

4.1 ANALYSIS OF TIME SERIES DATA STRUCTURE (PRE-ESTIMATION TESTS)

To put the time series data to be used for this analysis in good structure, the estimation will begin with the descriptive analysis, unit root or stationarity test and the co-integration analyses of the time series data. These processes enable the researcher to carry out some predetermined operations, where application. on the variables, so as to minimize estimation errors and achieve the unbiased estimator of the models analyses.

4.1.1 DESCRIPTIVE ANALYSIS OF THE VARIABLES

The time series variables used in this study were specified in the following format Gross domestic product (GDP), Savings (SAV), Investment (INV), Private consumption expenditure (PCE), Inflation (INF), Savings_Interest (SAV_INT), Spread, Exchange rate (EXR), GDP growth rate (GDPGRWT). The descriptive statistics and relationships emanating from these variables are presented in table 4.1 below.

TABLE 4.1 DESCRIPTIVE STATISTICS OF THE VARIABLES

Variable	Obs	Mean	Std. Dev.	Min	Max
gdp	35	17827.15	28092.36	94.32502	94144.96
saving	35	2072.17	3457.95	6.56	12008.21
saveratio	35	8.82	3.83	3.34	23.25
investment	35	2207041.00	4156779.00	8799.48	14100000.00
pce	35	11800000.00	19800000.00	28574.86	73800000.00
inf	35	19.72	17.94	5.38	72.84
sav_int	35	7.64	5.16	1.41	18.80
spread	35	13.57	7.29	2.25	26.04
lnGDP	35	8.06	2.29	4.546746	11.45
lnSaving	35	5.55	2.44	1.880991	9.39
lninvestment	35	12.50	2.36	9.082448	16.46
lncons	35	7.36	2.55	3.352527	11.21
gpdgrwt	34	0.20	0.19	-0.0488682	0.79
exr	35	71.14	65.89	0.61	194.00

Source: Author's computation from Eviews

From the results above, the mean value of each variable represents its average, the maximum and minimum value shows the highest and the lowest figures of each variable respectively. The results of the descriptive statistics show that all the variables are normally distributed, having large values of standard deviation. The mean of the average gross domestic product (GDP) is 17827.15, while the minimum is 94.32502 and the maximum 94144.96 and standard deviation is 28092.36. The mean value of Savings (SAV) is 2072.17, the minimum is 6.56 and maximum of 12008.21, with a standard deviation of 3457.95. The mean value of

Investment (INV) is 2207041.00, the minimum is 8799.48 and maximum of 14100000.00, with a standard deviation of 4156779.00. The mean value of private consumption expenditure (PCE) is 11800000.00, the minimum 28574.86 and maximum of 73850.00, with a standard deviation of 1980000.00. The mean value of Inflation (INF) is 19.72, the minimum is 5.38 and maximum of 72.84, with a standard deviation of 17.94. The mean value of Real Exchange rate (REXR) is 71.14, the minimum is 0.61 and maximum of 194.00, with a standard deviation 65.89. The mean value of Savings_Interest (SAV_INT) is 7.64, the minimum is 1.41 and maximum of 18.80, with a standard deviation 5.16. The mean value of Spread is 13.57, the minimum is 2.25 and maximum of 26.04, with a standard deviation 7.29. The mean value of Saver ratio is 8.82, the minimum is 3.34 and maximum of 23.25, with a standard deviation 3.83. The mean value of GDP growth rate is 0.20, the minimum is -0.0488682 and maximum of 0.79, with a standard deviation 0.19.

4.1.2 UNIT ROOT ANALYSIS OF THE TIME SERIES.

In an attempt to estimate the interrelationship among interest rate spread, gross domestic product, deposit rate, lending rate, investment, savings, inflation, real exchange rate and private consumption expenditure in Nigeria, the first task is to examine the unit root and the long-run linear combination in the stochastic time series. This is necessary in order to ensure that the variables are estimated in their stationary forms to avoid spurious result. Phillips and Perron (1988) developed a generalization of the ADF test procedure that allows for fairly mild assumptions of the coefficient γ from AR (1) regression to account for the serial correlation in μ_t. So, the PP statistics are just modification of the ADF *t* statistics. The essence of the PP is to test the null hypothesis of unit root or non-stationary stochastic process. To reject this, the PP statistic must be more negative than the critical values at 1%, 5% & 10% significance levels respectively. On the other hand, the PP test differs because it provides a more robust test for serial correlation and time dependent heteroskedasticities of the stochastic process.

Table 4.2 below presents the results of ADF test statistics for the levels and first difference of the stochastic time series data for the period, 1980-2015. The asterisk (*) denotes rejection of the unit root hypothesis at the 5% level, Note, the ADF test uses the automatic bandwidth selection technique of Newey-West.

TABLE 4.2: Unit Root Analysis

VARIABLES	Augmented Dickey-Fuller Test					
	Test Critical Value @ 10%	Test Critical Value @ 5%	Test Critical Value @ 1%	Test Statistic	Diff Prob	Order of Diff
INRS	-2.622	-2.980	--3.702	-6.050*	0.0000	I(1)
INF	-2.622	-2.980	-3.702	-5.957*	0.0000	I(1)
SAV_INT	-2.622	-2.980	-3.702	-3.637*	0.0051	I(1)
InGDP	-2.622	-2.980	-3.702	-4.143*	0.0008	I(1)
InSAV	-2.622	-2.980	-3.702	-3.436*	0.0098	I(1)
InINV	-2.622	-2.980	-3.702	-4.067*	0.0011	I(1)
InPCE	-2.622	-2.980	-3.702	-3.931	0.0018	I(1)
GDPgrwt	-2.623	-2.983	-3.709	-6.528*	0.0000	I(1)
EXR	-2.622	-2.980	-3.702	-3.519	0.0075	I(1)

Source: Author's computation with the use Stata 13

The results of the Augmented Dickey-Fuller test are reported in Table 4.2, the lag truncations for the Bartlett kernel were chosen according to the Newey and West, 1987, suggestions. Analytically the results from the unit root tests in the levels of INRS, INF, SAV_INT, InGDP, InSAV, InINV, InPCE, GDPgrwt and EXR clearly point to the presence of a unit root in all cases in level form. The results after first differencing INRS, INF, SAV_INT, InGDP, InSAV, InINV, InPCE, GDPgrwt and EXR series robustly reject the null hypothesis of the presence of a unit root, suggesting therefore that the other series are integrated of order one I (1).

4.2 MODEL SPECIFICATION TEST FOR OBJECTIVE ONE (1), TWO (2) AND THREE (3).

(1) To ascertain the impact of interest rate spread on savings in Nigeria, InSAV = *f* (INRS, GDPgrwt, INF, EXR,).

(2) To investigate the impact of interest rate spread on investment in Nigeria. Thus we have

InINV = f (INRS, SAV_INT, INF, EXR, GDPgrwt).

