Determinants of Bond Market Development in Nigeria

By

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Declaration

I declare that this dissertation titled "Determinants of Bond Market Development in Nigeria" is a product of my research effort conducted while in the Department of Accounting under the supervision of Professor Sani Abdullahi, Dr. Ahmed Bello, and Professor A.U. Sanda. The information sourced from the literature has been duly acknowledged in the work as well as referenced. There has been no prior presentation of any portion of this dissertation for another Degree or Diploma at any institution. I take the sole responsibility for all errors therein.

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Certification

This Dissertation titled "Determinants of Bond Market Development in Nigeria" by Luka MAILAFIA (PhD/Admin/01339/2006-2007) meets the regulations governing the award of the Degree of Doctor of Philosophy (Ph.D.) in Accounting and Finance of Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation.

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Dedication

I hereby dedicate this Ph.D. work to my father, Mallam Mailafia Gambo, who once sold our only dog to pay my school fees.

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Abstract

The various financial crises all over the globe underscore the need for economies to have vibrant bond markets to augment their financial portfolios. Among other benefits, this will enable them to support rapid and sustained infrastructural development, which in turn will lead to swift economic growth. The small size of the Nigerian bond market, the accompanying huge infrastructural challenges, the overdependence on external debt and Deposit Money Banks (DMBs), the lopsided empirical evidence, which is concentrated on western and Asian economies coupled with mixed findings in related studies call for the need to examine the factors that promote the country's bond market development. This study therefore examines the influence of bond market determinants on the development of the bond market in Nigeria. To this end, the study disaggregates bond market into corporate and government debt markets. The research utilizes secondary data sourced from Central Bank of Nigeria (CBN) Statistical Bulletin, World Bank, and Securities and Exchange Commission (SEC) covering 32 years (from 1980 to 2011). The Vector Error Correction Model (VECM) is employed as technique of data analysis. The Augmented Dickey-Fuller (ADF) stationarity test, the Johansen Co-integration test and other tests are carried out to ensure the robustness of the results. The findings of the study reveal that bank size, external debt, money supply and size of the economy are significant determinants of corporate bond market development in Nigeria. Also, level of economic development, budget deficit and bank size are significant determinants of government bond market size in Nigeria. However, bank size, money supply and external debt are seen to be the most important and significant drivers of total bond market size in Nigeria. Some of the key recommendations of the study include: developing the capacity of the banking sector to provide more qualitative and productive credit, channelling a substantial part of the existing pension funds towards investing in bonds, balancing bank finance and bond markets, and restricting finance raised through external borrowing to infrastructural projects.

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CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Bond financing has become a global phenomenon and constitutes a focal point for project financing by both public and private sectors of most economies. This key role of the bond market in meeting financial needs makes it so imperative that concerted efforts have to be made to ensure its sustained development. As a result of this, the development of domestic debt securities markets has increasingly attracted the attention of national and international policy makers (Financial Stability Forum, 1999). The domestic debt, which is predominantly government bond, stems from the need to identify and exploit alternative financing sources by other tiers of government (states and local governments) to bridge the persistent national budget deficit financing gap as well as the infrastructural need of economies. The private sector also needs funds for investment and infrastructure. Such dearth of resources required for project or infrastructure financing by most economies, coupled with the high cost of borrowing from the banking sector triggers the preference for domestic debt securities, which provides less risky, less costly and easily accessible financial sources.

Bond market development, which involves domestic debt (typically Federal Government, State Government, and municipal bonds) as well as corporate bond development, is a crucial aspect of debt management. It supports the external debt component and ensures an equitable debt portfolio of a country as well as reduces pressure on foreign debt. The essence of domestic and public debt management is to ensure that government financial needs and its payment obligations are met at the lowest possible cost over the medium to long run, consistent with a prudent degree

of risk (IMF and World Bank, 2001). An effective domestic debt management would enhance efficient budget deficit and project financing. In a similar vein, effective public debt management would ensure a balanced and sustainable national debt portfolio, eliminate the problem of debt overhang, and facilitate efficient project financing.

The bond market in Nigeria has undergone a series of challenges over the years, with accompanying policy efforts by the Nigerian government towards its sustainability. Despite being only a subset of the capital market, bonds have continued to witness relative growth irrespective of the global economic meltdown and the subsequent Nigerian stock market crash of 2009.

The Federal Government of Nigeria (FGN) is the main issuer of government bonds, which is implemented under a monthly programme for bond issuance. In the same vein the subnationals (States and Local Governments) and corporate organisations issue state government bonds, local government bonds, and corporate bonds occasionally. Bond issuance by the respective governments would require the approval of the law makers, a guarantee and sometimes a counter-guarantee, as well as the involvement and approval of the Federal Ministry of Finance based on the advice of the Debt Management Office (DMO).

Both the government and the private sectors require sufficient liquidity to support the financing of capital projects. Banks and other corporate organisations therefore raise bonds to boost their liquidity. The liquidity generated by banks arising from corporate bonds could boost the usual deposits derivable from customers, and create an impetus for supporting project financing even

in the private sector. An effective bond market therefore facilitates access to alternative sources of debt capital thereby serving as a supplement to bank financing (Harwood, 2000).

Bond financing entails raising funds through bonds and channelling such to various projects. It is justified by the argument that it provides alternative sources of finance thereby facilitating financial diversification, and subsequent risk reduction. This implies that the predominantly long term bond financing is expected to correct the imbalance in the largely short term financing from the money market.

Over time, several scholars have advocated for diversification by investment through bonds. Harwood (2000), Kim (2000), Witherell (2003), Battellino (2004) and Grandes and Pinaud (2004) provide strong arguments in support of diversification through bond markets as a cushioning effect for the pressure on the money market, which if not properly addressed, may have a spiral effect reflected by non-investment and reduction of aggregate demand through multiplier effect on the economy.

From the institutional investment perspective, the Pension Reform Act of 2004, which enables pension fund managers to diversify the funds derived from the 15% of basic salary of employees, has the capacity to provide an impetus for the growth and development of the Nigerian bond market. Such non-bank financial sectors have the capacity to provide a larger chunk of financing to the economy than the banking sector. This is confirmed by the projection that the pension scheme would in the next couple of years generate about $7.8 billion annually (Etu and Edu,

2007). This signifies an ample opportunity for investment in infrastructure, if a substantial chunk of such pension funds are channelled through the bond market.

In most developing countries, corporate financing is derived from the banking sector while the debt markets are dominated by the government sector (Silva, 2008). However, over the years, as the domestic debt outstanding in Nigeria has been rising, the corporate bonds activities have been dwindling. This necessitates the timely resuscitation of corporate bonds in Nigeria, which requires the corporate efforts of government, regulators and the private sector.

In examining the strategic role of bond markets, Kahn (2005) posits that bond markets, which attract foreign investors, could contribute to the economy by providing an efficient economic system, greater investment opportunities, and help deepen financial markets. This would direct the pattern of monetary policy, and enhance inflows of foreign investment.

Since persistent reliance on foreign debt, especially where such debts are not project-driven, could lead to debts overhang even if 'concessional' in nature, the option of expanding the domestic debt needs to be explored. However, provided a debt is project driven and sustainable, with strong justification for its existence, it may be encouraged.

The DMO (2008) identifies some of the common reasons for issuing bonds as restructuring of NTBs into FGN Bonds of longer maturities, financing the budget deficit, redemption of maturity bonds and exercise of call options on the local contractors Bonds, and funding of government's special needs.

Bond markets contribute to the economy by attracting foreign investors, the provision of an efficient economic system, greater investment opportunities, and deepening of the financial markets. It also ensures monetary policy direction, interest rate across maturity spectrum and the opportunity to hedge lending in the bond market (Kahn, 2005). It is glaring that developing a vibrant domestic bond market would also address the problem of original sin as confirmed by Eichengreen and Hausmann (1999), Bordo, Meissner and Redish (2003) in Kahn (2005), Goldstein and Turner (2004) and Kahn (2005).

According to Ahmed (2009), what Nigeria needed for such projects as roads, electricity, oil and gas, railways between 2009 and 2012 (six years) was over $100 billion, which indicates the huge financial requirement for such infrastructural projects. This implies that without recourse to diversification of finance sources, the bond financing option inclusive, an impending major shortfall in infrastructure financing in Nigeria is obvious. There is the dearth of financial resources available for funding infrastructure projects on a long term basis in Nigeria. This justifies the need to rely on other sources like bonds and concessions derived from private sector participation. Thus, it is obvious that both government bond market and the corporate (private) bond market are crucial to stimulating economic growth especially in developing economies like Nigeria.

Investment in bonds has become inevitable due to the volatile nature of the Nigerian capital market, particularly the equity aspect, as well as over-dependence on the banking sector for financing, and the need for further diversification into other alternative financing sources. Thus, the concessioning policy of the Federal Government of Nigeria as facilitated by Infrastructure

Concession Regulatory Commission (ICRC), has paved the way to various concessioning arrangements, like the Public-Private Partnership arrangements and Joint Venture Companies (JVC) among others. However, this would be a mirage without recourse to bond financing. The private sector through private companies, especially the blue chip companies, if granted an enabling environment, could serve as a huge source of corporate bonds, which could be channelled towards investment in infrastructure.

The global financial meltdown, arising from the sub-prime lending crisis and culminating in the crashing of some giant financial institutions in the US and Europe, is reflected by the downward trend of most economic fundamentals in Nigeria. However, such downward trend was accompanied by a paradoxical rise in the Nigerian bond market performance. There were major drops in Nigerian economic fundamentals as at 2008, some of which include; Crude oil price (from $147 to below $45 per barrel), market capitalisation of equities (N12.1 Trillion at the end of March to N6.21 December 2008 before finally closing at N9.56), external reserve balance (US$62bn to US$52.8bn), and currency (N116 per dollar to 131.25 per dollar (DMO, 2009). Meanwhile from the same report for the same period, the Nigerian bond market turnover closed at N10.9 trillion, up from N4.1 trillion. This statistics is bound to generate the interest of scholars towards further inquiry on the Nigerian bond market.

Most nations like the United States of America (USA), China, and Japan that have succeeded in realising huge infrastructure base had to rely on bonds. In Nigeria, especially the sub-national level, most states that are believed to be outstanding in terms of infrastructure such as Lagos State, Cross Rivers State, Rivers State and Akwa Ibom State, among others, have at the nuclear

point of their success story project financing through bonds. This study is therefore expected to provide a policy framework on financial and macroeconomic related fundamentals that should enhance bond market development in Nigeria.

1.2 Statement of the problem

Developing countries have up till date relied much on external debt financing and their banking sectors while largely neglecting the bond market. This is in spite of the fact that external loans and bank loans sometimes attract huge interests as well as penalties for lack of prompt repayment. The external debt challenges reflected by debt crises, leading to the classification of some of those countries by lending agencies as HIPC (Heavily Indebted Poor Countries) because of their inability to repay their loans coupled with their huge infrastructural gaps, is reflected by poverty, mismanagement and poor strategic financial management.

Although the Nigerian capital market appears to be vibrant, the equity component tends to dominate the bond market, which seems to attract little attention by policy makers. The potentials of the bond market of developing economies in bridging this financing gap and serving as a cushioning effect to other sources of finance does not seem to be sufficiently and strategically explored. The relatively small size of the Nigerian bond market, the huge infrastructural challenges, the dominance of government bonds over corporate bonds, and the over reliance on Deposit Money Banks as major sources of corporate financing in spite of their vulnerability to financial shocks calls for the need to examine the factors that promote the development of the bond market.

Besides the general dearth of research on the development of the bond market in Nigeria, there are contradictory evidence in terms of methodology, direction, and extent of correlation between variables by such scholars. For instance, Eichengreen and Luengnaruemitchai (2004) on Asia, Adelegan and Radzewicz-Bak (2009) on sub-saharan Africa (SSA), Adofu and Abula (2010) on Nigeria and Bhattacharyay (2013) either differ in methodology, findings on specific variables, or scope on bond market development in developing economies. Most finance studies on emerging economies, especially less developed ones, merely focus on areas related to determinants of banking systems, and stock markets, with little attention paid to bond market development. The limited research on the bond market fails to address either the determinants of bond market development in Nigeria, or how the bond market could be further developed to a world class bond market .It is also a pertinent fact that despite the documented evidence by few scholars on determinants of bond market development globally, most of the studies focus on western and Asian economies, which include the United States of America, United Kingdom, China, Hon-Kong, Malaysia, among others.

Furthermore, there is a challenge for Sub-Saharan African (SSA) countries to identify key determinants of bond market development and to devise strategies for driving the speedy development of the respective economies. What is also not very certain is whether or not Nigeria and other economies in SSA should adopt a regional or country-specific approach to bond market development.

Looking at SSA, a regional approach to domestic bond market development may not suffice for structural factors, such as the size of the economy, its openness, and the origin of its legal system (Adelegan and Radzewicz-Bak, 2009). Besides the identified structural factors, most aspects of

evidence tend to be in support of a regional approach to bond market development. One question, which needs to be addressed therefore, is whether or not determinants of bond market development under regional perspective as revealed by most studies will suffice for a country specific study like that of Nigeria.

1.3 Research Questions

The basic research questions, which this study seeks to address include:

i) How do Size of the Economy, Money Supply, Bank Size, External Debt and Government Bond Market size influence corporate bond market development in Nigeria?

ii) To what extent do Bank Size, Level of Economic Development, Interest Rate Spread, Capital Expenditure, Budget Deficit and External Debt impact on government and bond development in Nigeria?

iii) What is the contribution of Bank Size, Budget Deficit, External Debt, Interest Rate Spread, Money Supply and Stock Capitalization to total bond market development in Nigeria?

1.4 Objectives of the Study

The broad aim of this study is to identify the determinants of bond market development in Nigeria. The specific objectives of the study are to:

i) determine the extent to which Size of the Economy, Money Supply, Stock Capitalisation, Bank Size, External Debt and Government Bond Market size influence corporate bond market development in Nigeria;

ii) assess the impact of Bank Size, Level of Economic Development, Interest Rate Spread, Capital Expenditure, Budget Deficit, and External Debt on government bond market development in Nigeria; and

iii) evaluate the contribution of Bank Size, Budget Deficit, External Debt, Interest Rate Spread, Money Supply, and Stock Capitalisation to total bond market development in Nigeria.

1.5 Research Hypotheses

In line with the objectives of the study, the following hypotheses have been stated in their null form:

i) Size of the Economy, Money Supply, Stock Capitalisation, Bank Size, External Debt and Government Bond Market size have no significant influence on corporate bond market development in Nigeria;

ii) Bank Size, Level of Economic Development, Interest Rate Spread, Capital Expenditure, Budget Deficit, and External Debt have no significant impact on government bond market development in Nigeria; and

iii) Bank Size, Budget Deficit, External Debt, Interest Rate Spread, Money Supply, and Stock Capitalisation have no significant contribution to total bond market development in Nigeria.

1.6 Scope of the Study

The study covers a period of 32 years from 1980 to 2011. The choice of this period is justified by the culmination of both the downward and upward trends of the Nigerian bond market within which the market realised significant policy changes. The study examines bond market development with respect to government, corporate, and total bond market size with Nigerian bond market as its domain. The research does not focus on yield curve behaviour (term structure of interest rates) neither does it delve into detailed study bordering on liquidity. Rather, it concentrates on the development of bond market as influenced by institutional, financial, and macroeconomic variables.

1.7 Significance of the Study

It is hoped that regulatory bodies like the Securities and Exchange Commission (SEC), and policymakers will find the result of this study useful. This is because the key determinants or drivers of the Nigerian bond market development could be deployed for policy formulation and reforms in the bond market, and capital market in general. The findings of the study will also provide insight to policymakers and regulatory agencies towards initiating innovative avenues for the rapid development of the bond market, which should eventually reduce the overdependence on bank financing and its imminent effects. This would shape their focus on certain bond market fundamentals, which they could beam their searchlights upon.

Market participants like the Primary Dealer Market Makers (PDMMs) can utilise the findings of the research by assessing the determinants that constrain their markets' growth and devise means

of addressing them as well as contribute towards bringing in innovations towards enhancing the trading platform for the bond market in Nigeria.

Other benefits of the study include: an insight to the Debt Management Office (DMO) and the Security and Exchange Commission (SEC) towards developing both domestic and corporate bond borrowing strategies, and assist in guarding against the problem of original sin from the country's debt portfolio; revelation of the potentials, opportunities and direction for investment to international investors; and provision of insight on policy issues that will generate intellectual discussion. The new set of findings unique to Nigeria will contribute to literature on the subject.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter conceptualises the bond market development and its determinants, as well as reviews the key transformations, impediments, and determinants of bond market development available in most literatures, identifies the nexus between bond market activities in Nigeria, and other bond markets around the world. It also attempts to link the models developed for the study to the existing theories.

2.2 Conceptualization of Bond Market Development

The importance and centrality of the financial system to the growth of any economy is obvious and indisputable. There has been a posture by finance scholars, which suggests that a well-developed financial system boosts the efficiency of financial intermediation roles through cost reduction in terms of information, transaction and monitoring.

The bond market is a vital segment of financial system, and remains central to the development of an efficient economic system. Investment in bonds usually fills a major gap in the financial markets by generating returns that compensate for the cost of funds over the repayment period. The non- investment in bonds within the financial markets has a tendency of limiting investment options. This entails that the network of trading or investment activities in various bonds makes up a bond market.

A bond is viewed as certificate of indebtedness issued by a borrower to a lender (Onaolapo and Oluwafemi, 2010). It entails a debt instrument bearing a value, documenting and evidencing a commitment to redeem the debt at a particular coupon rate, upon maturity**.** A bond is non-collateralised debt issued by a government or corporate organisation, which doubles as a legalised IOU bearing terms of repayment.

A bond market refers to an arrangement where bonds are traded. This arrangement facilitates offer by the borrower, and acceptance, which must be backed by a consideration from the lender (Barmash, 2003). Trading in bonds therefore entails the exchange of bonds from one person or organisation to another. This may involve initial public offerings of the bonds at the primary stage, and subsequently, secondary trading of such bonds.

The ease as well as frequency of transferability of such bonds at a controlled cost (minimal transaction cost) entails bond liquidity, which is synonymous with bond efficiency. Bond market liquidity also has tendency to boost bond market development in an economy. For both corporate and domestic bond instruments, bond liquidity entails transferability of bonds. A liquid bond market therefore entails an enhanced trading efficiency of the bond market. Rigidity, which could be measured by the bid-ask spread, which is a feature of bond liquidity provides an insight on the financial commitment of the market participants in executing transactions (Gaspar, Hartmann and Sleijpen, 2002). Depth and resilience are also considered by the trio to shape the nature of liquidity of the bond market. The depth of the market determines the extent to which the bond market could cope with huge transactions, while maintaining little or no variations in bond prices. Resilience on the other hand determines the rate of dissipation of price variations.

Bond market development entails the transformations in bond market size within an economy, its access, stability, and efficiency or liquidity. The prominent aspect of bond market development is the bond market size, which is commonly considered as total value of outstanding bonds in the market as a ratio of Gross Domestic Product (GDP). Most studies on bond market development are actually hinged on the bond market size perspective.

Bond market development involves the influence of a network of bond trading activities, stock capitalisation, macroeconomic variables, bond spread, infrastructure, legal and regulatory as well as related governance issues, which add up to shape the bond market development fundamentals (indicators). Bond market development is commonly used interchangeably with bond size. It could be considered in three dimensions as done in this study, which include government bond market size (or development), corporate bond market development, and total bond market development. However, in a broader perspective, bond market development fundamentals could include bond size, bond access, bond stability, and bond efficiency or liquidity.

It is documented by Leland and Pyle (1997), Bouheas, Mizen and Yalcin (2006), and Mizen and Tsoukas (2010) that the financial situation of an organization is a fundamental determinant of access to external finance. Bond access in the context of bond market development may be more appreciated from the view point of the mix of finance accessed from the bond market comprising private or corporate bonds, and government bonds, derived from the entire bonds generated within the economy.

The domestic debt market comprises both short and long term debt instruments raised by the various arms of government including the national, and the sub-national governments, which include treasury bills, treasury certificates, treasury bonds, development stocks, and Federal Government of Nigeria (FGN) Bonds. Bond market numbers reveal that FGN bonds have eventually phased out development stocks as at December, 2011.

Although government bonds dominate the Nigerian bond market, there is the existence of corporate bonds, which emanate from private debt. They signify bonds issued by corporate organisations in the country. Thus bond market development is a highly essential ingredient in the strengthening of the financial systems of most economies. Onaolapo and Adebayo (2010) identify market infrastructures, institutional investors, active secondary bond market, and credit rating agencies as being factors necessary for the development of bond markets. The authors are of the view that the strength and extent of availability of these factors determine the extent of development of the Nigerian bond market.

In a study based on Hong Kong, Adeleke (2006) review the BIRDS model for developing bond market in an economy, covering determinants in terms of Benchmark, Infrastructure, Risk assessment, Demand and Supply dimensions. Bond market development refers to a steady improvement in the market performance of bonds over time. A more developed bond market has the tendency to reduce the lopsidedness, overdependence and inefficiency of the financing structure on not just the banking sector but other sectors of the economy.

Determinants of bond market development could be viewed from firm specific characteristics and the perspective market based characteristics. Mizen and Tsoukas (2010) identify the broad variables that determine bond market development as local market size and liquidity. It is worthwhile to acknowledge that market characteristics differ from firm characteristics in view of the microscopic nature of firms as against the macroscopic nature of the market. This study is not concerned with firm specific features of the bond market. A more vibrant corporate bond market would create a better opportunity to examine the determinants of bond market development from the firm characteristics angle. The available data on Nigeria tend to encourage a focus on the aspect of determinants of the bond market from a macroscopic perspective.

Developing a bond market would shift the focus of an economy away from foreign debt dependence thereby contributing in alleviating the challenges of having to repay such loan with foreign currency. Eichengreen and Hausmann (1999), Eichengreen, Hausmann, and Panizza (2002), Turner (2004), Bordo, Meissner and Redish (2003) in Kahn (2005), and Kahn (2005) all concur that a well developed bond market will contribute to alleviating the problem of original sin, which emanates from currency mismatch. Original sin is a term coined by Eichengreen and Hausmann (1999) and refers to the inability of developing countries to borrow abroad in their own currencies, and involves denominating a country's external debt in foreign currency, resulting in a currency mismatch.

Currency crises, which emanate from currency mismatch are characterised by depreciating domestic currency as well as rollover challenges for short-term debt, which in turn lead to balance sheet problems, thereby constituting a key source of financial instability leading to

default (Kahn, 2005). However, restructuring short term bonds to longer tenured bonds could sometimes be a beneficial repositioning strategy to the issuer.

For the purpose of this study, bond market development is used interchangeably with bond market size. The institutional, economic, and financial factors predominate the variables used in this study.

2.2.1 Bond Market Liquidity

Bond Efficiency is synonymous with bond liquidity, which has bond spreads as one of its major indicators. A study by Chabchitrchaidol and Panyanukul (2005) find out that adverse selection challenges bedevil bond market liquidity, arising from insider information on the existence of an asset in the market without reflection of current prices. Kapingura and Ikhide (2011) identify two key determinants of bond spreads, and hence liquidity in bond markets, which include volatility, and trading volume. Abdourahmane and Tonny (2002) perceive trading volume to be the best measure of liquidity, usually utilised to measure the existence of numerous market participants and transactions.

The adverse selection theory is of two fold. One perspective leading to the theory is hypothesised by Easely and O'Hara (1992), who advocate that higher trading volume justifies the presence of informed traders and culminates in increased spreads. Another perspective of the adverse selection theory is by Harris and Raviv (1993), who propose that higher trading volume indicates an increase in liquidity, signalling higher overall market liquidity. Kapingura and Ikhide (2011) utilise the summation of price and volume of bonds traded and the bid-ask spread as a measure

of liquidity and document that both volatility and trading volume are key determinants of bond spreads or liquidity of bond markets.

Mackintosh (1995) perceived liquidity from the perspective of a two-way market being made available to market participants in wholesale market size in a transparent process of determining asset fair value. O'Hara (1995), Sundaresan (1997), Gravelle (1998), and Borio (2000) point to the fact that liquidity involves a market for quick trade in securities with little cost at a narrow bid-offer spread without market prices being impacted. Fleminz (2001) and Di'az and Skinner (2001) focus on a study on the liquidity of the US bond market, comprising both the government and the corporate bond markets. They conclude that for bond market liquidity to thrive in an economy, the existence of repos, a certain level of capitalisation and a balanced combination of corporate and sovereign bonds are required.

Repos play a central role in providing liquidity for vibrant trading and financing treasury securities as well as risk in trading assets from low yielding investments to high yielding opportunities (Adyorough, 2010). Also McCauley and Remolona (2000) reveal that a critical size of about $100 - $200 billion is required to support a liquid bond market. Liquidity of both the corporate and public bond market measures the level of efficiency of the bond market. A research by the World Bank (2010) focus on liquidity of markets as reflected by the brightness of the quoted bid-offer spread and turnover ratio to measure efficiency. The financial sector development indicators (FSDI, 2010), establish that liquidity could enhance risk diversification, monitoring issuers, and allocating resources for more productive purposes.

Many studies on liquidity of government bonds focused on various proxies for liquidity. For example, Sarig and Warga (1989), Blume, Kerni and Patel (1991), Warga (1992) and Crabble and Turner (1995) address yield spreads, while Kamara (1994) and Alexander, Edwards and Ferri (2000) delve on trading volume as proxy of liquidity. Other studies such as Hong and Warga (2000), and Alexander, Edwards and Ferri (2000) examine the size of bonds in relation to liquidity. Kamara (1994) revealed that a focus only on Treasury bonds removes liquidity issues, which stem from credit risk in view of their credit-risk-free nature. This therefore, justifies the importance of the inclusion of corporate bonds in the determination of bond liquidity.

Liquidity of the bond market can also be influenced by monetary policy rates based on Central Banking activities. This in turn can affect the ability of banks to sustain acceptable levels of reserve, and liquidity ratios. Afrinvest (2010) identify five key liquidity drivers which include frequency of new bond issues, benchmark yield curve, level of confidence in the market, size of the market, the economy, and players in the market. According to Banimadhu (2003), between 30 percent and 50 percent of government securities issued in Nigeria, Tanzania and Ghana are limited non-marketable securities, which are registered to the owner and cannot be traded. Thus for the bond holders to recover the principal, they have to wait until maturity, a situation which poses a liquidity challenge to the bond market.

Many studies, especially those of Elton and Green (1998), Chabchitrchaidol and Panyanukul (2005), and Kapingura and Ikhide (2011) focus on the market microstructure perspective, and confirm that the bid-ask spread is positively related to volatility but negatively related to volume

of bonds traded. Bond efficiency or liquidity would require more microscopic work and rigorous analysis using vector auto-regression.

2.2.2 Bond Access

According to FSDI (2010), access, especially with regard to domestic market is useful and effective only when the cost of capital is low and the process of obtaining capital for the domestic private sector is relatively easy. Bond access is subdivided into ratio of domestic bonds to total bonds outstanding, and ratio of private sector bonds to total domestic bonds outstanding.

The earlier bond access ratio (ratio of domestic bonds to total bonds outstanding) helps to correct the problem of original sin, especially given a relatively developed bond market. Thus it enhances the ability of domestic markets to provide finance for issuers. The ratio of private sector bonds to total domestic bonds outstanding helps to assess the ease of access of finance for the local private sector.

Evidence provided by Faulkender and Peterson (2006) show that firms with bond market access have higher leverage compared to firms without access, which could be appreciated from a demand and supply angle. Lenders are willing to provide more funds while firm could access a cheaper source of capital. They also document in a US study that firms with bond market access (measured by having a credit rating) have reasonably higher leverage than firms without access, after controlling for demand side factors and endogenity of having a credit rating.

The FSDI (2006) under the World Bank documents a model for bond market access as: BOMAS= f(RPGDP, RPUGDP, RIBGDP, GBYDS); where BOMAS connotes Bond Market

Access (measured by credit rating), RPGDP is the Ratio of private sector bonds to GDP, RPUGDP is the Ratio of public sector bonds to GDP, Ratio of international bonds to GDP (RIBGDP), Government Bond Yield, 3 and 10 years (GBYDS), a Dummy variable (DVEG): existence of government bond market, and Dummy variable (DVEC) : existence of corporate bond market. However, the insufficient data, most of which are just being developed, especially the aspect of credit rating system, and an infinitesimal bonds poses a great deal of challenge in measuring bond market access.

