TITLE PAGE

THE NEXUS BETWEEN BOND PRICE AND INTEREST RATE IN NIGERIA: EVIDENCE FROM NIGERIA STOCK EXCHANGE. (1988-2014)

BY

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CERTIFICATION

This is to certify that this research was carried out by Akinsanmi Ronke Mary with the matric number, EDS/11/0160 of Department of Economics and Development Studies, Federal University Oye Ekiti and was duly supervised and approved having met the requirements for the award of Bachelor of Science Degrees (B.Sc) in Economics and Development Studies Department of Federal University Oye Ekiti,Ekiti State Nigeria.

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DEDICATION

This project is dedicated to the Almighty God, the custodian of great wisdom and the giver of knowledge .He is the River that waters my soul, the Breath that fills my lungs, The Love that fills my heart, the Height that lifts me up, the Deep that fills me with knowledge and understanding and the Strong Eagle that made me soar above all odds. As beautiful and blissful as it seems today, He has not finished with me yet .To you, my Shield and Buckler and you alone, God the trinity, I dedicate this work.

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ABSTRACT

The study evaluates the nexus between Bond price and Interest rate in Nigeria from 1988 to 2014 using time series data from the Central Bank of Nigeria. The financial systems of most developing countries including Nigeria have being under financial stress as a result of the economic shock of the 1980's .Consequently, the researcher tried to investigate the possibility of short run and long run relationship between Bond price and Interest rate, causality between Bond price and Interest rate, the cointegration between Bond price and Interest rate was also carried out .The study employs Estimated cointegration test, Johansen cointegration, Vector Error Correction model and Granger Causality test procedure. The result obtained shows that all the variables under consideration are stationary at order one in the Augmented Dickey Fuller unit root test procedure .The Johansen cointegration test result indicates at most two Cointegrating equations. The result on the relationship between bond price and interest rate shows that there exist a long run relationship between bond price and other variables used in the model and also an inverse relationship exist between bond price and interest rate during the period under review. The Vector Error Correction result conducted indicates that none of the independent variables except all share index has a significant short run impact on bond price during the period under study. The result of the Granger Causality test equally shows that the null hypothesis that interest rate does not granger cause bond price is accepted at 5% significant level .Based on the findings, the researcher recommends that the government should introduce a low interest rate regime that will enhance economic growth in Nigeria also, the government should employ means of correcting the structural rigidities that is experienced in the country so as to normalize the relationship between Interest rate and bond market in Nigeria.

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

CHAPTER TWO

LITERATURE REVIEW

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS OF EMPIRICAL RESULTS

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Interest rate and Bond prices are part of the important factors that can bring about economic growth in a country. The impact of Interest rate on bond prices provides important implications for monitory policy, risk management practices, financial Securities valuation and government policy (Oni 2006). The primary role of interest rate is to help in the mobilization of financial resources and to ensure efficient use of resources for the promotion of economic growth and development (CBN, (1970).

However, there are various states of interest rates in the financial system. They are classified into two categories: Deposit and lending rates. Deposits rate are rates paid to savings and time deposits of different maturities, while lending rates are interest rates charged on customers loan and they vary according to cost of loanable funds and lending margins.

The fixed income security (bond) market is an important segment of the capital market in the Nigerian economy. Its importance lies in the fact that it provides long term investment opportunity for the private investors and long term financing for firms at low cost. Also, Governments use it as a form of low cost financing instrument for deficit budget. The bond market is a source that creates huge liquidity in the financial market which eventually expands the size of the domestic capital market (Adeyemi 1998)

The extent to which interest rate is related to bond prices is through a negative correlation, base on economic theories .The prospective value of future dividends is affected by the rate of interest

since they reduce with the aim of increase in the rate of interest that depresses the bond prices. Low lending interest rate on the other hand brings about increase in investment due to the low cost of borrowing hence the bond prices tend to rise (Anyanwo 1997). When interest rates increases, the speculative demand for money falls due to the increased opportunity cost of holding cash, which leads to a substitution effect and then the interest bearing assets increases.

1.2 Statement of the problem

The financial systems of most developing countries including Nigeria have being under stress as a result of the economic shocks of the 1980s. The financial repression, largely manifested through indiscriminate distortions of financial prices including interest rates which tends to reduce the real rate of growth and the real size of financial system, more importantly, financial repression has (retarded) delay development process as envisage by (Adams1992)

The importance of a strong and viable domestic bond market as an alternative source of finance in emerging economies has been critically exposed by the global financial crisis (Osinubi 2006) The bond market is suppose to be an alternate source of finance in the country but due to the instability experienced in the country, it has exposed the economy to more global financial crisis (Iyare 2006)

Consequently, the Nigerian economy has been highly prone to interest rate instability and fragility CBN (2000). Again, Adewunmi (1997), also posit that interest rates of all instruments have experienced very unstable movements and inconsistencies have been the order of the day.

Interest rate policy in Nigeria was inconsistent during the Structural Adjustment Program (SAP), as periods of liberalization were intertwined with impositions of some credit controls (IMF 2007) The business environment in general was very risky and uncertain so firms were not able to service debt. The administration of low interest rate which was intended to encourage investment before the SAP era and during SAP era of 1986 ushered in a dynamic interest rate regime where rates were more influenced by market forces and it failed to yield desired result of stimulating investment growth in Nigeria. All these problems highlighted persist due to the inconsistency of monetary policy and inability to formulate interest rate reform that will be a component of the broad policy package aimed at facilitating financial intermediation and monetary management that can induce investment spending through low interest rate.

Based on the foregoing, it appears that the problems of interest rate and other macro economic variables have been of great effect on bond prices and other debt instruments. The bond market and capital market in general has been prone to this problems and this has made it not to be able to contribute much to the financial stability of the country as expected. Consequently, to make bond price one of the variables that can be used to ameliorate the problem of financial instability in Nigeria, there is the need to empirically ascertain the relationship between it and interest rate and by extension other relevant macroeconomic variables.

1.3 Objectives of the study

The broad objective of this study is to investigate the nexus between interest rate and bond price in Nigeria. In order to achieve this, the following objectives will also be considered:

1. To investigate the possibility of short run and long run relationship between interest rate and bond price in Nigeria.

2. To assess the direction of causality between interest rate and bond price in Nigeria.

1.4 Research Questions

In this research study, the following research questions exist:

1. Is there a nexus between interest rate and bond price?

2. To what extent do interest rate affect bond price?

3. What other factor influence bond price apart from interest rate?

1.5 Justification of the study

The Nigeria's capital market according to Olubi (2008) has been hailed as one with the highest returns in the world and one which offers opportunities for portfolio diversification outlet by both the capital world and Nigerian Stock Exchange.

This study will fill the gap in knowledge by providing basic information on Bond price and Interest rate. The findings of this study will also be useful to investors by providing empirical evidence on interest rate and bond which will help them in making investment decisions and also to policy makers in helping them design measures that will improve the interest rate policy of the country, the bond market and other macro economic variables considered in this research work.

1.6 Scope of the study

This study covers the period of 1988 to 2014 .The reason for the period covered is as a result of data availability. Data used in this study were sourced from the Central Bank of Nigeria Statistical bulletin.

1.7 Organization of the study

This research work is organized as follows: Chapter one introduces the study, which emphasizes on the nexus between bond prices and interest rate in Nigeria, while chapter two discusses the conceptual framework, theoretical review and several empirical literature on bond price and interest rate. Chapter three explains the methodology and model that includes the model specification, estimation technique and theoretical justification. Again, chapter four gives the data presentation, analysis of results and findings. Finally, chapter five concludes the paper by giving the summary, conclusion and policy recommendations.

1.8 Definition of terms

Bond: According to Fahm (2006), a bond is a long term debt instrument issued by an entity, company or government as evidence of a promise to pay. A bond can be described as a contract which gives the holder a financial claim on the issuer. The claim protects the holder in circumstances in which the issuer is unable to pay the amount due.

Interest Rate: Interest rate is the price paid on the use of money .It is the opportunity cost of borrowing money from a lender to finance investment project.

Money Supply: Money supply can be defined as the total stock of money in circulation in an economy. The circulated money includes the currency, printed notes, money in the deposit accounts and in the form of other liquid assets.

Inflation rate: Inflation rate is the rate at which the general level of prices for goods and services is rising and subsequently, purchasing power is falling.

All Share Index: All Share Index represents the change in the average value of all the share prices of all companies on the Nigeria Stock Exchange which majority use as a measure of how well the market is performing.

Capital market: Capital market is a financial market for the buying and selling of long term debt or equity backed security. It is a market where money is provided for periods longer than a year.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section focus on a review of the empirical literature on the nexus between bond price and interest rate in Nigeria. It explains the definition of different terms related to the study, some important facts on interest rate and bond price, theoretical review and a review of empirical work on the nexus between bond price and interest rate in Nigeria.

2:1 Conceptual Issues

2.1.1 Concept of Interest Rate

Interest rate was first used as an instrument of Monetary Policy in Nigeria in 1962 following the introduction of money market instruments. The interest rate then was made competitive to ensure that funds kept abroad were returned to the country. During the period of high government borrowing, for example, interest rate was reduced to minimize cost of servicing public debt, as was the case in the 1960's.

