Determinants of Development of the Corporate Bond Market in Kenya: 1997-2004.

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DECLARATION

This paper is my original work and has not been presented for a degree in any other university.
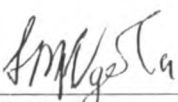
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This research paper has been submitted for examination with our approval as university supervisors.

MR.N.H.W.WAWIRE

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DATE

DEDICATION

To my parents James and Phyllis, my sister Irene and brothers Charles, Ephantus and

Francis. You are one in a million.

ACKNOWLEDGEMENT

TABLE OF CONTENTS

LIST OF TABLES.

LIST OF FIGURES

LIST OF ACRONYMS/ABBREVIATIONS

ADB: - Asian Development Bank.

BESA: - Bond Exchange of South Africa.

EMC: - Emerging Markets Committee.

EMH: - Efficient Markets Hypothesis.

FRBSF: - Federal Reserve Bank of San Francisco.

GDP: - Gross Domestic Product.

IMF: - International Monetary Fund.

JSE: - Johannesburg Stock Exchange.

NSE: - Nairobi Stock Exchange.

OLS:- Ordinary Least Squares.

RBA: - Reserve Bank of Australia.

RMB: - Rand Merchant Bank.

US: - United States.

DEFINITION OF OPERATIONAL TERMS.

Bond:- the written evidence of debt, bearing a stated rate of interest, or stating a formula for determining that rate, and maturing on a date certain, on which date and upon presentation a fixed sum of money plus interest is payable to the owner or holder.

Corporate bond: - is a long term debt instrument issued by a legal corporate entity.

Macroeconomic variables: - Refers to the variables indicating performance of an economy as a whole, or its major components, as opposed to that of individual industries, firms, or households. Indicators of economic growth are notably inflation rate, exchange rate and interest rate.

Treasury bond: - is a long term debt instrument issued by the government.

ABSTRACT

This study considers the short run relationship between macroeconomic variables and corporate bond market development for the Kenyan economy over the period 1997-2004. The aim of this study was to assess the effects of macroeconomic variables on the corporate bond market which are seen to impede the development of a market that is required to boost economic growth. Research so far has concentrated on weaknesses in market infrastructure, institutional constraints, firm characteristics and market characteristics of which is largely descriptive in nature.

This paper identified and examined the relationship between macroeconomic variables notably exchange rate, interest rate and inflation rate as determinants to corporate bond market development to have dissuaded bond issuance by companies and also contributed to underdevelopment of a market that is required to boost economic growth. Also included is the variables bank credit, treasury bonds, equity returns as other determinants to corporate bond market development. To achieve the laid down objectives, the study adopted a short run time series linear econometric model to estimate effects and contribution of these variables as determinants of domestic bond market development. Other notable inclusions were the bank credit, equity and treasury market variables. The study finds that exchange rate, interest rate and bank credit variables negatively affect the development of the corporate bond market which calls for implementation of sound policies. The inflation, equity and Treasury bond variables show no significance despite the existence of theories explaining their roles and significance in bond market development.

CHAPTER ONE

INTRODUCTION

1.1 Background

1.1.1 Importance of corporate bond markets

At the beginning of the nineties, Kenya underwent a series of major policy reforms aimed at facilitating the development of a corporate bond market, which at the time was practically nonexistent (N.S.E, 2005). Two decades later, there is a bond market that remains far from consolidation, concentrated on a small number of large suppliers, and exhibiting momentary growth spurs that are not sustained overtime. Consequently, in Kenya to date, bank credit remains the main source of external financing for firms.

Domestic bond markets in emerging market economies (EMEs) have seen a significant growth in recent years. Nevertheless, developing economies rely heavily on short- term financing (bank financing) that is not suitable for long term investments which has led to low levels of economic growth and development (Batten and Kim, 2001).

The magnitude of fixed investments undertaken by corporations in these economies especially in the non tradable sector such as real estate and infrastructure is mostly financed through taking on rising amounts of bank debt and equity issuance. This is in comparison to the developed world where long term financing (domestic bond markets) has played a major role in sustainable economic growth and development (Batten and Kim, 2001).