2.2.3 Bond Stability

Stability in bond prices, which is measured in terms of number of new corporate bonds or value of new corporate bonds, would enhance the development of the yield curves as well as assist in minimising the cost of capital, which will therefore encourage investors (FSDI, 2010). It could therefore be deduced that bond stability in an economy naturally attracts investors, whereas a dearth of it would detract investors.

Bond stability indicator as applied by FSDI assesses volatility standard deviation, skewness of foreign bond index, maturity structure and correlation between bond returns. Volatility which is the main measure of stability is reflected by outcome of trading in bonds.

The FSDI (2006) under the World Bank documents a model for bond stability as: VNCOBS= f(RSTBD, RSTBP, RIBGDP); where VNCOBS connotes Value of New Corporate bonds (or Number of New Corporate Bonds),RSTBD is the Ratio of Short Term to Total Bonds (Domestic), RSTBP is the Ratio of short term to total Bonds (private), Ratio of international

bonds to GDP (RIBGDP), a Dummy variable: existence of bond market, and Dummy variable (e) : existence of corporate bond market.

Government Participation and Corporate Governance

Without doubt the size of the banking system, the state of economic development, and the GDP are essential elements in measuring bond market development for most countries. As such, it would not be advisable to ignore environmental factors, which are linked to governance and regulation. Institutions and structures like legal and regulatory framework as well as other socioeconomic factors need to be in place for a complete understanding of the bond market transformations in an economy.

There are other aspects as reviewed in the literature, which are considered important in influencing bond market growth and development, but have not been properly and empirically addressed by most of the reviewed studies. For instance, issues of governance and regulation otherwise called government participation.

The Asian Development Bank (2010) believes that regulation and supervision of bond markets participants must include system and procedures to protect investors, to promote sound business practices, and to address systems risk issues. Claesseurs, Klingebriel, and Schmukler (2003), as well as Burger and Warnock (2005) provide evidence from literature that protection of creditor rights in a country contribute in determining the pace of bond market development.

Stable macroeconomic policies, improved regulation, enhanced transparency, and stronger investor protection are particularly expedient for bond market development (Adelegan and Radzewicz-Bac, 2009). Building market participation and securing government commitment are germane for the success of a bond market (Harwood, 2000:10).

Disclosure and information system, a credit rating system, bankruptcy laws, intermediaries, institutional investors, trading system, and clearing and depositing system are crucial to both non-government (corporate) bond market with the first three being restricted to corporate bonds relevant to corporate and bond markets too.

Bond markets require extensive infrastructure, including well-developed accounting, legal and regulatory systems, payment and settlement systems, rating agencies, networks of brokers (Bettlellino, 2004). Adeleke (2006) in Onaolapo and Oluwafemi (2010) identify a model developed in Hong Kong known as the BIRDS model for developing bonds infrastructure, which represents Benchmark, Infrastructure, Risk Assessment, Demand, and Supply. Eichengreen and Luengnaruemitchai (2004) documented that traditions of legal system, law and order, corporate governance, transparency, and regulatory enforcement have a positive direction with bond market size. A large economy is likely to have organised structures and transparent level of regulation and risk management. This appears to boost bond market development in a country. A reliable benchmark therefore entails setting up a standard for the country's yield curve, term structure, and interest rate for the economy.

The infrastructural aspect of the BIRDS model connotes the standardization and update trading, clearing and settlement system. For example, an enhanced and reliable bond trading platform is encouraged. Risk Assessment involving assessing the risk implications of the asset. Onaolapo and Oluwafemi (2010) identify the need for rating mechanism, full disclosure of information by the issuer as germane for an effective risk assessment.

Another related study is that of LKhagvajav, Batnyam and Gan-Ochir (2008) involving development of an econometric model of bond market development, which was first initiated by Garcia (1999). The econometric model for bond market developments premised on Garcia's position that that there are institutional and macroeconomic approaches to assessing stock or bond capitalization. The institutional factors address regulatory related issues like transparency and insider information, taxation, inflation, property rights, clearance and settlement issues among others as identified by LKhagvajav *et al* (2008). The macroeconomic and related approaches have been discussed previously.

Bond Exchange of South Africa (BESA) (2005) as cited in Hove (2008) identifies robust legal environment, appropriate regulatory and supervisory environment, market infrastructure, and diversified market participants, stable macro-economic policies, and stable political environment, as forming the basic framework for assessing bond market success. Further from the BESA study, a stable political environment is determined by political stability, absence of strong interest group activity, absence of corruption, reasonable level of government capacity. It was also revealed that a robust legal environment is determined by independent legal and judicial system, and protection of property and creditor rights.

The BESA study also documents that market based framework, good corporate governance, and internationally accepted accounting standards contribute to appropriate regulatory and supervisory environment. Also, market infrastructure is sub-divided into efficient settlement systems, and adequate information flows, while diversified market participants are comprised of diversified issuer base, and diversified investors.

Evidence provided by Claessens, Klin Gebiel, and Schmukler (2003), as well as Burger and Warnock (2005) established that the main determinant of the size of the bond market is the protection of creditor rights in a country. This implies that there is a strong need setting up institutional structures, as well as providing a framework for investors' protection.

2.2.4 Macroeconomic and Socio-political Influence on the Bond Market

Ensuring macroeconomic stability, eliminating tax disadvantages, and encouraging market participation are also key ingredients required for the bond market success (Hong Kong Monetary Authority, 1999:03). Lkhagvajav, Bartnyam and Gan-Ochir (2008) examine the multivariate relationship between stock returns and monetary policy using VAR. They conducted an analysis to determine the temporal relationship between bond market development (prefixed by bond market and capitalization) and macroeconomic variables, based on a lag order 5 selected by LR test statistics. The study applied monthly data from January, 1998 to March, 2007, and augmented with the Schwarz test. It revealed that macroeconomic stability and financial intermediary development are important predictors of bond market capitalization, while the real income level and bond market liquidity do not prove significant, and that financial intermediation and bond market were substitutes rather than complements.

Eichengreen and Luengnaruemitchai (2004) establish that interest rate, exchange rate variability, absence of public sector funding needs, and interest rate variability provide a negative direction to the magnitude of bond market. Although monetary policy and bond market require some degree of government involvement, studies on the subject require a critical examination of causal relationship among the key variables.

2.2.4 Approaches to Bond Market Development

There are two basic bond market development approaches currently discussed among policy makers and scholars as identified by Scott (2007) and quoted in Hyun and Jang (2008). They are the 'on-shore market integration approach', and 'off-shore market integration approach'. The on-shore market integration approach suggests that countries should separately develop their domestic markets, and integrate them through harmonisation and standardisation. The off-shore market integration approach on the other hand, advocates for a single regional bond market for professional players. These perspectives, which emanate from various studies on the Asian bond markets, could be applicable to other global bond markets.

Clearly, the off-shore market integration approach will be more suitable for reasonably well developed bond markets, like that of Asia, or countries that have the same currencies like the case of Euro in European countries. Most countries have different peculiarities in policies, legal and regulatory frameworks, and bond market development challenges, among others, which make it more complex for a regional approach to the study of bond market development. This justifies an on-shore approach to the study of bond market development, which enables a crystal

view of an economy on a country basis as focussed by this study. This study therefore, aligns with the on-shore approach to bond market development.

2.3 Transformations and Operating Environment of the Nigerian Bond Market

The Nigerian bond market, especially the corporate bonds is relatively small compared to emerging bond markets. Sanda, Mikailu and Garba (2005) in examining the operating environment of the Nigerian Stock Exchange, give an account of the small size of the Exchange by revealing its market capitalisation statistics to be only 2%, 1%, and 0.9%, of the Malaysian, South African and South Korean stock exchanges as at 1999. Yet this statistics may even be lower when comparing the bond capitalisation of Nigeria with the respective countries in the same year. However, the rapid growth of the Nigerian bond market after the year 2000 following the establishment of the DMO, and the accompanying reforms by both the latter and the SEC, has accelerated the growth of the bond market, especially the government bonds.

The various legislations and enabling laws have contributed to the growth and development of the Nigerian bond market. The DMO Act, the Securities and Investment Act, and the Pension reforms, among others have influenced bond market development in Nigeria. Such developments, transformations and laws are discussed subsequently.

2.3.1 Transformations in the Nigerian bond market

Nigeria's government bonds, otherwise referred to as sovereign bonds dates back to the 1970s with issuance considered to be "illiquid and redeemable only to the Central Bank of Nigeria (CBN) upon maturity" (Adyorough, 2010:02).The major activities of government bonds in the

Nigerian economy could be classified into five stages. First, there was the pre-moribund era (1970s-1980s); second, there was the moribund era (1980s-2001); the third was the revival era (between 2002 and 2007); fourth, there was also the transformation era (2008-2012), and fifth is what is likely going to be an era of harmonization (2013-2016).

The pre-moribund era was characterized by corporate bonds and development stocks until the 1980s. The corporate bonds dried up significantly following the recession at the end of the oil boom in the mid 1980s (Jackson, Etti & Edu, 2007). Development stocks were the major government related instruments traded. There was little regulatory structure and uncoordinated bond market management and planning with less involvement of the Federal Government of Nigeria.

The era of Revival and Sustainability as reflected in the DMO strategic plan (2002-2007), which was developed and targeted at achieving a sustainable debt portfolio in line with economic growth and development. The government bond market activities as documented earlier were revived after 18 years of discontinuation through the issuance of FGN bonds in 2003. However, the discontinuation of the trading activities of the bond market does not imply the nonexistence of the bonds earlier traded.

Between the years 2000 and 2002, the DMO focused on the aspects of debts rescheduling, debts conversion, securing waivers from the creditors and developing guidelines for new borrowing in order to avoid further build-up of unsustainable debt (DMO Status Report, 2007). The major strides attained by the Federal Government through the FGN bond programme of the DMO in its

first strategic programme between 2002 and 2006 include resuscitation of the government bond market, restructuring of the 91-day NTBs, development of a framework and calendar for regular monthly bond issuance, establishment of the Primary Dealers Market Markers (PDMMs) system, which included representation of selected banks and other financial institutions to participate in the trading activities of the bond market, and securitization and settlement of verified pension arrears and local contractors' debts of the Federal Government (DMO, 2008).

Trading in government bonds in Nigeria after 18 years of discontinuation was resuscitated through the issuance of the FGN bonds from October, 2003 following the establishment of the DMO (Debt Management Office) in 2000, and the creation of the DMO Act in 2003. It is essential to acknowledge that the moribund period of government bonds does not entail a complete phasing out of the entire bond market, especially its capitalisation, which has been sustained since the 1970s. Although there was the existence of other domestic debt securities, the establishment of the DMO has undoubtedly influenced the growth and development of the bond market in Nigeria. Since its inception, the DMO has been playing active and positive roles towards effective bond market development in Nigeria.

Prior to the enactment of the DMO Act in 2003, the short term instruments attracted high refinancing cost and were characterized by rollovers as open market securities were used to finance long term government needs (George, 2013). With the takeover of DMO as the issuer, CBN assumed the role of issuing house and the registrar. The innovations and refinancing strategy of the Federal Government of Nigeria through the DMO has lengthened the country's

yield curve with the various bonds categorized into 2-3 years, 5, 7, 10 and 20 years maturity (George, 2013).

The process of expanding the yield curve in Nigeria culminated in the introduction of FGN Bonds in October, 2003, which suffered a 'hold to maturity' syndrome at the outset from the perspective of investors, a situation that limited secondary trading in bonds. A government policy aimed at lengthening the yield curve has the tendency of enhancing the efficiency of the non-bank financial sector of the economy. The DMO's effort towards lengthening the yield curve could be appreciated by the extension or restructuring of the short-term treasury bills (T-bills) to longer tenured bonds.

The 91-day Nigerian Treasury Bills were also restructured into various instruments of longer maturity ranging from 6 months to 10 years. The PDMMs were introduced in 2006 to transact directly with the DMO, a situation similar to stock brokers in relation to shares. Verified pension arrears and local contractors' debts of the FGN were securitized, and included in the FGN bond issuance programme.

Nigeria's outstanding external debt of over $32 billion as at early 2006 posed a major challenge to the economy since it had to grapple with external debts service over the years, which remained unsustainable. However, the years 2006 and 2007 were remarkable in the history of Nigeria which saw the exit of the country from the Bretton Woods institutions' (Paris Club and London Club) debts. It cost Nigeria over $12 billion to exit the debt, while the sum of $18 was waived by the Breton woods institutions.

The external debt exit from the Bretton woods institutions' debt enabled Nigeria to leverage on its total debt portfolio by extending its focus on the domestic debt as well. Thus the era of transformation and innovation (2008-2012) provided the impetus for Nigeria to leverage on its prior achievements and to pursue strategies that would further deepen the bond market, develop various innovative instruments, develop an IT platform for bond trading, support the Development Finance Institutions (DFIs) and Ministries, Departments and Agencies (MDAs) as well as expose the bond market to the international community through the International Capital Market (ICM).

A $500 million sovereign bond with annual interest of 6.75%, was issued, and is expected to mature in January 2021. The bond investment process, which involved investors from 18 countries covering continents of Africa, Asia, Europe and America generated a subscription of $1.3 billion (an oversubscription of $800 million) as against the $500 million on offer. This has two major implications for project finance in Nigeria and the international community. First, the ICM has paved way for corporate entities to access long term financing to fund infrastructural development with ease, and an internationally observable benchmark for accurate pricing of risk by international investors (Aganga, 2011).

The establishment of the DMO in 2000 facilitated a resuscitation of the moribund bond market by the Federal Government through mobilization of funds by issuing FGN bonds in 2003 worth N72.56 billion to finance various capital projects. This partly contributed to the increase in the total domestic debt to N1.3 trillion in 2003 up from N897.95 billion in 2000. Since then, there had been a consistent increase in the total domestic debt of Nigeria. In 2008, the domestic debt of Nigeria hit the N2.3trillion mark, increased to N4.0 trillion in 2010 (Adyorough, 2010) and was about N5.3 trillion in 2011.

Before the end of year 2010, the Federal Government of Nigeria (FGN) had issued ₦4.0 trillion worth of bonds that were supplied to be traded in the Over-the-Counter (OTC) market and yet the bonds were not fully embraced (Adyorough, 2010). As at end of October, 2011, Nigeria's domestic debt had hit the ₦5.21 Trillion mark (17.53% of GDP), which is far below the 40% of GDP (The Nation, 2011). The pricing of such bonds issued is usually done at coupon rates based on prevailing interest rates, which is normally influenced by CBN's monetary activities. While a functional domestic bond market is necessary for capital investments, monetary authorities also use bonds to define the yield curve and to ensure stability of short term rates (Afrinvest, 2010).

The implementation of these strategies is being carefully monitored by the Federal Government of Nigeria through the DMO, one of its MDAs, and could be appreciated in table 2.1.

Table 2.1 Level of Implementation of the DMO's Second Strategic Programme (2008- 2012)

S/N	Activity	Completed	Partially Completed	On-going	Comment
1	The 3 year issue allocated @ a premium in two successive auction 341.64 mill in Nov 7, 2008	✓			
2	Deepening the bond market through extension of the yield curve to 20- years : 10 year tenured instrument (2003) -20-years bond	✓ ✓ ✓			This entails an extension of the yield curve
3	Funding of the annual budget deficit of the FGN in a non-inflationary manner			✓	This is an annual exercise linked with the budget.
4	Refinancing of local contractors Bonds at substantial cost saving to the government			✓	
5	On-lending to MDA's from the proceeds of FGN Bonds			✓	
6	Supporting the 3 DFIs			✓	
7	Framework for Global Depository Receipts (GDRs)			✓	
8	Programme for accessing the International Capital Market (ICM) by issuing foreign currency and naira denominated bonds	✓			The Sum of $500 million Eurobond has been issued at the ICM at an interest of 6.75%
9	Development of various innovative instruments such as derivatives and mortgage backed securities			✓	
10	Establishment of an Efficient automated IT platform for auctioning and Trading in FGN Bonds			✓	
11	Cooperate with ICRC in developing a framework for PPP and SPVs for BOTs, JVCs, etc.			✓	

Source: Compiled by the author from information supplied by the DMO

The Nigerian domestic debt is currently dominated by the FGN bonds, which are mostly raised to finance budget deficits and are highly regulated by the government through the DMO, the SEC and the CBN. The Federal Government's preference for domestic debt to foreign debt would help deepen the country's bond market, and its direction in subsequent years aimed at helping the private sector to access the bond market is expedient. However, there is the need to balance this with a policy that will support other bonds such as corporate bonds. This implies that a well-developed bond market would boost entrepreneurship since Small and Medium Scale Enterprises would be able to access the bond market.

FGN bonds have phased out development stocks and become dominant with 61% of the total bonds, while treasury bills have been minimized to 34%, and treasury bonds, 5% of the total sovereign bonds (George, 2012). The reduction in the percentage holding of treasury bills suggests a great reduction in the financing mismatch challenges attributable to the use of treasury bills to support the financing of long term projects. Since treasury bonds are known to be illiquid and redeemable only to the Central Bank of Nigeria (CBN) upon maturity, the reduction in percentage holding of treasury bonds from 36% to 5% (from 2002 to 2012) implies an alteration in the modus operandi of the instruments traded in terms of liquidity situation of the government bond market. The Nigerian bond market as at 2012 was dominated by FGN bonds to the tune of 86.0%, states 10.6% and corporate 3.4% (George, 2013).

Finally, the inclusion of the FGN bonds in the JP Morgan's and Barclays EM Bond Index has brought the country's government bond market to international limelight. This would certainly create a higher level of awareness on the Nigerian bond market, and enhance the confidence of

both local and international investors. These developments provide impetus for rapid development of corporate bond market in Nigeria.

2.3.2 Legal Provisions and Legislations

A number of legal provisions derived from various acts enacted by the Federal Government of Nigeria have contributed in shaping the operation of the Nigerian bond market. Some of these Acts, which include the DMO Act (2003), the Pension Reform Act (2004), and Investment and Securities Act (2007) are discussed subsequently together with references made to the role of the CBN.

Part XV of the ISA (223)(1) provides for borrowing by various tiers of government and their agencies with regard to the issuing of securities in the form of registered bonds or promissory notes, but there is a caveat of 50% of revenue from the preceding year.

Part IX Section 73(1) of the Pension Reform Act (2004) provides for investment of pension fund assets covering 'bonds, bills, and other securities issued or guaranteed by the Federal Government and the Central Bank of Nigeria (CBN)' (see p.A55).

At the corporate debt level, the (b) part of section 73 of the Pension Reform Act (2004) provides for investment in bonds, debentures, redeemable preference shares and other debt instruments issued by corporate entities and listed on a stock exchange registered under investment and securities Act 1999 (now 2007).The provision of this section is silent on the extent to which pension funds are to be channelled towards investment in bonds. Based on this, a percentage of

such funds to be reserved for investment in bonds and related securities ought to be specified. For example, a high percentage of the fund could be set aside for investment in corporate bonds, which could boost the sub-sector and correct the imbalance between the dominant sovereign debts, and less vibrant as well as small sized corporate debt market.

Although the Pension Reform Act 2004 is silent about the percentage of pension fund assets to be invested on bonds specifically, the Pension Commission, which is the apex regulatory agency of the pension funds released a guideline limiting the investment by the pension fund administrators of the total assets on all instruments/securities issued by a corporate entity to 10% (PenCom, 2012). This implies that the pension funds administrators can invest in various instruments traded in the financial market including capital market and banking sector, for instance, equity, debt and money market with a maximum of 10% of total pension funds. This does not appear high enough to stir up the corporate bond market. The pension fund institutions have great potential capital or asset base, which if properly harnessed could go a long way to boost the corporate bond market. Thus, the 10% includes the equity as well as money market components. Setting aside a minimum of 20% of the pension fund total asset towards investment in corporate bonds alone could alter the investment paradigm of the pension industry.

Section 171(1) of the ISA (2007) provides for the investment of a collective investment scheme, which entails a fund to be managed with the provision of the trust deed or custodial agreement with the objectives of safety and maintenance of fair return on amounts invested. Two key related aspects which relate to investment in bonds include: bonds, bills and other securities issued or generated by the Federal Government and Central Bank of Nigeria and bonds

debenture. The section provides for the management of debt instruments guaranteed by the Federal Government and the Central Bank of Nigeria, and debt instrument issued by corporate entities listed on the stock exchange and registered under the investment and security Act (2007). Key instruments usually guaranteed by either FGN or CBN as identified by this Act include: bonds, bills and related securities. The Federal Government usually, through the DMO, issue guarantees or counter guarantees as a protection to lending of instruments raised to finance various projects especially as the sub-national level.

The ISA identifies the common debt instruments issued by corporate entities listed on the exchange and expected to be traded. These include bonds, debenture, redeemable preference shares and other related debt instruments. Section 223(1) of ISA (2007) also provides for avenues to raise internal loans by organisations for specific projects. Such issue of securities can take the form of registered bonds or promissory notes.

Section 224(1) restricts raising funds from the capital market by state government and the federal capital territory by requiring a copy. The law authorizing the issue of bonds provides that a sinking fund to be fully funded from the consolidated revenue fund account of the issuer should be established. Also, a copy of a rating report by an accredited rating agency registered by the commission and an irrevocable letter of authority issued by the Accountant General of the State or his equivalent in the FCT to the Accountant General of the Federation are required. The Accountant General of any of the aforementioned arms of government is mandated to deduct at source from the statutory allocation due to the issuer, in the event of default or failure of the issuer(s) to meet their payment obligation(s).

Section 224(3) (b) in the case of a local government, peculiar requirements are expected from the state where the local government is located. However, for the federal or state government agency, or a company wholly owned by the federal or state government, section 224(3)c provides that a copy of the law or instrument establishing the agency or company authorizing the agency or company to issue the bonds, and an irrevocable letter of guarantee of repayment of the loan issued by the federal or state government that owns the agency or company. In situation of default, the trustee shall have the power to take legal action against the defaulting body failing which bond holders holding at least 10% of the value of the bond shall have the right to call a meeting to pass a resolution compelling the trustee to take legal action (see section 224(7). A bond holder who feels dissatisfied may personally initiate legal action and to enforce.

The fiscal responsibility Act number 31 part VI of 2007 empowers the federation to set off any sum due to that tier of government from the federation. The section empowers the Federal Government of Nigeria to channel any sum due to a tier of government from the federation towards offsetting any amount owed by the former to the federation. This supports the use of guarantees by the government toward ensuring that bonds raised by the sub nationals may not be defaulted. Some agencies or sub-national issue irrevocable standing payment order (ISPO) which is automatically deducted at source without reaching the borrower.

Part IX of the FSA (2007) (a and b) on debt and indebtedness provide that government shall only borrow for capital expenditure and human development provided that, such borrowing shall be on commercial term with low interest rate and with a reasonable long amortization period. This is also subject to approval by the appropriate legislative body.

Part IX (41) (1) sub-section (b) of the Act also provides that public debt as a proportion of national income should be held at a sustainable level as prescribed by the National Assembly from time to time on the advice of the ministers. The issue of sustainability implies the exercise of a high degree of caution on borrowing habits. Thus, if borrowing is project driven, it means that such borrowing channelled to a project would generate a cash flow that can yield a positive and favourable net present value, after factoring the principal and interest repayment of the loan.

The Bretton Woods institutions have gradually delisted Nigeria from the list of HIPC countries, which means that the country cannot enjoy concessional external loan financing as provided by the IDA (Concessional) window of the window of the world bank where a maximum of 3% interest rate of loan facility is enjoyed, with long grace period usually above 5 years, and long moratorium repayment period. Based on this development, it means that Nigeria will be facing stringent borrowing conditions. And since the fiscal responsibility Act part IX (41)(2) also encourages Federal Government to borrow from the capital market, it means that both equity and bond option could be explored.

Part X (44)(1-5) provides for the conditions of borrowing including the cost and benefit analysis, authorization and compliance with relevant legislation, emphasis on channelling such borrowings to long term capital expenditures.

The DMO augments the role of the National Assembly and the Central Bank of Nigeria by maintaining comprehensive, reliable and current electronic database of internal and external public debts, guaranteeing public access to the information.

Part X (47)(2) of the FRA (2007) provides that any guarantee granted by the minister shall be conditional upon the provision of counter-guarantee in an amount equal to or higher than the guarantee obligation, provided that there are no overdue obligation from the requesting government in the federation to the guarantor and its controlled corporations. This issue of guarantee is also supported by the DMO Act 2003 Part VII (22).

However, most of the provisions empowering the DMO to carry out its strategic duties appear to be usurped by provisions granted some of the agencies as highlighted earlier. For example, the aspect of guarantees has already been dealt with by the FRA. The provisions empowering the DMO to exercise its duties tend to reduce it to a custodian and messenger rather than a proactive innovative agency. Furthermore, the powers of the DMO seem to be restricted to the Federal level, with negligible influence at the sub-national levels.

The defaults by other tiers of government, arising from their past financial commitments, which could be in form of loans has a tendency to adversely affect the entire economy. Although the various Acts appear to provide for the prevention of occurrence of default by virtue of the provision for guarantees and counter guarantees, the current practice compels states and local governments to borrow with recourse to the DMO. There is therefore the need for the DMO to be further empowered to manage the debts and monitor the repayment of such debts at the sub-national level. The DMO Act therefore needs to be more firm as regards its responsibility in respect of debt management at the sub-national level.

For an effective debt management of the entire economy, it appears the DMO needs to be granted more power, with more tentacles and autonomy on debt management similar to the type enjoyed by the CBN with regards to monetary policy and bank surveillance. The DMO is in charge of all debt matters, whether government, corporate or international, provided it affects the citizens.

The aspect of grants from donor agencies is also not clearly addressed. Again, since the DMO helps the countries' debt stock, it can extend to the proper mentoring and management of grants. Most of these unaddressed lacunae could be addressed only within further review of the DMO Act without prejudice to key functions of the CBN, the SEC and FRC. However, those ancillary debts related provisions which are not the core of the other agencies could be harmonized, and the DMO allowed full responsibility. The reason for this is not far-fetched; the DMO cannot manage the country's debt effectively unless its responsibility is backed up with full authority. Presently, the DMO appears to be at the discretion of the minister of finance, which makes it an extension of the Federal Ministry of Finance.

The DMO Act (2003) is also silent on charges and other fees which some agencies like SEC and CBN usually charge based on their transactions. This would help organizations to generate revenue internally, have room to create more initiatives, develop more efficient manpower, so as to be more effective in dispensing its duty.

The SEC seems to be more disposed to the equity component of the capital market. There is therefore, the need to review the role of SEC in the ISA (2007) vis-à-vis corporate bonds with a view to revitalizing the corporate debt market.

2.4 Impediments to Bond Market Development in Nigeria

Although the Nigerian bond market appears to perform relatively well as earlier documented, it is bedevilled with some challenges. Critical challenges of bond market development are centred on how to accelerate development in the bond market through financial innovation, determination of the direction of innovation in the bond market, and maintaining a balance between risk minimisation and market innovation. Some of the constraints as documented by most writers include illiquidity, budget delays, lack of a bond auction trading platform, high inter-bank rate, lack of a strong policy to facilitate the speedy growth of corporate bonds, amongst others.

If most of the identified challenges of the Nigerian bond market are properly addressed, speedy development in the entire finance sector would be enhanced. According to Onaolapo and Oluwafemi (2010:40), the present state of the bond market in Nigeria cannot produce the desired result or economic growth unless it is effectively developed. The duo also identify pointers to Nigeria's underdeveloped bond market as inadequate market infrastructure, absence of institutional investors, non-availability of an active secondary bond market, and absence of credit rating Agencies.

The 'lack of a functioning bond market' is perceived to be a major contributor to 'persistent poverty, and indebtedness of African countries', which hampers effective debt management, corrective market forces, investment flows and conducive financial markets (Financial Independence, 2008:01). Over the years, the dearth of liquidity had been a common feature of the few 'functioning' bond markets in Africa, including the Nigerian bond market. This is

confirmed by Adyorough (2010), who posits that Nigeria's Capital Market lacks the Liquidity needed for a sustainable bond market that can fund growth and development in the public and private sectors. This assertion suggests that there is the need to improve the transaction volume of the predominantly active government bonds market in Nigeria.