Interest rate in Nigeria over the years has therefore played a dominant role as one of the Instruments used by the Federal Government in managing monetary policy. Interest rate guidelines/regulations have always been contained either in the Federal Government Annual Budget document or the Monetary/Credit Policy Circulars of the Central Bank of Nigeria (CBN) from time to time.

Interest rate is one of the important macroeconomic variables, which is directly related to economic growth. Generally, interest rate is considered as the cost of capital, meaning the price paid for the use of money for a period of time. From the point of view of a borrower, interest rate

is the cost of borrowing money (borrowing rate). From a lender's point of view, interest rate is the fee charged for lending money (lending rate). Fahm, (2006)

Interest rate plays a vital role in the determination of savings and investment behavior of households and enterprises and it is therefore a key importance in terms of cyclical development and long-term economic growth (Bello 2005). Interest rates play a crucial role in the efficient allocation of resources aimed at facilitating growth and development of an economy and as a demand management technique for achieving both internal and external balance and it is also one of the macroeconomics variables that affect the performance of the bond market. Investors consider macroeconomics variables when they value bonds. Increase in interest rate causes decrease in bond prices because required rate of return to bond rises which causes decrease in bond price.

The rate of interest measures the percentage reward a lender receives for deferring the consumption of resources until a future date. Correspondingly, it measures the price a borrower pays to have resources now. Suppose I have $100 today that I am willing to lend for one year at an annual interest rate of 5 percent. At the end of the year, I get back my $100 plus $5 interest ($0.05 \times 100$), for a total of $105. The general relationship is:

Money Today (1 + interest rate) = Money Next Year

Different question can be asked: What is the most I would pay today to get $105 next year? If the rate of interest is 5 percent, the most I would pay is $100. I would not pay $101, because if I had $101 and invested it at 5 percent, I would have $106 next year. Thus, the value of money in the future should be discounted, and $100 is the "discounted present value" of $105 next year.

The higher the interest rate, the more valuable is money today and the lower is the present value of money in the future. Interest rate is the cost of borrowing and also used as a discount rate to

discount future cash flows to the financial assets. Increase in interest rate causes decrease in stock prices because required rate of return to stock rises which causes decrease in stock prices. Modigliani (1971) and Mishkin (1977) point that lower interest rates increase bond prices which in turn leads to increased business investment.

According to Marshall's word, interest rate is the price paid for the use of capital in any market, just as wage is the price of the service of labor; similarly, interest rate is the price of capital. It is expressed as a percentage return on capital invested after allowing for risks of investment. Keynes' definition of interest rate focuses on the lending rate. Adebiyi (2002) defines interest rate as the return or yield on equity or opportunity cost of deferring current consumption into the future. Some examples of interest rate include the saving rate, lending rate, and the discount rate.

2.1.2 Concept of Bond market

The Bond Market is the channel through which government and corporations that need to borrow money are matched with investors who have funds to lend. There are really two markets for bonds - the primary market and the secondary market. The primary market is where the bond is first issued while the secondary market occurs later when bonds are sold from one bondholder to another. Prices on bonds in the secondary market are set by supply and demand and are impacted by what is expected of interest rates.

According to Soludo (2005) the bond market provides a secured and flexible investment outlet for investors and also stimulates economic activities through provision of appropriate long term finance for both government and non-government borrowers.

The Nigerian bond market is fairly developed with outstanding maturities ranging from 3 to 20 years but activities are focused more on the domestic primary market and Over-the Counter

(OTC), mostly at Financial Market Dealers Quotation (FMDQ), with very limited secondary trading at the Nigerian Stock Exchange .The bond market in Nigeria was moribund for 14 years before it was reactivated in 2003 when the Federal government returned and issued 3 year, 5 year, 7 year and 10 year bonds to raise N150billion. Investors preferred the 3 year bond which was oversubscribed 8.75 per cent. And in 2005, the Debt Management Office (DMO) started regular monthly issuance of N70billion FGN bonds, translating to N840billion per annum. For five years, government received a total of N4.2trillion. In 2008 tenor of FGN bond extended to 20 years, the longest tenor debt instrument ever offered in Nigeria. It provides for better asset/liability match and reduces roll-over and refinancing risks.

Some measures taken by the Securities and Exchange Commission (SEC) to strengthen the bond market include the appointment of 10 market makers for bonds, introduction of securities lending and collaboration with the Efficient Securities Market Institutional Development (ESMID) to streamline the process of bond issuance which includes rules on book-building, shelf registration, revision of the tax regime aimed at eliminating tax discrimination against investors in corporate and sub-national bond. There has been growing interest in the Nigerian domestic bond market. There are presently, 56 listed bonds with FGN bonds constituting 67 per cent. Two blocks of Sovereign bonds (dollar denominated)-10-year $550million bond and 5-year $550million bond worth US$1billion were also issued in 2013 to finance infrastructure development- laying of pipelines to supply gas to power plants.

This market plays a crucial role in bridging the funding gaps that resulted from the near total freeze in global credit flows as borrowers in less developed economies were forced to look to domestic markets in order to meet their medium to long term capital needs. Bond markets have also helped to correct currency and maturity mismatches arising from the extreme dependence on

banks in many emerging economies, thereby contributing to overall financial stability (Osinubi 2006) .The development of the domestic bond market is therefore one key ingredient required to further strengthen Nigeria's financial system and limit its vulnerability to external fiscal shocks in the future. Against this backdrop, Nigeria's bond market recorded a 34.2% expansion in the first half of 2009 as the economy staggered towards recovery from the global economic downturn.

2.1.3 Bond market terminologies

Par or Face Value: This is the stated principal amount of a bond. It is usually printed on the face of the selling document.

Callable Bond: A bond is said to be callable when it can be redeemed (i.e. the paying back of the principal amount) by the issuer before its maturity date. Usually a premium is paid to the owner when the bond is called.

Discount Bond: A Bond is discounted when it is valued or sold at less than its face / par value.

Coupon Rate: This is the interest rate payable on the bond. Payment is usually twice a year. This means that the value of the annual rate is paid in two installments.

Zero- Coupon Rate: These are bonds that do not have a specific coupon/interest rate but are sold at a substantial discount of their face value. At maturity the investor receives the face value of the bond. Thus the yield will be the difference between the purchase price and the redemption value.

Accrued Interest: This is the total interest due since the last payment was made.

Sinking Fund: A special fund set aside to retire a bond. Each year certain amount is paid into the fund according to a set schedule.

Yield: This is an evaluation of the income generated by a bond. It is calculated by dividing the amount of interest paid on a bond by its price.

Yield to Maturity: This is the entire rate of return on a bond if held to maturity. It includes both the coupon rate and the net gain or loss in the price of the bond (i.e. the difference between the current price and the face value) per year as it moves to its maturity date.

Current Yield: This is the actual return a bondholder receives from his bond investment. It is calculated by dividing the nominal value of the interest rate by the current market price of the bond. Current yield is a more accurate measure of return on the bond because it takes into cognizance the market price of the bond.

Term Maturity: This refers to the number of time (days) to the maturity date of a bond.

Bond Indenture: This is the bond contract document that stipulates the duties of the bond issuer and the rights of the bondholders and also discloses in details relevant information that will enable the investors make wise investment decision.

2.1.4: Concept of Bond

According to the Nigerian Stock Exchange, a bond is a debt security (Loan) issued by a government ,government agency or corporation .It is basically an "IOU" issued by one party to another. The bondholders (or investors) are the lenders, the issuer is the borrower. The borrower promises to make periodic interest payment (coupon) as well as repay the original loan (principal) to bond holder on a stipulated date in the future referred to as the maturity date.

A bond is a debt security in which the issuer owes the holder a debt and is obliged to repay the principal and interest (coupon) at a later date, termed maturity. Other stipulations may also be attached to the bond issued, such as the obligation of the issuer to provide certain information to

the bondholder or limitations on the behavior of the issuer. Bonds are generally issued for a fixed term (the maturity) longer than one year (Olashore, 2006).

Umoren (2000) also defines a bond as basically *IOU'S* of longer duration than the average money market instrument present in a given market. According to Fahm (2006), a bond is a long term debt instrument issued by an entity, company or government as evidence of a promise to pay.

A bond is simply a certificate of indebtedness issued by a borrower to a lender. Therefore investors in bonds are essentially lending money to the issuer. Some of the common bond issuers are governments (Federal, State and Local Government), government agencies and corporate institutions. There are different types of bonds with its unique features relating to the way it pays interest, the market in which the bond is issued, the currency it is payable in, protective features and the legal framework under which it operates (Drake 1985)

Bond can be described as a contract which gives the holder a financial claim on the issuer. The claim protects the holder in circumstances in which the issuer is unable to pay the amount due. According to Oni (2006.), the entity borrowing money by the way of a bond is called the issuer and the person investing is the buyer. The issuer of a bond promises to pay the buyer's interest which is called a coupon for the privilege of using the buyer's money. The issuer also promises to return the money which is the principal to the buyer on a specified date called the maturity date. The coupon which is a predetermined interest account is paid to the buyer at periodic intervals throughout the life of the bond. It is the nature of known periodic interest amount (coupon) and known principal amount that gave rise to the nomenclatures "fixed income securities" given to bonds.