(3) To investigate the impact of interest rate spread on private consumption expenditure in Nigeria. Thus we have InPCE = f (INRS, INF, EXR, SAV_INT, GDPgrwt)

Table 4.3: Effect of Interest Rate Spread on Consumption, Saving and Investment

	logcons	logcons	logsaving	logsaving	loginvest	loginvest
INF	0.0158	0.0123	0.0108	0.00806	0.0120	0.00872
	(0.133)	(0.247)	(0.246)	(0.391)	(0.213)	(0.387)
Spread	0.113**	0.106**	0.0664*	0.0613	0.0837*	0.0822*
	(0.003)	(0.006)	(0.044)	(0.061)	(0.016)	(0.022)
EXR	0.0259***	0.0270***	0.0297***	0.0300***	0.0254***	0.0270***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SAV_INT	-0.0231		-0.0105		-0.0303	
	(0.662)		(0.824)		(0.534)	
Gpdgrwt		0.0827		0.178		0.0352
		(0.930)		(0.830)		(0.968)
Constant	3.856***	3.777***	2.407***	2.416***	9.551***	9.281***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	35	34	35	34	35	34
R^2	0.906	0.904	0.919	0.918	0.907	0.902
Adjusted R^2	0.894	0.890	0.909	0.907	0.895	0.888
F	72.40	68.03	85.55	81.52	73.17	66.70

p-values in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.3 shows the results of the effect of interest rate spread on savings, investment and consumption

4.2.1 Model One for Objective One

For objective one, the results are reported in columns 4 and 5. The result on column 4 show that after controlling for inflation, exchange rate, interest rate on savings, it was found that interest rate spread surprisingly has a positive and significant effect on saving. But when GDP growth rate is controlled for, interest rate loses its significance. Positive effect of spread on saving may be due to weak financial markets and the fact that people save for other purposes. It is only speculative balances that should be negatively related to interest rate.

More specifically, one percentage change in interest rate spread, savings increases by 6.6 percent, other things remain constant. Also among other variables only exchange is statistically significant, one percentage change in exchange rate, savings increase by 3.0 percent, other things remain constant. The R^2 is about 92% goodness of fit and F-statistics shows 85.55 overall level of significant.

4.2.2 Model Two for Objective Two

The result for objective two (2) are reported in column 6 and 7. The result on column 6 shows that after inflation, exchange rate, interest rate on investment, GDP growth rate has been controlled for. It was found that interest rate spread has a positive and significant effect on

investment. Precisely a percentage change point change in interest rate spread leads to 8.4 percentage increase in investment, other things remain constant.

Also among all the control variables, only exchange rate was statistically significant in the investment model. One percentage point in exchange rate brings about 2.5 percent increase in investment, other things remain unchanged. The R^2 is about 91% goodness of fit and the F-statistics shows 73.17 overall level of significant

4.2.3 Model Three for Objective Three

For objective three (3) being the effect of interest rate spread on consumption, the results are illustrated on column 3 and 4. The result on column 3 indicates that there is a positive and significant relationship between interest spread and consumption. When interest rate spread changes by one percentage point, consumption increase by 1.1 percent, other things remain constant.

In the consumption model, it is only exchange rate that is statistically significant among other control variables. One percentage change in exchange rate brings about 2.5 percent change in consumption. The R^2 is about 91% goodness of fit and the F-statistics shows 72.40 overall level of significant

4.3 Short Run ECM Model (Shows no Co-integration)

Table 4: Short Run ECM Model (Shows no Cointegration)

	ECMcon1	ECMcon2	ECMsaving	ECMsaving1	ECMinvest	ECMinvest1
D.INF	0.00226	0.00301	0.00110	0.00129	-0.00142	-0.00141

	(0.363)	(0.246)	(0.493)	(0.451)	(0.626)	(0.641)
D.spread	0.0111	0.0140	0.00522	0.00528	0.0145	0.0151
	(0.304)	(0.175)	(0.429)	(0.420)	(0.230)	(0.200)
D.EXR	-0.00230	-0.00167	-0.000229	-0.000149	-0.00118	-0.00104
	(0.437)	(0.562)	(0.905)	(0.939)	(0.731)	(0.757)
D.SAV_IN T	0.0118		-0.00595		-0.00859	
	(0.597)		(0.661)		(0.728)	
L.Residuals	-0.0262					
	(0.684)					
D.gpdgrwt		-0.219		-0.0831		-0.145
		(0.173)		(0.433)		(0.443)
L.Residuals		-0.0641				
		(0.283)				
L.Residuals			-0.0200			
			(0.639)			
L.Residuals				-0.0239		
				(0.576)		
L.Residuals					-0.0887	
					(0.229)	
L.Residuals						-0.101
						(0.151)
Constant	0.240***	0.238***	0.218***	0.220***	0.193***	0.201***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	34	33	34	33	34	33
R^2	0.100	0.165	0.039	0.058	0.088	0.131
Adjusted R^2	-0.061	0.010	-0.133	-0.117	-0.075	-0.030
F	0.621	1.067	0.225	0.331	0.542	0.815

p-values in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.4 ERROR CORRECTION MODEL (ECM) FOR MODEL ONE (1), TWO (2) AND MODEL THREE.

Table 4.5

VARIABLES	COEFFICIENT	STD ERROR	T-STAT	PROB

UHAT SAV (-1)	-0.0200483	0.0422291	-0.47	0.639
UHAT SAV1 (-1)	-0.238735	0.021321	-0.57	0.576
UHAT INV (-1)	-0.0886966	0.721278	-1.23	0.229
UHAT INV1 (-1)	-0.1010186	0.0682732	-1.48	0.151
UHAT CON (-1)	-0.0262386	0.636962	-0.41	0.684
UHAT CON1 (-1)	-0.064082	0.058454	-1.10	0.283

Since the test statistics of the residuals (UHAT) are – 0.47, -0.57, -1.23, -1.48, -0.41 and -1.10 and the probabilities value 0.639, 0.576, 0.229, 0.151,0.684 and 0.283which are not less than 5%, it shows that the residuals are not statistically significant and shows no co-integration.

4.5 SHORT RUN DIFFERENCE MODEL OF EFFECT OF INTEREST SPREAD ON CONSUMPTION, SAVINGS AND INVESTMENT

Table 6: Short Run Difference Model of Effect of Interest Spread on Consumption Saving and Investment

	SRcon1	SRcon2	SRsaving	SRsaving1	SRinvest	SRinvest1
D.INF	0.00228	0.00228	0.00104	0.00130	-0.00154	-0.00141
	(0.351)	(0.351)	(0.509)	(0.441)	(0.598)	(0.646)
D.spread	0.00901	0.00901	0.00406	0.00401	0.00901	0.00898
	(0.334)	(0.334)	(0.500)	(0.507)	(0.421)	(0.419)
D.EXR	-0.00260	-0.00260	-0.000473	-0.000451	-0.00195	-0.00206
	(0.358)	(0.358)	(0.795)	(0.806)	(0.565)	(0.541)
D.SAV_INT	0.0156	0.0156	-0.00430		-0.000422	
	(0.435)	(0.435)	(0.739)		(0.986)	
D.gpdgrwt				-0.0827		-0.112
				(0.429)		(0.558)
Constant	0.243***	0.243***	0.220***	0.222***	0.201***	0.210***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	34	34	34	33	34	33
R^2	0.094	0.094	0.031	0.047	0.039	0.061
Adjusted R^2	-0.031	-0.031	-0.103	-0.090	-0.094	-0.073
F	0.756	0.756	0.231	0.342	0.294	0.452