The introduction of a policy that would lengthen the yield curve has the tendency of enhancing the efficiency of the non-bank financial sector of the economy thereby reducing the possibility of maturity mismatch. This proposition is elaborated by Adelegan and Radzewicz–Bak (2009) who posit that the underdevelopment of bond market is reflected by the compulsion of both pension funds and insurance companies in holding short-term securities, which exposes them to maturity mismatches. It is glaring that the development of an economy, especially the domestic financial markets has the potentials of alleviating problems of original sin and currency mismatch.

The monetary policy rates in recent time have resulted in frozen liquidity in the bond market and created a huge gap in the federal debt management programme that even the strongest capitalized banks have been struggling to maintain reserve requirements and liquidity ratio (Adyorough, 2010). This is an indication that monetary policy activities have some degree of influence on the bond market in Nigeria. Thus, an unfavourable monetary policy may be detrimental to the bond market.

The challenge of illiquidity is reflected by the buy–hold attitude of investors. Part of the reasons for the illiquidity of the Nigerian bond market as adduced by Adyorough (2010:06) is the dearth of repos that are perceived to "play a central role in producing liquidity for vibrant trading and

financing of treasuring securities". Repos are expected to augment the PDMMs system which was introduced in 2006, to facilitate liquidity in the Nigerian bond market.

The bond steering committee, which was constituted by the Security and Exchange Commission (SEC) (2002:06) identifies the following impediments of a viable bond market: 'dearth of long term savings, low level of awareness (public and private sector), illiquidity, instability in government policies, unfriendly macroeconomic environment, inflation, absence of yield curve, high cost of transaction in the Nigerian financial market, legal bottlenecks, and inadequate technical knowledge'. The bond market is also characterised by instability in microeconomic and fiscal policies, although it has a reasonable level of regulatory promise.

Considering the inverse relationship between bond price and interest rate, and since bond yields move in opposite direction to price, bond traders need some signals from the CBN about the direction of interest rate so that they can calculate the risk factor associated with market fixed income investment, wealth creation, and/or preservation investment (Adyorough, 2010). This clearly reflects the inter-relationship between the bond market activities and monetary policy as well as justifies the tradition of the Debt Management Office in liaising with the CBN in carrying out its mandate on domestic debt management, especially on the bond issuance programme. Since the bond market is very sensitive to interest rate (the main determinant for price and yield on bonds) and other economic management factors such as inflation, unemployment and economic growth, the CBN policy plays a significant impact on the stability of the bond market (Adyorough, 2010).

The benchmark yield curve, which describes the relationship between the coupon rate and time to maturity of the value of the various bonds within an economy, requires proper monitoring for stability, liquidity and subsequent efficiency. It appears that the level of confidence of the bond market in Nigeria is relatively high, but a lot more could be done to further enhance it. The level of confidence entails a glaring level of degree of transparency in bond market transaction with prices reflecting a true picture of variable of risks and return.

The size of the market and economy can be appreciated by its level of economic activities, or its level of development in terms of whether it is under-developing, developing or developed. Nigeria tends to have a vibrant economy, but needs to be further developed to accommodate a vibrant market that would encourage more investors. The calibre of players or participants in the market could determine the direction of bond market activities and may eventually take its turn on the level of bond liquidity in an economy.

Political stability and state of security of a nation can also be considered as another liquidity driving factor. The state of insecurity of a nation could serve as a disincentive to investment which may affect the level of liquidity of the bond market. A stable democracy has a direct influence on economic activities which should serve as further impetus to transactions and liquidity in bonds. Government policy can directly or indirectly influence the liquidity of bonds. The FGN bonds do not seem to encourage bond liquidity within the economy, especially considering the 'buy-hold' attitude of investors.

The implementation of the bond issuance calendar is dependent on the passage of annual budget by the Federal Government, which implies that any delay in the passage of the budget is tantamount to frustrating the bond issuance programme. There is a level of efficiency in the publication of bond results associated with the manual submissions of bids for auction re-openings.

The high cost of funds at times arises from high inter-bank rates, which usually affects the cost of doing business. There are little structures on ground to upscale the speedy growth of corporate bonds in Nigeria. It has become glaring that what is required is not too much government involvement, but simply enabling institutions. Lack of incentives for companies to issue bonds, therefore, constitutes a major hindrance to the rapid development of corporate bonds in Nigeria.

The Minimum Rediscount Rate (MRR) otherwise known as Monetary Policy Rate (MPR), which is the base rate for lending to commercial banks by CBN is 14%, and the banks lend at a range of 22-25%, while most of the giant corporations in Nigeria can borrow at a range of 18-19% (Jackson, Etti & Edu, 2007). This scenario makes it almost impracticable for corporate bonds to thrive. This calls for an enabling policy that will enhance the accessibility of funds directly from the CBN at MRR, or only slightly higher rate than the MRR so as to pave way for the corporate bonds to flourish. This should help address the crowding out of corporate bonds by government bonds as observed by many.

Despite the sharp drop in economic fundamentals as a result of the global economic meltdown, there has been a paradoxical improvement on the performance of the Nigerian bond market (DMO, 2008). Irrespective of the turbulence experienced by the banking sector arising from the sub-prime lending crisis, the severing of the GDP, as well as stock market crash, the Nigerian bond market appears to be witnessing a paradoxical rise in recent years.

The Nigerian domestic debt is dominated by the FGN bonds, which are mostly raised to finance budget deficit and are highly regulated by government through the DMO, the SEC and the CBN. The Federal Government's preference for domestic debt to foreign debt would help deepen the country's bond market, as well as its direction in subsequent years towards helping the private sector to access the bond market is expedient. This implies that there could be a boost in entrepreneurship since Small and Medium Scale Enterprises would be able to access the bond market. Government influence through its agencies, like the DMO, the SEC, and the CBN on bond market is therefore useful in enhancing the development of bond market since it would aid in correcting imbalance between the bank and non-bank financial sectors.

Although Cenley (2011) agrees that investment in bonds are among the safest in the world, he is quick to identify seven types of risks associated with it, which include inflation risk, interest rate risk, default risk, downgrade risk, liquidity risk, reinvestment risk, and rip-off risk. Usually, sovereign bonds are less risky than corporate bonds. Despite the associated risks, investment in bonds tend to stand out over stocks because of high risk of relativity of stock prices and of their potentials of higher gravity of loses.

The fluctuating and mostly high interest rates tend to frustrate bond investment in Nigeria. Bonds prices are inversely related with interest rate, which implies that an investor who wants to sell a bond before its maturity would not find it favourable with risen interest rates (Cenley, 2011). Thus to enhance an active secondary market, interest rates need to be reasonably low. In addition, trading in bonds entails the denomination of bonds in a country's currency with a substantial portion of the activity being domesticated.

It also requires transaction of new bond issues through auction or related apparatus at a market based price. Furthermore, it promotes investment by identifying and locating viable business opportunities; helps in mobilizing savings; monitors the performance of managers thereby enabling trading, hedging and diversification of risk in order to facilitate the exchange of goods and services. These functions result in efficient allocation of resources and rapid accumulation of physical and human capital with faster technological process which in turn feed economic growth (Onaolapo & Adebayo, 2010).

The inability of firms or households to match the financing of long-term assets by long-term debt has a tendency of negatively influencing their long-term investment decision. Financing long-term investments with short-term debt exposes borrowers to balance sheet mismatches specifically with regard to their assets and liabilities. However, short term bonds have a way of boosting the domestic bond market in its entirety because of the possibility of recycling or even restructuring the bonds. In another dimension, if firms attempt to compensate for the lack of a domestic bond market by borrowing in international bond markets, they may expose themselves

to excessive foreign exchange risk. In addition, as bond markets become more liquid, the hedging of maturity risks becomes cheaper and more reliable (Tuner, 2003).

It could be deduced that a correction of some of the key impediments of bond market development would free-up bond market liquidity and activities thereby enhancing its rapid development. This entails that a developed economy with a friendly macroeconomic environment; especially one with low rate of inflation, low cost of transaction, high level of awareness, liquid secondary market and good legal and regulatory structure. In addition to the aforementioned, the presence of technical experts in the market, and a well-developed yield curve, are likely to facilitate rapid development of bond markets in the Nigerian economy.

2.5 Review of Bond Market Development Determinants

This section addresses literature on bond market size, bothering on the factors that influence bond market size in general. It delves into various literatures across countries and regions as well as identifies some of the variables commonly utilised for the respective indicators.

2.5.1 Bond Market Size

Bond size usually measures the value of government, corporate, or total bonds in relation to the GDP of a country. This is perceived to be the most important indicator of bond market development and is usually used by most scholars synonymously with bond market development. Bond capitalisation is sometimes used as a proxy to replace bond market size. The Financial Systems Development Indicators (2010) manual reveals that the World Bank's financial structure database utilises the basic measures of both public and private bond market

size (ratio of public or private sector bonds to GDP). It is worthwhile to assess the Nigerian ratio over the years, and ascertain its relationship with other bond market fundamentals. The public sector bond market size varies across regions and income groups (Financial Systems Development Indicators, 2010). This justifies the need to not only rely on regional studies but country specific studies on bond market size.

Despite substantial development in terms of both size and depth, some regional bond markets defy initiatives for improvement, and lag behind those of mature economies (Battlellino, 2004). The total value of private sector bonds is relatively small (below ₦1 trillion), considering the size of Nigeria's economy, which reflects the inability of companies to issue bonds received by their assets or debentures on the strength of their balance sheets (Adyorough, 2010). The small size of Nigeria's private sector bonds seems far below the minimum threshold for the mobilisation of funds outside the banking system for critical infrastructural development.

Countries vary in the features and characteristics that shape the development of their bond markets. The South African bond market stands out when compared with those of Egypt, Nigeria and Kenya. There are key factors, which are responsible for the rapid development of the South Africa's bond market as rated by Fitch Rating (2010). Such factors include advanced regulatory framework, macroeconomic and physical policies, healthy banking sector, and sound quality of infrastructure. It is not quite glaring whether or not such factors could be applicable to Nigeria. South African bond market appears to be uniquely different from the other African bond market, and seems to favourably compete both in size, access and liquidity with a good number of bond

markets around the world, especially the emergent bond markets. The country's bond market is well developed with a substantial part of its debts held by private creditors in the form of bonds.

In Tanzania, Nigeria and Ghana, between 30 to 50 percent of the government securities that are issued in the market are limited non-marketable securities (Financial independence, 2008). This ratio has reduced drastically for Nigeria. Non-marketable securities constitute a major liquidity constraint because of the difficulty of transferability of such bonds until maturity. In 2001, Africa as a whole only accounted for 7 percent of the total tradable debt of emerging markets or less than 0.4 percent of the total world bond market, with the average time to maturity of 14.8 years for all developing countries as compared to the global average of 22.1 years (Financial Independence, 2008:03). Such securities, which could hardly be traded, will compel the owner to wait until maturity to recover the principal (Baminadhu, 2003). The empirical position of the current liquidity situation of the Nigerian bond market is not quite glaring. This calls for further exploration of that aspect.

On the level of development, Moyo (2010) posits that bond markets, which are an integral part of the capital markets, remain largely underdeveloped in Africa with corporate bond markets non-existent or in their infancy stage despite efforts by government, private sector and donors to enhance its performance. He identifies correcting deficiencies in the legal system, enhancing bond issuance, broadening and diversifying investor base, strengthening market infrastructure, developing supranational, sub-national and corporate bond markets and the promotion of regional initiatives as germane towards enhancing bond market development.

Although promoting regional initiatives is a good concept, it may not necessarily always suffice as other alternatives may be sufficient in enhancing bond market development. A large economy like that of the US, for example, did not require any regional initiative for the attainment of its bond market to thrive. Moyo's view tends to provide a prima facie contradiction vis-a-vis the statistics of the bond market volume.

Basic economic development models provide that growth is a sub-set of development, which entails that the sudden growth in volume of the Nigerian bond market signifies some level of development. Although a hasty conclusion cannot be made in view of the need for a holistic review of some bond market indicators in order to ascertain a reliable level of development.

Afrinvest (2010) emphasizes the need for a deeper bond market in Nigeria as a measure to bridge the long term financing gaps, and minimize the structural risks to Nigeria's growth potential, arising from infrastructure financing gaps. Despite the seeming conducive environment for a vibrant bond market, Adyorough (2010) posits that Nigeria's capital market lacks the liquidity needed for a sustainable bond market that can fund growth and development in the public and private sectors.

Prior to the creation of the DMO in 2000, the Nigeria's domestic debt was characterized by an underdeveloped yield curve and was dominated with treasury bills of 91 days and below, which adversely affected the Federal Government borrowing costs. With the establishment of the DMO in 2000, there have been remarkable achievements, some of which include deepening the market, expanding the yield curve, improved trading platform and going into the International Capital

Market (ICM). But there is no known research with a holistic yardstick of identifying the extent of developments, or drivers of the bond market in line with international yardsticks on bond market development in Nigeria.

According to Kapingura and Ikhide (2011), much studies on bond liquidity have been undertaken on developed countries with only a few on developing countries due to underdevelopment of the latter's financial markets. However, despite a slowdown in economic growth combined with liquidity constraints, leading to downward prices of stocks in the recent past, the Nigerian bond market in contrast, has remained buoyant (VETIMA, 2010).

Although the Nigerian bond market when compared to developed bond markets could be perceived as small in terms of size, the country's government bond market is perceived to be more liquid than the corporate bond market aspect. On the overall, a lot is required to be achieved for the country's bond market to be above board in all ramifications.

On Nigeria, Onaolapo and Oluwafemi (2010) examine the development of the bond market in relation to the Nigeria economy using OLS regression analysis. The study reveals a considerable link between bond market and economic growth, with bond market size, liquidity being significant determinants of economic growth in Nigeria.

A similar study on Nigeria is by Adofu and Abula (2010) on Domestic Debt and the Nigeria Economy, who investigate the empirical relationship between debt and economic growth in Nigeria using OLS regression techniques. The findings indicate that domestic debt has a negative

effect on the growth of the Nigerian economy. They argue that domestic debt should be discouraged and advocated for increase in the revenue base through reform programmes. Although the two studies above are country specific since they focus on Nigeria, they are not encompassing since they are only limited to bond size of the Nigerian bond market vis-à-vis economic growth.

The Seminal work of Eichengreen and Luengnaruemitchai (2004) documenteds that developmental stage of the economy, size of the banking system, geographical/disease endowments, and environment, among others have a positive direction to bond size, with their enhancement. Furthermore, they posit that economic size and natural openness are weakly and positively related with bond size.

There is evidence on bond market development from SSA, which advocates a regional approach with some exception to a number of determinants. Adelegan and Radzewicz-Bak (2008) also establish based on an empirical work from a cross section of 23 Sub-Saharan African (SSA) countries that the key determinants of bond market development in SSA are structure of the economy, investment profile, law and order, size of the banking sector, and level of economic development, and various macroeconomic factors. Since their study has a regional approach, all the variables may not necessarily suffice if only a single country in the SSA is considered. The model fashioned by the foregoing duo states that:

$Yit = \alpha i + \beta_1 EcSize_{it} + \beta_2 Open_{it} + \beta_3 Banksize_{it} + \beta_4 Intrate_{it} + \mu_{it}$. Where Y_{it} represents bond capitalisation as a share of GDP, $\beta_1 EcSize_{it}$ constitutes measures of economic size, $Open_{it}$

connotes natural openness, $Banksize_{it}$ is the size of the banking sector, and $Intrate_{it}$ represents interest rate.

On the other hand, Eichengreen and Luengnaruemitchai (2006) in their survey of 41Asian countries used the generalized least square (GLS) tool of analysis. Their study, which covered the period 1990-2011 (22 years), revealed that the size of economy, openness of an economy, interest rate spread, and banking system are the major determinants of bond market development.

Similarly, Bhattacharyay (2011) utilizes Ordinary Least Square (OLS) fixed and random effects, as well as generalized least square. The study documents that the size of the economy, stage of economic development, openness of the economy, size of the banking system, and interest rate spread constitute major determinants of bond financing. It is worthwhile to enquire whether such determinants follow similar pattern for Nigerian bond market.

Key determinants of bond market financing as documents by Eichengreen and Luengnaruenuitchai (2004) include: economic size, natural openness, developmental stage of the economy, interest rate, size of the banking system, exchange rate variability, traditions of legal system, law and order, corporate governance and transparency, banking concentration, absence of public sector funding needs, regulatory enforcement, and interest rate variability. The four dimensions of Size, Stability, Efficiency and Access are positively correlated (FSDI, 2010).

2.5.2 Size of the Banking System

Banks constitute part of portfolio of finance sources, which provide external finance just as bond markets. But their role cannot be taken in isolation. Although it is glaring that a combination of both financial sources is required for effective project financing, a research effort is necessary to gauge the level and direction of contribution of the banking sector to the bond market in an economy. This would facilitate policy direction and decision making.

Emerging market economies are perceived to be over-dependent on their domestic banking systems for finance, which calls for the need for further development of their domestic bond markets (IOSCO, 2002:3). Bank loans attract higher intermediation costs as a result of branch networks and required capital as compared to cost advantages of debt securities (Diamond, 1994). This implies that blue chip firms will have preference for debt market in order to attain efficient cost savings. Furthermore, less financially secure firms will opt for bank loans due to greater flexibility in rescheduling, while the larger, creditworthy firms seek to tap the bond markets (Bolton and Freixas, 2000). It is glaring that there is a link between banks and corporate bond market development although the direction and magnitude may not be quite clear, and may differ depending on the features of the banking sector. Furthermore, finding by Demirguc-Kunt and Huizinga (2001) reveals that a transformation from an underdeveloped towards a more developed financial system reduces bank profitability and margins.

An empirical test conducted by Jiang and Law (2001) shows that bond issuance and bank lending are positively correlated both in countries of the Organisation for Economic Cooperation and Development (OECD) and the emerging economies. The outcome of a study by Hawkins

(2002) indicates that highly rated companies issue more bonds than do lower rated companies. Another study on the determinants of the financing choice for a sample of 1,560 new debt financing undertakings by publicly traded firms reveals that the choice of debt instrument is strongly linked to the credit history and current credit quality of the issuing firms (Denis and Mihov, 2003). To affirm this position, Paul and Fan (2005) clarify that firms with high credit quality prefer public debt, while firms with average credit ratings borrow from banks, and those with low credit rating borrow from nonbank private sources. They argued that such finding suggests competition between corporate bond markets and banks with a tendency to draw away good borrowers from banks.

The interest group theory, which was developed by Rajan and Zingales (2003) posit that the actions of policy makers in relation to an initial financing source may resist financial development because of competitive tendencies. This could be so in view of their prior sources of finance in their growing business environment and the fear of loss of competitive advantage as a result any potential impairment by such financial development. This is premised on the basis of the argument that financial development aids the entry of new firms, thus enhancing competition (Paul and Fan, 2005). Based on this theory, it could be deduced that large deposit money banks with corresponding large capital base and high lending capacity are likely to reduce corporate bond market development.

Eichengreen and Luengnaruemitchai (2004) examine the relationship between the banking sector and bond market development for 41 countries and documented that countries with competitive, well-capitalized banking systems have larger bond markets. These studies point to a

complementary relationship between banks and bond market development. The mixed results suggest a need for further research to explore the relationship between banks and corporate bond market development. This means that deposit money banks could either play competitive or complementary roles**.** Many researches, for example, Adelegan and Radzewicz-Back (2009), and Raghavan and Sarwono (2012) document the contribution of banks towards the development of effective and liquid bond market, especially by their role as dealers and market makers. Bhattacharyay (2011) documents the presence of a large, well developed, competitive, and well-capitalized banking system as a prerequisite for developing a liquid and properly functioning bond market. According to Hawkins (2002), such banks double as dealers and market makers. This is the same situation in Nigeria where most of the Primary Dealer Market Makers (PDMMs) are money deposit banks.

The size of the banking sector is measured as the ratio of domestic credit provided by the banking sector to GDP. A well developed and complementary banking system is expected to reveal a positive correlation with size of the bond market, whereas the reverse signals competition between the bond market and the banking sector in providing funds [Eichengreen and Luengnaruenuitchai (2004), and Raghavan and Sarwono (2012)].

2.5.3 Developmental Stage of the Economy

The developmental stage of the economy is expected to run pari passu with bond market development. Developed economies are characterised by less volatile investment environment, less government involvement in commercial activity, strong creditor rights, transparency, and good corporate governance with less developed countries having weaker structures, and heavy

government participation in business activities (Raghavan and Sarwono, 2012). The measure for stage of economic development is GDP per capita. Higher incomes in terms of per capita income, which describes the developmental stage of the economy, can positively influence bond market development through enhanced investor base as well as investments required for developing supportive institutions. Such institutions include market infrastructure such as trading platform, clearing and settlement systems, regulatory agencies and credit rating agencies (Dickie and Fan, 2005).

FSDI (2010) reveals that countries, which have less developed or non-existent domestic bond markets are generally small countries. Evidence provides that for most countries there is a direct correlation between bond market size and level of economic development. The study further documents that the size of the bond market, which is measured by ratio of private sector bonds to GDP is positively correlated with size of the banking sector.

Braun and Briones (2006) establish that the level of economic development impacts greatly with significant variations cross countries after controlling for the earlier (level of economic development). Their study further established that Latin American countries and Chile exhibit small differences in the level of development of their bond markets. McCauley and Remolona (2000) provide evidence that a critical size of about $100-$200 billion is required to support a liquid bond market. On the other hand, Adelegan and Radzewicz-Back (2008) provide a conflicting evidence of a positive relationship between bond size and savings to GDP as against the findings of Jeanne and Guscina (2006).

(2009) document a negative significant relationship between the size of the Adelegan and Radzewiczback banking sector and bond market development, which suggests complementarity, a situation where a more developed banking sector relies less on bonds and has a less developed bond market rather than supplementarity.

2.5.4 Stock Market Capitalisation

The Nigerian Capital market has appreciably developed over the years, having witnessed a relative and steady growth until the global financial meltdown of 2009, which saw the capital market crashing. However, as at second quarter of 2012, the capital market could be said to have recuperated. The equity and the bond markets could either play complementary roles through provision of alternative sources of external finance to companies, or compete with each other through companies' choice of financing investments from the equity market rather than the bond market (Raghavan and Sarwono, 2012).

Although the ratio of Nigeria's bond market to stock market capitalisation remains higher than those obtainable in other emerging markets such as South Africa, India, Singapore and Russia, the market still remains laggard, both in terms of market depth and product diversity, with FGN bonds comprising about 95 percent of the total domestic market as at November, 2009 (VETIMA, 2010). Claessens *et al* (2006), Jeanne and Guscina (2006), and Adelegan and Radzwiczkbak (2009) find out that a positive relationship exists between stock capitalisation and government bond market development (share of the Debt to GDP). The total value of shares traded as a percentage of GDP could be used as a measure for stock market development. Eichengreen and Luengnaruemuitchai (2004) document a positive correlation with corporate

bond size and total bond size. However, their study revealed that where the level of economic development is not impressive, a contrary result may be expected.

2.5.5 Size of the Government Bond Market

This determinant from an explanatory variable perspective is relevant to corporate bond market development, and derives from the school of thought that the corporate bond market precedes a well-developed government bond market. Studies conducted by Fabella and Madhur (2003), and Park (2008) support this position by the evidence of catalytic role of benchmark yield curve of sovereign bond markets, which serves as a basis for valuing corporate bonds, towards the latter's development.

However, there may be the crowding-out phenomenon, which could affect corporate bonds in some countries through liquidity squeeze of corporate bond market generated by favourable pricing of government bonds. Raghavan and Sarwono (2012) elucidate this by giving the instance of Indian government securities, which are perceived to be more attractive to foreign investors than the corporate bonds as a result of its higher credit rating.

Although the number of government bonds outstanding could be used to assess the impact of government bonds on corporate bond market performance for a low and dwindling size of the corporate bonds, a negative correlation is expected with government bonds, which signifies that government bonds are crowding out corporate bonds (Raghavan and Sarwono, 2012). A positive correlation on the other hand signifies that government bond market is driving corporate bonds

positively, a situation that implies that corporate bonds are growing and favourably influencing government bonds.

2.5.6 Economic Size

This is otherwise known as the size of the economy, or size of a country, and is measured by natural log of GDP. Key studies on bond market development point to the fact that a huge economy could attract huge capital, hence greater bond financing, whereas a small economy has the tendency of attracting less bond financing. According to Eichengreen and Luengnaruemitchai (2004), the size of an economy positively influences financing through the bond market, although such impact is weak. "The size or scale of an economy needs to reach a certain level to influence financial decisions of large economic entities investing in the bond market of an economy" (Bhattacharyay, 2013:131).

There is a wide disparity in the size of domestic debt to GDP across SSA countries with some countries still recently developing (Adelegan and Randzewicz-back, 2008). The situation with the Nigerian bond market is not glaring. There is therefore the need to empirically ascertain the correct position of the size of the bond market in relation to the economy, banking sector, and other related variables.

A large sized economy is expected to move in a positive direction with the size of the bond market. However, an economy that is small in size may be positively insignificant or even be negatively correlated with size of the bond market, especially for an economy that is dwindling in size.

2.5.7 Budget Deficit Financing

The long history of fiscal deficits as well as the challenges of development and structural investment make bond markets in SSA (besides South Africa) to lack depth, liquidity and efficiency (Adelegan and Radzewicbak, 2008). Njiforti and Muhammad (2010) examine the relationship between public sector borrowing and deficit financing. They established statistical significance between domestic and foreign borrowing on one hand, and deficit financing on the other. This aligns with the Keynesian framework of deficit, which is a short time deficit static equilibrium analysis used as a basis upon which the impact of deficit financing on private sector savings and investment in Nigeria is analysed.

In Nigeria, government budget deficit which is 'simply', the shortfall of budgeted income over expenditure, has been persistent for over two decades (with only a few exceptions). Since the seventies, the Federal Government of Nigeria has been grappling with the challenge of deficit financing for most part of its annual budgets. Although budget deficit may not be a favourable phenomenon, there has to be recourse to some financial sources to bridge the gap. Such financing gap could arise as a result of inflationary and related macroeconomic trends, rising demand for capital expenditure, coupled with persistent (or rising) percentage of recurrent expenditure over capital expenditure. Capital expenditure is expedient for infrastructural development. Deficit financing is an essential tool in macroeconomic management provided it is efficiently financed and productively utilised on projects and programmes that could be self-sustaining (Bamidele and Englama, 1995).

There have been several studies on budget deficit in relation to some macroeconomic variables, but their empirical relationships with bonds is hardly conclusive. For example, Hamburger and Zwick (1981), Dwyer (1982), Ahking and Miller (1985), Dogas (1992), Sowa (1994), Hondroyiannis (1994), Metin (1995), Ali (2003) all document empirically the relationship between budget deficit and inflation in developed countries. Most of these studies did not provide conclusive results on the causal relationship between the two variables, especially for Nigeria.

However, Oladipo and Akinbobola (2011) document the existence of uni-directional causality from budget deficit to inflation. Their study exposes the direct influence of budget deficits on inflation, and indirect effect arising from fluctuations in exchange rate within the economy.

Budget deficit could also be examined in relation to money supply. Chimobi and Igwe (2010) posit that money supply causes budget deficit in Nigeria, meaning that the level of money supply is a determinant factor for budget deficit in the economy. Budget deficit is usually financed through borrowing (domestic or foreign), or utility of foreign reserve (Paiko, 2012).

Although there could be possibility of crowing out phenomenon as argued by MacCauley and Remolona (2000), Eichengreen and Luenruemitchai (2004) and concurred by Adelegan and Radzewiczback (2009), raising government bonds to meet deficit financing gaps may not be without some benefits. This is confirmed by the later duo's argument that governments, which run deficits, are likely to have more public debt, and the public sector deficit encourages private

debt issuance. This argument appears valid since it is common phenomenon that government bonds are required to pave way for corporate bonds.

In Nigeria, budget deficit is commonly financed using government bonds. It is therefore pertinent to examine the relationship between bond market development and budget deficit financing. Budget deficit in this context could be measured as the excess of expenditure over revenue, or as a ratio of budget deficit as a percentage of GDP.

2.5.8 Money Supply (M2) as a Percentage of GDP

Money Supply is also known as Broad Money and reflects the level of liquidity in a country. Broad money generally involves the total available cash within an economy (except that of the Federal Government), whether at hand, outside the bank, at bank, or in the form of demand deposits. M2 includes the sum of currency outside banks, demand deposits other than those of the Central Bank, time, savings and foreign currency deposits of resident sectors other than the central government (World Bank, 2009). It typically involves coins and notes, bills, money in current and savings accounts as well as deposits. Thus M1, which comprises money in circulation and in accounts of banks (including money deposit banks and microfinance banks), is a subset of M2.