2.1.5 Types of Bonds

The common types of bond in Nigeria are:

1. Government Bond:

These are bonds issued by the Federal Government of Nigeria via the Debt Management Office and they are listed on The Nigeria Stock Exchange (NSE) .The income earned on FGN Bonds are tax free. These securities are seen to have low – risk since they are backed up by the taxing power of the government.

2. Munical Bond:

Munical Bond are debt securities issued by states, cities ,countries and other government entity to fund day to day activities and also to carry out capital projects. By purchasing this security, you are lending money to the issuer in exchange for a regular interest payment and the return of the principal at maturity.

3. **Corporate Bond:**

Corporate bond are bonds issued by a corporation to raise funds for the company's expansion plans. The corporate bonds usually have a maturity period of at least one year. If a corporation issues bonds that has short term maturity period, it is called a Commercial Paper. The interests on this type of bond are taxable. Corporate bonds are often called debentures, but the term debenture is usually used to refer to borrowings without specified collateral. Such borrowings are based on the general credit standing of the borrower. In Nigeria, however, some debentures are said to be mortgage debentures. In such cases, the security provided goes beyond the credit worthiness of the borrowers to include a mortgage of some specific assets and also all future assets (Odife, 1999).

4. **Zero coupon Bond**:

Zero coupon bonds are bonds that do not pay interest during the life time of the bonds and this is because this bond pay no interest until maturity ,their prices fluctuates more than other type of bonds in the secondary market.

2.1.6 Benefits of issuing a Bond

According to Bello (2005), the following are some of the benefits of issuing a bond:

1. It fosters economic growth through effective capital allocation.
2. It can be used to implement major capital investment project such as roads, hospitals, schools, housing estate etc.
3. It improves productivity levels by expanding production capacity and thereby creating more jobs.
4. It provides appropriate investment avenues for person and life insurance funds and matches the gestation period of project with the tenor of financing the project.
5. It deepens the Nigerian financial market.
6. It serves as a catalyst to the issuance of other instruments such as mortgage backed securities (that are also long term instruments) which would lead to growth of the economy.
7. It enhances availability of additional investment for trading and investing.
8. It enhances the local financial market for global competitiveness.

2.1.7 Risk associated with issuing bonds

According to Chang (2005), the various risks that can be associated with investing in bonds in the general sense are:

i. **Interest Rate Risk:** Changes in interest rate may affect the market value of bonds. Bond prices rise when interest rate falls and bond prices fall when interest rate rise.

ii. **Inflation Risk:** This is a risk that has to do with the reduction in the real value of returns on investment in bonds due to an increase in the rate of inflation. Since the interest payment is usually a fixed amount, a rise in the rate of inflation will reduce the value of the interest payment.

iii. **Liquidity Risk:** This has to do with the ease of converting into cash. Some bonds do not have an active secondary trading market therefore in such a case if there is a need to redeem such bond before it reaches maturity there might be a substantial discount to the original purchase price. The more difficult it is to convert to cash, the more the liquidity risk.

iv. **Credit and default Risk:** This threat looms in the form of an issuer being unable to meet a bond's payment obligations. One way to sniff out the likelihood of a potential default is to investigate the rating assigned to an issuer's bond at standard credit rating agencies.

v. **Maturity Risk:** This is an investment risk associated with the tenure or maturity period of the bond. The longer the tenure, the higher the risk assumed and the shorter the tenure, the lesser the risk assumed.

vi. **Call Risk and Reinvestment risk:** Certain bonds contain call provisions which allows the issuer to redeem the bonds before they reach maturity. Issuers frequently do this in a period of declining interest rates because they can sell new bonds at lower rates. While the holder receives

the principal early, he or she is unable to replace the called bond with a similar one yielding as much. The market value of a bond also may not rise above its call price.

2.1.8 Concept of Bond price

The price of a bond is the present value of the payments promised by the bond. Bond prices vary depending on market forces and investment risk. Like any other lender, you want to earn a good return while limiting your risk, so the relationship between bond price and interest rate is a major consideration.

Every bond has a par value and coupon. Par value is the amount the bond issuer must give bondholders to pay off the debt when a bond reaches maturity. A bond coupon is the fixed amount of interest the bond pays each year. It's usually expressed as a percentage of the par value called the coupon rate. For example, a $1,000 bond with a $50 coupon has a coupon rate of 5 percent.

A bond's effective interest rate is called its yield. When a bond's price goes down, the yield goes up. If a bond trades for more than the par value, the yield falls below the coupon rate. Suppose a $1,000 bond with a 5 percent coupon rate sells for $800. Divide the coupon by the price and you get a yield of 6.25 percent. The higher yield is due to the fact that you invest less money to earn the same amount of interest. The reverse happens if the bond price goes up. You pay more for the same coupon, so your yield goes down.

Typically, investors buy bonds mainly for their interest income. For this reason, changes in market interest rates cause changes in bond prices on the secondary market. Suppose market interest rates go up. Existing bonds pay less than the new market rates, so investor demand drops. The price of existing bonds tends to fall until yields go up enough to attract buyers.

Conversely, if market rates drop, existing bonds are more attractive investments than newly issued bonds. Demand for existing bonds increases, driving prices up and yields down.

Bond issuers have credit ratings just as individuals do. Suppose the credit rating of a top-rated "AAA" bond is downgraded, meaning the risk of lending to the bond issuer has increased. Demand for the bonds falls, causing the price to drop and the yield to rise. The bond price will stabilize only when the yield has gone up enough to attract investors willing to take more risk in return for a higher return.

Some bonds are "callable." This means the issuer can pay off the bonds before they mature. If this happens, investors lose the income the bonds would have provided. Typically, callable bonds have higher interest rates than non-callable bonds to offset this extra risk. Regardless of interest rates and other risks, prices move close to the par value as bonds near maturity. A bond owner won't sell a bond for much less than the par value because she will shortly be paid that par value when the bond matures. Investors won't pay a premium for pretty much the same reason: when the bond is paid off, all they will receive is the par value. When the bond is about to mature, interest earnings won't be enough to offset a higher price.

2.1.9 The Nigeria Stock Exchange

The Nigerian Stock Exchange was founded in 1960 as the Lagos Stock Exchange. It started operations in Lagos in 1961 with 19 securities listed for trading. In December 1977 it became known as The Nigerian Stock Exchange, with branches established in some of the major commercial cities of the country.

The Nigeria Stock Exchange is regulated by the Securities and Exchange Commission, which has the mandate of Surveillance over the exchange to forestall breaches of market rules and to

deter and detect unfair manipulations and trading practices. The Exchange has an automated trading System. Data on listed companies' performances are published daily, weekly, monthly, quarterly and annually.

The Nigerian Stock Exchange has been operating an Automated Trading System (ATS) since April 27, 1999, with dealers trading through a network of computers connected to a server. The ATS has facility for remote trading and surveillance. Consequently, many of the dealing members trade online from their offices in Lagos and from all the thirteen branches across the country. The Exchange is in the process of establishing more branches for online real time trading. Trading on The Exchange starts at 9.30 a.m. every business day and closes at 2.30 p.m. In order to encourage foreign investment into Nigeria, the government has abolished legislation preventing the flow of foreign capital into the country. This has allowed foreign brokers to enlist as dealers on the Nigerian Stock Exchange, and investors of any nationality are free to invest. Nigerian companies are also allowed multiple and cross border listings on foreign markets.

In1993, the Nigerian Capital Market was deregulated and consequently prices of new issues were determined by issuing houses and stockbrokers, while on the secondary market prices are made by stockbrokers only. The market/quote prices, along with the All-Share Index plus Nigeria Stock Exchange and Sector Indices are published daily in the Stock Exchange Daily Official List, the Nigerian Stock Exchange CAPNET (an intranet facility), newspapers, and on the stock market page of the Reuters Electronic Contributor System.

The Nigerian Stock Exchange is regulated by the Securities and Exchange Commission, which has the mandate of Surveillance over the exchange to forestall breaches of market rules and to deter and detect unfair manipulations and trading practices. The exchange has an automated trading System. Data on listed companies' performances are published daily, weekly, monthly,

quarterly and annually. Transactions on The Exchange are regulated by The Nigerian Stock Exchange, as a self-regulatory organization (SRO), and the Securities & Exchange Commission (SEC) – apex regulator, which administers the Investments & Securities Act of 1999. As of December 31, 2013, it has about 200 listed companies with a total market capitalization of about N12.88 trillion ($80.8 billion).

2.10 Capital Market

Capital market is the markets for the buying and selling of equity and debt instruments. Capital markets helps to channel savings and investment between suppliers of capital such as retail investors and institutional investors, and users of capital like businesses, government and individuals. Capital markets involve the issuing of instruments such as stocks and bonds for medium-term and long-term. In this respect, capital markets are distinct from money markets, which refer to markets for financial instruments with maturities not exceeding one year.