In recent years, many countries especially in the developed world have taken decisive steps to promote the development of their bond markets and as a result, corporations are floating growing amounts of fixed income securities in international and domestic markets while steadily reducing their dependence on bank financing. This change in the corporate financing pattern is caused by the necessity of substantial investments in capital intensive projects that require long term and fixed rate debt capital.

As a result, bond markets enable the performance of key activities that are crucial to economic growth. By providing the framework within which long term securities are bought and sold, bond markets play a pivotal role in the development of stable and efficient financial markets. Lewis (1995, 18) observes, *that the financial services industry is a major engine of growth and financial market functions go hand in hand with the volume of commerce.* Thus, the importance of bond markets in this process of economic stimulus revolves around the contribution that a sound bond market makes in providing a stable and reliable source of finance for both government and non-government borrowers and a secure and flexible investment mechanism for investors.

A major component of the capital market is the corporate bond. The corporate bond performs much better than treasury securities in terms of returns because corporate bonds are subject to higher borrowing costs in form of higher yields on issues. Bonds differ across many dimensions including maturity, collateral and whether there is any optionality such as a call provision embedded in the bond. Typically, corporate bonds have maturities longer than two years and play a major part in many investors' portfolios.

Empirical studies conducted by Hankansson (1999) and Bondt and Marques (2004), have supported the view that a well functioning corporate bond market plays a vital role in realizing sustainable economic growth and development.

Since the Asian financial crisis of 1997-1998, attention has increasingly focused on the relative roles of the banking sector and of the capital market in developing economies. In many instances, the domestic bond market, where it exists, is generally under-developed, in both breadth and depth, compared to the banking system and the equity market.

In light of the experience of the crisis, many commentators and studies have made a case for developing the domestic bond market as an alternative source of debt financing not only in the crisis-hit economies, but for all emerging markets where general shortcomings are observed in terms of the variety of debt financing (Herring and Chaturispitak, 2000).

According to the Efficient Markets Committee (2002), the existence of a local market for corporate bonds reduces costs of funding. Corporate bond markets help borrowers reduce their financing costs in two ways. First, they facilitate bank disintermediation by allowing direct access to investors, thus removing the middleman and related costs. Second, by issuing corporate bonds, firms may tailor their asset and liability profiles to reduce the risk of maturity and currency mismatch on their balance sheet, thus reducing the overall cost of capital.

Gilson and Warner (1997) note that corporate bonds provide, under usual credit conditions, a larger degree of flexibility than bank loans which are subject to more strict

covenants and narrower investment conditions. These flexibility features of corporate bonds are particularly enticing for fast- growing firms that tend to rely extensively on bank financing. More generally, a well developed corporate bond mrket could be beneficial towards smoothening the financing of firms as the market could provide funds complementary to bank based debt or equity (Davis, 2001).

Bondt and Marques (2004), argue that financing via corporate bonds encourages a swifter reallocation of funds from cash-rich but economically declining sectors, to fast-growing sectors with urgent need of funds. Consequently, a well developed financial sector, in which there is a deep and liquid market for bonds facilitate both innovative new business and the transition of medium sized firms into large enterprises (Rajan and Zingales, 1998).

A well-developed bond market provides an alternative to bank intermediation that may be valuable in times of financial distress. Banks are highly leveraged and are seriously affected in periods of financial distress. Asami and Mori (2001) after experiencing the Asian financial crisis of 1997-1998, governments in East Asia region started considering that the development of domestic bond markets was necessary. As many of the regions economies succumbed to the crisis through contagion, it became a more realistic endeavor for the governments to work together to harmonize and standardize development of the bond markets in the region. In the Korean financial crisis; the study noted that the bond market remained relatively healthy and active, providing a spare tire for domestic finance. This was due to the commitment of the Korean government that had injected huge amounts of public money into the financial sector.