It is expected that an increase in the ratio of M2 to GDP could enhance the potentials for investment in the capital market especially bonds provided there is a high level of awareness. M2 is measured as money supply as a percentage of GDP is expected to exert influence on bond market development. M2 as a percentage of GDP is a measure of financial development base,

and could have correlation with bond market development (Adelegan and Radzewicbak, 2008). The duo establishes a positive correlation between money supply as percentage of GDP and government bond market development.

2.5.9 External Debt

There have been a few studies on the relationship between external or public debt and private debt, or private rates of return. A study carried out in the United States (U.S.) reveals that the spread between corporate and U.S. Treasury bonds declines with a higher level of Federal Government debt. However, Laubach (2009) reports an insignificant relationship between projected U.S. federal budget deficits and the yield spread between corporate and U.S. Treasury bonds. In contrast, Alesina, Broeck, Prati, and Tabellini (1992) documents that there is a small positive effect of higher public debt on the spread between private and public rates of return in some OECD countries.

The nature and structure of Africa's debt has received little attention (Financial Independence, 2008). This is reflected in most studies by scholars who hardly focus on the portfolio of debt securities by African countries. An encompassing study that would require policy makers to consider a mix of debt instruments towards achieving an optimal portfolio of securities would be useful for developing countries like Nigeria. In another perspective, there is a common trend of a shift in focus by less developed economies from external debt to domestic debt with a more reasonable chunk of Sub-Saharan Africa's (SSA's) domestic debts being dominated by short term instruments. Reliance on short term discounted debts entails that the bond markets are

poorly developed and cannot easily support the issuance of intermediate or long-term debt instruments (Turner, 2003).

Another relevant statistics on the Nigerian debt profile is provided by Amaefule (2011). He put the Debt profile at $34.6 billion (N5.19 Trillion) as at December, 2010, constituting 19.24% of GDP, a ratio far below the international threshold of 40%. This gives room for further borrowing, domestic borrowing inclusive although such borrowing needs to be properly guarded and calculative. In the same year, 86.71%, of the total debt, which translates to N4.5 Trillion is domestic, 66.02% of the domestic debt is long tenure, with the remaining 33.98% being short tenured.

External debt has a way of impacting on corporate debt although there seems to be dearth of evidence to clarify this position. There is evidence of negative correlation between the ceiling of corporate credit ratings with the level of public debt (Borensztein, Cowan, and Valenzuela, 2007). It is essential to establish the link between external debt and corporate borrowing, especially corporate bonds. Since there is a link between the government bond rating and corporate borrowing limit, it tends to suggest that a higher rating might enhance corporate debt.

There appears to be a link between external debt and private debt. A positive sign is expected between external debt and private debt, provided the finance raised through external debt is channelled towards infrastructural development, which should spur economic actives, attract foreign investors, and facilitate the business growth. This will in turn facilitate the need for corporate organisations to raise more debt. It therefore implies that once external borrowing is

not channelled to infrastructure, the translation of such financing towards productive business activities may not be achieved, and hence discourage private debt financing. This later situation could generate a negative relationship between private debt and external debt.

2.7 Theoretical Framework and Model Development

The bond market is a vital aspect of an economy and is guided by quite a number of theories. These include the Term Structure Theory, the Interest Group Theory, Theory of Corporate Capital Structure, Financial Structure theory, Financial Innovation Theory, Information Economics Theory, Ricardian Equivalence Theory, Financial Deepening Theory, Segmented Market theory, Loanable Funds Theory, Financial Dualism Theory, Leibenstein's Theory on Shocks and Stimulants, the Domar Model, Debt Overhang Theory, and Institutional Economic Engineering Theory. This study is hinged on the Institutional Economic Engineering Theory (IEEN), which encompasses the later six. However, the study will utilise only the relevant theories, while the non-relevant ones will either be de-emphasised or criticized.

One of the related theories is the term structure of interest rates, which addresses 'the relationship between the maturity of debt and its cost' (Pandey, 2010:662). It 'is best estimated through yields in the default risk free government securities' (Bhalla, 2009:374). Interest rates and monetary policy issues are germane in assessing bond market performance. Monetary policy authorities, which 'must be concerned with the structure and operation of the bond market, use bonds to define the yield curve and to ensure stability of short term rates' (Afrinvest, 2010:05).

The Ricardian Equivalence Theory otherwise known as the Barro-Ricardian Equivalence Theory, which was first initiated by David Ricardo in the nineteenth century, and later developed by Robert Barro posits that government effort to stimulate demand through debt-financed government spending, does not have impact in the long run because of the savings attitude of the public towards future tax increases. The argument from the Ricardian school of thought is that since government would naturally raise taxes to pay back its debt, the savings attitude of the public towards taxes would eventually neutralize the impact of government borrowing, which in the long run renders demand unaltered.

The theory negates the aspect of project finance, which is the main crux of debt financing in the contemporary society. Project-driven financing implies calculated borrowing such that the returns or cash flow generated from a project is enough to finance the project. This means that if money is borrowed to generate infrastructure such as electricity, it would be planned in such a way as to ensure that the income generated from such an infrastructure is able to pay back the loan (including interest) that accrues to it. This would boost production, enhance business activities, encourage competitiveness, and lead to efficiency within the economy. The implication of such stimulation of economic activities is that demand would eventually be enhanced.

For developing nations where structures are still largely underdeveloped, avenues exist for mismanagement of funds and wrong channelling of funds. This has a tendency towards distortions in the numbers. This could even make it more difficult to establish empirically whether or not demand is enhanced as a result of government borrowing.

The Market Segmentation theory as proposed by Culbertson (1957) assumes that debt management is segmented based on the maturity of debt, in relation to demand and supply, and by implication that there are barriers of switching between short and long term investments. An inference is drawn and criticized by many scholars. The implication of this position is that the bond market is segmented into different markets with developments in an aspect of the market exerting little or no influence on other segments of the market. Pilbeam (2005) confirms this inference and argues that it could only be used to explain the different varieties of yield curve shapes, but not the situation of investors and institutions as they will not move investments between different maturity horizons as an impulse to fluctuating interest rates. A study on bond market development looks at the entire bond market as a conglomerate of bonds, which add up to support the financing of projects.

Since finance could be likened to blood flowing through the blood stream of humans, short term bonds are required to augment the long term bonds within an economy. The short term bonds could be likened to 'white blood cells' while the long term bonds could be likened to 'red blood cells', which are both required for efficient blood flow in the human body system. This analogy confirms the operation of the bond market as a holistic network of institutions, investment, social and regulatory arrangement, which enhances the level of financing within the economy. The isolation of specific financing for specific firms, and specific nature of projects is what brings about the challenge of balance sheet mismatch, a situation where short term funds ought not to be used to finance long term projects. Based on this, developing a bond market goes beyond the issue of balance sheet mismatch since it is the aggregate network of bond market development activities that are considered from a holistic perspective.

The banking sector, which is a source of credit measured by the size of the banking sector (BKSIZE), could augment the bond market, as well as the difference between the lending and deposit rates otherwise known as interest rate spread (INSPR). The loanable funds, which could as well include money supply, M2 (MNSUP) within the economy also plays a relevant role in providing support to the bond market, if tapped. Thus Bond Market Size (Government, Corporate or Total) could be expressed as BMS= f (BKSIZE, INSPR, MNSUP)…….(i).

Equation (i) is based on the loanable funds theory as propounded by Knut Wicksel, a Swedish economist in the 1900s. This theory posits that the level of supply and demand of loanable funds in an economy's credit market suggests the determination of its investment and savings by the differences in the long and short term interest rates as determined by its financial and monetary conditions (Da Vinci, 2010). The banking sector is a very important agent in providing credit, which could contribute in project financing.

The level of economic development has a way of exerting influence on an economy's bond market size. This is confirmed by Jhingan (2007) who posits that there is a correlation between changes in bond market development and level of economic development (ECDEV). It could therefore be deduced that BMS= f (ECDEV)……(ii).

Equation (ii) is derived from Leibenstein's (1957) theory on shocks and stimulants as cited in Jhingan (2007), which could be explained by decrease or increase in per capita income.

There is a relationship between growth in output and capital accumulation. It could therefore be deduced that bond market size (BMS) correlates with economic size (ECSIZE). Blackburn and

Hung (1998) documented a positive relationship between economic growth and financial activity.

Thus BMS= f (ECSIZE)…….....……(iii). This is in line with the Domar model for economic growth, which delves on the relationship between capital accumulation and growth in output. The increase in bond market size is a form of capital accumulation, while transformation in GDP, which translates to economic size, could be perceived as growth in output.

There is a link between bond financing especially if project driven, and bond market, for an economy that is properly utilising the debt, and is steadily improving. Although a debt could stir up business activities especially if it is project driven, if it exceeds a sustainable threshold, it could lead to a dearth of liquidity within the economy. This is because the money that would ordinarily be spent for infrastructural development could be channelled towards servicing the debt, a situation that could make the economy to shrink, which could in turn adversely affect the bond market in the long run. The link between the bond market (BMS) and External Debt (EDGDP) could be expressed as:

BMS = f (EDGDP)……..(iv).

The debt over-hang theory explains the phenomenon where the debt stock of a nation exceeds its capacity to repay it, which could lead to a dwindling economy as a consequence of poor business environment, and dearth of investment. The process of hinging external debts on infrastructural projects, or conversion of such debts to project driven bond financing has great potentials for bond market development, and could be perceived as a ‘debt enhancement strategy’. This is so-called in view of the fact that the same debt, if mobilised and converted to project-driven bond

financing could correct the overhang tendency, and enhance the effectiveness of debt management.

The Nigerian bond market is an aspect of the capital market, whose activities could be influenced positively or negatively by capital market related factors, which are economic, institutional and societal factors. The corporate bond market particularly has a greater tendency to be affected by a country's capital market. Thus the equity component could either complement or supplement the corporate bond market than the government bond market. The government bond activities could also impact on the corporate bond market. For example, there could be the crowding out effect on the corporate bond size (CBNMS) arising from government bond market size (GBNMS), which may sometimes be the reverse, depending on the peculiarities of a country's economy. This could be presented as follows:

CBMNS=f (STCAP, GBNMS)…….....(v).

Government bonds especially in less developed economies like Nigeria are partly driven by budget deficit financing (BUDEF), which when generated are sometimes used to finance such shortfalls. There are situations where such deficit financing arises from commitments on capital projects or situations where bonds are raised for capital expenditure (CAPEX). This suggests a statistical link between government bond financing on the one hand, and budget deficit financing and capital expenditure on the other. Such link could be expressed as:

GBNMS= f (CAPEX, BUDEF)…….....(vi).

For measuring determinants of bond market size, the study modifies the model in Bhattacharyay (2011) with that of Adelegan and Radzewicz-Bak (2008). The two works when harmonised with some modifications reflect the model in this study. Combining equations (i) – (vi), give:

Corporate Bond Market Size (CBNMS) Determinants:

CBNMS = f (ECSIZ, MN SUP, STCAP,BKSIZE, EDGDP, GBNMS)……(vii).

Government Bond Market Size (GBNMS) Determinants

GBNMS = f (BKSIZ, ECDEV, INSPR, CAPEX, BUDEF, EDGDP)……(viii).

Total Bond Market Size (TBNMS) Determinants

TBNMS = f (BKSIZ, BUDEF, EDGDP, INSPR, MNSUP, STCAP)……..(ix).

Equations (vii) – (ix) form the basis for arriving at the final models, which could be seen in chapter three as well as the variable measurements and definitions.

This study adopts a holistic approach of determining bond market development, which excludes the term structure of interest rates, and aligns with the IEEN theory. According to (Gao, 2007), institutional economic engineering theory perceives the bond market as an integral part of the financial, economic and social systems, which propounds that understanding the interaction between bond market and the economic system is a pre-requisite to understanding bond market development. The IEEN theory perceives markets as the sole vehicles for economic exchange, while the social and socioeconomic exchanges are achieved outside the market, towards attainment of 'economic development in an endogenously driven evolutionary process'. The IEEN theory, which serves as a new theoretical instrument to explain institutional change

perceives the occurrence of equilibrium when the unity of opposites is in place with transformation taking place when there is disequilibrium (Gao, 2007).

Bond market size, which is the most important indicator of bond market development, could either be measured by bond capitalization as a share of GDP or total bonds outstanding as a percentage of GDP. It is a product of the influence by all the various trading activities of the bond market, which arises from the entire financial and economic system. There is also an element of the society, which requires responses from investors and potential investors, whose patronage of the bond market arises as a result of their level of confidence, generated by the legal, regulatory, corporate governance and related environmental structures within the economy.

The study adopts the IEEN theory as its theoretical framework because the models of this research, which are subsumed in a combined model, all add up to describe the institutional economic engineering theory (IEEN). Government Bond Market Size, Corporate Bond Market Size, and Total Bond Market Size, which constitute variables and parameters, should determine the influence and direction of bond market development. The conglomeration of these variables describes the network of financial, economic and social systems, which expound the Gao's theory.

2.8 Summary of the Chapter

This Chapter has conceptualised the bond market development, and traced as well as identified the transformations in the Nigerian bond market. It has also identified some of the impediments to bond market development, as well as reviewed its determinants. The study after reviewing

several literatures has been able to identify various key indicators out of which three were adopted for the research, which include government bond market size, corporate bond market size, and total bond market size. Finally, the research adopted the Gao's theory of institutional economic financial engineering theory as its framework, which involves a network of financial activities covering institutional, economic, financial and social activities, which enhance financial development.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains how the research was conducted, the research design, methods of data collection, how the sample was arrived at, the size of the sample and the variables used for analysis. It also covers the tools for testing the hypothesis formulated.

3.2 Research Design

The study is descriptive in nature, and focuses more on the correlation research design. It is basically a correlation study in view of the assessment of relationships among the variables derived from the regression models.

The correlation research design enables the gathering of historical data in such a manner as to facilitate the use of analytical tools such as regression analysis. This will enable the establishment of impact and relationships between the dependent and explanatory variables on the one hand, and between the independent variables themselves on the other.

Three sets of models are developed. The stationarity, co-integration, and other robustness tests are subsequently carried out. The regression is then run with the option of Vector Error Correction Model (VECM) after confirming satisfaction of all conditions as evidenced by the aforementioned tests.

3.3 Data Collection Methods

Financial information relating to bond trading activities, which is secondary in nature were gathered on Nigerian Bond Market from various sources. Such sources included the Central Bank of Nigeria (CBN) statistical bulletin, Nigerian Stock Exchange (NSE) Fact Book, the DMO annual Reports, SEC Annual Report, the World Bank, and IMF websites for the period between 1980 and 2011.The data on GDP per capita were accessed from both the World Bank and IMF. Most of the data gathered, especially those that utilised Gross Domestic Product (GDP) as a quotient were predominantly derived from the CBN statistical bulletin, except for Stock Capitalisation which required heavy reliance on SEC Annual Report.

3.4 Variables Definition and Data Analysis Technique

Various available bond market and macroeconomic data were lined up based on the variables. A preliminary stepwise analysis was done using the 'add/remove' technique to ascertain the most suitable set of variables for each of the models covering corporate, government and total bonds. The Error Correction Model was used, after all the necessary tests were carried out in line with Gujirati and Porter (2009) as discussed in section 3.5.

The study presents a major indicator for measuring bond market development, which is Size, patterned after the model in Eichengreen and Luengnaruemitchai (2006) but with modifications. The World Bank financial sector operation and policy through the Financial Sector Development Indicators (FSDI) presents four dimensions of the financial system: size, access, efficiency and stability. This study is limited to bond market size.

Model Specification

The following models are designed for testing the hypotheses in the introductory Chapter of the study, in order to achieve the set out objectives of the study.

Model 1: Corporate Bond Market Size (CBNMS):

$$CBNMS = \alpha + \beta_1 ECSIZ_t + \beta_2 MNSUP_t + \beta_3 STCAP_t + \beta_4 BKSIZ_t + \beta_5 EDGDP_t + \beta_6 GBNMS_t + \mu \ldots\ldots (1)$$

Model 2: Government Bond Market Size (GBNMS):

$$GBNMS = \alpha + \beta_1 BKSIZ_t + \beta_2 ECDEV_t + \beta_3 INSPR_t + \beta_4 CAPEX_t + \beta_5 BUDEF_t + \beta_6 EDGDP_t + \mu \ldots\ldots (2)$$

Model 3: Total Bond Market Size (TBNMS):

$$TBNMS = \alpha + \beta_1 BKSIZ_t + \beta_2 BUDEF_t + \beta_3 EDGDP_t + \beta_4 INSPR_t + \beta_5 MNSUP_t + \beta_6 STCAP_t + \mu \ldots\ldots (3)$$

The variables used in the three models above are defined in the subsequent table 3.1.

Table 3.1: Variable Definition and Measurement:

Variable	Definition	Measurement
CBNMS	Corporate Bond Market Size	Ratio of Total Domestic Private Debt as a % of GDP
GBNMS	Government Bond Market Size	Ratio of Federal Government Bonds as a % of GDP
TBNMS	Total Bond Market Size	Ratio of Total Bonds as a Percentage of GDP
ECSIZ	Size of the Economy	Log of GDP
MNSUP	Money Supply	Money Supply (M2) as Percentage of GDP
STCAP	Stock Capitalisation	Total Equity Capitalisation as a Percentage of GDP
BKSIZE	Size of the Banking System	Domestic Credit by Banks as a Percentage of GDP
EDGDP	External Debt	External Debt as a Percentage of GDP
ECDEV	Economic Development	Log of GDP Per Capita
INSPR	Interest Rate Spread	Difference between Lending Rate and Deposit Rate
CAPEX	Capital Expenditure	Capital Expenditure as a Percentage of GDP
BUDEF	Budget Deficit	Budget Deficit as a percentage of GDP

Source: Compiled by the Author based on Literature

3.5 Robustness Tests

The study carried out further tests using E-views statistical software in order to establish the reliability and robustness of the dissertation's findings. Some of these tests carried out are presented subsequently. The stationarity test was employed with the aid of the Augmented Dickey-Fuller Test based on E-views statistical analysis. The Johanson co-integration test was also carried out in order to establish the long run reliability of the models.

Furthermore, a test for serial correlation was conducted to establish whether or not the residuals of the model are constantly varied. This is carried out using Durbin-Watson (DW) statistics and compared with the related tabular data as derived from Gujirati and Porter (2009). Where the DW value is far outside the high range, it could be deduced that there is no serial correlation for the respective models within the period of study. Furthermore, the Breusch-Godfrey test for autocorrelation was carried out to ascertain the presence of serial correlation using Eviews version 6.0.

The normality test was done using the Jarque-Bera statistics derived from Eviews version 6.0, as well as White Heteroskedasticity test to establish the reliability of the re-specified models. Another stability test was conducted for the re-specified models using the cumulative sum of the residuals (CUSUM). This is aimed at ascertaining whether or not there exists any parameter instability in the models.

The three models were tested for stationarity using the Augmented Dickey-Fuller Unit root test, which should support the aversion of analysing inconsistent and spurious relationship. Time series variables are stochastic in nature, or simply wander around at random, and exhibit non-

stationary tendency, which make future forecasting complex. The concept of stationarity is exposed by Hall (1994) who perceives stationarity of a series from the perspective of constant return to a given value irrespective of the starting point, which entails that in the long-run, it has tendency to attain that value.

To further clarify the use of Dickey-Fuller test, the following autoregressive AR(1) process as stated by Dickey and Fuller (1981) is presented. Thus:

$Yt = \alpha\mu + \rho Yt\text{-}1 + \varepsilon$ (3)

Where μ and ρ are parameters and εt is the white noise assumption. Y is a stationary series if $-1 < \rho < 1$. Note that this is valid only in a series of AR(1) process. If $\rho = 1$, Y is a non-stationary series (a random walk with drift). The hypothesis of a stationary series can therefore be evaluated by testing whether the absolute value of ρ is strictly less than one. Thus, H0: $\rho = 0$ and H1: $\rho < 1$. If the series is correlated at higher order lags, the assumption of white noise disturbance is violated and the ADF test makes a parametric correction for higher order by assuming that the Y series follows an AR(ρ) process. The test methodology is then adjusted by adding lagged difference terms of the dependent variable Y to the right hand side of the regression. Thus,

$\Delta Yt = \mu + \square Y_{t-1} + \delta_1 \Delta Y_{t-1} + \delta_2 \Delta Y_{t-2} + \ldots\ldots\ldots + \delta_{p-1} \Delta Y_{t-p+1} + \varepsilon_t$ ..... (I)

The hypothesis for the augmented specification is tested thus;

H_0: $\square = 0$ and H_1: $\square < 0$.

A non-stationary series could be made stationary by differencing once or twice. This is called an integrated series. It could be integrated of order 1 which is often denoted as I(1) or order 2 represented by I(2). The stationary linear combination of the variables under consideration is called cointegration equation (Engle and Granger, 1991).

The cointegration test is a test for the estimation of long run relationship, which in this context is between the three indicators of bond market size, and the explanatory variables. For variables to be cointegrated, it implies that they share a long-run relationship and will move closely together over time. This could also mean that the differences between such variables are stable over time, and there is a degree of convergence in the long-run. A cointegration test is aimed at examining whether a stochastic non-stationary data are cointegrated although given a premise that a linear combination of such data is stationary. To establish the cointegration process, the error term in the long run equation, which could be more appreciated by the extraction of the residuals in an initial OLS regression result, is expected to be stationary.

To test for cointegration, Johansen's (1991) method is to test the restrictions imposed by cointegration on the unrestricted vector autoregressions (VAR) involving the series as presented here below. Where the VAR is of order P, the preliminary equation could be expressed as

$Y_t = A_1Y_{t-1} + A_2Y_{t-2} + \ldots\ldots\ldots\ldots + A_pY_{t-p} + BX_t + \varepsilon_t$……………………….(II)

Where Y_t is a k – vector of non-stationary I(1) variables, X_t is a d vector of deterministic variables and ε_t is a vector of innovations. The VAR can be re-written as:

$\Delta Y_t = \prod Y_{t-1} + \sum \Gamma_i \Delta Y_{t-i} + BX_t + \varepsilon_t$……………………………………………………………………(III)

Where $\prod = \sum A_i - I$, $\Gamma_i = - \sum A_j$……………………………………………………………………(IV)

An example of simples bivariate VAR is presented by Brooks (2008), with two variables, *y*1*t* and *y*2*t* , each of whose current values depend on different combinations of the previous *k* values of both variables, and error terms y1t = β10 + β11 y1t−1 +· · ·+β1k y1t−k + α11 y2t−1 +· · ·+α1k y2t−k + u1t............ (V)

y2t = β20 + β21 y2t−1 +· · ·+β2k y2t−k + α21 y1t−1 +· · ·+α2k y1t−k + u2t....................... (VI)

Where ui t is a white noise disturbance term with E(ui t) = 0, (i = 1, 2),

E(u1tu2t) = 0.

There exist two basic forms of VAR, the restricted and the unrestricted VAR. The VECM is the restricted form of VAR.

3.6 Justification for the Methods Used

Usually, in time series analysis, OLS is expected to be run only if the basic conditions as highlighted by most econometric texts are met. But most importantly, it is conducted only when all the variables run are stationary at level. Otherwise, one of the aforementioned analytical tools in the heading must suffice.

The ECM is based on asymmetry relation, a situation of cause and effect relationship must be established. It is also 'theoric', in other words, based on theory. There must also be co-integration between the variables in the model. Thus if there is no theory to back the relationships between the respective explanatory (independent) variables and the dependent variable, then it is not advisable to proceed with ECM. If these conditions are not met, then the options of either VAR or VECM are to be considered.

The VAR and VECM assume symmetric (or endogenous) relationship; this entails expressing each variable as a function of all other variables. The VAR assumes that the variables are endogenous, which infers that each of the variables is expressed as a function of itself and other variables in the model. It also involves 'atheoric' assumptions, which means it is best used for variables that have little or no theoretical backing. Furthermore, it is applied when there are no cointegrating vectors in the equation. Thus, if the variables in the model do not follow co-

integration process, the VAR is preferred. VECM is applied in atheoric situation, although on condition that the variables in the model are co-integrated.

Although the data used in the study are time series in nature, the Ordinary Least Square (OLS) regression technique would not adequately address the problem and subsequently the objective of the study, especially considering that a pilot test to ascertain the stationarity of the data used indicates that not all variables of the later are stationary at level, for all the models, which would require differencing of the variables. This is because most of the data are stationary at least at first difference. However, the variables satisfy the conditions, and justification for using Vector Error Correction Model (VECM). As stated by Gujurati and Porter (2009), the cointegration analysis, for instance, the Johansen's procedure, which is the maximum likelihood for finite order vector autoregression (VAR) helps to clarify the long run relationships between integrated variables.

The Vector Error Correction Model is initiated by Sargan (1962) and subsequently developed by Engle and Granger (1987) for adjusting disequilibrium in a cointegrating relationship. The error correction mechanism reconciles such short and long run behaviour of economic variables.

Advantages of VAR modelling as identified by Brooks (2008) compared with univariate time series models or simultaneous equations structural models as follows:

i) There is no need to specify which variables are endogenous or exogenous all are endogenous;

ii) VAR is flexible, allows the value of a variable to depend on more than just its own lags or combinations of white noise terms, and can capture more features of data;

iii) Pre-determined variables include all exogenous variables and lagged values of the endogenous variables.

iv) The forecasts generated by VARs are often better and more accurate than 'traditional structural' models.

3.7 Summary of the Chapter

In this chapter, key issues on the techniques of data collection and data analysis have been presented. Various robustness tests have been identified in order to ascertain the validity of the data and results being regressed. The model is also specified here, with the techniques deployed clearly spelt out.

CHAPTER FOUR

PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter sets out to present the data, the regression results as well as discuss the results. In the process, the chapter will examine the various tests that led to ascertainment of the stationarity, cointegration and general robustness of the models. The three initial models were restated, after extracting and adding the residuals, which make up the error correction model (ECM) with a lag of 1 year; carrying out a stationarity test for each of the variables; doing a co-integration test for the respective models. The chapter also presents three new models rebuilt from the initial ones, while taking cognisance of the differenced variables in line with their stationarity levels, and then re-running the three new sets of models. In addition, the chapter covers other robustness tests like the serial correlation tests, heteroschedasticity test, the normality tests, as well as the stability test. Finally, the results were interpreted, with policy implications drawn, while making a case for remedial action, identifying the limitations of the study as well as suggesting areas for further research.

4.2 Data Presentation and Preliminary Tests

In this section, the data is presented and discussed. Other preliminary tests particularly robustness covering stationarity, cointegration and stability are addressed under this section.

4.2.1 Data Presentation

The data covers a time series institutional, macroeconomic and financial data. The data as stated earlier, which are annual, span a period of 32 years (1980 to 2011). The bond market size is the

key dependent variable of the study, and is in three categories: the corporate bond market size, the government bond market size and total bond market size. Other series that are relevant to the study include bank size, economic size otherwise known as size of the economy, level of economic development, interest rate spread, stock capitalisation, external debt, budget deficit, and money supply.

Most of the variables were taken as a percentage of GDP. The few variables whose proxies are not ratios or percentages such as economic size and bank size were transformed into natural logarithms before running the data. Various tests, and data analyses were carried out as described in chapter three, and the results presented subsequently.

4.2.2 Stationarity Tests

In testing the hypotheses of the study, there is the need to consider all the variables in the three models as presented in chapter three, which are replicated here below:

Model 1: Corporate Bond Market Size (CBNMS):

$$CBNMS = \alpha + \beta_1 ECSIZ_t + \beta_2 MNSUP_t + \beta_3 BKSIZ_t + \beta_4 EDGDP_t + \beta_5 GBNMS_t + \mu \ldots\ldots (1)$$

Model 2: Government Bond Market Size (GBNMS):

$$GBNMS = \alpha + \beta_1 BKSIZ_t + \beta_2 ECDEV_t + \beta_3 INSPR_t + \beta_4 CAPEX_t + \beta_5 BUDEF_t + \beta_6 EDGDP_t + \mu \ldots\ldots (2)$$

Model 3: Total Bond Market Size (TBNMS):

$TBNMS = \alpha + \beta_1 BKSIZ_t + \beta_2 BUDEF_t + \beta_3 EDGDP_t + \beta_4 INSPR_t + \beta_5 MNSUP_t + \beta_6 STCAP_t + \mu$ …………………………………………… (3)

All the variables are as defined in chapter 3.