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

From the above result of Table 4.6. In the estimation of short run difference of interest rate spread on SRsavings and SRsavings1, Interest rate spread and exchange rate, inflation, savings_interest and GDP growth rate are statistically insignificant. The R^2 is about 9% goodness of fit and F-statistics is 0.756 and 0.756 In the estimation of short run difference interest rate on SRinvestment and SRinvestment1, Interest rate spread and exchange rate, inflation, GDP growth rate and saving_interest are statistically insignificant. The R^2 is about 3% and 4% goodness of fit and F-statistics is 0.231 and 0.342 In the estimation of interest rate spread SRconsumption and SRconsuption1, Interest rate spread and exchange rate. inflation, savings_interest and GDP growth rate are statistically insignificant. The R^2 is about 3% and 6% goodness of fit and F-statistics is 0.294 and 0.425.

4.6 Policy Implication of the Result

The fact that savings do not respond robustly and significant to interest rate or spread implies that interest rate does not influence savings. Hence, policies that are designed to influence savings should look at other factors such as increasing the minimum wage, so countries with high wage rate such as Japan saves more. Again consumption increasing with spread means consumer do not care about interest rate

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of Findings

In this study, the main concern of this work is to determine the impact of interest rate spread on savings, investment and private consumption from (1980-2015) in Nigeria. This was accomplished by employing econometric models comprising 3 different equation models that were specified and estimated using the ordinary least square estimation techniques. The study made some interested finding that interest rate spread is statistically significantly to savings, investment and private consumption expenditure in Nigeria. The regression result shows that the t-test, standard error test, coefficient of determination (R^2), F-test was all significant. The short run Error Correction Model (ECM) shows no co-integration in the three models after which model (1), (2) and (3) remain insignificant. The regression results also show that there is significant relationship between the interest rate spread on savings, investment and private consumption in Nigeria. The study indeed discovered that interest rate spread does not really have any effect on savings, investment and private consumption in Nigeria.

5.2 Policy Recommendations

Based on findings, the study recommends that the central bank should but in place measures to monitoring interest rate spread related measures such as deposit rate, lending rate, operating efficiency, liquidity risk, provision and Gross domestic rate in other to boost financial performance in Nigeria. The study recommends that there are several loose knots that need to be tightened for the economy to experience positive significant effects of interest rate spread on savings and investment to boost the financial performance of commercial banks in Nigeria. The study also recommends that government should strengthen collaboration with financial institutions to put appropriate policies and strategies in place to reduce banks' lending rate

5.3 Conclusion

The study empirically examined the impact of interest rate spread from 1980-2015. The study is anchored on Fishers theory which explain that when individual sees that the future is best, they will prefer to save than current consumption, they will prefer to consume small today and save more for future consumption. According to him, two factors influence different individual to save, invest and consume; one is the income, when there is high income individual may save more and the other is compensation individual obtained for lending his savings to another individual, who needs extra funds and ready to pay for their use. The rate of interest is the reward or use of funds payment. When the interest is low, the less individual's opportunity consumption cost, and the will dis-save vice versa.

For effective estimation, each objective was modelled differently, using short run ECM to investigate the impact interest rate spread on savings, investment and private consumption expenditure for the first to the third objective respectively. The short run difference model was also used to find the effect of interest spread on consumption, savings and investment. To actualize all these estimations, all the structural tests on the data were carried out in order to achieve an unbiased estimation of the models. Starting from the descriptive test analysis, Augmented- Dickey Fuller Unit root test, co-integration test, Ordinary least square estimation and Error Correction Model (ECM), the ECM test was carried out to know whether there is an error in OLS model or not. This study also suggests areas for further research which include.

. (1) The effect of interest rate spread on financial performance of commercial banks in Nigeria.

(2) The impact of interest rate spread on profitability in commercial banks.

(3) Impact of interest rate spread on Economic growth in Nigeria.