4

Hankansson (1999) argues that a significant bond market is in a much stronger position than the banking system to give free reign to the important disciplinary role exercised by market forces. In other words, investors in corporate bonds and related instruments appear to do a better job than bankers in deciding which enterprises to fund and on what terms and thus in preventing the economy from ending up in a crisis. The study points out that in economies without a bond market, bank-determined interest rates may not be competitively determined and thus may not reflect the true opportunity cost of capital. For instance, banks may collude to set interest rates or may fix them at government mandated levels. Also argued is that banks may not assess credit risk as well as bond investors. This results in the problem of efficient pricing of credit risk.

In a nutshell, a broad range of tradable debt instruments enhances public debt management. A sound and liquid domestic bond market attracts domestic as well as foreign investors shifting the composition of sovereign debt towards domestic currency denominated instruments, reducing problems of currency mismatch and liability dollarization.

1.1.2 International Bonds Market

For a long time the developed world has dominated the worlds bond market. The International Monetary Fund (1997) and Kindleberger (1965) argued that the United States played the role of international banker, selling liquid short-term obligations to nonresidents and buying longer-term claims against them. This trend continued through the 1980's where economies experienced widely disparate rates of economic growth together with interest rate volatility within and between countries, which contributed to

high real rates that encouraged investors to shift investment from one country to another. This was evident in the late 1990's where low interest rates in Europe and Japan coupled with the global search for yields facilitated capital flows into the United States and other high yielding mature domestic bond markets outside Europe, for example Canada, into corporate bonds. This strong demand for dollar denominated instruments raised the share of dollar issuance by more than 100 percent. The large differentials between the United States and other countries interest rates were the key factor driving large flows in the U.S market and hence the good performance.

In the late 1990's, there was remarkable development in the composition of external financing by emerging markets through increase in bond issuance. The growing volume of bond issuance by emerging market entities, matched by increased investor interest in emerging debt markets led to a drastic increase in the turnover of such instruments which, after remaining relatively stable from 1994 to 1995, rose by 93 percent by 1996. This was experienced in Latin America, Asian markets notably China among other emerging market entities (IMF, 1997)

According to Rand Merchant Bank and Bond Exchange of South Africa (2001), in the U.S, bond finance has exceeded bank loans as a source of corporate funding as well as commanding 43.8 percent of the world's bond market, which is attributed to broad, and well functioning financial markets which consists of a range of financial products. Bondt and Marques (2004) asserted that while in the United States the corporate bond market has flourished over the last two decades, in other countries this market has only begun to develop in the late 1990's and remains both in terms of amounts outstanding and gross

issuance well below the U.S market. As a percentage of GDP, bond market financing in other countries is a small fraction of that in the U.S and in 1995 bank lending as a percentage of GDP was three times the U.S. number in Japan and twice as large in Malaysia and Thailand (Sapsford, 1997).

According to the Federal Reserve Bank of San Francisco (2004) the U.S corporate bond market was large, with $6.8 trillion in outstanding corporate and foreign debt in the fourth quarter of 2003. This total was about two-thirds the amounts of outstanding U.S treasury debt and five times the amount of outstanding business loans at banks in the U.S. The growth rate of net corporate debt issuance was approximately 12 percent per year since 1980, and was less variable than the net growth in business loans at banks.

Globalization, among other factors, has however brought change. For example in Japan where government protected long-term credit banks, discouraged growth of the corporate bond market, issuance has been increased in an effort to stimulate economic growth. This was enabled by Japan's resolve to revise its policies that seemed to take toll on growth of this market. In the Euro zone, issuance activity rose sharply immediately after the introduction of the euro in 1999. This went to show that a non-government debt, particularly the corporate bond had taken a much larger role in the global bond market and in economic growth and development.

In most developing countries, the vast majority of external funding for the private sector is provided by the banking sector. Bank loans in these economies dwarf equity and bonds, in striking contrast with the case of the United States (US), where bonds dominate

(Batten and Kim, 2001). This is particularly true for small and new companies, which depend on short-term loans. Banks are not well suited to finance long-term investments on a large scale, as the marriage of short-term liabilities and long-term assets results in maturity mismatches in their balance sheets. As such, according to AERC (2001), Africa's weak financial sector has long been a brake on economic growth and development, making it important to consider means of increasing long-term funding.