Prior to the regression analysis, a stationarity test is conducted on the respective variables of all the models; a phenomenon with economic theoretical underpinning designed to enhance the reliability of the regression results. Such a test could be conducted using either the Phillip Peron (PP) test or Augmented Dickey-Fuller Test (ADF). In this case, the ADF is deployed in carrying out the test. This will confirm the level of stationarity of the variables, which will be incorporated in the models after differencing while taking cognizance of the level of stationarity so as to avoid misleading results. In performing the stationarity test a maximum lag of 1is used, and included the intercept. The result of the stationarity test for all the variables used in the three models is presented in table 4.2.2 below

Table 4.2.2 ADF Unit Root Test of Stationarity for the variables

Variable	**ADF Test Statistics**	**Max Lag**	**Order of Integration**
CBNMS	-3.565343	1	I(1)
GBNMS	-4.450136	1	I(0)
TBNMS	-3.996335	1	I(1)
MNSUP	-3.206755	1	I(1)
ECSIZ	-3.314441	1	I(1)
ECDEV	-3.660937	1	I(1)
BUDEF	-5.515109	1	I(1)
INSPR	-6.250330	1	I(1)
EDGDP	-3.564689	1	I(0)

Critical values 1% = -3.6752, 5% = -2.9665, 10% = -2.6220

Extracted from Eviews 6.0 output file

These results show that corporate bond size, total bond size, money supply (M2), size of the economy, level of economic development, budget deficit, capital expenditure, interest rate spread and natural openness, are integrated of order one, I(1) at 5% level of significance with lag 1.

Government bond size and external debt variables are integrated at level I(0) at 5% level of significance. The residuals for the three models are all stationary at level. This is an indication that all variables including the three residuals of each of the models are found to be stationary, at least once, which entails that the model follows integrating process.

4.2.3 Cointegration Tests

Following the establishment of stationarity of the variables, a time series set of variables requires the determination of existence of cointegrating vectors supporting the existence of long-run relationship between the dependent and the explanatory variables. To do this, the Johansen test is used. The result of the test is presented in table 4.2.3(i) below.

Table 4.2.3(i) Cointegration Test Result for the Model in Equation 1

Date: 07/24/14 Time: 16:42
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments
Trend assumption: Linear deterministic trend
Series: CBNMS ECSIZ MNSUP BKSIZ EDGDP GBNMS
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.777198	134.5864	95.75366	0.0000
At most 1 *	0.747187	89.54226	69.81889	0.0006
At most 2 *	0.604151	48.28904	47.85613	0.0455
At most 3	0.318396	20.48734	29.79707	0.3904
At most 4	0.229378	8.988160	15.49471	0.3665
At most 5	0.038296	1.171447	3.841466	0.2791

Trace test indicates 3 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Eviews Version 6.0

The result of the cointegration test for the model in equation 1 as presented in table 4.2.3(i) above reveals the presence of 3cointegrating equations at 5 percent level of significance. This

confirms the existence of long-run equilibrium relationship between corporate bond market size and the explanatory variables. The likelihood ratio is greater than critical values at 5%, which confirms the long run relationship between the dependent and independent variables of the model. This implies that in the long run, the dependent variables could be efficiently predicted using the specified independent variables. Thus, error correction model can, thus, be estimated. Thus deductions can be made from this result that the regression model is not spurious and the conclusions on them could be valid.

Johansen Cointegration Test for Equation 2

Similar to the model 1, there is need to determine whether there exists any cointegrating vector supporting the existence of long-run relationship between the dependent and the explanatory variables for model 2. To do this, the Johansen test is used as well. The result of the test is presented in table 4.2.3(ii).

Table 4.2.3(ii) Cointegration Test Result for the Model in Equation 2

Date: 07/24/14 Time: 14:59
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments
Trend assumption: Linear deterministic trend
Series: GBNMS BKSIZ ECDEV INSPR BUDEF EDGDP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value
None *	0.781121	122.6498	95.75366
At most 1 *	0.568617	77.07278	69.81889
At most 2 *	0.507530	51.84999	47.85613
At most 3 *	0.391048	30.60035	29.79707
At most 4 *	0.366492	15.71989	15.49471
At most 5	0.065286	2.025427	3.841466

Trace test indicates 5 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Eviews Version 6.0

The result of the test indicates the presence of 5 co-integrating equations at 5 percent level of significance, which signifies the existence of long-run equilibrium relationship between government bond market size and the explanatory variables. The likelihood ratio is greater than critical values at 5%, which confirms the long run relationship between the dependent and independent variables of the model. This implies that in the long run, the dependent variables could be efficiently predicted using the specified independent variables. Thus, error correction model can, thus, be estimated. Thus deductions can be made from this result that the regression model is not spurious and the conclusions on them could be valid.

Johansen Co-integration Test for the model in Equation 3

Again, the search for a co-integrating vector supporting the existence of long-run relationship between the dependent and the explanatory variables for the third model is ascertained by the Johansen co-integration test. The result of the test is presented in table 4.2.3(iii).

Table 4.2.3(iii) Johansen Co-integration Test for the Model in Equation 3

Date: 07/24/14 Time: 14:24
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments
Trend assumption: Linear deterministic trend
Series: TBNMS BKSIZ BUDEF EDGDP INSPR MNSUP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.842074	148.3421	95.75366	0.0000
At most 1 *	0.723591	92.97316	69.81889	0.0003
At most 2 *	0.626761	54.39696	47.85613	0.0107
At most 3	0.354023	24.83090	29.79707	0.1675
At most 4	0.301233	11.72118	15.49471	0.1708
At most 5	0.031753	0.968039	3.841466	0.3252

Trace test indicates 3 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Eviews Version 6.0

The result of the test indicates the presence of 3 co-integrating equations at 5 percent level of significance, which signifies the existence of long-run equilibrium relationship between total bonds and the independent variables. This is an indication of long run reliability of the variables, which validates the conclusions on the results.

4.3 Hypothesis Testing and Robustness Tests

The statements of hypotheses presented in chapter one are addressed here. This is expected to reveal the determinants of bond market size in relation to government, corporate and total bond market size.

4.3.1 Hypotheses I: Determinants of Corporate Bond Market Size

This section presents the re-specified models based on the outcome of preliminary tests in section 4.2, as well as the parsimonious VECM results for the respective models from which the hypotheses are tested. The results of various robustness tests as described in chapter 3 are hereby presented and discussed. The study has been able to establish the level of stationary of each variable in the model. Furthermore, the existence of a long run relationship between dependent and independent variables in the model has been established.

The result of Vector error correction model comprising the first set of model in respect of corporate bond market development, is presented in table 4.3.1.

Table 4.3.1 VECM Results (abridged) for Equation 1

Error Correction:	D(CBNMS)
CointEq1	-0.651926
	(0.19630)
	[-3.32109]
D(CBNMS(-1))	-0.235865
	(0.17441)
	[-1.35235]
D(CBNMS(-2))	0.196090
	(0.15674)
	[1.25102]
D(ECSIZ(-1))	-0.497823
	(0.18453)
	[-2.69784]
D(ECSIZ(-2))	-0.342624
	(0.13610)
	[-2.51744]
D(MNSUP(-1))	0.869603
	(0.35744)
	[2.43288]
D(MNSUP(-2))	0.074602
	(0.38033)
	[0.19615]
D(BKSIZ(-1))	-0.283196
	(0.12007)
	[-2.35866]
D(BKSIZ(-2))	-0.301096
	(0.12314)
	[-2.44517]
D(EDGDP(-1))	0.056028
	(0.05937)
	[0.94377]
D(EDGDP(-2))	0.325481
	(0.06187)
	[5.26058]
D(GBNMS(-1))	-0.027908
	(0.19620)
	[-0.14225]
D(GBNMS(-2))	0.153871
	(0.18947)
	[0.81212]
C	-0.008116
	(0.03983)
	[-0.20377]
R-squared	0.859474
Adj. R-squared	0.737684
F-statistic	7.057044
Log likelihood	14.46965
Akaike AIC	-0.032389
Schwarz SC	0.627684
Mean dependent	0.010684
S.D. dependent	0.398852

Source: Extracted from Eviews Version 6.0

The results of the VECM estimation show that the explanatory variables account for approximately 85.94 percent variation in corporate bond development in Nigeria. The estimation also shows that corporate bond market size and the size of the economy are significant but it is negatively signed. For instance, a 1 percentage increase in economic activities in the previous year reduces corporate bond activities in the market by approximately 49.8 while a 1 percentage increase in economic activities in the previous two years reduces corporate bond activities in the market by approximately 34.3 percent. The results also indicate that corporate bond market size and money supply are statistically and economically significant. A 1% increase in money supply in the previous year leads to approximately 86.9 percentage increase in corporate bond activities while a one percentage in the previous two years leads to a 7.4 % increase in corporate bond market size.

Furthermore, the estimation revealed that the size of the banking system and corporate bond market size are negatively related. A 1 percent increase in the size of the banking system in the previous or previous two years causes the Nigerian corporate bond market size to fall by approximately 28.3 or 30.1 percentage. In addition, the result indicates a positive influence of external debt on corporate bond market size. A 1% increase in external debt in the previous one or two years will cause the size of the corporate bond market to increase by 5.6% or 32.5% respectively although it is statistically significant only at 10%.

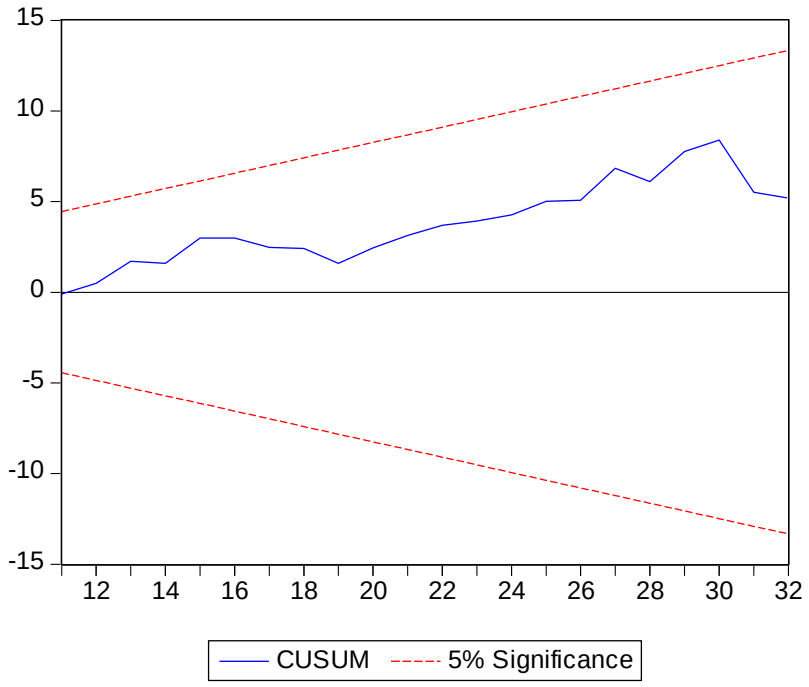
Finally, it is shown that the previous year government bond market size is negatively related to corporate bond market size but the previous two years government bond market size is positively related to corporate bond market size. A 1 percent increase in government bond market size in

the previous or previous two years leads to a decrease or an increase in the corporate bond market size by approximately 2.7% or 1.5 %.

Stability Test:

The stability properties of the model are conducted using Cumulative Sum of the residuals (CUSUM) test as shown in the figure below.

Figure 4.3.1 Cumulative Sum of Residuals for Equation 1



Source: Generated from E-views Version 6.0

The critical lines for Cumulative Sum of the residuals and Cumulative Sum of the Squares of residuals are estimated at 5 percent critical level. The existence of parameter for instability is established if the cumulative sum of the residuals goes outside the area between the two critical

(dotted) lines. From Figure 4.2.4 above, it can be inferred that, for the period under review, stability is established for the model.

A summary of other confirmatory tests to support the validity of the model is presented in the subsequent table.

Table 4.3.1(b) Summary of other Test Results for Equation 1

Nature of Test	F-Statistics	Probability
Normality Test		
(Jarque-Bera Statistics)	0.712748	0.700211
Serial Correlation		
(Breusch-Godfrey Serial Correlation LM Test)	0.561814	0.998492
Heteroschedasticity		
(White Heteroskedasticity Test)	1.888438	0.120303

Source: Extracted from Eviews Version 6.0

Further to the other tests, the Jarque-Bera test for normality, the Breusch-Godfrey Serial Correlation LM test, and the White Heteroschedasticity Tests are also carried out to further establish reliability of the variables being deployed in the analysis. The results as seen from table 4.2.5 establish that the model is properly specified. The probabilities of F-statistics derived from the various tests are insignificant, which imply the failure to reject the null hypotheses of the respective tests. On the overall, the results of the various tests suggest that the residuals are normally distributed, homoschedastic, serially uncorrelated, and have stable parameters.

4.3.2 Determinants of Government Bond Market Size

The study has been able to establish the level of stationary of each variable in the model. Furthermore, the existence of a long run relationship between dependent and independent variables in the model has been established. The VECM estimation is then run, which reveals the result as presented in table 4.3.2 below.

Table 4.3.2 VECM Result (abridged) for the Model in Equation 2

Error Correction:	D(GBNMS)
CointEq1	-1.870444
	(0.38183)
	[-4.89863]
D(GBNMS(-1))	0.585351
	(0.35135)
	[1.66600]
D(GBNMS(-2))	0.527926
	(0.41023)
	[1.28690]
D(BKSIZ(-1))	-0.926516
	(0.40103)
	[-2.31033]
D(BKSIZ(-2))	-0.940768
	(0.56769)
	[-1.65719]
D(ECDEV(-1))	1.785010
	(0.38362)
	[4.65308]
D(ECDEV(-2))	0.910051
	(0.23712)
	[3.83786]
D(INSPR(-1))	0.712558
	(0.65766)
	[1.08347]
D(INSPR(-2))	-0.251896
	(0.71158)
	[-0.35400]
D(BUDEF(-1))	0.638849
	(0.27850)
	[2.29389]
D(BUDEF(-2))	0.250234
	(0.27261)
	[0.91792]
D(EDGDP(-1))	-0.012471
	(0.20117)
	[-0.06199]
D(EDGDP(-2))	-0.017215
	(0.22896)
	[-0.07519]
C	0.039245
	(0.20901)
	[0.18776]
R-squared	0.822271
Adj. R-squared	0.668240
Sum sq. Resids	17.99095
S.E. equation	1.095170
F-statistic	5.338328

Source: Computations by the author from Eviews version 6.0

The results of the VECM estimation show that the explanatory variables account for approximately 82.22 % variation in government bond development in Nigeria. The estimation also shows that government bond market size and the size of the banking system are negatively correlated with the dependent variable. For instance, a 1 percentage increase in the size of the banking system in the previous two years reduces government bond activities in the market by approximately 92.6% or 94.0%. The results also indicate that government bond market size and economic development is statistically and economically significant. A 1% increase in economic development in the previous year leads to approximately 178.5 percentage increase in government bond activities while a one percentage in the previous two years leads to a 91.0 % increase in government bond market size.

Furthermore, the estimation reveals that the interest rate spread and government bond market size are positively related in the previous year and negatively related in the previous two years. A 1% increase in the interest rate spread in the previous year causes the government bond market size to rise by approximately 71.2%, while a 1 percentage increase in the interest rate spread in the previous two years causes the government bond market size to fall by approximately 25.1%.

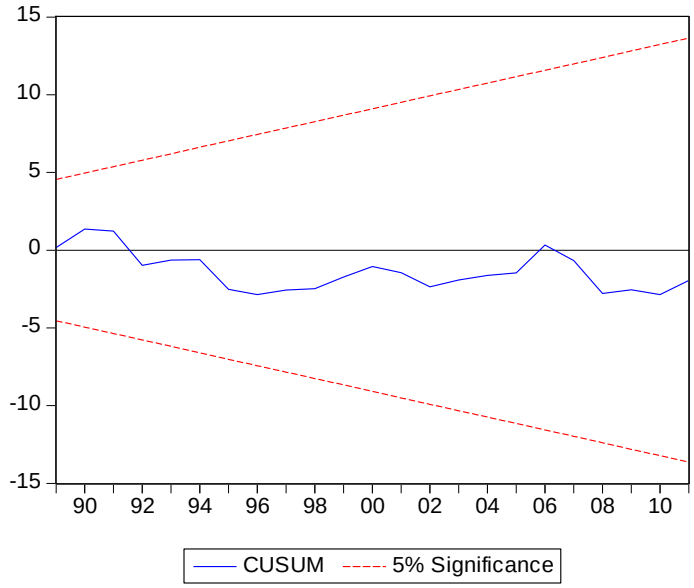
In addition, the result indicates a positive relationship between government bond market size and budget deficit and it is statistically and economically significant for the previous year. A 1% increase in budget deficit in the previous one or previous two years will cause the size of the government bond market to increase by 63.8% or 25.8% respectively. Finally, it is shown that the previous and previous two year external debt is negatively related to government bond

market size. A 1 percent increase in external debt in the previous or previous two years leads to a decrease in the government bond market size by approximately 1.2% or 1.7 %.

Stability Test

The stability properties of the model are conducted using Cumulative Sum of the residuals (CUSUM) and Cumulative Sum of Squares of the residuals (CUSUM Squares) tests. The critical lines for Cumulative Sum of the residuals and Cumulative Sum of the Squares of residuals are estimated at 5 percent critical level. The existence of parameter for instability is established if the cumulative sum of the residuals goes outside the area between the two critical (dotted) lines. From Figure 4.3.2 below, it can be inferred that, for the period under review, stability is established for the model.

Figure 4.3.2 Cumulative Sum of Residuals for model 2



Source: Generated from E-views Version 6.0 Further confirmatory tests are carried out, with the results displayed in table 4.3.4 subsequently.

Table 4.3.2(b) Summary of other Test Results for model 2

Nature of Test	F-Statistics	Probability
Normality Test		
(Jarque-Bera Statistics	1.173621	0.556098
Serial Correlation		
(Breuscg-Godfrey Serial Correlation LM Test)	1.614922	0.942187
Heteroschedasticity		
(White Heteroskedasticity Test)	0.584308	0.761634

Source: Extracted from Eviews

Similar to the model in equation 1, the Jarque-Bera test for normality, the Breusch-Godfrey Serial Correlation LM test and the White Heteroschedasticity test were also carried out to determine the quality of specification of the variables in the model.

The results as seen from table 4.3.2(b) above suggest that the model is properly specified. The probabilities of F-statistics derived from the various tests are insignificant, which imply the failure to reject the null hypotheses of the respective tests. On the overall, the results of the various tests suggest that the residuals are normally distributed, homoschedastic, serially uncorrelated, with stable parameters.

4.4.2 Determinants of Total Bond Market Size

The level of stationary of each variable of the model in equation 3 has also been established. Furthermore, the existence of a long run relationship between dependent and independent variables in the model has been established. Subsequently, the result of VECM model is presented in table 4.4.2.

Table 4.4.2 VECM Results (abridged) for Model in Equation 3

Error Correction:	D(TBNMS)
CointEq1	-1.510317
	(0.40266)
	[-3.75082]
D(TBNMS(-1))	0.255234
	(0.29779)
	[0.85708]
D(TBNMS(-2))	0.106583
	(0.18998)
	[0.56101]
D(BKSIZ(-1))	-0.269646
	(0.23237)
	[-1.16043]
D(BKSIZ(-2))	-0.494697
	(0.22695)
	[-2.17977]
D(BUDEF(-1))	0.058203
	(0.26104)
	[0.22296]
D(BUDEF(-2))	0.287435
	(0.24477)
	[1.17432]
D(EDGDP(-1))	0.538376
	(0.20500)
	[2.62618]
D(EDGDP(-2))	0.410986
	(0.16812)
	[2.44455]
D(INSPR(-1))	-0.131678
	(0.14444)
	[-0.91165]
D(INSPR(-2))	0.213789
	(0.16271)
	[1.31397]
D(MNSUP(-1))	-0.719473
	(0.23406)
	[-3.07384]
D(MNSUP(-2))	-0.259491
	(0.25229)
	[-1.02855]
C	0.117526
	(0.20594)
	[0.57069]
R-squared	0.864343
Adj. R-squared	0.746774
Sum sq. Resids	16.72591
S.E. equation	1.055964
F-statistic	7.351781

Source: Extracted from Eviews version 6.0

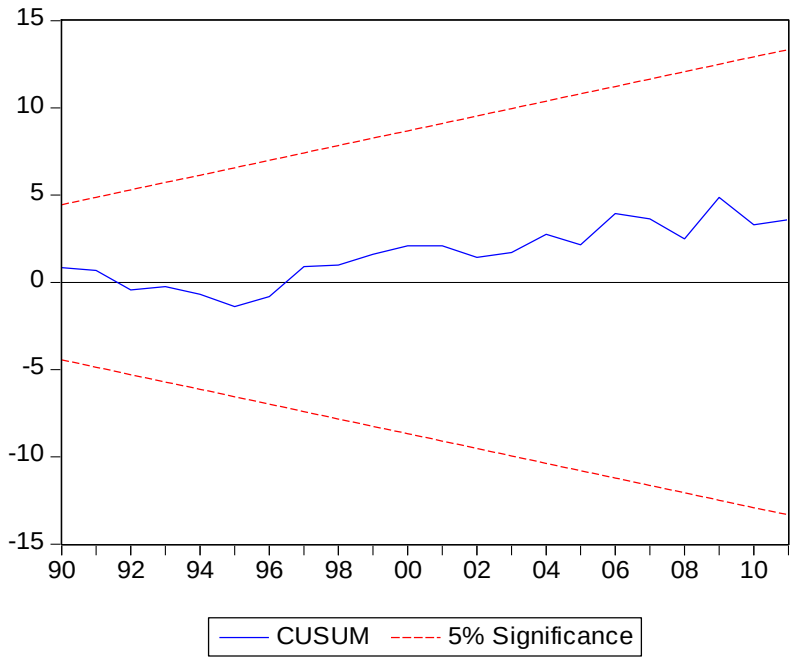
The result of the VECM estimation shows that the explanatory variables account for approximately 86.43 percent variation in total bond market size in Nigeria. The estimation also shows that total bond market size and the size of the banking system are negatively related. For instance, a 1 percentage increase in the size of the banking system in the previous one or previous two years reduces total bond activities in the market by approximately 26.9% or 49.4% respectively. The results also indicate that total bond market size and budget deficit are positively related. A 1 percentage increase in budget deficit in the previous one or previous two year leads to approximately 5.8% or 28.7% increase in total bond activities respectively.

Furthermore, the estimation reveals that the external debt and total bond market size are positively related and it is statistically and economically significant. A one percentage increase in the external debt in the previous one or previous two year will cause the total bond market size to rise by approximately 53.8% or 41% respectively. In addition, the result indicates a negative relationship between total bond market size and interest rate spread in the previous year but a positive relationship in the previous two year. A 1% increase in interest rate spread in the previous one or previous two years will cause the size of the total bond market to increase or decrease by 31.1% or 21.3% respectively. Finally, it shows that the previous one and previous two years, money supply is negatively related to total bond market size. A 1% increase in money supply in the previous one or previous two years leads to a decrease in the total bond market size by approximately 71.9% or 25.9 % respectively.

Stability Test: Cumulative Sum of Least Squares Test

The stability properties of the model are conducted using Cumulative Sum of the residuals (CUSUM) test. The critical lines for Cumulative Sum of the residuals and Cumulative Sum of the Squares of residuals are estimated at 5 percent critical level. The existence of parameter for instability is established if the cumulative sum of the residuals goes outside the area between the two critical (dotted) lines. From Figure 4.4.2 below, it can be inferred that, for the period under review, stability is established for the models.

Figure 4.4.2 Cumulative Sum of Residuals (CUSUM) for Model in Equation 3



Source: Generated from E-views Version 6.0

Lastly, other supporting test results are presented in the subsequent table.

Table 4.4.2(b) Summary of other Test Results for the Model in Equation 3

Nature of Test	F-Statistics	Probability
Normality Test		
(Jarque-Bera Statistics	0.274952	0.871555
Serial Correlation		
(Breusch-Godfrey Serial Correlation LM Test)	2.687862	0.784433
Heteroschedasticity		
(White Heteroskedasticity Test)	0.807183	0.590501

Source: Extracted from E-views Version 6.0

In this equation 6 model, the Jarque-Bera test for normality, the Breusch-Godfrey Serial Correlation LM test, and the White Heteroschedasticity Tests are also carried in the same fashion with the earlier two. This builds further confidence on the entire output of the model.

The results as seen from the above the table 4.4.4 suggest that the model is properly specified. The probabilities of F-statistics derived from the various tests are insignificant, which imply the failure to reject the null hypotheses of the respective tests. On the overall, the results of the various tests suggest that the residuals are normally distributed, homoschedastic, serially uncorrelated, with stable parameters.

4.5 Discussion of Results

4.5.1 Hypotheses I: Factors that Impact on Corporate Bonds

This aspect addresses Hypothesis (I), which is about factors that influence corporate bonds market size. Although the significant coefficients and t-statistics of bank size in relation to corporate bonds are significant at 5% in line with Adelegan and Radzewiczbac (2009),

Bhattachrayay (2011), and Raghavan and Sarwono (2012), there are differences in the signs between Nigeria and Asia on the one side, and the Sub-Saharan Africa (sub-region) on the other. A study by Adelegan and Radzewiczbac (2009) reveals positive but significant correlation between bank size and corporate bond size for SSA.. This study, however, shows a negative and significant correlation, which is actually in line with the results from the work of Bhattacharyay (2011) on Asia, and Raghavan and Sarwono (2012) on India. This helps to explain the country specific differences in the relationships between the banking sector and corporate bonds of different regions. This is deduced from the correlation between the variables.

Thus the disparity between regions or even countries, could lead to variation on the impact and/or correlation between bond market variables. In this case, the differences in correlation between bank size and corporate bond market development could be interpreted as a paradoxical disparity in the complimentarity and supplementarity of the variables for the respective countries or regions.

Meanwhile, the significant coefficients and t-statistics of government bond size in relation to corporate bonds are insignificant contrary to the findings of Christensen (2004), Adelegan and Radzewicz-bak (2009), and Raghavan and Sarwono (2012), although their significant findings have contrasting correlation signs. Thus while government bonds in Nigeria do not exert any influence on corporate bonds, government bonds in India are complimenting (supporting) corporate bonds, while government bonds in the entire SSA sub-region are crowding out (choking out corporate bonds). The results of the regression analyses have revealed new sets of

variables for policy making, some of which have not been previously empirically documents before based on the available evidence to the researcher.

The occurrence of both external debt as a percentage of GDP, and Money Supply (M2) as percentage of GDP are phenomenal in view of the striking level of significant positive impact the two variables pose on corporate bond market size. This implies that a guarded increase in money supply (M2) has a tendency of positively driving corporate bond market development. In a similar vein, a larger but efficient external debt could in the long run drive corporate bond market development. This could be achieved if the financing raised from external sources are project driven towards infrastructural development, which should facilitate rapid growth of businesses as well as competitiveness, which leads to high tendency for firms to raise corporate finance through bonds. This variable aligns with the loanable funds theory, which was later developed by Da Vinci (2010).

There is the possibility that a proportion of external debt could be restructured into corporate bonds, which would directly boost the corporate bond market, thereby enhancing its development. This would only be possible with the lending agencies through a re-negotiation of the financing agreements. This could help address the debt overhang theory. Although it is obvious that external debt finance is consummated through a series of processes including drafting and review of project appraisal documents, financing agreements, among others, the realisation of such restructuring may be achieved through new agreements between the borrower nation and the lending agency.

It can be argued that arranging a good mix of debt instruments including corporate bonds, government bonds, external debt, among others, in a debt portfolio of an economy would facilitate efficient debt management, which could also be achieved through restructuring of such debts. This confirms the relevance of external debt in facilitating bond market development in an economy, provided such debt is within its threshold.

This study has revealed that the value of stocks traded is insignificant in Nigeria. This is in consonance with the findings of Rhagavan (2012) for India. This confirms that the growth of equity stock capitalisation may not matter much for improving the Nigerian corporate bond market development.