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Appendix

```
. tsset year
        time variable:  year, 1981 to 2015
                delta:  1 unit

. gen gpdgrwt= lnGDP-l.lnGDP
(1 missing value generated)

. reg lncons inf spread exr sav_int

      Source |       SS       df       MS              Number of obs =      35
-------------+------------------------------           F(  4,    30) =   72.40
       Model |  199.844933     4  49.9612331            Prob > F      =  0.0000
    Residual |  20.7018066    30  .690060221            R-squared     =  0.9061
-------------+------------------------------           Adj R-squared =  0.8936
       Total |  220.546739    34   6.4866688           Root MSE      =   .8307

------------------------------------------------------------------------------
      lncons |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inf |   .0158304   .0102597     1.54   0.133    -.0051227    .0367834
      spread |   .1127987   .0355082     3.18   0.003     .0402813     .185316
         exr |   .0258753   .0050271     5.15   0.000     .0156086    .0361421
     sav_int |    -.02313   .0523524    -0.44   0.662    -.1300478    .0837878
       _cons |   3.856345   .6017313     6.41   0.000     2.627445    5.085244
------------------------------------------------------------------------------

. est sto mod23

. predict uhatcon, resid

. dfuller uhatcon, lag(1) regress
```

```
Augmented Dickey-Fuller test for unit root         Number of obs   =        33

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical      10% Critical
          Statistic          Value             Value            Value
------------------------------------------------------------------------------
 Z(t)          -3.055           -3.696           -2.978           -2.620
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0301


------------------------------------------------------------------------------
  D.uhatcon |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
    uhatcon |
        L1. |  -.5181929   .1696106    -3.06   0.005     -.864584   -.1718018
        LD. |    .075366   .1796932     0.42   0.678    -.2916164    .4423484
            |
      _cons |   .0362237   .1163178     0.31   0.758    -.2013289    .2737764
------------------------------------------------------------------------------

. reg d(lncons inf spread exr sav_int) l.uhatcon

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  5,    28) =    0.62
       Model |  .153253235     5  .030650647           Prob > F      =  0.6848
    Residual |  1.38168681    28  .049345958           R-squared     =  0.0998
-------------+------------------------------           Adj R-squared = -0.0609
       Total |  1.53494005    33  .046513335           Root MSE      =  .22214

------------------------------------------------------------------------------
   D.lncons |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
         inf |
         D1. |   .0022574     .00244     0.93   0.363    -.0027406    .0072554
             |
      spread |
         D1. |   .0111446   .0106469     1.05   0.304    -.0106645    .0329537
             |
         exr |
         D1. |  -.0022982   .0029135    -0.79   0.437    -.0082663    .0036699
             |
     sav_int |
         D1. |   .0117923   .0220406     0.54   0.597    -.0333557    .0569404
             |
     uhatcon |
         L1. |  -.0262386   .0636962    -0.41   0.684    -.1567144    .1042372
             |
       _cons |   .2397674   .0417865     5.74   0.000     .1541716    .3253633
------------------------------------------------------------------------------

. est sto modecm1

. reg lncons inf spread exr gpdgrwt

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    29) =   68.03
       Model |  184.345631     4  46.0864077           Prob > F      =  0.0000
    Residual |  19.6457858    29  .677440888           R-squared     =  0.9037
-------------+------------------------------           Adj R-squared =  0.8904
       Total |  203.991417    33  6.18155808           Root MSE      =  .82307

------------------------------------------------------------------------------
      lncons |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
         inf |   .0123192   .0104231     1.18   0.247    -.0089985    .0336368
      spread |   .1059752   .0355496     2.98   0.006     .0332682    .1786822
         exr |   .0270069   .0041575     6.50   0.000     .0185039    .0355099
     gpdgrwt |   .0826808   .9276941     0.09   0.930    -1.814667    1.980028
       _cons |   3.776638   .4005362     9.43   0.000     2.957449    4.595826
------------------------------------------------------------------------------

. est sto mod26

. predict uhatcon1, resid
(1 missing value generated)

. dfuller uhatcon1, lag(1) regress

Augmented Dickey-Fuller test for unit root         Number of obs   =        32

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic           Value            Value           Value
------------------------------------------------------------------------------
 Z(t)          -3.066           -3.702           -2.980          -2.622
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0292

------------------------------------------------------------------------------
  D.uhatcon1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    uhatcon1 |
         L1. |  -.5240082    .170926    -3.07   0.005    -.8735911   -.1744252
         LD. |   .1060145   .1839368     0.58   0.569    -.2701785    .4822076
             |
```

```
       _cons |   .0344264   .1167795     0.29   0.770    -.2044146    .2732674
------------------------------------------------------------------------------

. reg d(lncons inf spread exr gpdgrwt) l.uhatcon1

      Source |       SS       df       MS              Number of obs =      33
-------------+------------------------------           F(  5,    27) =    1.07
       Model |  .248356784     5  .049671357           Prob > F      =  0.4004
    Residual |  1.25722814    27  .046564005           R-squared     =  0.1650
-------------+------------------------------           Adj R-squared =  0.0103
       Total |  1.50558492    32  .047049529           Root MSE      =  .21579

------------------------------------------------------------------------------
    D.lncons |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inf |
          D1. |   .0030061   .0025333     1.19   0.246    -.0021919    .0082041
              |
      spread |
          D1. |   .0139788   .0100447     1.39   0.175    -.0066313    .0345889
              |
         exr |
          D1. |  -.0016689   .0028416    -0.59   0.562    -.0074994    .0041616
              |
     gpdgrwt |
          D1. |  -.2185631   .1561933    -1.40   0.173    -.5390453    .1019191
              |
    uhatcon1 |
          L1. |   -.064082   .0584854    -1.10   0.283    -.1840842    .0559201
              |
       _cons |   .2384998   .0411029     5.80   0.000     .1541637     .322836
------------------------------------------------------------------------------
```

```
. est sto modecm2

. *SR Models of consumption
. reg d(lncons inf spread exr sav_int)

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    29) =    0.76
       Model |  .144879782     4  .036219946           Prob > F      =  0.5625
    Residual |  1.39006026    29  .047933113           R-squared     =  0.0944
-------------+------------------------------           Adj R-squared = -0.0305
       Total |  1.53494005    33  .046513335           Root MSE      =  .21894

------------------------------------------------------------------------------
   D.lncons |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        inf |
         D1. |   .0022796   .0024042     0.95   0.351    -.0026375    .0071967
             |
     spread |
         D1. |   .0090077   .0091635     0.98   0.334    -.0097338    .0277492
             |
        exr |
         D1. |  -.0025969   .0027812    -0.93   0.358     -.008285    .0030912
             |
    sav_int |
         D1. |   .0156061   .0197134     0.79   0.435    -.0247124    .0559246
             |
      _cons |   .2426888   .0405865     5.98   0.000       .15968    .3256976
------------------------------------------------------------------------------

. est sto modsrcon
```

```
. reg d(lncons inf spread exr sav_int)

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    29) =    0.76
       Model |  .144879782     4  .036219946           Prob > F      =  0.5625
    Residual |  1.39006026    29  .047933113           R-squared     =  0.0944
-------------+------------------------------           Adj R-squared = -0.0305
       Total |  1.53494005    33  .046513335           Root MSE      =  .21894

------------------------------------------------------------------------------
   D.lncons |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        inf |
         D1. |   .0022796   .0024042     0.95   0.351    -.0026375    .0071967
             |
     spread |
         D1. |   .0090077   .0091635     0.98   0.334    -.0097338    .0277492
             |
        exr |
         D1. |  -.0025969   .0027812    -0.93   0.358     -.008285    .0030912
             |
    sav_int |
         D1. |   .0156061   .0197134     0.79   0.435    -.0247124    .0559246
             |
      _cons |   .2426888   .0405865     5.98   0.000       .15968    .3256976
------------------------------------------------------------------------------

. est sto modsrcon1

.
. reg lnSaving inf spread exr sav_int
```

```
      Source |       SS       df       MS              Number of obs =      35
-------------+------------------------------           F(  4,    30) =   85.55
       Model |  186.770492     4  46.6926229           Prob > F      =  0.0000
    Residual |  16.3733443    30  .545778143           R-squared     =  0.9194
-------------+------------------------------           Adj R-squared =  0.9087
       Total |  203.143836    34   5.9748187           Root MSE      =  .73877

------------------------------------------------------------------------------
    lnSaving |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inf |   .0107917   .0091243     1.18   0.246    -.0078425     .029426
      spread |   .0664146   .0315786     2.10   0.044     .0019224    .1309067
         exr |   .0296741   .0044708     6.64   0.000     .0205435    .0388046
     sav_int |  -.0104593   .0465587    -0.22   0.824    -.1055448    .0846263
       _cons |   2.406889   .5351397     4.50   0.000     1.313987     3.49979
------------------------------------------------------------------------------

. est sto mod24

. predict uhatsav, resid

. dfuller uhatsav, lag(1) regress

Augmented Dickey-Fuller test for unit root         Number of obs   =        33

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic           Value             Value           Value
------------------------------------------------------------------------------
 Z(t)          -2.546           -3.696           -2.978           -2.620
------------------------------------------------------------------------------
```

MacKinnon approximate p-value for Z(t) = 0.1047

```
------------------------------------------------------------------------------
  D.uhatsav |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
    uhatsav |
        L1. |  -.3977546   .1562301    -2.55   0.016     -.716819   -.0786902
        LD. |  -.0044228   .1896054    -0.02   0.982    -.3916488    .3828031
            |
      _cons |   .0254754   .0977774     0.26   0.796    -.1742126    .2251634
------------------------------------------------------------------------------
```