Osaze (2000) sees the capital market as the driver of any economy to growth and development because it is essential for the long- term growth capital formation. It is crucial in the mobilization of savings and channeling of such savings to profitable self-liquidating investment.

In the world today, the capital market is playing a significant role in the national economic growth and Development of Nigeria. One intermediary in the market that operates as a rallying point for activities is the bond market. It is a market for government securities, for corporate bonds, for the mobilization and utilization of long-term funds for development – the long term end of the financial system (Osinubi, 2006).In this market, lenders (investors) provide long term funds in exchange for long term financial assets offered by borrowers.

Nwankwo (1980), opined that the central task of the capital market is the mobilization of funds in the hands of myriad individual who save and the pooling and channeling of such funds into productive uses. It is the most important institution for massive capital formation geared towards economic development. This market embraces both the new issues (primary) market and secondary market. Thus, it is a mechanism whereby economic unit desirous to invest their surplus funds, interact directly or through financial intermediaries with those who wish to procure funds for their businesses.

2.2 THEORETICAL FRAMEWORK

2.2.1 Theories of Interest rate

Interest rate has been a controversial issue since the era of the classical, neo classical and Keynesians.

2.2.2 The Keynesian theory of Interest Rate

Keynes defines the rate of interest as the reward of not hoarding but the reward for parting with liquidity for the specified period .It "is not the 'price' which brings into equilibrium the demand for resources to invest with the readiness to abstain from consumption. It is the 'price' which equilibrates the desire to hold wealth in the form of cash with the available quantity of cash." In other words, the rate of interest, in the Keynesian sense, is determined by the demand for and then supply of money, this theory is therefore regarded as the monetary theory of interest as different from the theory of the classical.

According to the Keynesian Liquidity Preference Theory, when the amount of money supply in the economy is increased, it encourages people to transfer the excess money to interest bearing assets. This process increases the share prices and reduces the Interest rate simultaneously.

Supply of money:

Out of the two determinants of the rate of interest, the supply of money refers to the total quantity of money in the country for all purposes at any time. Though the supply of money is a function of the rate of interest to a degree, yet it is considered to be fixed by the monetary authorities, that is, the supply curve of money is taken as perfectly inelastic.

Demand for money:

For the second determinant, the demand for money, Keynes formed a new term "Liquidity preference "by which his theory of interest is commonly known. Liquidity preference means the desire of the public to hold cash .The rate of interest, in Keynes words, is the "premium which has to be offered to induce people to hold the wealth in some form other than hoarded money "of cash to induce them to part with their liquid assets. The lower the liquidity preference, the lower will be the rate of interest that will be paid to the cash- holders. The higher the liquidity preference, the higher will be the rate of interest that will have to be paid to the holder.

According to Keynes, there are three motives behind the desire to hold cash

- The Transaction motive
- The Precautionary motive
- The Speculative motive

Transaction motive: The transaction motive relates to the "need to hold cash to carry out current personal transactions and business exchange" It is further divided into the income and

business motives. The income motive is meant to bridge the interval between the receipt of income and its disbursement and the business motive is the interval between the time of incurring business costs and that of the receipt of the sale proceeds.

Precautionary motive: Relates to "the desire to provide for contingencies requiring sudden expenditures and for unforeseen opportunities of advantageous purchases". Both individuals and business keeps cash in reserve to meet unexpected needs. Individuals hold cash to provide for illness, accidents, unemployment and other unfavorable conditions or to gain from unexpected deals. The precautionary demand for money depends upon the level of income, and business activity, opportunities for unexpected profitable deals.

Keynes holds that the transactions and precautionary motives are relatively interest inelastic, but are highly income elastic. The amount of money held under these two motives [M_1] is a function [L_1] of the level of income [Y] and is expressed as $M_1 = L_1$ [Y].

Speculative motive : The money held under the speculative motive is for "Securing profit from knowing better than the market what the future will bring forth'' .Individuals and businessmen still have funds ,after keeping enough for transactions and precautionary purpose and like to gain from it by investing in bonds. Money held for speculative purposes is a liquid store of value which can be invested at an opportune moment in interest-bearing bonds or securities. Low bond prices are indicative of high interest rates, and high bond prices reflect low interest rates.

According to Keynes, it is the expectations about changes in bond prices or in the current market rate of interest that determines the speculative demand for money .The speculative demand for money is a decreasing function of rate of interest .The higher the rate of interest, the lower the speculative demand for money ,and lower the rate of interest ,the higher the speculative demand for money . Algebraically, Keynes expressed the speculative demand for money as $M_2 = L_2$ [r]

where L_2 is the speculative demand for money and r is the rate of interest .Geometrically; it is a smooth curve which slopes downward from left to right. (Macro Economic Theory by M.L Jhigan "Keynes's Liquidity Preference Theory of Interest page 360, 361) . If bond prices are expected to fall, the rate of interest is expected to rise; businessmen will sell bonds to avoid capital losses. Nothing is certain in this changing world, where guesses about the future course of events are made on precarious bases; businessmen keep cash to speculate on the probable future changes of bond prices or the rate of interest with the view of making profit.

Base on the expectation about the changes in the rate of interest in future, less money will be held under the speculative motive at a higher current or prevailing rate of interest and more money will be held under this motive at lower current rate of interest.

According to Keynes the interest rate definitely influences the marginal propensity to save. This savings is also linked to the level of income. Hence it is concluded by Keynes that the rate of interest should be at a point where the demand curve for capital at different interest rates intersects the savings curve at a fixed income level.

2.2.3 The Classical theory of Interest Rate

According to the classical theory, rate of interest is determined by the supply of and demand for capital. The supply of capital is governed by the time preference and the demand for capital by the expected productivity of capital. The Classical theory of interest defines interest rate as the element that equates savings and investment. Under this theory, investment is nothing but the demand for investible resources and savings is their supply. The rate of interest that is determined by the interaction of investment and savings is the price of the investible resources.

Demand Side: The demand for capital consists of the demand for productive and consumption purposes. Capital is demanded by the investors because it is productive but the productivity of capital is subject to the law of variable proportions.

Supply Side: The supply of capital depends upon savings, rather upon the will to save and the power to save of the community .Some people save irrespective of the rate of the interest .They would continue to save even if the rate of interest were zero. There are others who save because the current rate of interest is just enough to induce them to save.

2.2.4 The Neo- Classical theory of Interest Rate

The neo classical theory of interest is also the same with Loanable Funds Theory of Interest. According to the Loanable Funds Theory of Interest, interest rate is the price of credit which is determined by the demand and supply of loanable funds present in the capital market. The concept formulated by Knut Wicksell, the well-known Swedish economist, is among the most important economic theories. The Loanable Funds Theory of Interest advocates that interest rate is determined by both savings and investment in the long-run. On the other hand, short-term interest rates are calculated base on the financial conditions of a particular economy. The determination of the interest rates in case of the Loanable Funds Theory of the Rate of Interest depends essentially on the availability of loan amounts. For the loan to be available it depends on some certain factors like; the net increase in currency deposits, the amount of savings made, willingness to enhance cash balances and opportunities for the formation of fresh capitals.

According to the loanable funds theory of interest the nominal rate of interest is determined by the interaction between the demand and supply of loanable funds. Keeping the same level of supply, an increase in the demand for loanable funds would lead to an increase in the interest rate

and the vice versa is true. Conversely an increase in the supply of loanable funds would result in fall in the rate of interest. If there is a change in both the demand and supply of loanable funds, the resultant interest rate would depend much on the magnitude and direction of movement of the demand and supply of the loanable funds. Now, the demand for loanable funds is basically derived from the demand from the final goods and services. These final goods and services are again generated from the use of capital that is financed by the loanable funds. The demand for loanable funds is also generated from the government.

The Loanable Funds Theory of the Rate of Interest has similarity with the Liquidity-Preference Theory of Interest in the sense that both of them identify the significance of the cash balance preferences and the role played by the banking sector to ensure security of the investment fund.

Demand for Loanable Funds:

The demand for loanable funds has primarily three sources i.e., government, business and consumers who need them for purposes of investment hoarding and consumption .The government borrows funds for constructing public works or for war preparation The businessmen borrow for the purchase of capital goods and for starting investment projects. Such borrowing is interest elastic and depends mostly on the expected rate of profit as compared with the rate of interest. The demand for loanable funds on the part of consumers is for the purchases of durable consumer goods .Individual borrowing are also interest elastic. The tendency to borrow is more at a lower rate of interest than at a higher rate in order to enjoy their consumption soon.

Supply of Loanable Funds:

The supply of loanable funds comes from savings, dishoarding and bank credit. Private ,individuals and corporate savings are the main source of savings .Though personal savings depend upon the income level ,yet taking the level of income as given they are regarded as interest rate .The higher the rate of interest ,the greater will be the inducement to save and vice versa. Corporate savings are the undistributed profit of a firm which also depends on the current rate of interest to some extent .The second source is the volume of funds coming out of hoards or being added to them .Dishoarding may represent not only purchases of old assets or securities from others out of idle cash balance of one's own funds for net investment or for consumption in purchases in excess of net disposable income. Such funds are directly related to the rate of interest .The higher the interest rate the larger the funds that will be coming out of hoards and vice versa.