4.5.2 Hypothesis II: Factors that Impact on Government Bonds

Hypothesis (ii) addresses the impact of Bank Size, Level of Economic Development, Interest Rate Spread, Capital Expenditure, Budget Deficit, and External Debt on Government Bond Market Size. Bank size is seen to exert significant but negative impact at 1% on government bond market size contrary to the finding of Adelegan and Radzewiczbac (2009) and Bhattacharyay(2011) who documented an insignificant impact as well as positive sign on government bonds. This implies that while the domestic credit by the banking sector does not matter for government bond markets of Asia, and Sub-Saharan Africa in general, it matters much for Nigerian government bond market development.

The level of economic development on the other hand is significant at 5% level, and is positively correlated with government bond market size in line with the findings of Adelegan and

Radzewiczbac (2009), and Bhattacharyay (2011). This contradicts the common trends in the Sub-Saharan sub-region, and Asia.

Interest rate spread however as revealed by this study, is insignificant at 5% for Nigeria, which is in line with the findings of Adelegan and Radzewiczbac 2009) who document a positive but insignificant impact for Sub-Saharan Africa, and insignificant and negative for Asia as evidenced by Bhattacharyay (2011). This revelation aligns the Nigerian government bond market with that of the Sub-Saharan Africa with regard to interest rate spread. This implies that an increased interest rate spread would not trigger government bond market development in Nigeria.

Budget deficit is seen to be a new phenomenon that is important in driving government bond market development in Nigeria, in view of its significant positive impact on government bond market development. This finding aligns with evidence provided by Adelegan and Radzewiczback (2009), Njiforti and Muhammad (2010) and Paiko (2012). But this would require some caution because the main cause of the budget deficit could be counterproductive, which may hamper bond market development in the long run.

4.5.3 Hypothesis (III): Factors that affect Total Bond Market Development

Although bank size is significant and negative at 5% for Nigeria as a revealed by this study, it is insignificant and negative for SSA and also insignificant for Asia as revealed by Adelegan and Radzewiczbac (2009), and Battacharayay (2011) respectively. This explains the possibility of country-specific disparity in determinants as against regional based factors.

The interest rate spread and stock capitalisation, do not exert significant impact on overall bond market development in Nigeria. This implies that they do not matter much for policy decisions on to total bond market size.

Money supply and external debt constitute new phenomena on total bond market size in Nigeria as they both present a significant positive impact on total bond market size in Nigeria. Thus if the quantum of money in terms of M2 as a percentage of GDP within the economy increases, it will drive total bond market size negatively. But this may not necessarily be the case in isolating either corporate bond market or government bond market. For example, while money supply as a percentage of GDP does not matter much for government bond market size in Nigeria, it matters for corporate bond market size as revealed in this study since it is a positive driver of the latter.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This dissertation has examined bond market development in Nigeria from the perspectives of bond market size as an indicator, which is disaggregated into three; corporate bond market size, government bond market size and total bond market size. The variables examined span across financial, Institutional and macro-economic factors. The study conceptualises the bond market development, traces and identifies the transformations in the Nigerian bond market as well as its impediments, reviews various contributions of scholars globally on bond market development, as well as the various determinants of bond market development. The research, after identifying various related theories, aligns with Gao's theory of institutional economic financial engineering.

Based on the three disaggregated indicators of bond market development, the study identifies certain common determinants of each of the indicators. For example, the commonly identified set of determinants, which influence corporate bond market size include economic size, bank size, external debt and money supply. External debt and money supply drive corporate bonds positively, while size of the economy and bank size drive it negatively. There is no evidence of crowding out phenomenon on the Nigerian corporate bonds by the government bonds.

Among the key assessed determinants of government bond market size for Nigeria, the level of economic development and budget deficit are seen to drive government bond market development positively, while bank size drives it negatively. However, interest rate spread, and external debt have no significant impact on government bond market size.

The study also documents that external debt exerts a significant positive influence on total bond market size, while bank size and money supply impact significantly but negatively on total bond market size. However, budget deficit and interest rate spread are insignificant determinants of total bond market size in Nigeria.

It is clear that bank size is outstanding as a determinant of government, corporate and total bond market size. Money supply and external debt are outstanding determinants for only corporate bond market size and total bond market size. Size of the economy is a unique determinant to corporate bond market size, while level of economic development and budget deficit matter for government bond market size in Nigeria.

5.2 Conclusion

It is now evident that although a regional perspective on determinants of bond market development is essential, a study of country-specific determinants may reveal a new set of variables and raise new issues for further empirical inquiry and diagnosis. In the case of Nigeria, evidence from this study indicates that the size of the banking sector remains very critical in developing policies for bond market development. Furthermore, money supply as a percentage of GDP, budget deficit as a percentage of GDP, and the composition of external debt to GDP are germane in shaping Nigeria's corporate bond market development. The bond market remains the vital avenue for effective financing of projects in financial crisis ridden economy. This makes it necessary for considering the crucial role played by the bond market in the entire capital structure of an economy.

The banking sector is the most important factor in determining all three aspects of bond market development in Nigeria, which include corporate, government and total bond market size. Its

relevance calls for the special attention of policy makers towards developing the sector, which will complement corporate, government and total bonds as provided by the numbers.

The revelations of this research suggest that policy makers need to pay attention to the structure, objective, and efficiency of finance generated through external debt. From the evidence gathered so far, policy makers need to harmonise themselves and ascertain the most efficient portfolio of debt within the economy, cutting across domestic debt, external debt and corporate bonds, among others. It is also evident that the proportion of external debt financing is important in determining the long run development of corporate bonds and total bonds, in general. As stated earlier, the channelling of external debt financing to infrastructural developmental projects would in the long run reduce cost of doing business, enhance economic activities, increase competitiveness, and eventually force businesses to raise corporate debt through bonds in a bid to expand.

It is evident that government external borrowing in developing economies, particularly Nigeria therefore has the tendency to boost economic activities in the long run, which means that it could spark up demand. This revelation controverts the barro-richardian equivalence theory, which posits that government debt would not lead to increase in demand in the long run because of the public attitude towards tax savings as discussed under the theoretical framework section in chapter two.

There is also the challenge for policies makers, especially CBN to pay a special attention to the quantum of money supply within the economy because of its potential to drive corporate bond

and total bond market development. However, this needs to be done with care because of the implications on the exchange rate, interest rate, inflation, and the country's reserve, a situation that could generate a debt management quadrilemma, which entails balancing debt with inflation, interest rate, exchange rate, and foreign reserve.

5.3 Recommendations

From the foregoing, the study arrives at the subsequent recommendations, which should guide policy towards corporate bond market development.

i) The Federal Government of Nigeria through the DMO and SEC needs to initiate a policy of restructuring a reasonable percentage of the country's external debt to corporate bonds. This could be achieved by loan re-negotiation, which could be feasible with the cooperation of the international lending agencies. This suggests that external debt earlier negotiated could be re-negotiated under some modified arrangement that would enable a conversion of a component of such debt to corporate bonds.

ii) There is need for a deliberate policy by FGN through SEC and DMO that could spur the rapid growth and development of Nigeria's corporate bond market as well as monitor and control the government bond market. The numbers from the evidence derived from this study suggest that in order to grow the corporate bond market, the government bond market needs to be deemphasized and a greater searchlight beamed on the corporate bonds. This calls for a need to maintain a threshold for government bonds on one hand and policy that would lead to proliferation of corporate bonds on the other.

iii) The Central Bank of Nigeria (CBN) should further develop the capacity of the banking sector to provide more qualitative and productive credit through enhanced risk management of the sector, ensuring effective governance and proper protection of the sector. To achieve this, the international best practice could be carefully reviewed and adopted in a calculated manner. There is no doubt that the CBN is putting some efforts in this direction, but such efforts need to be improved upon. Thus Nigerian policy makers including Central Bank of Nigeria (CBN), Security and Exchange Commission (CBN), the Nigerian Stock Exchange (NSE) need to synergise and harmonise their activities, which relate to the banking sector in order to attain a formidable height towards developing the sector, thereby improving the quality of delivery.

iv) The CBN through its monetary policy committee should improve its control on money as part of its monetary policy measure in order to ensure optimum level of money supply. This would provide an enabling environment for potential investors to invest in bonds. But this needs to be done with care because of the possibility of debt management quadrilemma.

v) The Federal Government through its agencies, and the support of the National Assembly should initiate the review of the existing provisions of the DMO Act (2003), the Pension Reform Act (2004) and the Investment and Securities Act (2007). They should also be harmonised towards creating a more vibrant bond investment environment. A minimum of 20% of the total assets of the pension funds could be set aside for investment in the corporate bond market alone apart from the government bonds and the equity market.

Such channelling of a more substantial part of the pension funds towards investment on bonds would speed up the rapid development of the bond market.

vi) In order to enhance development of the corporate bond market, government needs to channel its external debt towards project driven infrastructural development, and avoid spending such funds or borrowing for social projects. Thus the provision for borrowing for human development should be critically examined with a view to restricting borrowing to only those projects that could be easily and transparently assessed. Social projects like HIV, among others, could be funded through donor agencies and others. The funding or donor agencies have a way of monitoring their projects.

vii) In view of the strategic role of bonds globally, government needs to prioritise the application of bonds by laying more emphasis on financing capital projects, especially infrastructural development projects, rather than heavy reliance on financing budget deficit.

5.4 Limitations of the Study:

The nature of data used in the study and the subsequent output is only relevant from a macroscopic perspective but not firm specific characteristics. Thus it may not be relevant for policy issues of individual firms. This is because the variables are a conglomeration of institutional, financial and macroeconomic data from a holistic perspective.

5.5 Suggestions for Further Research:

Since the study is about only one aspect of the key indicators of bond market development, which is bond market size, one area for further research includes the aspects of bond access, bond stability, and bond efficiency. They are also indicators of bond market development, and could be explored for Nigeria.

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APPENDIX I

VARIABLES USED IN THE STUDY

Year	CBNMS	GBNMS	TBNMS	ECSIZ	ECDEV	MNSUP	INSPR	CAPEX	STCAP	BUDEF	BKSIZ	EDGDP
1980	17.18	18.93	36.11	1.64	2.67	30.5	3.2	20.5	1.18	3.98	25.4	19.92
1981	20.32	23.51	43.83	1.68	2.67	30.4	3.2	13.8	0.7	8.19	34.04	24.85
1982	23.65	30.57	54.22	1.69	2.62	32.2	1.9	13.1	0.44	12.44	45.36	25.48
1983	23.05	41.85	64.9	1.73	2.49	33.3	2.6	9.2	0.75	6.34	54.03	59.99
1984	21.64	43.07	64.71	1.78	2.41	33.7	2	6.9	0.7	4.46	53.73	95.81
1985	20.82	41.16	61.98	1.83	2.47	32.8	0.3	8	0.47	4.48	50.75	96.3
1986	26.48	41.16	67.64	1.84	2.67	34.5	0.7	12.3	0.71	11.94	54.78	110.88
1987	20.81	34.97	55.78	2.02	3.02	26.2	0.9	6.1	0.33	5.6	41.96	115.97
1988	18.31	33.81	52.12	2.14	3.05	27.6	3.7	6	0.1	8.74	39.41	3.76
1989	13.67	21.7	35.37	2.34	3.27	21.2	5.8	6.9	0.24	6.98	17.07	4.9
1990	13.76	32.66	46.42	2.41	3.33	20.5	5.5	9	0.1	8.27	22.61	17.96
1991	13.48	37.23	50.71	2.49	3.34	24.2	5.1	9.1	0.04	11.45	26.18	19.92
1992	14.29	33.41	47.7	2.73	3.5	20.9	6.7	7.5	0.06	7.42	32.12	24.85
1993	13.34	40.04	53.38	2.83	3.55	24.2	8.4	8	0.06	9.53	41.04	25.48
1994	16.12	45.29	61.41	2.95	3.69	25.6	7.4	7.9	0.06	7.81	48.8	59.99
1995	10.6	24.71	35.31	3.29	3.75	15	6.7	6.3	0.1	-0.5	24.54	95.81
1996	9.46	15.54	25	3.43	3.84	12.8	6.8	7.9	0.26	-1.19	13.73	96.3
1997	11.18	17.72	28.9	3.45	3.84	14.6	10.6	9.6	0.39	0.18	12.92	110.88
1998	13.71	20.75	34.46	3.43	3.78	18.1	8.1	11.4	0.5	4.92	18.96	115.97
1999	14.16	24.88	39.04	3.5	3.8	19.7	7.5	15.6	0.44	8.93	19.79	105.24
2000	12.82	19.6	32.42	3.66	4.5	19.2	9.6	5.2	0.61	2.26	10.3	102.19
2001	18.45	21.52	39.97	3.67	4.6	26.9	8.2	9.3	1.22	4.68	17.97	92.58
2002	14.62	16.87	31.49	3.84	4.71	21.8	8.1	4.6	0.87	4.36	19.23	72.1
2003	15.36	15.67	31.03	3.93	4.81	23	6.5	2.8	1.42	2.39	21.26	37.08
2004	14.4	12.01	26.41	4.06	4.92	18.7	5.5	3.1	1.98	1.51	17.7	22.84
2005	13.19	10.47	23.66	4.16	5.04	18.1	7.4	3.6	1.8	1.11	15.88	21.04
2006	13.76	14.67	28.43	4.27	5.13	20.4	7.2	3	2.53	0.55	3.84	23.42
2007	24.05	19.98	44.03	4.32	5.15	24.9	6.7	3.7	10.1	0.57	13.01	80.69
2008	32.56	9.55	42.11	4.39	5.28	33	3.5	4	9.79	0.2	20.38	67.6
2009	35.18	12.98	48.16	4.39	5.21	38.1	5.1	4.7	2.76	3.27	14.39	67.22
2010	31.58	15.59	47.17	4.47	5.28	37.8	11.1	3	2.73	3.25	13.35	56.9
2011	32.24	18.33	50.57	4.49	5.36	39.3	8.1	2.4	2.47	3.09	17.18	52.771992

Source(s): CBN Statistical Bulletin, World Bank Website, and SEC Bulletin

APPENDIX II
ROBUSTNESS AND TEST RESULT

FIRST MODEL
COINTEGRATION TEST

Date: 07/24/14 Time: 16:42
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments
Trend assumption: Linear deterministic trend
Series: CBNMS ECSIZ MNSUP BKSIZ EDGDP GBNMS
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.777198	134.5864	95.75366	0.0000
At most 1 *	0.747187	89.54226	69.81889	0.0006
At most 2 *	0.604151	48.28904	47.85613	0.0455
At most 3	0.318396	20.48734	29.79707	0.3904
At most 4	0.229378	8.988160	15.49471	0.3665
At most 5	0.038296	1.171447	3.841466	0.2791

Trace test indicates 3 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.777198	45.04419	40.07757	0.0127
At most 1 *	0.747187	41.25321	33.87687	0.0055
At most 2 *	0.604151	27.80171	27.58434	0.0469
At most 3	0.318396	11.49918	21.13162	0.5975
At most 4	0.229378	7.816713	14.26460	0.3976
At most 5	0.038296	1.171447	3.841466	0.2791

Max-eigenvalue test indicates 3 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

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

CBNMS	ECSIZ	MNSUP	BKSIZ	EDGDP	GBNMS
3.899573	-1.032397	-3.825173	-3.163420	-0.092659	3.022192
-3.009932	-5.043271	3.489905	0.940216	1.031717	-4.597180
4.170755	-1.857086	-5.668993	1.743361	-1.068391	-1.841842
1.601472	1.306375	-4.567656	1.997448	0.387049	-1.885880
-2.095970	-0.689602	0.577943	-0.271464	-0.436005	-1.574992
-0.891385	1.778711	4.670888	-0.904691	-0.024652	-0.608793

Unrestricted Adjustment Coefficients (alpha):

D(CBNMS)	-0.008996	0.105478	-0.159120	0.025672	0.099599	0.001764
D(ECSIZ)	0.071650	0.124716	0.020058	-0.135134	-0.004578	-0.042057
D(MNSUP)	0.074193	0.059878	0.016392	0.015448	0.050714	0.010475
D(BKSIZ)	0.160327	0.043302	-0.058920	-0.136329	0.048618	0.042186
D(EDGDP)	-0.146821	-0.436775	0.164683	-0.098026	0.154783	-0.016639
D(GBNMS)	-0.057357	0.075930	0.114024	-0.006322	0.043540	0.026660

1 Cointegrating Equation(s): Log likelihood -14.67178

Normalized cointegrating coefficients (standard error in parentheses)

CBNMS	ECSIZ	MNSUP	BKSIZ	EDGDP	GBNMS
1.000000	-0.264746	-0.980921	-0.811222	-0.023761	0.775006
	(0.17247)	(0.14574)	(0.12621)	(0.03855)	(0.16801)

Adjustment coefficients (standard error in parentheses)

D(CBNMS)	-0.035081
	(0.26581)
D(ECSIZ)	0.279405
	(0.29580)
D(MNSUP)	0.289322
	(0.12233)
D(BKSIZ)	0.625209
	(0.30065)
D(EDGDP)	-0.572540
	(0.55663)
D(GBNMS)	-0.223667
	(0.19872)

2 Cointegrating Equation(s): Log likelihood 5.954828

Normalized cointegrating coefficients (standard error in parentheses)

CBNMS	ECSIZ	MNSUP	BKSIZ	EDGDP	GBNMS
1.000000	0.000000	-1.005282	-0.743156	-0.067289	0.877659
		(0.12662)	(0.11078)	(0.03331)	(0.12299)
0.000000	1.000000	-0.092018	0.257101	-0.164413	0.387742
		(0.12737)	(0.11143)	(0.03350)	(0.12371)

Adjustment coefficients (standard error in parentheses)

D(CBNMS)	-0.352562	-0.522666
	(0.31698)	(0.33125)
D(ECSIZ)	-0.095982	-0.702948
	(0.34996)	(0.36571)
D(MNSUP)	0.109093	-0.378579
	(0.14115)	(0.14751)
D(BKSIZ)	0.494873	-0.383905
	(0.37706)	(0.39404)
D(EDGDP)	0.742122	2.354351
	(0.53291)	(0.55691)
D(GBNMS)	-0.452211	-0.323722
	(0.23802)	(0.24874)

3 Cointegrating Equation(s): Log likelihood 19.85568

Normalized cointegrating coefficients (standard error in parentheses)

CBNMS	ECSIZ	MNSUP	BKSIZ	EDGDP	GBNMS
1.000000	0.000000	0.000000	-3.990361	0.599856	3.796462
			(0.53289)	(0.19285)	(0.66734)
0.000000	1.000000	0.000000	-0.040131	-0.103347	0.654913
			(0.08444)	(0.03056)	(0.10574)
0.000000	0.000000	1.000000	-3.230142	0.663639	2.903465
			(0.47178)	(0.17073)	(0.59080)

Adjustment coefficients (standard error in parentheses)

D(CBNMS)	-1.016211	-0.227167	1.304567
	(0.35293)	(0.29924)	(0.41982)
D(ECSIZ)	-0.012325	-0.740198	0.047464
	(0.45771)	(0.38808)	(0.54446)
D(MNSUP)	0.177459	-0.409020	-0.167758
	(0.18357)	(0.15564)	(0.21836)
D(BKSIZ)	0.249131	-0.274485	-0.128143
	(0.48736)	(0.41321)	(0.57972)
D(EDGDP)	1.428973	2.048521	-1.896270
	(0.66047)	(0.55999)	(0.78564)
D(GBNMS)	0.023357	-0.535475	-0.162015
	(0.26953)	(0.22853)	(0.32061)

4 Cointegrating Equation(s): Log likelihood 25.60527

Normalized cointegrating coefficients (standard error in parentheses)

CBNMS	ECSIZ	MNSUP	BKSIZ	EDGDP	GBNMS
1.000000	0.000000	0.000000	0.000000	-1.038722	0.989960
				(0.28046)	(0.55870)
0.000000	1.000000	0.000000	0.000000	-0.119825	0.626689
				(0.03080)	(0.06136)
0.000000	0.000000	1.000000	0.000000	-0.662767	0.631641
				(0.21846)	(0.43519)
0.000000	0.000000	0.000000	1.000000	-0.410634	-0.703320
				(0.09833)	(0.19588)

Adjustment coefficients (standard error in parentheses)

D(CBNMS)	-0.975098	-0.193629	1.187305	-0.098494
	(0.36180)	(0.30610)	(0.48604)	(0.23031)
D(ECSIZ)	-0.228739	-0.916734	0.664711	-0.344355
	(0.43092)	(0.36457)	(0.57888)	(0.27430)
D(MNSUP)	0.202199	-0.388839	-0.238320	-0.118972
	(0.18786)	(0.15894)	(0.25237)	(0.11959)
D(BKSIZ)	0.030804	-0.452582	0.494561	-0.841499
	(0.46344)	(0.39209)	(0.62257)	(0.29500)
D(EDGDP)	1.271988	1.920463	-1.448522	0.145095
	(0.66615)	(0.56359)	(0.89489)	(0.42404)
D(GBNMS)	0.013232	-0.543734	-0.133139	0.438992
	(0.27756)	(0.23482)	(0.37286)	(0.17668)

5 Cointegrating Equation(s): Log likelihood 29.51363

Normalized cointegrating coefficients (standard error in parentheses)

CBNMS	ECSIZ	MNSUP	BKSIZ	EDGDP	GBNMS
1.000000	0.000000	0.000000	0.000000	0.000000	0.828799
					(0.45184)
0.000000	1.000000	0.000000	0.000000	0.000000	0.608097
					(0.08652)
0.000000	0.000000	1.000000	0.000000	0.000000	0.528810
					(0.32542)
0.000000	0.000000	0.000000	1.000000	0.000000	-0.767031
					(0.18936)
0.000000	0.000000	0.000000	0.000000	1.000000	-0.155153
					(0.57645)

Adjustment coefficients (standard error in parentheses)

D(CBNMS)	-1.183854	-0.262313	1.244868	-0.125532	0.246170
	(0.34926)	(0.28393)	(0.44842)	(0.21248)	(0.08005)
D(ECSIZ)	-0.219142	-0.913577	0.662065	-0.343112	0.050295
	(0.45176)	(0.36725)	(0.58002)	(0.27483)	(0.10355)
D(MNSUP)	0.095903	-0.423812	-0.209010	-0.132739	0.021257
	(0.18197)	(0.14794)	(0.23364)	(0.11071)	(0.04171)
D(BKSIZ)	-0.071097	-0.486109	0.522660	-0.854697	0.018806
	(0.48051)	(0.39063)	(0.61694)	(0.29232)	(0.11014)
D(EDGDP)	0.947567	1.813724	-1.359067	0.103077	-0.718396
	(0.65946)	(0.53611)	(0.84670)	(0.40119)	(0.15116)
D(GBNMS)	-0.078025	-0.573758	-0.107976	0.427173	-0.059600
	(0.28373)	(0.23066)	(0.36429)	(0.17261)	(0.06503)

VECM

Vector Error Correction Estimates
Date: 07/24/14 Time: 16:36
Sample (adjusted): 1983 2011
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

CointegratingEq:	CointEq1
CBNMS(-1)	1.000000
ECSIZ(-1)	-0.949521
	(0.20101)
	[-4.72368]
MNSUP(-1)	-1.003579
	(0.14026)
	[-7.15526]
BKSIZ(-1)	-0.153215
	(0.16635)
	[-0.92106]
EDGDP(-1)	0.100335
	(0.03970)
	[2.52750]
GBNMS(-1)	0.028747

	(0.19808)					
	[0.14513]					
C	1.310176					

Error Correction:	D(CBNMS)	D(ECSIZ)	D(MNSUP)	D(BKSIZ)	D(EDGDP)	D(GBNMS)
CointEq1	-0.651926	0.210890	-0.079916	-0.099325	-0.763233	-0.112041
	(0.19630)	(0.40340)	(0.18609)	(0.48564)	(0.53688)	(0.26997)
	[-3.32109]	[0.52278]	[-0.42945]	[-0.20452]	[-1.42160]	[-0.41501]
D(CBNMS(-1))	-0.235865	-0.315470	-0.063324	0.155461	0.549552	-0.032381
	(0.17441)	(0.35842)	(0.16534)	(0.43149)	(0.47702)	(0.23987)
	[-1.35235]	[-0.88016]	[-0.38300]	[0.36029]	[1.15205]	[-0.13500]
D(CBNMS(-2))	0.196090	-0.273367	0.215180	0.255330	0.524743	0.295594
	(0.15674)	(0.32212)	(0.14859)	(0.38779)	(0.42870)	(0.21557)
	[1.25102]	[-0.84866]	[1.44813]	[0.65843]	[1.22403]	[1.37120]
D(ECSIZ(-1))	-0.497823	-0.657197	-0.116721	0.007158	0.699204	-0.122372
	(0.18453)	(0.37921)	(0.17493)	(0.45652)	(0.50469)	(0.25378)
	[-2.69784]	[-1.73308]	[-0.66725]	[0.01568]	[1.38543]	[-0.48219]
D(ECSIZ(-2))	-0.342624	-0.200159	-0.178003	0.001539	1.024299	-0.071585
	(0.13610)	(0.27969)	(0.12902)	(0.33671)	(0.37224)	(0.18718)
	[-2.51744]	[-0.71564]	[-1.37964]	[0.00457]	[2.75172]	[-0.38243]
D(MNSUP(-1))	0.869603	0.363540	0.563583	0.998104	1.812234	0.767308
	(0.35744)	(0.73455)	(0.33885)	(0.88430)	(0.97760)	(0.49159)
	[2.43288]	[0.49492]	[1.66324]	[1.12869]	[1.85375]	[1.56086]
D(MNSUP(-2))	0.074602	0.441126	-0.146937	0.314698	-1.677434	-0.772395
	(0.38033)	(0.78160)	(0.36055)	(0.94095)	(1.04023)	(0.52308)
	[0.19615]	[0.56439]	[-0.40753]	[0.33445]	[-1.61257]	[-1.47663]
D(BKSIZ(-1))	-0.283196	-0.123608	-0.156396	-0.693020	-1.086361	-0.270812
	(0.12007)	(0.24674)	(0.11382)	(0.29705)	(0.32839)	(0.16513)
	[-2.35866]	[-0.50096]	[-1.37405]	[-2.33305]	[-3.30818]	[-1.63999]
D(BKSIZ(-2))	-0.301096	0.033602	-0.153269	-0.428890	0.185712	0.247853
	(0.12314)	(0.25306)	(0.11673)	(0.30465)	(0.33679)	(0.16936)
	[-2.44517]	[0.13278]	[-1.31297]	[-1.40782]	[0.55142]	[1.46350]
D(EDGDP(-1))	0.056028	-0.139845	0.071498	0.157550	0.106271	0.104478
	(0.05937)	(0.12200)	(0.05628)	(0.14687)	(0.16237)	(0.08165)
	[0.94377]	[-1.14626]	[1.27043]	[1.07269]	[0.65450]	[1.27962]
D(EDGDP(-2))	0.325481	0.024486	0.004053	0.019941	-0.126706	-0.111581
	(0.06187)	(0.12715)	(0.05865)	(0.15307)	(0.16922)	(0.08509)
	[5.26058]	[0.19257]	[0.06910]	[0.13027]	[-0.74876]	[-1.31128]
D(GBNMS(-1))	-0.027908	-0.163461	-0.224350	0.205982	0.837510	-0.035219
	(0.19620)	(0.40319)	(0.18599)	(0.48540)	(0.53661)	(0.26984)
	[-0.14225]	[-0.40541]	[-1.20623]	[0.42436]	[1.56075]	[-0.13052]
D(GBNMS(-2))	0.153871	0.425209	0.135271	0.423062	1.211110	0.058574
	(0.18947)	(0.38937)	(0.17961)	(0.46875)	(0.51820)	(0.26058)