. reg d(lnSaving inf spread exr sav_int) l.uhatsav

```
      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  5,    28) =    0.22
       Model |  .023329297     5  .004665859            Prob > F      =  0.9487
    Residual |   .58141983    28  .020764994            R-squared     =  0.0386
-------------+------------------------------           Adj R-squared = -0.1331
       Total |  .604749128    33  .018325731            Root MSE      =   .1441

------------------------------------------------------------------------------
 D.lnSaving |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
        inf |
        D1. |   .0011033   .0015873     0.70   0.493    -.0021481    .0043547
            |
     spread |
        D1. |   .0052226   .0065095     0.80   0.429    -.0081116    .0185568
            |
        exr |
        D1. |  -.0002294   .0019011    -0.12   0.905    -.0041236    .0036647
```

```
             |
     sav_int |
         D1. |  -.0059504   .0134331    -0.44   0.661    -.0334668    .0215659
             |
     uhatsav |
         L1. |  -.0200483   .0422291    -0.47   0.639    -.1065507    .0664541
             |
       _cons |   .2180416   .0270088     8.07   0.000     .1627167    .2733665
------------------------------------------------------------------------------

. est sto modecmSav

. reg lnSaving inf spread exr gpdgrwt

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    29) =   81.52
       Model |  173.814761     4  43.4536902            Prob > F      =  0.0000
    Residual |  15.4578162    29  .533028146            R-squared     =  0.9183
-------------+------------------------------           Adj R-squared =  0.9071
       Total |  189.272577    33  5.73553263            Root MSE      =  .73009

------------------------------------------------------------------------------
    lnSaving |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inf |   .0080561   .0092457     0.87   0.391    -.0108534    .0269656
      spread |   .0613454   .0315336     1.95   0.061     -.003148    .1258389
         exr |   .0300395   .0036878     8.15   0.000      .022497    .0375819
     gpdgrwt |   .1781908   .8228945     0.22   0.830    -1.504817    1.861199
       _cons |   2.416146   .3552885     6.80   0.000       1.6895    3.142793
------------------------------------------------------------------------------

. est sto mod29
```

```
. predict uhatsav1, resid
(1 missing value generated)

. dfuller uhatsav1, lag(1) regress

Augmented Dickey-Fuller test for unit root         Number of obs   =        32

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical      10% Critical
          Statistic          Value            Value            Value
------------------------------------------------------------------------------
 Z(t)          -2.541          -3.702           -2.980           -2.622
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1058

------------------------------------------------------------------------------
  D.uhatsav1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    uhatsav1 |
         L1. |   -.407655    .160439    -2.54   0.017    -.7357896   -.0795203
         LD. |   .0273415   .1952896     0.14   0.890    -.3720706    .4267536
             |
       _cons |   .0208543   .0993992     0.21   0.835    -.1824399    .2241484
------------------------------------------------------------------------------

. reg d(lnSaving inf spread exr gpdgrwt) l.uhatsav1

      Source |       SS       df       MS              Number of obs =      33
-------------+------------------------------           F(  5,    27) =    0.33
       Model |  .034489368     5  .006897874            Prob > F      =  0.8899
    Residual |  .562950878    27  .020850033            R-squared     =  0.0577
```

```
-------------+------------------------------           Adj R-squared = -0.1168
       Total |  .597440246    32  .018670008           Root MSE      =   .1444

------------------------------------------------------------------------------
  D.lnSaving |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inf |
          D1.|   .0012854   .0016807     0.76   0.451    -.0021631    .0047339
             |
      spread |
          D1.|   .0052806   .0064458     0.82   0.420    -.0079452    .0185063
             |
         exr |
          D1.|  -.0001492   .0019169    -0.08   0.939    -.0040824    .0037841
             |
     gpdgrwt |
          D1.|  -.0831387   .1043635    -0.80   0.433    -.2972749    .1309974
             |
    uhatsav1 |
          L1.|  -.0238735   .0421321    -0.57   0.576    -.1103215    .0625744
             |
       _cons |   .2200829   .0274868     8.01   0.000     .1636847    .2764812
------------------------------------------------------------------------------

. est sto modecmSav1

. reg d(lnSaving inf spread exr sav_int)

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    29) =    0.23
       Model |  .018649113     4  .004662278           Prob > F      =  0.9189
    Residual |  .586100015    29  .020210345           R-squared     =  0.0308
```

```
-------------+------------------------------           Adj R-squared = -0.1028
       Total |  .604749128    33  .018325731           Root MSE      =  .14216

------------------------------------------------------------------------------
  D.lnSaving |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inf |
          D1.|   .0010443   .0015611     0.67   0.509    -.0021486    .0042371
             |
      spread |
          D1.|   .0040599   .0059502     0.68   0.500    -.0081096    .0162295
             |
         exr |
          D1.|   -.000473   .0018059    -0.26   0.795    -.0041665    .0032205
             |
     sav_int |
          D1.|  -.0042994   .0128006    -0.34   0.739    -.0304796    .0218808
             |
       _cons |   .2199325   .0263543     8.35   0.000     .166032     .2738331
------------------------------------------------------------------------------

. est sto modsrsav

. reg d(lnSaving inf spread exr gpdgrwt)

      Source |       SS       df       MS              Number of obs =      33
-------------+------------------------------           F(  4,    28) =    0.34
       Model |  .027794938     4  .006948735           Prob > F      =  0.8476
    Residual |  .569645308    28  .020344475           R-squared     =  0.0465
-------------+------------------------------           Adj R-squared = -0.0897
       Total |  .597440246    32  .018670008           Root MSE      =  .14263
```

```
------------------------------------------------------------------------------
 D.lnSaving |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
        inf |
        D1. |   .0012984     .00166     0.78   0.441     -.002102    .0046988
            |
     spread |
        D1. |   .0040083   .0059684     0.67   0.507    -.0082175    .0162341
            |
        exr |
        D1. |  -.0004513   .0018188    -0.25   0.806     -.004177    .0032743
            |
    gpdgrwt |
        D1. |  -.0826653   .1030871    -0.80   0.429    -.2938298    .1284991
            |
      _cons |   .2222897   .0268776     8.27   0.000     .1672334    .2773459
------------------------------------------------------------------------------

. est sto modsrsav1

.
. reg lninvestment inf spread exr sav_int

      Source |       SS       df       MS              Number of obs =      35
-------------+------------------------------           F(  4,    30) =   73.17
       Model |  171.601787     4  42.9004468           Prob > F      =  0.0000
    Residual |  17.5905486    30   .58635162           R-squared     =  0.9070
-------------+------------------------------           Adj R-squared =  0.8946
       Total |  189.192336    34  5.56448046           Root MSE      =  .76574

------------------------------------------------------------------------------
lninvestment |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
         inf |   .0120266   .0094573     1.27   0.213    -.0072879    .0313411
      spread |   .0837168   .0327314     2.56   0.016     .0168704    .1505631
         exr |   .0253641    .004634     5.47   0.000     .0159002    .0348279
     sav_int |  -.0303344   .0482583    -0.63   0.534     -.128891    .0682221
       _cons |   9.550586   .5546745    17.22   0.000      8.41779    10.68338
------------------------------------------------------------------------------