2.3 Empirical Review

It is important to understand that bond prices and interest rate have an inverse relationship, meaning that when interest rate goes up, existing bond prices go down, and when interest rate are low ,bond prices are high. Increase in interest rate causes decrease in bond prices because required rate of return to bond rises which causes decrease in bond prices. It has also been observed in the findings that bonds and interest rate are typically studied in isolation.

Bond prices go up and down base on two factors: changes in interest rates and changes in credit quality. Investors who purchase bonds worry a lot about how safe their money is. However, they tie safety to credit considerations. Many individual investors do not fully understand how changes in interest rates affect price. Since the late 1970s, changes in the interest rate have

become the greatest single determinant of bond return and prices. Managing interest rate risk has become the most critical variable in the management of bond portfolios paid for it .The prices, therefore, tend to be a factor of market forces of demand and supply of that bond.

Varma (1996) examined Bond Valuation and the pricing of Interest Rate options in India. The paper expounded a practical methodology for pricing Interest Rate options in India and valuing Bond with embedded Interest Rate options. The findings of the paper shows that the Black – Derman –Toy model (Black et al ,1994) is shown to be the most attractive tool for valuing Interest Rate options in India.

Ivanovski ,Draganov and Nadica (2013) worked on Interest rate risk of Bond Prices and Valuation on Macedonian Stock Exchange. The article presents valuation of Treasury Bonds on Macedonian Stock Exchange and empirical test of duration, modified duration and convexity of the Treasury bonds at MSE in order to determine the sensitivity of bond prices on Interest rate changes. The findings of this article is that T-Bonds traded at MSE are not sensitive on Interest rate changes due to institutional investors permanent higher demand and at the same time, market limited offer of risk – free institutions.

Richard, Adekunle and Ojodu(2012) investigated the impact of Interest rate on capital market growth(A Case of Nigeria) and they shed light on how some other macro economic variables such as inflation rate ,exchange rate can also influence the capital market growth using Multiple regression of the OLS ,Augmented Dickey –Fuller (ADF) Test and E-view econometric software .The findings of this work revealed that interest rate have an adverse effect on capital market growth. Also in their findings, Inflation rate and exchange rate has no significant effect on the growth of the capital market.

Also, Dabale and Jagero(2013) examined the causes of Interest rate volatility in Nigeria for the period between January 2000 and December 2005 using an econometric model. The empirical analysis examined the nature of causality amongst the variable using SPSS version 17 software packages. The results of the study indicated that Interest rate has a significant negative effect on money supply and the required reserved ratio during the period.

According to Adams (1992), the functions of interest rate are as follows: it helps to guarantee that current savings will flow into investment that will promote economy growth, it retains the available supply of credit, generally providing loadable funds to those investment projects with the highest expected returns and it brings the supply of money into balance with the polices of demand for money. It is also an important tool of government policy through which its influence the volume of savings and investment.

Kandel, Offer and Sang (1996) worked on Real Interest rate and Inflation: An Ex-ante Empirical Analysis. In this work, a method was developed for measuring ex-ante real interest rate using prices of index and nominal bonds. Employing this method and newly available data, they directly test the Fisher Hypothesis that the real rate of interest is independent of inflation expectations. The finding was that there exist a negative correlation between ex-ante real interest rate and expected inflation and this is in line with the theory of Mundel and Tobin (1994).

Vunana, et al. (2014) worked on the effect of money supply on interest rate in Nigeria. In this paper, vector auto- regression approach and granger causality statistics are applied so as to examine the effect of money supply and fiscal deficits on interest rate in a market based monetary regime and the bilateral relationships between these economic variables .A negative effect of money supply on interest rate with the liquidity frame theory is confirmed, while Fiscal

deficits variables is found to have a positive relation with interest rate variable. The granger causality statistics shows bilateral relationships between interest rate and money supply.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Methodology

Research methodology refers to the theory of the research and the reasons for the way the research has been designed. A methodology offers the theoretical underpinning for understanding which method or set of methods that can be applied in a research.

3.2 Source and method of data collection

Although observation of financial records of the interplay of interest rate with bond prices relevant to the study were looked into, the data used in this field of research were sourced mainly from secondary data.

Secondary Source:

These are those data derived from prepared list. The data for the variables were obtained mainly from publications of Central Bank of Nigeria statistical bulletin.

3.3 Model Specification

Koutsoyianis (2003) define model specification as the statement of maintained hypotheses. According to Gujarati (2007), an econometric investigation begins with the specification of the econometric model underlying the phenomenon of interest.

Therefore, model specification is a function of the theoretical relationship between or among variables, the nature of study objectives and type of data. It has to do with expressing the model in econometric from which would be used to explore the economic phenomenon.

This study generates data over the period of 1988 to 2014. Meanwhile, the study examines the time series property of bond price and interest rate using regression analysis to establish the nexus of the following variables.

Given the above trend, the model is formulated thus:

BP= F (INT, INF, MS, ASI)..... (1)

BP - Bond price being the dependent or endogenous variable.

INT- Interest rate which is the explanatory, exogenous Variable or independent variable.

MS - Money supply

INF - Inflation rate

ASI - All share index

b_0, b_1, b_2..... – Parameters

The econometric model therefore becomes:

$$BP = b_0 + b_1 INT + b_2 MS + b_3 INF + b_4 ASI + \mu \quad \ldots\ldots (2)$$

Where: μ – Error term (Stochastic Variable)

Error term is introduced to the equation to account for omitted variables which could as well affect the explained variable Bond Price.

Apriori Expectation

$\frac{\partial BP}{\partial INT} < 0$. (A negative or inverse relationship is expected between bond price and interest rate)

$\frac{\partial BP}{\partial MS} > 0$. (A positive or direct relationship is expected between bond price and money supply)

$\frac{\partial BP}{\partial INF} > 0$. (A positive or direct relationship is expected between bond price and inflation rate)

$\frac{\partial BP}{\partial ASI} < 0$(A negative or inverse relationship is expected between bond price and All Share Index)

Definition of variables

Bond: A bond is a debt security in which the issuer owes the holder a debt and is obliged to repay the principal and interest (coupon) at a later date, termed maturity.

Interest Rate: Interest rate is the return being paid to the provider of financial resources for giving the fund for future use

Money Supply: Money supply can be defined as the total stock of money in circulation in an economy.

All Share Index: All Share Index represents the change in the average value of all the share prices of all companies on the Nigeria Stock Exchange which majority use as a measure of how well the market is performing.

Inflation Rate: Inflation rate is the rate at which the general level of prices for goods and services is rising and subsequently, purchasing power is falling.

3.4 Estimation Techniques

The estimation procedures employed in this empirical investigation is based on Unit Root test, Cointegration test, Granger Causality Test and Vector Error correction model. The choice of this estimation procedure is informed by the need to determine the time series characteristics of the variables that are used in this study. The process of co-integration is discussed as follows:

(A) Unit Root Test

Testing for the existence of unit roots is a key pre-occupation in the study of time series models and co-integration. What are unit roots? Let us begin with a definition. A stochastic process with a unit root is itself non-stationary. Another way of looking at it is that testing for the presence of

unit roots is equivalent to testing whether a stochastic process is a stationary or non-stationary process. In sum, the presence of a unit root implies that the time series under scrutiny is non-stationary while the absence of a unit root means that the stochastic process is stationary

Currently, there are some commonly accepted methods of testing for unit roots. These are the Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF) test and the Philip Peron (PP) test. The Augmented Dickey-Fuller (ADF) test is considered superior to the Dickey-Fuller (DF) test because it adjusts appropriately for the occurrence of serial correlation.

$$X_t = b_0 + b_1 X_{t-1} + b_2 X_{t-2} + b_n X_{t-n} + U \qquad \text{.. (3)}$$

Where X_t is the dependent variable

Where U is a stationary error term. The null hypothesis that $X_t$is non stationary is rejected if b_l is significantly negative. The number of lag (n) of $X_t$is usually chosen to ensure that the regression is approximately white noise. It is simply referred to as the DF test if no such lags are required in which case $b_i = 0$ (i = 1…………..n). However, the t-ratio from the regression does not have a limiting normal distribution.

An important assumption of the ADF test is that the error term is independently and identically distributed. The ADF test adjust the DF test to take care of possible serial correlation in the error term by adding the lag difference terms of the regress and. Phillip and Perron use non-parametric methods to take care of the serial correlation in the error term without adding lagged difference terms. Since the asymptotic distribution of PP test is the same as the ADF test statistic, the PP test is preferred for this study.

Co-integration is based on the properties of the residuals from regression analysis when the series are individually non stationary. A series is stationary if it has a constant mean and constant finite variance. Thus, a time series X_t is stationary if its mean E(Xt) is independent of time and

its variance $E\{X_t - E(X_t)^2\}$ is bounded by some finite number and does not vary systematically with time. It tends to return to its mean with the fluctuations around this mean having constant amplitude.