	[0.81212]	[1.09205]	[0.75312]	[0.90254]	[2.33713]	[0.22478]
C	-0.008116	0.041488	-0.004677	-0.079899	-0.042559	-0.022159
	(0.03983)	(0.08186)	(0.03776)	(0.09854)	(0.10894)	(0.05478)
	[-0.20377]	[0.50684]	[-0.12387]	[-0.81080]	[-0.39066]	[-0.40449]
R-squared	0.859474	0.640125	0.419197	0.425547	0.738098	0.495344
Adj. R-squared	0.737684	0.328234	-0.084166	-0.072313	0.511116	0.057976
Sum sq. resids	0.625948	2.643491	0.562523	3.831239	4.682342	1.183983
S.E. equation	0.204279	0.419801	0.193653	0.505387	0.558709	0.280949
F-statistic	7.057044	2.052399	0.832792	0.854753	3.251792	1.132556
Log likelihood	14.46965	-6.418881	16.01876	-11.79966	-14.70851	5.227755
Akaike AIC	-0.032389	1.408199	-0.139225	1.779287	1.979897	0.604982
Schwarz SC	0.627684	2.068273	0.520849	2.439361	2.639971	1.265056
Mean dependent	0.010684	0.017666	0.006871	-0.033479	0.025106	-0.017637
S.D. dependent	0.398852	0.512194	0.185984	0.488049	0.799067	0.289465

Determinant resid covariance (dof adj.)	4.51E-08
Determinant resid covariance	8.63E-10
Log likelihood	55.72069
Akaike information criterion	2.364090
Schwarz criterion	6.607422

SECOND MODEL
COINTEGRATION TEST

Date: 07/24/14 Time: 14:59
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments
Trend assumption: Linear deterministic trend
Series: GBNMS BKSIZ ECDEV INSPR BUDEF EDGDP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.781121	122.6498	95.75366	0.0002
At most 1 *	0.568617	77.07278	69.81889	0.0117
At most 2 *	0.507530	51.84999	47.85613	0.0201
At most 3 *	0.391048	30.60035	29.79707	0.0403
At most 4 *	0.366492	15.71989	15.49471	0.0462
At most 5	0.065286	2.025427	3.841466	0.1547

Trace test indicates 5 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**

None *	0.781121	45.57707	40.07757	0.0109
At most 1	0.568617	25.22279	33.87687	0.3701
At most 2	0.507530	21.24964	27.58434	0.2614
At most 3	0.391048	14.88046	21.13162	0.2974
At most 4	0.366492	13.69446	14.26460	0.0614
At most 5	0.065286	2.025427	3.841466	0.1547

Max-eigenvalue test indicates 1 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

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

GBNMS	BKSIZ	ECDEV	INSPR	BUDEF	EDGDP
1.143081	-1.051460	-0.951991	-0.402259	-1.152296	0.680201
-1.125052	-0.083767	-0.844900	-0.872101	-0.333983	-0.577586
-1.378578	1.435860	-0.553564	-0.326108	-0.324792	0.429226
0.969695	-3.172437	0.186659	0.115539	-0.037368	1.229083
-0.102176	0.191925	-0.882988	0.729406	0.403764	0.015443
0.514859	-0.546814	-0.060496	-0.991202	0.463011	-0.167762

Unrestricted Adjustment Coefficients (alpha):

D(GBNMS)	-0.336291	0.833883	0.253345	0.290217	-0.164088	-0.121923
D(BKSIZ)	0.225262	0.462016	-0.014809	0.344936	-0.002686	0.018404
D(ECDEV)	-0.117659	0.135602	-0.017261	0.151688	0.697717	-0.087750
D(INSPR)	0.046987	0.096968	0.100782	-0.140846	-0.081079	0.056124
D(BUDEF)	0.816643	0.013532	0.129450	-0.164049	-0.065788	-0.076181
D(EDGDP)	0.230275	0.633275	-0.607651	-0.060645	0.158120	0.036579

1 Cointegrating Equation(s): Log likelihood -202.6715

Normalized cointegrating coefficients (standard error in parentheses)

GBNMS	BKSIZ	ECDEV	INSPR	BUDEF	EDGDP
1.000000	-0.919848	-0.832829	-0.351908	-1.008062	0.595059
	(0.24640)	(0.15960)	(0.15651)	(0.13624)	(0.13459)

Adjustment coefficients (standard error in parentheses)

D(GBNMS)	-0.384407
	(0.33571)
D(BKSIZ)	0.257493
	(0.20383)
D(ECDEV)	-0.134494
	(0.30262)
D(INSPR)	0.053710
	(0.09566)
D(BUDEF)	0.933489
	(0.15214)
D(EDGDP)	0.263223
	(0.30300)

2 Cointegrating Equation(s): Log likelihood -190.0601

Normalized cointegrating coefficients (standard error in parentheses)

GBNMS	BKSIZ	ECDEV	INSPR	BUDEF	EDGDP
1.000000	0.000000	0.632387	0.690767	0.199144	0.519502
		(0.24497)	(0.23586)	(0.20994)	(0.18222)
0.000000	1.000000	1.592890	1.133529	1.312397	-0.082141
		(0.30996)	(0.29843)	(0.26564)	(0.23056)

Adjustment coefficients (standard error in parentheses)

D(GBNMS)	-1.322569	0.283744
	(0.37493)	(0.24658)
D(BKSIZ)	-0.262300	-0.275556
	(0.23840)	(0.15678)
D(ECDEV)	-0.287054	0.112355
	(0.42206)	(0.27757)
D(INSPR)	-0.055384	-0.057528
	(0.13006)	(0.08554)
D(BUDEF)	0.918265	-0.859801
	(0.21342)	(0.14036)
D(EDGDP)	-0.449244	-0.295173
	(0.36586)	(0.24061)

3 Cointegrating Equation(s): Log likelihood -179.4353

Normalized cointegrating coefficients (standard error in parentheses)

GBNMS	BKSIZ	ECDEV	INSPR	BUDEF	EDGDP
1.000000	0.000000	0.000000	0.369129	-0.422239	0.925265
			(0.25264)	(0.19473)	(0.19794)
0.000000	1.000000	0.000000	0.323370	-0.252775	0.939917
			(0.33534)	(0.25847)	(0.26273)
0.000000	0.000000	1.000000	0.508610	0.982599	-0.641638
			(0.19886)	(0.15327)	(0.15580)

Adjustment coefficients (standard error in parentheses)

D(GBNMS)	-1.671825	0.647512	-0.524645
	(0.48102)	(0.40522)	(0.31569)
D(BKSIZ)	-0.241885	-0.296819	-0.596607
	(0.31429)	(0.26476)	(0.20627)
D(ECDEV)	-0.263258	0.087571	0.006995
	(0.55649)	(0.46880)	(0.36522)
D(INSPR)	-0.194321	0.087181	-0.182450
	(0.16538)	(0.13932)	(0.10854)
D(BUDEF)	0.739809	-0.673930	-0.860528
	(0.27531)	(0.23193)	(0.18068)
D(EDGDP)	0.388451	-1.167675	-0.417900
	(0.39708)	(0.33451)	(0.26060)

4 Cointegrating Equation(s): Log likelihood -171.9951

Normalized cointegrating coefficients (standard error in parentheses)

GBNMS	BKSIZ	ECDEV	INSPR	BUDEF	EDGDP
1.000000	0.000000	0.000000	0.000000	-0.093469	-0.915448
				(0.27791)	(0.27559)
0.000000	1.000000	0.000000	0.000000	0.035239	-0.672612
				(0.15697)	(0.15566)
0.000000	0.000000	1.000000	0.000000	1.435600	-3.177895
				(0.63465)	(0.62935)

0.000000	0.000000	0.000000	1.000000	-0.890664	4.986644
				(1.05005)	(1.04128)

Adjustment coefficients (standard error in parentheses)

D(GBNMS)	-1.390404	-0.273183	-0.470473	-0.641041	
	(0.50921)	(0.79633)	(0.30652)	(0.22342)	
D(BKSIZ)	0.092598	-1.391108	-0.532222	-0.448856	
	(0.30045)	(0.46985)	(0.18085)	(0.13182)	
D(ECDEV)	-0.116168	-0.393648	0.035309	-0.047775	
	(0.60756)	(0.95013)	(0.36572)	(0.26657)	
D(INSPR)	-0.330898	0.534006	-0.208740	-0.152606	
	(0.16798)	(0.26270)	(0.10112)	(0.07370)	
D(BUDEF)	0.580732	-0.153496	-0.891149	-0.401471	
	(0.29173)	(0.45622)	(0.17561)	(0.12800)	
D(EDGDP)	0.329644	-0.975283	-0.429220	-0.453757	
	(0.43579)	(0.68151)	(0.26232)	(0.19120)	

5 Cointegrating Equation(s): Log likelihood -165.1478

Normalized cointegrating coefficients (standard error in parentheses)

GBNMS	BKSIZ	ECDEV	INSPR	BUDEF	EDGDP
1.000000	0.000000	0.000000	0.000000	0.000000	-1.174692
					(0.28540)
0.000000	1.000000	0.000000	0.000000	0.000000	-0.574875
					(0.12543)
0.000000	0.000000	1.000000	0.000000	0.000000	0.803854
					(0.24818)
0.000000	0.000000	0.000000	1.000000	0.000000	2.516318
					(0.48498)
0.000000	0.000000	0.000000	0.000000	1.000000	-2.773579
					(0.51601)

Adjustment coefficients (standard error in parentheses)

D(GBNMS)	-1.373638	-0.304675	-0.325586	-0.760728	-0.050379
	(0.50315)	(0.78719)	(0.35770)	(0.27106)	(0.28246)
D(BKSIZ)	0.092872	-1.391623	-0.529850	-0.450815	-0.423038
	(0.30073)	(0.47050)	(0.21379)	(0.16201)	(0.16883)
D(ECDEV)	-0.187458	-0.259739	-0.580767	0.461144	0.371940
	(0.49983)	(0.78199)	(0.35533)	(0.26927)	(0.28059)
D(INSPR)	-0.322614	0.518445	-0.137148	-0.211746	-0.146736
	(0.16325)	(0.25542)	(0.11606)	(0.08795)	(0.09165)
D(BUDEF)	0.587454	-0.166122	-0.833059	-0.449457	-1.008010
	(0.29018)	(0.45399)	(0.20629)	(0.15633)	(0.16290)
D(EDGDP)	0.313488	-0.944936	-0.568838	-0.338423	-0.213379
	(0.42909)	(0.67131)	(0.30504)	(0.23116)	(0.24088)

VECM

Vector Error Correction Estimates
Date: 07/24/14 Time: 14:55
Sample (adjusted): 1983 2011
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

CointegratingEq: CointEq1

GBNMS(-1)	1.000000
BKSIZ(-1)	-0.252715 (0.21472) [-1.17693]
ECDEV(-1)	0.899675 (0.17021) [5.28573]
INSPR(-1)	0.788737 (0.12892) [6.11820]
BUDEF(-1)	0.738024 (0.14911) [4.94968]
EDGDP(-1)	0.126821 (0.12018) [1.05528]
C	-5.893524

Error Correction:	D(GBNMS)	D(BKSIZ)	D(ECDEV)	D(INSPR)	D(BUDEF)	D(EDGDP)
CointEq1	-1.870444 (0.38183) [-4.89863]	-0.486642 (0.32897) [-1.47930]	0.004317 (0.52994) [0.00815]	-0.111482 (0.15605) [-0.71441]	-0.630163 (0.26985) [-2.33524]	-0.405015 (0.42714) [-0.94820]
D(GBNMS(-1))	0.585351 (0.35135) [1.66600]	0.678846 (0.30271) [2.24258]	-0.287056 (0.48764) [-0.58867]	-0.125704 (0.14359) [-0.87543]	0.517991 (0.24831) [2.08608]	1.219453 (0.39305) [3.10258]
D(GBNMS(-2))	0.527926 (0.41023) [1.28690]	0.127574 (0.35344) [0.36095]	-0.161338 (0.56935) [-0.28337]	0.072093 (0.16765) [0.43001]	0.353917 (0.28992) [1.22074]	0.561166 (0.45891) [1.22282]
D(BKSIZ(-1))	-0.926516 (0.40103) [-2.31033]	-1.321615 (0.34551) [-3.82511]	0.199284 (0.55659) [0.35805]	0.331977 (0.16389) [2.02556]	0.067718 (0.28342) [0.23893]	-1.527101 (0.44862) [-3.40399]
D(BKSIZ(-2))	-0.940768 (0.56769) [-1.65719]	-0.253535 (0.48909) [-0.51838]	-0.056991 (0.78789) [-0.07233]	0.027170 (0.23200) [0.11711]	0.241297 (0.40120) [0.60144]	-0.647478 (0.63506) [-1.01956]
D(ECDEV(-1))	1.785010 (0.38362) [4.65308]	0.088956 (0.33051) [0.26915]	-0.728577 (0.53242) [-1.36842]	0.128926 (0.15678) [0.82235]	0.208343 (0.27111) [0.76847]	0.061715 (0.42914) [0.14381]
D(ECDEV(-2))	0.910051 (0.23712) [3.83786]	-0.068270 (0.20430) [-0.33417]	0.062652 (0.32910) [0.19037]	-0.103901 (0.09691) [-1.07216]	-0.021378 (0.16758) [-0.12757]	-0.225520 (0.26526) [-0.85017]
D(INSPR(-1))	0.712558 (0.65766)	-0.837864 (0.56661)	0.085124 (0.91276)	0.364491 (0.26877)	0.029983 (0.46479)	-1.181027 (0.73571)

	[1.08347]	[-1.47872]	[0.09326]	[1.35612]	[0.06451]	[-1.60530]
D(INSPR(-2))	-0.251896	-0.265953	1.206307	-0.281455	0.235477	-1.023556
	(0.71158)	(0.61306)	(0.98759)	(0.29081)	(0.50289)	(0.79602)
	[-0.35400]	[-0.43381]	[1.22147]	[-0.96784]	[0.46825]	[-1.28585]
D(BUDEF(-1))	0.638849	0.207207	0.031008	0.041133	-0.134321	0.948911
	(0.27850)	(0.23994)	(0.38653)	(0.11382)	(0.19682)	(0.31155)
	[2.29389]	[0.86357]	[0.08022]	[0.36139]	[-0.68245]	[3.04578]
D(BUDEF(-2))	0.250234	-0.236152	-0.151800	0.102289	0.027460	-0.295580
	(0.27261)	(0.23487)	(0.37835)	(0.11141)	(0.19266)	(0.30496)
	[0.91792]	[-1.00547]	[-0.40121]	[0.91813]	[0.14253]	[-0.96924]
D(EDGDP(-1))	-0.012471	0.199056	0.040143	-0.202539	0.188052	-0.001421
	(0.20117)	(0.17332)	(0.27920)	(0.08222)	(0.14217)	(0.22504)
	[-0.06199]	[1.14849]	[0.14378]	[-2.46353]	[1.32270]	[-0.00632]
D(EDGDP(-2))	-0.017215	-0.008830	-0.129172	0.004246	0.329604	-0.169931
	(0.22896)	(0.19726)	(0.31777)	(0.09357)	(0.16181)	(0.25613)
	[-0.07519]	[-0.04476]	[-0.40650]	[0.04538]	[2.03697]	[-0.66346]
C	0.039245	0.029754	-0.035412	0.058834	-0.014129	0.183722
	(0.20901)	(0.18008)	(0.29009)	(0.08542)	(0.14772)	(0.23382)
	[0.18776]	[0.16523]	[-0.12207]	[0.68876]	[-0.09565]	[0.78575]
R-squared	0.822271	0.689081	0.665099	0.652006	0.765893	0.769014
Adj. R-squared	0.668240	0.419617	0.374852	0.350412	0.563001	0.568827
Sum sq. resids	17.99095	13.35428	34.65496	3.004860	8.985781	22.51423
S.E. equation	1.095170	0.943549	1.519977	0.447576	0.773985	1.225132
F-statistic	5.338328	2.557232	2.291493	2.161865	3.774870	3.841467
Log likelihood	-34.22652	-29.90506	-43.73232	-8.276777	-24.16026	-37.47857
Akaike AIC	3.325967	3.027935	3.981539	1.536329	2.631742	3.550246
Schwarz SC	3.986041	3.688009	4.641613	2.196403	3.291816	4.210320
Mean dependent	-0.052120	-0.033479	0.041260	0.050000	-0.048026	0.025106
S.D. dependent	1.901381	1.238532	1.922409	0.555325	1.170825	1.865765

Determinant resid covariance (dof adj.)	0.048233
Determinant resid covariance	0.000924
Log likelihood	-145.5811
Akaike information criterion	16.24697
Schwarz criterion	20.49030

STATIONARY TEST
AUGMENTED DICKEY-FULLER

Null Hypothesis: TBNMS has a unit root **AT LEVEL**
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.005469	0.2831
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TBNMS)
Method: Least Squares
Date: 07/24/14 Time: 17:17
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TBNMS(-1)	-0.245514	0.122422	-2.005469	0.0543
C	0.927577	0.458544	2.022874	0.0524

R-squared	0.121795	Mean dependent var	0.010864
Adjusted R-squared	0.091512	S.D. dependent var	0.211952
S.E. of regression	0.202021	Akaike info criterion	-0.298551
Sum squared resid	1.183560	Schwarz criterion	-0.206036
Log likelihood	6.627541	Hannan-Quinn criter.	-0.268393
F-statistic	4.021907	Durbin-Watson stat	1.664729
Prob(F-statistic)	0.054324		

AT FIRST DIFFERENCE

Null Hypothesis: D(TBNMS) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.075647	0.0003
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TBNMS,2)
Method: Least Squares
Date: 07/24/14 Time: 17:23
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TBNMS(-1))	-0.946703	0.186519	-5.075647	0.0000
C	0.004293	0.039516	0.108649	0.9143

R-squared	0.479188	Mean dependent var	-0.004138
Adjusted R-squared	0.460587	S.D. dependent var	0.294431
S.E. of regression	0.216244	Akaike info criterion	-0.160476
Sum squared resid	1.309324	Schwarz criterion	-0.067063
Log likelihood	4.407140	Hannan-Quinn criter.	-0.130592
F-statistic	25.76219	Durbin-Watson stat	2.012135
Prob(F-statistic)	0.000023		

Null Hypothesis: ECSIZ has a unit root **AT LEVEL**
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.530374	0.1186
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ECSIZ)
Method: Least Squares
Date: 07/24/14 Time: 17:00
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECSIZ(-1)	-0.596299	0.235656	-2.530374	0.0175
D(ECSIZ(-1))	-0.368274	0.177381	-2.076182	0.0475
C	0.604301	0.232031	2.604395	0.0148

R-squared	0.526525	Mean dependent var	0.032769
Adjusted R-squared	0.491452	S.D. dependent var	0.510038
S.E. of regression	0.363721	Akaike info criterion	0.909781
Sum squared resid	3.571912	Schwarz criterion	1.049900
Log likelihood	-10.64671	Hannan-Quinn criter.	0.954606
F-statistic	15.01256	Durbin-Watson stat	2.045876
Prob(F-statistic)	0.000041		

AT FIRST DIFFERENCE

Null Hypothesis: D(ECSIZ) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.21086	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ECSIZ,2)
Method: Least Squares
Date: 07/24/14 Time: 17:01
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ECSIZ(-1))	-1.658173	0.147908	-11.21086	0.0000
C	0.041753	0.072559	0.575441	0.5696

R-squared	0.817807	Mean dependent var	0.019118
Adjusted R-squared	0.811300	S.D. dependent var	0.914524
S.E. of regression	0.397266	Akaike info criterion	1.055917
Sum squared resid	4.418957	Schwarz criterion	1.149330
Log likelihood	-13.83875	Hannan-Quinn criter.	1.085800
F-statistic	125.6834	Durbin-Watson stat	2.327503
Prob(F-statistic)	0.000000		

Null Hypothesis: CBNMS has a unit root **AT LEVEL**
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.394544	0.1514
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CBNMS)
Method: Least Squares
Date: 07/24/14 Time: 16:46
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CBNMS(-1)	-0.365940	0.152822	-2.394544	0.0233

C	1.044616	0.432622	2.414617	0.0223

R-squared	0.165079	Mean dependent var	0.020305
Adjusted R-squared	0.136289	S.D. dependent var	0.387128
S.E. of regression	0.359782	Akaike info criterion	0.855702
Sum squared resid	3.753844	Schwarz criterion	0.948218
Log likelihood	-11.26339	Hannan-Quinn criter.	0.885860
F-statistic	5.733839	Durbin-Watson stat	2.057493
Prob(F-statistic)	0.023326		

AT FIRST DIFFERENCE

Null Hypothesis: D(CBNMS) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.871249	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CBNMS,2)
Method: Least Squares
Date: 07/24/14 Time: 16:51
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CBNMS(-1))	-1.252951	0.182347	-6.871249	0.0000
C	0.020520	0.070689	0.290284	0.7737

R-squared	0.627729	Mean dependent var	-0.004906
Adjusted R-squared	0.614434	S.D. dependent var	0.622679
S.E. of regression	0.386646	Akaike info criterion	1.001728
Sum squared resid	4.185873	Schwarz criterion	1.095142
Log likelihood	-13.02593	Hannan-Quinn criter.	1.031612
F-statistic	47.21406	Durbin-Watson stat	2.089774
Prob(F-statistic)	0.000000		

AT LEVEL

Null Hypothesis: GBNMS has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.602696	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GBNMS)
Method: Least Squares
Date: 07/24/14 Time: 16:22
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GBNMS(-1)	-1.205657	0.182601	-6.602696	0.0000
C	3.136133	0.524854	5.975250	0.0000

R-squared	0.600527	Mean dependent var	-0.033297
Adjusted R-squared	0.586752	S.D. dependent var	1.838363
S.E. of regression	1.181780	Akaike info criterion	3.234262
Sum squared resid	40.50152	Schwarz criterion	3.326777
Log likelihood	-48.13105	Hannan-Quinn criter.	3.264419
F-statistic	43.59559	Durbin-Watson stat	2.077350
Prob(F-statistic)	0.000000		

AT LEVEL

Null Hypothesis: BKSIZ has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.050741	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BKSIZ)
Method: Least Squares
Date: 07/24/14 Time: 15:48
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

BKSIZ(-1)	-1.114846	0.184249	-6.050741	0.0000
C	3.315619	0.569868	5.818220	0.0000

R-squared	0.558004	Mean dependent var	-0.012613
Adjusted R-squared	0.542763	S.D. dependent var	1.226584
S.E. of regression	0.829408	Akaike info criterion	2.526131
Sum squared resid	19.94960	Schwarz criterion	2.618647
Log likelihood	-37.15504	Hannan-Quinn criter.	2.556289
F-statistic	36.61147	Durbin-Watson stat	1.951255
Prob(F-statistic)	0.000001		

Null Hypothesis: ECDEV has a unit root
Exogenous: Constant **AT LEVEL**
Lag Length: 1 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.592732	0.1055
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ECDEV)
Method: Least Squares
Date: 07/24/14 Time: 16:00
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECDEV(-1)	-0.696670	0.268701	-2.592732	0.0152
D(ECDEV(-1))	-0.373063	0.180012	-2.072435	0.0479
C	1.229604	0.530393	2.318288	0.0282

R-squared	0.618241	Mean dependent var	-0.010104
Adjusted R-squared	0.589962	S.D. dependent var	1.909808
S.E. of regression	1.222930	Akaike info criterion	3.335015
Sum squared resid	40.38005	Schwarz criterion	3.475135
Log likelihood	-47.02523	Hannan-Quinn criter.	3.379841
F-statistic	21.86260	Durbin-Watson stat	1.913922
Prob(F-statistic)	0.000002		

AT FIRST DIFFERE CE

Null Hypothesis: D(ECDEV) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-13.20497	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ECDEV,2)
Method: Least Squares
Date: 07/24/14 Time: 15:49
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ECDEV(-1))	-1.723426	0.130513	-13.20497	0.0000
C	-0.017776	0.245034	-0.072544	0.9427

R-squared	0.861640	Mean dependent var	0.000501
Adjusted R-squared	0.856699	S.D. dependent var	3.545327
S.E. of regression	1.342088	Akaike info criterion	3.490670
Sum squared resid	50.43357	Schwarz criterion	3.584083
Log likelihood	-50.36005	Hannan-Quinn criter.	3.520554
F-statistic	174.3713	Durbin-Watson stat	2.184205
Prob(F-statistic)	0.000000		

Null Hypothesis: INSPR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.820488	0.3640
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INSPR)
Method: Least Squares
Date: 07/24/14 Time: 16:04
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

AT LEVEL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INSPR(-1)	-0.209494	0.115076	-1.820488	0.0790
C	0.346703	0.198010	1.750940	0.0905

R-squared	0.102561	Mean dependent var	0.029958
Adjusted R-squared	0.071615	S.D. dependent var	0.546237
S.E. of regression	0.526314	Akaike info criterion	1.616504
Sum squared resid	8.033195	Schwarz criterion	1.709020
Log likelihood	-23.05582	Hannan-Quinn criter.	1.646662
F-statistic	3.314175	Durbin-Watson stat	1.899514
Prob(F-statistic)	0.079020		

AT FIRST DIFFERENCE

Null Hypothesis: D(INSPR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.172709	0.0030
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INSPR,2)
Method: Least Squares
Date: 07/24/14 Time: 15:50
Sample (adjusted): 1983 2011
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INSPR(-1))	-1.171478	0.280748	-4.172709	0.0003
D(INSPR(-1),2)	0.109105	0.198994	0.548286	0.5882
C	0.054429	0.106584	0.510668	0.6139

R-squared	0.540516	Mean dependent var	0.007111
Adjusted R-squared	0.505171	S.D. dependent var	0.813074
S.E. of regression	0.571950	Akaike info criterion	1.818166
Sum squared resid	8.505292	Schwarz criterion	1.959611
Log likelihood	-23.36341	Hannan-Quinn criter.	1.862465
F-statistic	15.29260	Durbin-Watson stat	1.984547
Prob(F-statistic)	0.000041		

Null Hypothesis: BUDEF has a unit root

AT LEVEL

Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-2.963618	0.0497
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BUDEF)
Method: Least Squares
Date: 07/24/14 Time: 16:07
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BUDEF(-1)	-0.464409	0.156703	-2.963618	0.0060
C	0.536942	0.259328	2.070514	0.0474

R-squared	0.232460	Mean dependent var	-0.008165
Adjusted R-squared	0.205993	S.D. dependent var	1.142272
S.E. of regression	1.017845	Akaike info criterion	2.935593
Sum squared resid	30.04425	Schwarz criterion	3.028109
Log likelihood	-43.50170	Hannan-Quinn criter.	2.965751
F-statistic	8.783033	Durbin-Watson stat	2.128272
Prob(F-statistic)	0.006021		

Null Hypothesis: D(BUDEF) has a unit root

FIRST DIFFERENCE

Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.567506	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BUDEF,2)
Method: Least Squares
Date: 07/24/14 Time: 15:51
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(BUDEF(-1))	-1.336197	0.176570	-7.567506	0.0000
C	-0.034762	0.201690	-0.172354	0.8644

R-squared	0.671620	Mean dependent var	-0.025737
Adjusted R-squared	0.659892	S.D. dependent var	1.894216
S.E. of regression	1.104683	Akaike info criterion	3.101334
Sum squared resid	34.16907	Schwarz criterion	3.194747
Log likelihood	-44.52001	Hannan-Quinn criter.	3.131217
F-statistic	57.26714	Durbin-Watson stat	2.053212
Prob(F-statistic)	0.000000		

Null Hypothesis: EDGDP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.568122	0.0010
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EDGDP)
Method: Least Squares
Date: 07/24/14 Time: 15:52
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EDGDP(-1)	-0.842034	0.184328	-4.568122	0.0001
C	2.691782	0.634219	4.244246	0.0002

R-squared	0.418462	Mean dependent var	0.031428
Adjusted R-squared	0.398409	S.D. dependent var	1.802844
S.E. of regression	1.398328	Akaike info criterion	3.570772
Sum squared resid	56.70428	Schwarz criterion	3.663287
Log likelihood	-53.34696	Hannan-Quinn criter.	3.600929
F-statistic	20.86774	Durbin-Watson stat	2.008750
Prob(F-statistic)	0.000084		

PHILIP PERRON TEST

AT LEVEL

Null Hypothesis: TBNMS has a unit root
Exogenous: Constant

Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.130957	0.2346
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	0.038179
HAC corrected variance (Bartlett kernel)	0.044107

Phillips-Perron Test Equation
Dependent Variable: D(TBNMS)
Method: Least Squares
Date: 07/24/14 Time: 17:25
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TBNMS(-1)	-0.245514	0.122422	-2.005469	0.0543
C	0.927577	0.458544	2.022874	0.0524