. est sto mod25

. predict uhatinv, resid

. dfuller uhatinv, lag(1) regress

Augmented Dickey-Fuller test for unit root         Number of obs   =        33

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic           Value             Value           Value
------------------------------------------------------------------------------
 Z(t)          -2.393           -3.696           -2.978          -2.620
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1438

------------------------------------------------------------------------------
  D.uhatinv |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    uhatinv |
         L1. |  -.3954834   .1652969    -2.39   0.023    -.7330648    -.057902
         LD. |  -.0132306    .191337    -0.07   0.945    -.4039929    .3775318
             |
       _cons |   .0045693   .1068347     0.04   0.966    -.2136164    .2227549
```

```
------------------------------------------------------------------------------

. reg d(lninvestment inf spread exr sav_int) l.uhatinv

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  5,    28) =    0.54
       Model |  .185534027     5  .037106805           Prob > F      =  0.7432
    Residual |  1.91852035    28  .068518584           R-squared     =  0.0882
-------------+------------------------------           Adj R-squared = -0.0746
       Total |  2.10405438    33  .063759224           Root MSE      =  .26176

------------------------------------------------------------------------------
D.           |
lninvestment |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inf |
          D1. |  -.0014184   .0028763    -0.49   0.626    -.0073102    .0044734
              |
      spread |
          D1. |    .014539   .0118417     1.23   0.230    -.0097177    .0387957
              |
         exr |
          D1. |  -.0011767   .0033848    -0.35   0.731    -.0081101    .0057567
              |
     sav_int |
          D1. |  -.0085865   .0244866    -0.35   0.728    -.0587451    .0415721
              |
     uhatinv |
          L1. |  -.0886966   .0721278    -1.23   0.229    -.2364437    .0590506
              |
       _cons |   .1929201   .0489829     3.94   0.000     .0925832    .2932569
------------------------------------------------------------------------------
```

```
. est sto modecminv

.
. reg lninvestment inf spread exr  gpdgrwt

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    29) =   66.70
       Model |  163.945381     4  40.9863452           Prob > F      =  0.0000
    Residual |  17.8212366    29  .614525399           R-squared     =  0.9020
-------------+------------------------------           Adj R-squared =  0.8884
       Total |  181.766617    33  5.50807932           Root MSE      =  .78392

------------------------------------------------------------------------------
lninvestment |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inf |   .0087233   .0099273     0.88   0.387    -.0115804    .0290269
      spread |   .0822388   .0338586     2.43   0.022     .0129903    .1514873
         exr |   .0270006   .0039597     6.82   0.000      .018902    .0350991
     gpdgrwt |   .0352321    .883566     0.04   0.968    -1.771863    1.842328
       _cons |    9.28056   .3814837    24.33   0.000     8.500339    10.06078
------------------------------------------------------------------------------

. est sto mod28

. predict uhatinv1, resid
(1 missing value generated)

. dfuller uhatinv1, lag(1) regress

Augmented Dickey-Fuller test for unit root         Number of obs   =        32
```

```
                    ---------- Interpolated Dickey-Fuller ---------
           Test         1% Critical       5% Critical      10% Critical
         Statistic          Value             Value            Value
------------------------------------------------------------------------------
 Z(t)          -2.413          -3.702          -2.980          -2.622
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1380


------------------------------------------------------------------------------
  D.uhatinv1 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    uhatinv1 |
         L1. |  -.4005565    .165972    -2.41   0.022    -.7400073   -.0611058
         LD. |    .010937   .1939374     0.06   0.955    -.3857094    .4075835
             |
       _cons |   .0090549   .1100494     0.08   0.935    -.2160214    .2341312
------------------------------------------------------------------------------


. reg d(lninvestment inf spread exr gpdgrwt) l.uhatinv1


      Source |       SS       df       MS              Number of obs =      33
-------------+------------------------------           F(  5,    27) =    0.82
       Model |  .267039677     5  .053407935            Prob > F      =  0.5495
    Residual |   1.7692544    27  .065527941            R-squared     =  0.1311
-------------+------------------------------           Adj R-squared = -0.0298
       Total |  2.03629408    32   .06363419            Root MSE      =  .25598


------------------------------------------------------------------------------
D.           |
lninvestment |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inf |
```

```
       D1. |  -.0014052   .0029792    -0.47   0.641    -.0075182    .0047077
           |
    spread |
       D1. |   .0150843   .0114797     1.31   0.200      -.00847    .0386386
           |
       exr |
       D1. |  -.0010445   .0033361    -0.31   0.757    -.0078895    .0058005
           |
   gpdgrwt |
       D1. |  -.1452255   .1863638    -0.78   0.443    -.5276125    .2371616
           |
  uhatinv1 |
       L1. |  -.1010186   .0682732    -1.48   0.151    -.2411037    .0390665
           |
     _cons |   .2010337   .0486498     4.13   0.000     .1012124    .3008549
------------------------------------------------------------------------------

. est sto modecminv1

.
. reg d(lninvestment inf spread exr sav_int)

     Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    29) =    0.29
      Model |  .081920489     4  .020480122           Prob > F      =  0.8796
   Residual |  2.02213389    29  .069728755           R-squared     =  0.0389
-------------+------------------------------           Adj R-squared = -0.0936
      Total |  2.10405438    33  .063759224           Root MSE      =  .26406

------------------------------------------------------------------------------
D.           |
lninvestment |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
         inf |
         D1. |  -.0015446   .0028997    -0.53   0.598    -.0074752     .004386
             |
      spread |
         D1. |   .0090128   .0110522     0.82   0.421    -.0135915    .0316172
             |
         exr |
         D1. |  -.0019544   .0033544    -0.58   0.565    -.0088149    .0049061
             |
     sav_int |
         D1. |  -.0004222   .0237766    -0.02   0.986    -.0490508    .0482065
             |
       _cons |   .2011338    .048952     4.11   0.000     .1010158    .3012519
------------------------------------------------------------------------------

. est sto modsrinv

. reg d(lninvestment inf spread exr gpdgrwt)

      Source |       SS       df       MS              Number of obs =      33
-------------+------------------------------           F(  4,    28) =    0.45
       Model |  .123580437     4  .030895109           Prob > F      =  0.7699
    Residual |  1.91271364    28  .068311201           R-squared     =  0.0607
-------------+------------------------------           Adj R-squared = -0.0735
       Total |  2.03629408    32   .06363419           Root MSE      =  .26136

------------------------------------------------------------------------------
D.           |
lninvestment |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         inf |
```

```
       D1. |  -.0014114   .0030419    -0.46   0.646    -.0076424    .0048195
           |
    spread |
       D1. |   .0089754   .0109366     0.82   0.419    -.0134272    .0313781
           |
       exr |
       D1. |  -.0020634   .0033328    -0.62   0.541    -.0088903    .0047636
           |
   gpdgrwt |
       D1. |  -.1120444   .1888979    -0.59   0.558    -.4989843    .2748954
           |
     _cons |   .2103913   .0492508     4.27   0.000     .1095056    .3112769
------------------------------------------------------------------------------
```