(B) Co-integration and Vector Error Correction Model

The theory of multivariate co-integration, as propounded and propagated by Johansen and Joselius provides a nexus or connection among integrated processes and the notion of long run equilibrium. The co integration test commenced with a test for the number of co-`integrating relation or rank (r) of π using Johansen's maximal Eigenvalue of the stochastic matrix and the likelihood Ratio (LR) test based on the trace of the stochastic matrix π which is the long – run multiplier matrix of m x n that is the matrix of the coefficients. Note that the Eigenvalue of $\pi 1$ are the roots of the kth order characteristic polynomial $|\Pi_1 - vI|$ obtained by solving the characteristic equation

$$| \Pi_1 - v I | = 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

The number of non – zero Eigenvalue is the rank of the matrix π. Also, the trace statistic suggested by Johansen to determine the co- integration rank in a multivariate model is based on the ordered (estimated) Eigenvalue in the following relation.

$$Trace(r_0 / k) = -T \sum_{ir=r_0+1}^{K} \ell n(1 - \lambda_i) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Where λi = ordered (estimated) Eigenvalue.

This is the relevant test statistic for the null hypothesis $r \leq r_0$ against the alternative $r \geq r_0+1$ following a sequence (This sequence has been fully discussed under chapter three) Π matrix (the matrix of the coefficient in the VAR models) is a product of two matrices α and β. Let Y denote

an n x 1 vector of the I(1) variables the rank of π which is r, determines how many linear combination of the variables in the levels are stationary. If r = o such that $\pi = 0$, none of the linear combination are stationary. Π can be factored, that is $\pi = \alpha\ \beta$. Both α and β are n x r matrices. While β contains the co-integrating vector (the error – correction mechanism in the system), α is the adjustment parameter.

The second is the maximum Eigenvalue $(\lambda_{\max})$ statistic:

$$\lambda_{\max} = -T\ell n(1 - \lambda_{r+1}) \quad \ldots\ldots (6)$$

This test allows for the comparison of a cointegrating rank of r against the alternative of a cointegrating rank of r + 1. This test may then be repeated for larger values of r until one fails to reject the null hypothesis.

The Johansen representation theorem establishes formally the theoretical basis of error-correction modeling. According to the theorem, if Y_t and X_t are co-integrated, then there is a long run relationship between them. In addition, the theorem proves that the short-run adjustment dynamics can be usefully described by the error correction model (ECM) as stated in the following equation:

$$a(L)\Delta Y_t = a_0 - \chi(Y_t - d_i X_t) + b(L))\Delta Y_t + C(L)\Sigma_t \quad \ldots\ldots (7)$$

In simple terms, the Error Correction Model involves using the lagged residual to correct for deviations of actual values from the long run equilibrium values. To fix ideas, consider the equation above and will discover that the residual from that regression is $U_t = Y_t . BX_t$ Which is 1 (0), since Y_t and X_t are assumed to be con-integrated. In applied work it is require that the coefficient of Error Correction Model be significant and negative. Its sign should be negative if it

is to play the role of error correction. Specifically, if actual equilibrium value is too high, the error correction term will reduce it while if it is too low, the error correction term will raise it.

(C) Granger Causality Test

Causality can be described as the relationship between cause and effect. The term causality suggests a cause and effect relationship between two sets of variables say Y and X. In line with most of the literatures in econometric, one variable is said to Granger cause the other if it helps to make a more accurate prediction of the other variable .Granger causality between variables cannot be interpreted as real causal relationship but merely shows that one variable can help to predict the other one better.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This section of the research work covers the presentation of the empirical results as well as the analysis and discussion of the results. The analysis begins with the exploration of time series properties of the variables used in the model through test for stationarity.

4.2 Unit Root Test

Table 1: Results of the Augmented Dickey Fuller (ADF) stationarity test

Variables	Test Statistics	Order of integration
Bond price	-4.158	I(1)
Interest rate	-4.561	I(1)
Money supply	-3.264	I(1)
All share index	-8.236	I(1)
Inflation rate	-5.090	I(1)

The result of the augmented Dickey fuller {ADF} unit root test is presented above. From the result, all of the variables are stationary at first difference. The condition for testing for contegration has been met. The idea behind cointegration is that even if some variables are not stationary their linear combination may be stationary after all. The existence of cointegration confirms co-movement among the variables and consequently long run relationship exists among the variables

Being multivariate function Johansen methods of cointegration is employed and the result is presented in table 2.

4.3 Cointegration Test

Table 2 Johansen Cointegration test

Trace statistics Value	5% Critical Value	Maximum Rank
74.6031	68.52	**0**
47.3315	47.21	**1**
26.3371*	29.68	**2**
10.9478	15.41	**3**
0.8287	**3.76**	**4**

Source: Author's Computation

Note: {**} denotes rejection of the hypothesis at 5% level of significance.

The result of the Johansen co-integration test presented above shows that the hypothesis of no cointegration is rejected at 5% level. However, it indicates at least two co-integration equations. The result therefore confirms the existence of cointegration among the variables. Consequently we can conclude that there exists a long run relationship between bond price and other variable used as independent variable including interest rate. This is an indication of a long run relationship.

To assess the long run relationship, we estimate the cointegrating equation which also explains the impact of each variable including interest rate on bond price in Nigeria. The cointegrating equation is shown in table 3

4.4 Estimated Cointegrating equation (Long run relationship)

Table 3: Cointegrating equation for bond price

Variables	Coefficients	Standard errors	z	P>|z|
Interest rate	-.4224047**	.2153609	-1.96	0.050
Money supply	.2186217*	.1157802	7.29	0.000
All share index	-.1086633***	.2510749	1.89	0.059
Inflation rate	.1178622***	.1617623	-4.33	0.000
Constant	-.927786			

Chi Sq=120.6595 Prob (Chi Sq) =0.0000

The results in 3 confirm the existence of a long run relationship between bond price and other variables used in the model. Firstly, the coefficient of interest rate is -.4224047. This indicates that there exist an inverse relationship between bond price and interest rate. The coefficient is also statistically significant at 5%. The implication is that interest rate has significant impact on bond price in the long run model.

Secondly, money supply is another variable used in the model. The coefficient is .2186217. the implication is that there is a direct relationship between bond price and money supply. Though the coefficient fails to pass the test of statistical significance at 5% but it does at 10%. This shows that money supply has a relative significant impact on bond price.

Again, inflation has shown a significant positive relationship with bond price. Specifically, the coefficient is .1178622. The meaning is that inflation has a significant direct impact on bond price. This is shows that inflation might be a significant factor affecting bond price.

For all share index, the coefficient is -.1086633. Thus, it implies that all share index has inverse relationship with bond price. Hence, all share index has significant impact on bond price in the long run during the period under review.

Finally, the whole model of cointegration passed test of statistical significance at 5% this is shown by the chi square value of 120.6595 and the probability of 0.0000. The implication of this is that interest rate and other variables used in the model have significant long run impact on bond price during the period under review.

To examine the short run pattern of relationship between bond price and other variables including interest rate, the vector error correction model is examined. The result is presented in table 4.

4.5 Vector Error Correction Model (Short run relationship)

Table 4: Vector error correction model VECM for DBP

Variables	Coefficient	Standard error	z	P>|z|
-ce1 L1.	-.1105752**	.1726152	-0.64	0.022
bpLD.	-.3842042	.2741094	-1.40	0.161
intrLD.	.2582713	.1670268	0.15	0.877
infr LD.	-.1868468	.1840083	-0.10	0.919
ms LD.	-.6105845	.78612	-0.78	0.437
asiLD.	-.8923945**	.4076145	-2.19	0.029
Constant	.2141047	.6157464	0.00	1.000

R square= 0.4357 Chi= 13.89993 0.0000

The vector error correction model results in table 4 shows that the short run results might not be as significant as the long run results. None of the independent variables has significant short run impact on bond price except all share index. The coefficient of all share index is -.8923945, this is an indication that the short run inverse relationship between bond price all share index is sustained through the long run.

All other variables fail to pass individual statistical test, thus they might not have significant short run relationship with bond price. Therefore the impact of all these variables namely interest rate, inflation rate, money supply appears to have stronger long run impact than short run impact on bond price.

However, it should be noted that the error correction coefficient of is correctly signed and it is also significant at 5%. The implication is that there is disequilibrium and disequilibrium will bring in adjustment process that will restore the equilibrium position. The feedback is also shown through the error correction coefficient.

Precisely, the error correction coefficient is -.1105752. This implies that about 11% feedback is expected from the past disequilibrium this shows the speed of adjustment process. On the whole the ECM coefficient is significant and correctly signed and be able to play the adjustment role very well.

Moreover, the short run model shows a moderately low R square of 0.4357 which means that about 43% variation in the output is accounted for by its determinants. The VECM chi square value of 13.89993 is statistically not significant at 5% level. This result further shows that the relationship between bond price and other variables including interest rate are not significant in the short run.