R-squared	0.121795	Mean dependent var	0.010864
Adjusted R-squared	0.091512	S.D. dependent var	0.211952
S.E. of regression	0.202021	Akaike info criterion	-0.298551
Sum squared resid	1.183560	Schwarz criterion	-0.206036
Log likelihood	6.627541	Hannan-Quinn criter.	-0.268393
F-statistic	4.021907	Durbin-Watson stat	1.664729
Prob(F-statistic)	0.054324		

AT FIRST DIFFERENCE

Null Hypothesis: D(TBNMS) has a unit root
Exogenous: Constant
Bandwidth: 8 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.368474	0.0001
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Residual variance (no correction)	0.043644
HAC corrected variance (Bartlett kernel)	0.019235

Phillips-Perron Test Equation
Dependent Variable: D(TBNMS,2)
Method: Least Squares
Date: 07/24/14 Time: 17:27
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TBNMS(-1))	-0.946703	0.186519	-5.075647	0.0000
C	0.004293	0.039516	0.108649	0.9143

R-squared	0.479188	Mean dependent var	-0.004138
Adjusted R-squared	0.460587	S.D. dependent var	0.294431
S.E. of regression	0.216244	Akaike info criterion	-0.160476
Sum squared resid	1.309324	Schwarz criterion	-0.067063
Log likelihood	4.407140	Hannan-Quinn criter.	-0.130592
F-statistic	25.76219	Durbin-Watson stat	2.012135
Prob(F-statistic)	0.000023		

Null Hypothesis: MNSUP has a unit root **AT LEVEL**
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.513248	0.5138
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	0.029295
HAC corrected variance (Bartlett kernel)	0.032240

Phillips-Perron Test Equation
Dependent Variable: D(MNSUP)
Method: Least Squares
Date: 07/24/14 Time: 17:07
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MNSUP(-1)	-0.159164	0.112217	-1.418362	0.1667
C	0.515322	0.358966	1.435572	0.1618

R-squared	0.064871	Mean dependent var	0.008177
Adjusted R-squared	0.032625	S.D. dependent var	0.179920
S.E. of regression	0.176961	Akaike info criterion	-0.563431
Sum squared resid	0.908143	Schwarz criterion	-0.470916
Log likelihood	10.73319	Hannan-Quinn criter.	-0.533274
F-statistic	2.011752	Durbin-Watson stat	1.786828
Prob(F-statistic)	0.166743		

AT FIRST DIFFERENCE

Null Hypothesis: D(MNSUP) has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.178883	0.0002
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Residual variance (no correction)	0.032352
HAC corrected variance (Bartlett kernel)	0.032373

Phillips-Perron Test Equation
Dependent Variable: D(MNSUP,2)
Method: Least Squares
Date: 07/24/14 Time: 17:09
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MNSUP(-1))	-0.978905	0.189022	-5.178789	0.0000
C	0.008409	0.034019	0.247173	0.8066

R-squared	0.489236	Mean dependent var	0.001407
Adjusted R-squared	0.470995	S.D. dependent var	0.255980
S.E. of regression	0.186181	Akaike info criterion	-0.459855
Sum squared resid	0.970574	Schwarz criterion	-0.366441
Log likelihood	8.897819	Hannan-Quinn criter.	-0.429971
F-statistic	26.81985	Durbin-Watson stat	1.995277
Prob(F-statistic)	0.000017		

Null Hypothesis: ECSIZ has a unit root **AT LEVEL**

Exogenous: Constant
Bandwidth: 3 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.792529	0.0005
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	0.138970
HAC corrected variance (Bartlett kernel)	0.172268

Phillips-Perron Test Equation
Dependent Variable: D(ECSIZ)
Method: Least Squares
Date: 07/24/14 Time: 17:05
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECSIZ(-1)	-0.868727	0.186131	-4.667288	0.0001
C	0.845050	0.187355	4.510425	0.0001

R-squared	0.428949	Mean dependent var	0.032489
Adjusted R-squared	0.409258	S.D. dependent var	0.501468
S.E. of regression	0.385427	Akaike info criterion	0.993411
Sum squared resid	4.308064	Schwarz criterion	1.085926
Log likelihood	-13.39787	Hannan-Quinn criter.	1.023568
F-statistic	21.78358	Durbin-Watson stat	2.076044
Prob(F-statistic)	0.000064		

Null Hypothesis: CBNMS has a unit root **AT LEVEL**
Exogenous: Constant
Bandwidth: 2 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.365425	0.1593
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	0.121092
HAC corrected variance (Bartlett kernel)	0.117887

Phillips-Perron Test Equation
Dependent Variable: D(CBNMS)
Method: Least Squares
Date: 07/24/14 Time: 16:54
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CBNMS(-1)	-0.365940	0.152822	-2.394544	0.0233
C	1.044616	0.432622	2.414617	0.0223

R-squared	0.165079	Mean dependent var	0.020305
Adjusted R-squared	0.136289	S.D. dependent var	0.387128
S.E. of regression	0.359782	Akaike info criterion	0.855702
Sum squared resid	3.753844	Schwarz criterion	0.948218
Log likelihood	-11.26339	Hannan-Quinn criter.	0.885860
F-statistic	5.733839	Durbin-Watson stat	2.057493
Prob(F-statistic)	0.023326		

AT FIRST DIFFERENCE

Null Hypothesis: D(CBNMS) has a unit root
Exogenous: Constant
Bandwidth: 5 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-7.818455	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Residual variance (no correction)	0.139529
HAC corrected variance (Bartlett kernel)	0.070813

Phillips-Perron Test Equation
Dependent Variable: D(CBNMS,2)
Method: Least Squares
Date: 07/24/14 Time: 16:56
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CBNMS(-1))	-1.252951	0.182347	-6.871249	0.0000
C	0.020520	0.070689	0.290284	0.7737

R-squared	0.627729	Mean dependent var	-0.004906
Adjusted R-squared	0.614434	S.D. dependent var	0.622679
S.E. of regression	0.386646	Akaike info criterion	1.001728
Sum squared resid	4.185873	Schwarz criterion	1.095142
Log likelihood	-13.02593	Hannan-Quinn criter.	1.031612
F-statistic	47.21406	Durbin-Watson stat	2.089774
Prob(F-statistic)	0.000000		

Null Hypothesis: GBNMS has a unit root
Exogenous: Constant
Bandwidth: 11 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.717535	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	1.306501
HAC corrected variance (Bartlett kernel)	1.108814

Phillips-Perron Test Equation
Dependent Variable: D(GBNMS)
Method: Least Squares
Date: 07/24/14 Time: 16:24
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GBNMS(-1)	-1.205657	0.182601	-6.602696	0.0000
C	3.136133	0.524854	5.975250	0.0000

R-squared	0.600527	Mean dependent var	-0.033297
Adjusted R-squared	0.586752	S.D. dependent var	1.838363
S.E. of regression	1.181780	Akaike info criterion	3.234262
Sum squared resid	40.50152	Schwarz criterion	3.326777
Log likelihood	-48.13105	Hannan-Quinn criter.	3.264419
F-statistic	43.59559	Durbin-Watson stat	2.077350
Prob(F-statistic)	0.000000		

Null Hypothesis: BKSIZ has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.045995	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	0.643536
HAC corrected variance (Bartlett kernel)	0.655931

Phillips-Perron Test Equation
Dependent Variable: D(BKSIZ)
Method: Least Squares
Date: 07/24/14 Time: 15:53
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BKSIZ(-1)	-1.114846	0.184249	-6.050741	0.0000
C	3.315619	0.569868	5.818220	0.0000

R-squared	0.558004	Mean dependent var	-0.012613
Adjusted R-squared	0.542763	S.D. dependent var	1.226584
S.E. of regression	0.829408	Akaike info criterion	2.526131
Sum squared resid	19.94960	Schwarz criterion	2.618647
Log likelihood	-37.15504	Hannan-Quinn criter.	2.556289
F-statistic	36.61147	Durbin-Watson stat	1.951255
Prob(F-statistic)	0.000001		

Null Hypothesis: ECDEV has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.066101	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	1.510196
HAC corrected variance (Bartlett kernel)	1.937594

Phillips-Perron Test Equation
Dependent Variable: D(ECDEV)
Method: Least Squares
Date: 07/24/14 Time: 15:54
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECDEV(-1)	-1.116561	0.183233	-6.093654	0.0000
C	1.986788	0.394952	5.030453	0.0000

R-squared	0.561487	Mean dependent var	0.022480
Adjusted R-squared	0.546366	S.D. dependent var	1.886452
S.E. of regression	1.270570	Akaike info criterion	3.379148
Sum squared resid	46.81606	Schwarz criterion	3.471664
Log likelihood	-50.37680	Hannan-Quinn criter.	3.409306
F-statistic	37.13261	Durbin-Watson stat	1.909194
Prob(F-statistic)	0.000001		

AT LEVEL

Null Hypothesis: INSPR has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.856525	0.3475
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	0.259135
HAC corrected variance (Bartlett kernel)	0.270706

Phillips-Perron Test Equation
Dependent Variable: D(INSPR)
Method: Least Squares
Date: 07/24/14 Time: 16:10
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INSPR(-1)	-0.209494	0.115076	-1.820488	0.0790
C	0.346703	0.198010	1.750940	0.0905

R-squared	0.102561	Mean dependent var	0.029958
Adjusted R-squared	0.071615	S.D. dependent var	0.546237
S.E. of regression	0.526314	Akaike info criterion	1.616504

Sum squared resid	8.033195	Schwarz criterion	1.709020
Log likelihood	-23.05582	Hannan-Quinn criter.	1.646662
F-statistic	3.314175	Durbin-Watson stat	1.899514
Prob(F-statistic)	0.079020		

FIRST DIFFERENCE

Null Hypothesis: D(INSPR) has a unit root
Exogenous: Constant
Bandwidth: 6 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.752250	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Residual variance (no correction)	0.297396
HAC corrected variance (Bartlett kernel)	0.180131

Phillips-Perron Test Equation
Dependent Variable: D(INSPR,2)
Method: Least Squares
Date: 07/24/14 Time: 15:55
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INSPR(-1))	-1.056744	0.189982	-5.562331	0.0000
C	0.033310	0.103360	0.322268	0.7496

R-squared	0.524937	Mean dependent var	-0.010503
Adjusted R-squared	0.507970	S.D. dependent var	0.804737
S.E. of regression	0.564481	Akaike info criterion	1.758521
Sum squared resid	8.921890	Schwarz criterion	1.851934
Log likelihood	-24.37781	Hannan-Quinn criter.	1.788405
F-statistic	30.93953	Durbin-Watson stat	1.970633
Prob(F-statistic)	0.000006		

AT LEVEL

Null Hypothesis: BUDEF has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.897769	0.0571
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	0.969169
HAC corrected variance (Bartlett kernel)	0.895976

Phillips-Perron Test Equation
Dependent Variable: D(BUDEF)
Method: Least Squares
Date: 07/24/14 Time: 16:12
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BUDEF(-1)	-0.464409	0.156703	-2.963618	0.0060
C	0.536942	0.259328	2.070514	0.0474

R-squared	0.232460	Mean dependent var	-0.008165
Adjusted R-squared	0.205993	S.D. dependent var	1.142272
S.E. of regression	1.017845	Akaike info criterion	2.935593
Sum squared resid	30.04425	Schwarz criterion	3.028109
Log likelihood	-43.50170	Hannan-Quinn criter.	2.965751
F-statistic	8.783033	Durbin-Watson stat	2.128272
Prob(F-statistic)	0.006021		

AT FIRST DIFFERENCE

Null Hypothesis: D(BUDEF) has a unit root
Exogenous: Constant
Bandwidth: 6 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-9.167654	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Residual variance (no correction)	1.138969
HAC corrected variance (Bartlett kernel)	0.515299

Phillips-Perron Test Equation
Dependent Variable: D(BUDEF,2)
Method: Least Squares
Date: 07/24/14 Time: 16:13
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(BUDEF(-1))	-1.336197	0.176570	-7.567506	0.0000
C	-0.034762	0.201690	-0.172354	0.8644

R-squared	0.671620	Mean dependent var	-0.025737
Adjusted R-squared	0.659892	S.D. dependent var	1.894216
S.E. of regression	1.104683	Akaike info criterion	3.101334
Sum squared resid	34.16907	Schwarz criterion	3.194747
Log likelihood	-44.52001	Hannan-Quinn criter.	3.131217
F-statistic	57.26714	Durbin-Watson stat	2.053212
Prob(F-statistic)	0.000000		

AT LEVEL

Null Hypothesis: EDGDP has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.568122	0.0010
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	1.829170
HAC corrected variance (Bartlett kernel)	1.829170

Phillips-Perron Test Equation
Dependent Variable: D(EDGDP)
Method: Least Squares
Date: 07/24/14 Time: 16:15
Sample (adjusted): 1981 2011
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EDGDP(-1)	-0.842034	0.184328	-4.568122	0.0001

C	2.691782	0.634219	4.244246	0.0002

R-squared	0.418462	Mean dependent var	0.031428
Adjusted R-squared	0.398409	S.D. dependent var	1.802844
S.E. of regression	1.398328	Akaike info criterion	3.570772
Sum squared resid	56.70428	Schwarz criterion	3.663287
Log likelihood	-53.34696	Hannan-Quinn criter.	3.600929
F-statistic	20.86774	Durbin-Watson stat	2.008750
Prob(F-statistic)	0.000084		

THIRD MODEL
COINTEGRATION TEST

Date: 07/24/14 Time: 14:24
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments
Trend assumption: Linear deterministic trend
Series: TBNMS BKSIZ BUDEF EDGDP INSPR MNSUP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.842074	148.3421	95.75366	0.0000
At most 1 *	0.723591	92.97316	69.81889	0.0003
At most 2 *	0.626761	54.39696	47.85613	0.0107
At most 3	0.354023	24.83090	29.79707	0.1675
At most 4	0.301233	11.72118	15.49471	0.1708
At most 5	0.031753	0.968039	3.841466	0.3252

Trace test indicates 3 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.842074	55.36894	40.07757	0.0005
At most 1 *	0.723591	38.57620	33.87687	0.0128
At most 2 *	0.626761	29.56606	27.58434	0.0275
At most 3	0.354023	13.10973	21.13162	0.4422
At most 4	0.301233	10.75314	14.26460	0.1670
At most 5	0.031753	0.968039	3.841466	0.3252

Max-eigenvalue test indicates 3 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

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

TBNMS	BKSIZ	BUDEF	EDGDP	INSPR	MNSUP
-0.657370	-1.758032	0.489715	-0.330060	-0.729521	0.474182

1.432198	-0.741225	0.223048	-0.458694	-0.194831	-0.242428
-0.240912	0.430778	0.354332	-1.009024	0.745679	-0.293325
-0.135527	1.157122	-0.500227	-0.698930	-0.303217	0.870538
-0.016996	0.002530	-1.112393	0.072807	0.094478	-0.676757
-0.128555	0.228882	0.368347	-0.218314	-0.346681	-0.897225

Unrestricted Adjustment Coefficients (alpha):

D(TBNMS)	0.419231	-0.889995	0.428553	-0.051485	0.251795	0.027227
D(BKSIZ)	0.705459	0.351678	0.131909	-0.261140	0.060214	0.043278
D(BUDEF)	0.382065	0.210225	-0.084504	0.076676	0.305738	-0.067567
D(EDGDP)	0.681993	0.310407	0.942099	0.521574	0.054199	0.038811
D(INSPR)	0.704501	-0.219323	-0.934211	0.340564	-0.067633	0.086176
D(MNSUP)	-0.128715	0.082138	0.148139	-0.019776	0.438209	0.081141

1 Cointegrating Equation(s): Log likelihood -252.4430

Normalized cointegrating coefficients (standard error in parentheses)

TBNMS	BKSIZ	BUDEF	EDGDP	INSPR	MNSUP
1.000000	2.674343	-0.744962	0.502091	1.109758	-0.721332
	(0.32035)	(0.20049)	(0.19241)	(0.16277)	(0.21116)

Adjustment coefficients (standard error in parentheses)

D(TBNMS)	-0.275590
	(0.18068)
D(BKSIZ)	-0.463747
	(0.10447)
D(BUDEF)	-0.251158
	(0.10586)
D(EDGDP)	-0.448321
	(0.21991)
D(INSPR)	-0.463118
	(0.20448)
D(MNSUP)	0.084613
	(0.13247)

2 Cointegrating Equation(s): Log likelihood -233.1549

Normalized cointegrating coefficients (standard error in parentheses)

TBNMS	BKSIZ	BUDEF	EDGDP	INSPR	MNSUP
1.000000	0.000000	0.009696	-0.186932	0.065961	-0.258783
		(0.10401)	(0.10931)	(0.08058)	(0.12084)
0.000000	1.000000	-0.282184	0.257642	0.390300	-0.172958
		(0.06807)	(0.07153)	(0.05273)	(0.07908)

Adjustment coefficients (standard error in parentheses)

D(TBNMS)	-1.550239	-0.077334
	(0.31335)	(0.37938)
D(BKSIZ)	0.039926	-1.500892
	(0.22082)	(0.26735)
D(BUDEF)	0.049926	-0.827506
	(0.24375)	(0.29511)
D(EDGDP)	-0.003756	-1.429046
	(0.51676)	(0.62565)

D(INSPR)	-0.777232	-1.075967
	(0.48462)	(0.58673)
D(MNSUP)	0.202251	0.165403
	(0.31635)	(0.38301)

3 Cointegrating Equation(s): Log likelihood -218.3718

Normalized cointegrating coefficients (standard error in parentheses)

TBNMS	BKSIZ	BUDEF	EDGDP	INSPR	MNSUP
1.000000	0.000000	0.000000	-0.163311	0.053930	-0.253083
			(0.10355)	(0.07969)	(0.12013)
0.000000	1.000000	0.000000	-0.429808	0.740466	-0.338862
			(0.13486)	(0.10378)	(0.15645)
0.000000	0.000000	1.000000	-2.436175	1.240913	-0.587927
			(0.45500)	(0.35016)	(0.52787)

Adjustment coefficients (standard error in parentheses)

D(TBNMS)	-1.653483	0.107277	0.158642
	(0.28155)	(0.34544)	(0.11379)
D(BKSIZ)	0.008147	-1.444068	0.470655
	(0.21884)	(0.26850)	(0.08845)
D(BUDEF)	0.070284	-0.863908	0.204051
	(0.24490)	(0.30048)	(0.09898)
D(EDGDP)	-0.230719	-1.023211	0.737034
	(0.41323)	(0.50700)	(0.16701)
D(INSPR)	-0.552169	-1.478405	-0.034936
	(0.37353)	(0.45830)	(0.15097)
D(MNSUP)	0.166563	0.229218	0.007777
	(0.31605)	(0.38776)	(0.12773)

4 Cointegrating Equation(s): Log likelihood -211.8170

Normalized cointegrating coefficients (standard error in parentheses)

TBNMS	BKSIZ	BUDEF	EDGDP	INSPR	MNSUP
1.000000	0.000000	0.000000	0.000000	0.114163	-0.358863
				(0.08305)	(0.12443)
0.000000	1.000000	0.000000	0.000000	0.898990	-0.617257
				(0.13027)	(0.19518)
0.000000	0.000000	1.000000	0.000000	2.139437	-2.165885
				(0.54656)	(0.81891)
0.000000	0.000000	0.000000	1.000000	0.368826	-0.647719
				(0.20994)	(0.31455)

Adjustment coefficients (standard error in parentheses)

D(TBNMS)	-1.646505	0.047702	0.184397	-0.126571
	(0.28202)	(0.40059)	(0.14378)	(0.23819)
D(BKSIZ)	0.043539	-1.746239	0.601284	-0.344738
	(0.20076)	(0.28516)	(0.10235)	(0.16956)
D(BUDEF)	0.059892	-0.775184	0.165695	-0.190858
	(0.24439)	(0.34714)	(0.12460)	(0.20641)
D(EDGDP)	-0.301407	-0.419686	0.476129	-1.682624
	(0.37462)	(0.53212)	(0.19099)	(0.31640)
D(INSPR)	-0.598325	-1.084330	-0.205295	0.572685
	(0.35643)	(0.50628)	(0.18172)	(0.30104)
D(MNSUP)	0.169243	0.206334	0.017670	-0.130846

	(0.31711)	(0.45044)	(0.16167)	(0.26783)	

5 Cointegrating Equation(s): Log likelihood -206.4404

Normalized cointegrating coefficients (standard error in parentheses)

TBNMS	BKSIZ	BUDEF	EDGDP	INSPR	MNSUP
1.000000	0.000000	0.000000	0.000000	0.000000	-0.216883
					(0.11414)
0.000000	1.000000	0.000000	0.000000	0.000000	0.500776
					(0.23230)
0.000000	0.000000	1.000000	0.000000	0.000000	0.494834
					(0.40056)
0.000000	0.000000	0.000000	1.000000	0.000000	-0.189028
					(0.22439)
0.000000	0.000000	0.000000	0.000000	1.000000	-1.243654
					(0.39064)

Adjustment coefficients (standard error in parentheses)

D(TBNMS)	-1.650785	0.048339	-0.095699	-0.108239	0.226524
	(0.26863)	(0.38156)	(0.23160)	(0.22720)	(0.18598)
D(BKSIZ)	0.042516	-1.746086	0.534302	-0.340354	-0.399931
	(0.19972)	(0.28367)	(0.17218)	(0.16891)	(0.13827)
D(BUDEF)	0.054696	-0.774411	-0.174406	-0.168598	-0.377059
	(0.22103)	(0.31394)	(0.19056)	(0.18694)	(0.15303)
D(EDGDP)	-0.302328	-0.419549	0.415839	-1.678678	-0.008530
	(0.37418)	(0.53147)	(0.32259)	(0.31647)	(0.25906)
D(INSPR)	-0.597175	-1.084501	-0.130061	0.567761	-1.277494
	(0.35570)	(0.50522)	(0.30666)	(0.30084)	(0.24626)
D(MNSUP)	0.161795	0.207443	-0.469791	-0.098941	0.235759
	(0.27969)	(0.39726)	(0.24113)	(0.23656)	(0.19364)

VECM

Vector Error Correction Estimates
Date: 07/24/14 Time: 14:11
Sample (adjusted): 1983 2011
Included observations: 29 after adjustments
Standard errors in ( ) & t-statistics in [ ]

CointegratingEq:	CointEq1
TBNMS(-1)	1.000000
BKSIZ(-1)	-0.310166
	(0.11784)
	[-2.63199]
BUDEF(-1)	0.087766
	(0.05087)
	[1.72521]
EDGDP(-1)	0.591160
	(0.05485)

	[10.7782]
INSPR(-1)	-0.117247
	(0.05470)
	[-2.14345]
MNSUP(-1)	-0.292591
	(0.05177)
	[-5.65218]
C	-2.368778

Error Correction:	D(TBNMS)	D(BKSIZ)	D(BUDEF)	D(EDGDP)	D(INSPR)	D(MNSUP)
CointEq1	-1.510317	0.176625	-0.450607	-2.502298	-0.027336	-0.608642
	(0.40266)	(0.31485)	(0.40161)	(0.38812)	(0.52922)	(0.41866)
	[-3.75082]	[0.56098]	[-1.12200]	[-6.44723]	[-0.05165]	[-1.45379]
D(TBNMS(-1))	0.255234	1.89E-05	0.254129	1.411675	0.113485	0.607656
	(0.29779)	(0.23285)	(0.29702)	(0.28704)	(0.39139)	(0.30962)
	[0.85708]	[8.1e-05]	[0.85560]	[4.91807]	[0.28995]	[1.96255]
D(TBNMS(-2))	0.106583	0.160141	0.123328	0.705598	-0.274012	0.393308
	(0.18998)	(0.14855)	(0.18949)	(0.18312)	(0.24970)	(0.19753)
	[0.56101]	[1.07801]	[0.65085]	[3.85315]	[-1.09738]	[1.99111]
D(BKSIZ(-1))	-0.269646	-0.716634	-0.340248	-0.691617	-0.589389	0.036291
	(0.23237)	(0.18169)	(0.23176)	(0.22397)	(0.30540)	(0.24160)
	[-1.16043]	[-3.94421]	[-1.46810]	[-3.08792]	[-1.92988]	[0.15021]
D(BKSIZ(-2))	-0.494697	-0.189283	-0.372763	-0.456616	-0.383035	-0.307976
	(0.22695)	(0.17746)	(0.22636)	(0.21875)	(0.29828)	(0.23597)
	[-2.17977]	[-1.06665]	[-1.64679]	[-2.08737]	[-1.28415]	[-1.30518]
D(BUDEF(-1))	0.058203	0.501455	-0.249462	0.328648	0.432629	0.123327
	(0.26104)	(0.20411)	(0.26036)	(0.25161)	(0.34309)	(0.27141)
	[0.22296]	[2.45674]	[-0.95814]	[1.30616]	[1.26098]	[0.45439]
D(BUDEF(-2))	0.287435	0.450514	0.138189	0.687725	0.189456	-0.042737
	(0.24477)	(0.19139)	(0.24413)	(0.23593)	(0.32170)	(0.25449)
	[1.17432]	[2.35393]	[0.56605]	[2.91500]	[0.58892]	[-0.16793]
D(EDGDP(-1))	0.538376	-0.082620	0.395434	0.426617	0.040063	0.032194
	(0.20500)	(0.16030)	(0.20447)	(0.19760)	(0.26944)	(0.21315)
	[2.62618]	[-0.51542]	[1.93396]	[2.15900]	[0.14869]	[0.15104]
D(EDGDP(-2))	0.410986	-0.461871	0.086679	-0.104281	0.101186	0.256324
	(0.16812)	(0.13146)	(0.16768)	(0.16205)	(0.22097)	(0.17480)
	[2.44455]	[-3.51343]	[0.51692]	[-0.64351]	[0.45793]	[1.46637]
D(INSPR(-1))	-0.131678	-0.134141	-0.012923	-0.381135	-0.454451	-0.026831
	(0.14444)	(0.11294)	(0.14406)	(0.13922)	(0.18984)	(0.15018)
	[-0.91165]	[-1.18772]	[-0.08970]	[-2.73760]	[-2.39390]	[-0.17866]
D(INSPR(-2))	0.213789	-0.348451	-0.023878	-0.424121	-0.744836	0.193359
	(0.16271)	(0.12722)	(0.16228)	(0.15683)	(0.21384)	(0.16917)
	[1.31397]	[-2.73891]	[-0.14714]	[-2.70436]	[-3.48308]	[1.14299]

D(MNSUP(-1))	-0.719473	-0.329304	-0.036931	-0.229726	0.278810	-0.777231
	(0.23406)	(0.18302)	(0.23345)	(0.22561)	(0.30763)	(0.24336)
	[-3.07384]	[-1.79929]	[-0.15819]	[-1.01825]	[0.90631]	[-3.19372]
D(MNSUP(-2))	-0.259491	-0.376145	-0.024311	-0.629678	0.839251	0.194403
	(0.25229)	(0.19727)	(0.25163)	(0.24318)	(0.33158)	(0.26231)
	[-1.02855]	[-1.90676]	[-0.09661]	[-2.58938]	[2.53103]	[0.74111]
C	0.117526	0.090463	-0.048132	0.251867	0.088432	0.148500
	(0.20594)	(0.16103)	(0.20540)	(0.19850)	(0.27066)	(0.21412)
	[0.57069]	[0.56179]	[-0.23433]	[1.26885]	[0.32672]	[0.69354]
R-squared	0.864343	0.781234	0.454579	0.884837	0.734117	0.809541
Adj. R-squared	0.746774	0.591638	-0.018119	0.785030	0.503685	0.644476
Sum sq. resids	16.72591	10.22619	16.63877	15.53954	28.89228	18.08128
S.E. equation	1.055964	0.825679	1.053210	1.017826	1.387859	1.097916
F-statistic	7.351781	4.120504	0.961670	8.865439	3.185828	4.904382
Log likelihood	-33.16934	-26.03523	-33.09359	-32.10255	-41.09525	-34.29915
Akaike AIC	3.253058	2.761051	3.247834	3.179486	3.799673	3.330976
Schwarz SC	3.913132	3.421125	3.907908	3.839560	4.459747	3.991049
Mean dependent	0.032080	0.035487	-0.048026	0.025106	0.050000	0.006871
S.D. dependent	2.098433	1.292077	1.043796	2.195252	1.970001	1.841342

Determinant resid covariance (dof adj.)	0.138440
Determinant resid covariance	0.002651
Log likelihood	-160.8698
Akaike information criterion	17.30136
Schwarz criterion	21.54470