. est sto modsrinv1

.

. esttab mod23 mod26 mod24 mod29 mod25 mod28 using tab111.rtf, r2 ar2 p replace nogaps nonumber l scalar(F) mtitle(logcons logcons logsaving logsaving loginvest loginvest)

(output written to tab111.rtf)

. esttab modecm1 modecm2 modecmSav modecmSav1 modecminv modecminv1 using tab112.rtf, r2 ar2 p replace nogaps nonumber l scalar(F) mtitle(ECMcon1 ECMcon2 ECMsaving ECMsaving1 ECMinvest ECMin

> vest1)

(output written to tab112.rtf)

. esttab modsrcon modsrcon1 modsrsav modsrsav1 modsrinv modsrinv1 using tab113.rtf, r2 ar2 p replace nogaps nonumber l scalar(F) mtitle(SRcon1 SRcon2 SRsaving SRsaving1 SRinvest SRinvest1)

(note: file tab113.rtf not found)

(output written to tab113.rtf)

```
.
. foreach v of varlist spread  inf sav_int  lnGDP lnSaving lninvestment lncons gpdgrwt exr {
  2. dfuller `v', lag(1) regress
  3. }

Augmented Dickey-Fuller test for unit root         Number of obs   =        33

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic          Value            Value           Value
------------------------------------------------------------------------------
 Z(t)          -1.368          -3.696          -2.978          -2.620
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5977

------------------------------------------------------------------------------
   D.spread |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     spread |
       L1. |   -.149818    .109543    -1.37   0.182    -.3735347    .0738988
       LD. |  -.2233898   .1776306    -1.26   0.218    -.5861598    .1393802
           |
     _cons |   2.728847   1.631723     1.67   0.105    -.6035762     6.06127
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        33

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic          Value            Value           Value
------------------------------------------------------------------------------
 Z(t)          -3.316          -3.696          -2.978          -2.620
```

```
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0142

------------------------------------------------------------------------------
      D.inf |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
        inf |
         L1. |   -.506967   .1528882    -3.32   0.002    -.8192064   -.1947277
         LD. |   .3077137    .172922     1.78   0.085    -.0454402    .6608676
             |
       _cons |   10.30146   3.956987     2.60   0.014     2.22021     18.3827
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        33

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic           Value             Value           Value
------------------------------------------------------------------------------
 Z(t)          -0.844           -3.696           -2.978           -2.620
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8058

------------------------------------------------------------------------------
  D.sav_int |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
    sav_int |
         L1. |  -.0579423   .0686317    -0.84   0.405     -.198107    .0822223
         LD. |  -.0189657   .1825943    -0.10   0.918    -.3918731    .3539416
             |
       _cons |   .3323763   .6417082     0.52   0.608    -.9781666    1.642919
------------------------------------------------------------------------------
```

Augmented Dickey-Fuller test for unit root Number of obs = 33

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-0.625	-3.696	-2.978	-2.620

MacKinnon approximate p-value for Z(t) = 0.8653

D.lnGDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnGDP						
L1.	-.0096753	.0154836	-0.62	0.537	-.041297	.0219463
LD.	.0421446	.1818035	0.23	0.818	-.3291477	.4134369
_cons	.2764467	.132859	2.08	0.046	.0051123	.547781

Augmented Dickey-Fuller test for unit root Number of obs = 33

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-0.261	-3.696	-2.978	-2.620

MacKinnon approximate p-value for Z(t) = 0.9309

```
 D.lnSaving |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+----------------------------------------------------------------
   lnSaving |
        L1. |  -.0027842   .0106778    -0.26   0.796    -.0245912    .0190228
        LD. |   .1895568   .1942399     0.98   0.337    -.2071341    .5862476
            |
      _cons |   .1943178   .0712548     2.73   0.011     .0487961    .3398395
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        33

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic         Value             Value           Value
------------------------------------------------------------------------------
 Z(t)           0.516          -3.696           -2.978          -2.620
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9854

------------------------------------------------------------------------------
D.           |
lninvestment |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+----------------------------------------------------------------
lninvestment |
        L1. |   .0108258   .0209624     0.52   0.609    -.0319851    .0536366
        LD. |   .1407844   .1874584     0.75   0.458    -.2420567    .5236255
            |
      _cons |   .0403445    .255283     0.16   0.875     -.481013    .5617021
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        33
```

```
                    ---------- Interpolated Dickey-Fuller ---------
           Test         1% Critical       5% Critical     10% Critical
         Statistic          Value            Value           Value
------------------------------------------------------------------------------
 Z(t)       -0.674          -3.696          -2.978          -2.620
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8535

------------------------------------------------------------------------------
   D.lncons |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     lncons |
       L1. |  -.0107647   .0159803    -0.67   0.506    -.0434008    .0218714
       LD. |  -.1407394   .1781615    -0.79   0.436    -.5045937     .223115
           |
     _cons |   .3484331   .1296063     2.69   0.012     .0837418    .6131244
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        32

                    ---------- Interpolated Dickey-Fuller ---------
           Test         1% Critical       5% Critical     10% Critical
         Statistic          Value            Value           Value
------------------------------------------------------------------------------
 Z(t)       -4.143          -3.702          -2.980          -2.622
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0008

------------------------------------------------------------------------------
  D.gpdgrwt |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
    gpdgrwt |
```

```
       L1. |  -1.07251   .2588944    -4.14   0.000    -1.602008   -.5430114
       LD. |  .0959427   .1847747     0.52   0.608     -.281964    .4738495
           |
     _cons |  .2262397    .064584     3.50   0.002     .0941507    .3583288
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        33

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic         Value             Value           Value
------------------------------------------------------------------------------
 Z(t)           0.287          -3.696           -2.978          -2.620
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9768

------------------------------------------------------------------------------
     D.exr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       exr |
       L1. |   .0121515    .042285     0.29   0.776     -.074206    .0985091
       LD. |  -.014953   .2004509    -0.07   0.941    -.4243283    .3944224
           |
     _cons |   5.084156   3.909717     1.30   0.203    -2.900551    13.06886
------------------------------------------------------------------------------

. *Unit Roots in First Diference
. foreach v of varlist spread  inf sav_int  lnGDP lnSaving lninvestment lncons gpdgrwt exr {
  2. dfuller d.`v', lag(1) regress
  3. }

Augmented Dickey-Fuller test for unit root         Number of obs   =        32
```

```
                    ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical      10% Critical
          Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)        -6.050         -3.702           -2.980           -2.622
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

------------------------------------------------------------------------------
  D2.spread |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     spread |
       LD. |  -1.713648   .2832424    -6.05   0.000    -2.292944   -1.134352
      LD2. |   .3200939   .1758438     1.82   0.079     -.039547    .6797348
           |
     _cons |   1.005794   .7542789     1.33   0.193    -.5368795    2.548467
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        32

                    ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical      10% Critical
          Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)        -5.957         -3.702           -2.980           -2.622
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

------------------------------------------------------------------------------
     D2.inf |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
```

```
         inf |
        LD. | -1.335899   .2242753    -5.96   0.000    -1.794594   -.8772049
       LD2. |   .4332323   .1619212     2.68   0.012     .1020663    .7643983
            |
       _cons | -.6114623   2.629846    -0.23   0.818    -5.990102    4.767177
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        32

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic         Value             Value           Value
------------------------------------------------------------------------------
 Z(t)          -3.637           -3.702           -2.980          -2.622
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0051

------------------------------------------------------------------------------
  D2.sav_int |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     sav_int |
        LD. | -.9776252   .2688183    -3.64   0.001     -1.52742   -.4278299
       LD2. |  -.072714   .1846417    -0.39   0.697    -.4503487    .3049207
            |
       _cons | -.1202782   .3637065    -0.33   0.743    -.8641415    .6235851
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        32

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic         Value             Value           Value
```

```
------------------------------------------------------------------------------
 Z(t)          -4.143          -3.702          -2.980          -2.622
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0008

------------------------------------------------------------------------------
   D2.lnGDP |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
      lnGDP |
       LD. |   -1.07251   .2588944    -4.14   0.000    -1.602008   -.5430114
      LD2. |   .0959427   .1847747     0.52   0.608     -.281964    .4738495
           |
     _cons |   .2262397    .064584     3.50   0.002     .0941507    .3583288
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        32

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic         Value             Value           Value
------------------------------------------------------------------------------
 Z(t)          -3.436          -3.702          -2.980          -2.622
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0098

------------------------------------------------------------------------------
 D2.lnSaving |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   lnSaving |
       LD. |  -.8554035   .2489352    -3.44   0.002    -1.364533   -.3462739
      LD2. |   .0521985    .201692     0.26   0.798    -.3603079    .464705
           |
```

```
      _cons |   .1881655   .0619046     3.04   0.005     .0615564    .3147745
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        32

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic         Value             Value           Value
------------------------------------------------------------------------------
 Z(t)          -4.067          -3.702           -2.980          -2.622
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0011

------------------------------------------------------------------------------
D2.          |
lninvestment |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lninvestment |
         LD. |  -.9234012   .2270682    -4.07   0.000    -1.387808   -.4589945
        LD2. |   .0495425   .1750322     0.28   0.779    -.3084387    .4075236
             |
       _cons |   .2013005   .0640238     3.14   0.004     .070357    .3322439
------------------------------------------------------------------------------

Augmented Dickey-Fuller test for unit root         Number of obs   =        32

                     ---------- Interpolated Dickey-Fuller ---------
            Test         1% Critical       5% Critical     10% Critical
          Statistic         Value             Value           Value
------------------------------------------------------------------------------
 Z(t)          -3.931          -3.702           -2.980          -2.622
------------------------------------------------------------------------------
```