4.6 Granger causality test

Table 5

Equation	Excluded	F	df	df_r	Prob > F
Bp	intr	2.6186	5	11	0.0852
Bp	ALL	2.6186	5	11	0.0852
Intr	bp	4.8979	5	11	0.0133
Intr	ALL	4.8979	5	11	0.0133

Table 5 shows that the null hypothesis that interest rate does not granger cause bond price is accepted at 5%. Though, it will be rejected at 10%. However, the null hypothesis that bond price does not granger cause interest rate is rejected at 5% and the alternative hypothesis that bond price granger cause interest rate is accepted at 5%. The implication is that there exist a bi-directional causality between bond price and interest rate. Though, bond price can granger cause interest rate more than interest rate causing bond price.

4.7 Discussion of findings

Firstly, the result has shown that bond price and interest rate are inversely related. Also, it further shows from the result that the relationship is significant. In other words, interest rate has significant impact on bond price. The significant inverse relationship implies that for example if there is an increase in interest rate, there will be a fall in bond price significantly. The findings from the result on the relationship between bond price and interest rate conform to apriori expectation.

Again, money supply shows a relatively significant positive relationship with bond price. The implication is that the higher the money supply the higher the bond price. This also conforms to apriori expectation. The link is that as money supply rises, it increases demand in favor of bond which automatically will lead to rise in its price.

Inflation from the model shows a significant positive relationship with bond price. It forms a spiral chain of action with money supply. That is, as money supply rises, inflation triggers and bond price also rises. This relationship also conforms to apriori expectation.

All share index exhibit an inverse relationship with bond price. The relationship is significant both in the long and short run periods. This makes all shares index a very important factor that affects bond price. The inverse relationship indicates that, when all share index falls it can be attributed to increase in bond price and vice versa.

In addition, the relationship between all the variables used in the model with bond price appears to be more significant in the long run than in the short run. Definitely, result from the study shows that interest rate and other variables have more of permanent effect on bond price than transitory effect.

Finally, the granger causality test has confirmed that both bond price and interest rate has symbiosis relationship. In that they can both cause each other. But the bond price can cause interest rate more.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Interest rate and Bond prices are part of the important factors that can bring about economic growth in a country. The impact of Interest rate on bond prices provides important implications for monitory policy, risk management practices, financial Securities valuation and government policy (Oni 2006).

Generally, interest rate is considered as the cost of capital, meaning the price paid for the use of money for a period of time. From the point of view of a borrower, interest rate is the cost of borrowing money (borrowing rate). From a lender's point of view, interest rate is the fee charged for lending money (lending rate) Fahm, (2006). Interest rate can also be seen as the cost of borrowing and can also used as a discount rate to discount future cash flows to the financial assets .Interest rates does play a crucial role in the efficient allocation of resources aimed at facilitating growth and development of an economy and as a demand management technique for achieving both internal and external balance and it is also one of the macroeconomics variables that affect the performance of the bond market.

A bond is a debt security in which the issuer owes the holder a debt and is obliged to repay the principal and interest (coupon) at a later date, termed maturity. Other stipulations may also be attached to the bond issued, such as the obligation of the issuer to provide certain information to the bondholder or limitations on the behavior of the issuer. Bonds are generally issued for a fixed term (the maturity) longer than one year (Olashore2006)

The motivation for this study is that the Nigerian economy has been highly prone to interest rate instability and fragility and the financial systems of most developing countries including Nigeria have being under stress as a result of the economic shocks of the 1980's. Financial repression manifested largely through indiscriminate distortions of financial prices including interest rates which tends to reduce the real rate of growth and the real size of financial system.

Based on the foregoing, it appears that the problems of interest rate and other macro economic variables have been of great effect on bond prices, other debt instruments. The bond market and capital market in general has been prone to this problems and this has made it not to be able to contribute much to the financial stability of the country as expected. Consequently, there is need to make bond price one of the variables that can be used to ameliorate the problem of financial instability in Nigeria.

Relevant literature was reviewed in the study ranging from conceptual, theoretical to empirical literature. Ivanovski , Draganov and Nadica (2013) worked on Interest rate risk of Bond Prices and Valuation on Macedonian Stock Exchange. The findings of this article is that T-Bonds traded at MSE are not sensitive on Interest rate changes due to institutional investors permanent higher demand and at the same time, market limited offer of risk – free institutions. Also, Kandel, Offer and Sang (1996) worked on Real Interest rate and Inflation: An Ex-ante Empirical Analysis. In this work, a method was developed for measuring ex-ante real interest rate using prices of index and nominal bonds. The finding was that there exist a negative correlation between ex-ante real interest rate and expected inflation and this is in line with the theory of Mundel and Tobin. According to Adams (1992), the functions of interest rate are as follows: it helps to guarantee that current savings will flow into investment that will promote economy growth, it retains the available supply of credit, generally providing loadable funds to those

investment projects with the highest expected returns and it brings the supply of money into balance with the polices of demand for money.

5.2 Conclusion

In conclusion, the study conducted on the nexus between bond price and interest rate in Nigeria for the period of 1988 to 2014 using the Estimated Cointegrating procedure confirms a long run relationship between bond price and interest rate during the period under consideration .The result equally indicates direct relationship between bond price and money supply .On the relationship between inflation and bond price, the test conducted shows a positive relationship between the variables. Also, the result obtained between all share index and bond price showed an inverse relationship.

The unit root test conducted on the variables under consideration showed that all the variables under consideration are integrated of order one at 5% level of significance. The Johansen cointegration test result conducted indicates that there are at most two Cointegrating equations. From the Vector Error Correction model conducted, the result showed that none of the independent variables except all share index has a significant short run impact on bond price in Nigeria during the period of study. While testing for the direction of causality between bond price and interest rate ,the Granger Causality test result obtained indicates that the null hypothesis that interest rate does not granger cause bond price is accepted at 5%level of significant. The result also showed that the null hypothesis is rejected at 10 % significance level.

5.3 Recommendations

As a result of the findings of this research, the followings are suggestions as per the best course of action that should be embarked upon

1. The government should introduce a low interest rate regime that will enhance economic growth in Nigeria.

2. Government should introduce an effective curriculum to schools to make the student understand the workings of the economy by exposing them to monetary policy rules and the institutions governing the financial market.

3. Further study that will cover the period of 1970 to 2015 should be done on the nexus between bond price and interest rate in Nigeria so as to give a broader outlook and robust information on the stock market variable.

4. There is need for the government to articulate appropriate incentives and policies to ensure that lending rate is on one digit(not high) in order to encourage investors to invest in Bonds, Stocks and equities so as bring about higher stream of income into the capital market.

5.In other to enable the capital market to take full advantage of the various opportunities and cope with challenges ,interest rate must be properly put to check and this must be done in relation to appropriate monetary policies to ensure macroeconomic stability.

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APPENDIX

Data Presentation

YEARS	INTR	INFR	MS	ASI	BP
1988	1.9875	17.82053	31.66025	117.2833	2940
1989	0.316667	7.435345	30.67908	117.2833	6131.9
1990	0.724167	5.717151	31.99899	149.8167	8226.6
1991	0.874167	11.29032	24.10828	176.9167	12250
1992	3.666667	54.51122	23.16848	210.8083	11147.4
1993	5.766667	50.46669	18.18904	273.8688	11598.1
1994	5.516667	7.3644	19.36113	423.6583	17800.8
1995	5.125	13.00697	20.81904	671.6167	19276.4
1996	6.716667	44.58884	16.78443	931.0167	28165.7
1997	8.408333	57.16525	16.93226	1229.025	28482.6
1998	7.391667	57.03171	18.81076	1913.225	48878.6
1999	6.7025	72.8355	14.80754	3815.117	83102.2
2000	6.7775	29.26829	12.20102	5955.142	139847
2001	10.62583	8.529874	13.60816	7638.592	211408.6
2002	8.075833	9.996378	16.88733	5961.875	308857.8
2003	7.479167	6.618373	19.07996	5264.192	438481.3
2004	9.583333	6.933292	18.55932	6701.175	313848.6
2005	8.1825	18.87365	21.96494	10185.08	406053.4
2006	8.100833	12.87658	20.09739	11631.87	456984.6
2007	6.496667	14.03178	18.99775	15559.9	532292.1

2008	5.482494	14.99803	16.69228	24738.56	513003.4
2009	7.415833	17.86349	16.09758	22876.72	738585.4
2010	7.1575	8.239527	16.50381	25343.55	532453.2
2011	6.650833	5.382224	22.5493	48773.31	592234.1
2012	3.509	11.57798	30.09288	50424.7	441590
2013	5.065	11.53767	38.11653	23091.55	188298.9
2014	5.065	13.7202	22.45199	24775.59	652493.1

Source: CBN Statistical Bulletin.

___ ____ ____ ____ ____ (R)

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Notes:

1. (/m# option or -set memory-) 500.00 MB allocated to data
2. (/v# option or -set maxvar-) 5000 maximum variables

running C:\Users\hp\Desktop\Stata11\profile.do ...

unable to change to D:\Research\CRA\

r(170);

. *(6 variables, 27 observations pasted into data editor)

. save "C:\Users\hp\Desktop\Stata11\ronke.dta"

file C:\Users\hp\Desktop\Stata11\ronke.dta saved

. *(6 variables, 27 observations pasted into data editor)

. save "C:\Users\hp\Desktop\Stata11\ronke.dta", replace

file C:\Users\hp\Desktop\Stata11\ronke.dta saved

. tsset year, yearly

time variable: years, 1988 to 2014

delta: 1 year

. dfuller intr, lags(1)

Augmented Dickey-Fuller test for unit root Number of obs = 25

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

Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value

Z(t)	-2.425	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.1348

. dfuller D.intr, lags(1)

Augmented Dickey-Fuller test for unit root Number of obs = 24

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

Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t) -4.561	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0002

. dfuller infr, lags(1)

Augmented Dickey-Fuller test for unit root Number of obs = 25

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

Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-3.089	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0274

. dfuller D.infr, lags(1)

Augmented Dickey-Fuller test for unit root Number of obs = 24

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

Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value

Z(t)	-5.090	-3.750	-3.000	-2.630

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

. dfuller ms, lags(1)

Augmented Dickey-Fuller test for unit root Number of obs = 25

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

Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-2.740	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0673

. dfuller D.ms, lags(1)

Augmented Dickey-Fuller test for unit root Number of obs = 24

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

Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-3.264	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0166

. dfuller asi, lags(1)

Augmented Dickey-Fuller test for unit root Number of obs = 25

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

Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value

Z(t)	-1.333	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.6138

. dfuller D.asi, lags(1)

Augmented Dickey-Fuller test for unit root Number of obs = 24

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

Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t) -8.236	-3.750	-3.000	-2.630

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

. dfuller bp, lags(1)

Augmented Dickey-Fuller test for unit root Number of obs = 25

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

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-0.840	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.8072

. dfuller D.bp, lags(1)

Augmented Dickey-Fuller test for unit root Number of obs = 24

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

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value

Z(t)	-4.158	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0008

. vecrank bp intr infr ms asi, trend(constant)

Johansen tests for cointegration

Trend: constant Number of obs = 25

Sample: 1990 - 2014 Lags = 2

---

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	30	-787.75788	.	74.6031	68.52
1	39	-774.12207	0.66407	47.3315	47.21
2	46	-763.62488	0.56819	26.3371*	29.68
3	51	-755.93022	0.45967	10.9478	15.41
4	54	-750.87067	0.33287	0.8287	3.76

5 55 -750.45632 0.03260

. vec bp intr infr ms asi, trend(constant)

Vector error-correction model

Sample: 1990 - 2014 No. of obs = 25

AIC = 65.04977

Log likelihood = -774.1221 HQIC = 65.57715

Det(Sigma_ml) = 5.41e+20 SBIC = 66.95121

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_bp	7	121165	0.4357	13.89993	0.0530
D_intr	7	1.60974	0.3094	8.0651	0.3269
D_infr	7	18.0837	0.2538	6.121637	0.5256
D_ms	7	3.55142	0.6079	27.90504	0.0002

```
D_asi          7   8239.34  0.1527  3.244007  0.8615
------------------------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
D_bp         |
       _ce1 |
        L1. |  -.1105752   .1726152    -0.64   0.022    -.4488948    .2277444
            |
         bp |
        LD. |  -.3842042   .2741094    -1.40   0.161    -.9214488    .1530404
            |
       intr |
        LD. |   .2582713   .1670268     0.15   0.877    -30153.95    35319.37
            |
       infr |
        LD. |  -.1868468   .1840083    -0.10   0.919    -3793.343    3419.649
```

```
             |
          ms |
          LD. |  -.6105845   .78612   -0.78  0.437   -21513.51   9301.824
             |
         asi |
          LD. |  -.8923945   .4076145   -2.19  0.029   -16.91304   -.9348474
             |
       _cons |   .2141047   .6157464    0.00  1.000   -120662.7   120705.5
-------------+----------------------------------------------------------------
D_intr       |
      _ce1 |
          L1. |  -7.50e-08   2.29e-06   -0.03  0.974   -4.57e-06   4.42e-06
             |
          bp |
          LD. |  -5.98e-07   3.64e-06   -0.16  0.870   -7.74e-06   6.54e-06
             |
       intr |
          LD. |  -.3671091   .2219052   -1.65  0.098   -.8020353   .0678171
```

```
             |
        infr |
          LD. |  .0097364   .0244466     0.40   0.690    -.0381781    .0576508
             |
          ms |
          LD. |  -.2175819   .1044408    -2.08   0.037    -.422282   -.0128817
             |
         asi |
          LD. |  -.0000762   .0000542    -1.41   0.159    -.0001823    .0000299
             |
       _cons |   .3423808   .8180561     0.42   0.676    -1.26098    1.945741
-------------+----------------------------------------------------------------
D_infr       |
       _ce1 |
          L1. |  -.000059   .0000258    -2.29   0.022    -.0001095   -8.53e-06
             |
          bp |
          LD. |  -7.89e-06   .0000409    -0.19   0.847    -.0000881    .0000723
```

```
             |
        intr |
         LD. |  -2.351885   2.492852    -0.94   0.345   -7.237785    2.534015
             |
        infr |
         LD. |    .513011   .2746297     1.87   0.062   -.0252534    1.051275
             |
          ms |
         LD. |  -.7084162   1.173273    -0.60   0.546   -3.007989    1.591156
             |
         asi |
         LD. |  -.0004773   .0006084    -0.78   0.433   -.0016697    .0007151
             |
       _cons |   -18.9842   9.189927    -2.07   0.039   -36.99613   -.9722732
-------------+----------------------------------------------------------------
D_ms         |
       _ce1 |
         L1. |  -9.14e-06   5.06e-06    -1.81   0.071   -.0000191    7.80e-07
```

```
             |
          bp |
         LD. |  -5.16e-06   8.03e-06    -0.64   0.521    -.0000209    .0000106
             |
        intr |
         LD. |   -.2608078   .4895677    -0.53   0.594    -1.220343    .6987272
             |
        infr |
         LD. |   .0090419   .0539342     0.17   0.867    -.0966671    .1147509
             |
          ms |
         LD. |   -.1395512   .2304174    -0.61   0.545    -.5911611    .3120587
             |
         asi |
         LD. |   .0003781   .0001195     3.16   0.002     .0001439    .0006122
             |
       _cons |   -3.715278   1.804797    -2.06   0.040    -7.252615   -.1779402
-------------+----------------------------------------------------------------
```

D_asi						
_ce1						
L1.	.001538	.011738	0.13	0.896	-.0214682	.0245441
bp						
LD.	-.0065906	.0186398	-0.35	0.724	-.0431238	.0299427
intr						
LD.	809.7276	1135.803	0.71	0.476	-1416.405	3035.86
infr						
LD.	-77.19175	125.1278	-0.62	0.537	-322.4378	168.0543
ms						
LD.	-550.8593	534.571	-1.03	0.303	-1598.599	496.8807
asi						
LD.	.0538059	.2771828	0.19	0.846	-.4894623	.5970741

```
             |
       _cons |  1538.779   4187.15    0.37   0.713   -6667.883    9745.442
------------------------------------------------------------------------------


Cointegrating equations

Equation       Parms    chi2     P>chi2
----------------------------------------
_ce1             4    120.6595   0.0000
----------------------------------------

Identification:  beta is exactly identified


   Johansen normalization restriction imposed

------------------------------------------------------------------------------
        beta |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
_ce1         |
          bp |           1          .       .       .            .           .
        intr |  -.4224047   21536.09    -1.96   0.050    -84450.43   -30.51265
```

infr	.1178622	1617.623	7.29	0.000	8615.74	14956.71
ms	.2186217	11578.02	1.89	0.059	-830.3353	44554.67
asi	-.1086633	2.510749	-4.33	0.000	-15.78731	-5.945357
_cons	-.927786	.	.	.	.	.

.Table 5

. vargranger

Granger causality Wald tests

Equation	Excluded	F	df	df_r	Prob > F
bp	intr	2.6186	5	11	0.0852
bp	ALL	2.6186	5	11	0.0852
intr	bp	4.8979	5	11	0.0133
intr	ALL	4.8979	5	11	0.0133

. vac soc bp unrecognized command: vac

r(199);. vacsoc bp

unrecognized command: vacsoc

r(199);. varsoc intr bp infr ms asi, maxlag(8)

Selection-order criteria

Sample: 1996 - 2014 Number of obs = 19s

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-623.665				3.8e+22	66.1753	66.2174	66.4238
1	-579.37	88.59	25	0.000	5.5e+21	64.1442	64.3966	65.6354
2	-544.203	70.334	25	0.000	3.9e+21	63.074	63.5367	65.8079
3	217.874	1524.2	25	0.000	1.6e-11*	-14.513	-13.84	-10.5365
4	2423.52	4411.3*	25	0.000	.	-245.108	-244.309	-240.386
5	2439.74	32.441	25	0.146	.	-246.815*	-246.016*	-242.093*
6	2345.88	-187.73	25	.	.	-236.935	-236.136	-232.213
7	2205.84	-280.08	25	.	.	-222.194	-221.394	-217.471

| 8 | 2023.7 -364.29 25 . . -203.021 -202.221 -198.298 |

+----------+

Endogenous: intr bp infr ms asi

Exogenous: _cons