MacKinnon approximate p-value for Z(t) = 0.0018

D2.lncons	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
lncons						
LD.	-1.107816	.2817894	-3.93	0.000	-1.68414	-.5314922
LD2.	-.0429892	.1850217	-0.23	0.818	-.4214011	.3354226
_cons	.2648345	.078103	3.39	0.002	.1050959	.4245731

Augmented Dickey-Fuller test for unit root Number of obs = 31

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-6.528	-3.709	-2.983	-2.623

MacKinnon approximate p-value for Z(t) = 0.0000

D2.gpdgrwt	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
gpdgrwt						
LD.	-1.954181	.2993468	-6.53	0.000	-2.567365	-1.340997
LD2.	.3590415	.1764999	2.03	0.051	-.0025021	.7205851
_cons	.0008997	.0417738	0.02	0.983	-.0846699	.0864694

Augmented Dickey-Fuller test for unit root Number of obs = 32

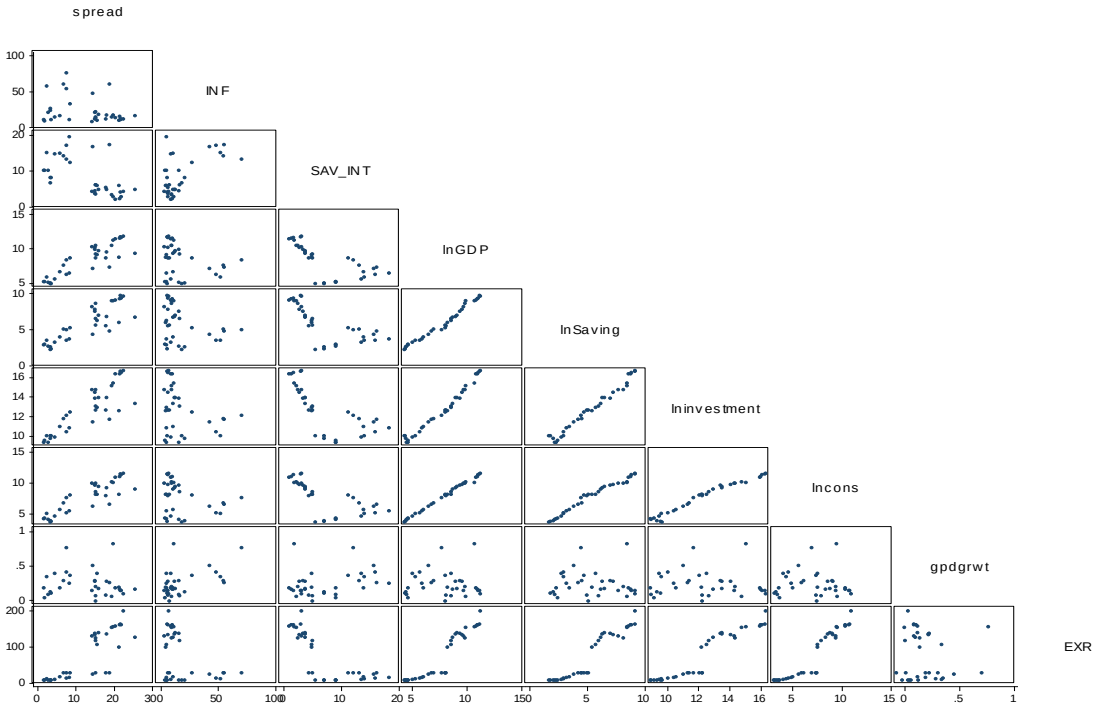
---------- Interpolated Dickey-Fuller ---------

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-3.519	-3.702	-2.980	-2.622

MacKinnon approximate p-value for Z(t) = 0.0075

D2.exr	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
exr						
LD.	-.9921655	.2819204	-3.52	0.001	-1.568757	-.4155736
LD2.	-.0180693	.2007666	-0.09	0.929	-.4286832	.3925445
_cons	6.002389	3.001528	2.00	0.055	-.1364242	12.1412

Graph Matrix of the Variables and their Relationship with Interest Rate Spread


spread
INF
SAV_INT
lnGDP
lnSaving
lninvestment
lncons
gpdgrwt
EXR