As such, financial markets development in these economies is of importance if they are to sustain growth and development. Domestic financial systems need to be able to provide a range of financial services, short and long-term credit at growth-sustaining costs, backed up with good information, and strong regulatory systems. Domestic bond markets in these economies are an alternative source of domestic debt finance as well as a cheaper source of raising credit, which helps to stimulate economic growth and development.

In the African continent, South Africa is the only country with a well functioning corporate bond market but with relatively low returns. The country has experienced rapid development of corporate issues with a total market share of 28 percent in the South African bond market. According to a report by the Johannesburg Stock Exchange (1994), the exchange has been termed an emerging market in a global stock market context.

The Johannesburg Stock Exchange (JSE) is one of the biggest emerging stock markets in the world with a daily turnover of 2.5-3.0 billion. According to annual reports by JSE (2000 and 2004) in the year 2000 the JSE was ranked 17th out of 55 exchanges in the world in terms of market capitalization with an excess income over expenditure of Rand

66,280,000 million. As at March 2004, its market capitalization was about four times the size of Ireland's stock exchange.

According to Bond Exchange of South Africa (2004), corporate bonds market share was 28 percent with the government taking the rest. Issue in corporate bonds grew from 2.82 percent in 1999 to 16.9 percent in 2/2004. Though small in comparison to the developed world, it has considerable growth potential.

According to Kibua et al (2005), governments of Eastern African countries have depended on donor aid to finance their long term projects. However with increasing uncertainty and harsh donor conditionalities, mobilization of domestic resources as an alternative source of finance has gained greater significance. Increased government borrowing using short term debt instruments crowds out the private sector. This happens through competition in the domestic money market and the concomitant increase in the level of interest on Treasury bills. With this realization, countries are now increasingly focusing on building an environment that fosters sustainable internal capital mobilization for the development of a bond market within the region.

However, the share of the world bond market that is made up of non-government bonds has risen materially, driven by strong private sector debt issuance and dwindling government sector issuance. This has enabled the global bond markets to grow broader and deeper as demonstrated by the impressive growth of the corporate bond market in Europe and the budding development of the corporate bond market in Asia.

1.1.3 The Bond Market in Kenya

According to NSE (1996), the Exchange has only accommodated a limited number of securities. It has mainly been active in equities, both ordinary and preference, and to a very limited extent some bonds in the form of debenture stocks which form the fundamental products of any stock market.

The Kenyan bond market is characterized by fixed interest rate, floating interest rate and the zero coupon rate bonds. The listing of Government of Kenya Treasury Bonds started in 1986 while the corporate bond market has its origin in 1996. For both cases, the interest rates were floating rates pegged to the 91- day Treasury bill. Since then, the bonds market has grown with the notable inclusion being the fixed interest rates bonds, zero coupon rates and special issue bonds by the government, Kibua et al (2005).

The corporate bond market in Kenya is very thin. Kenya has only four corporate bonds with a coupon based on the prevailing 91-day Treasury bill moving average rate plus a premium of 0.75 percent. The first corporate bond was issued by East African Development Bank which issued a floating rate corporate bond due 1999 at a price of 99 percent to raise Kshs 600 million

Currently, there are other four corporate bonds (with either floating or fixed rates) have been issued by East African Development Bank, Shelter Afrique, Safaricom, Mabati Rolling Mills and Faulu Kenya's 500 million bond. Faulu Kenya was the first micro financing institution in Africa to float a bond.

This market paints a grim picture of an underdeveloped corporate bond market with only five issues spanning the period 1996 to date (2005) raising questions regarding the implementation of the necessary infrastructure towards a robust domestic bond market. For a robust corporate bond market to evolve a stable macroeconomic environment should prevail characterized by low inflation and interest rates. In such a macroeconomic environment, companies are likely to take a longer time horizon in making investment decisions.

Also, a healthy government bond market creates a conducive environment for the development of a robust corporate bond market working as a catalyst for corporate bond market development.

As such, debt market in Kenya remains substantially underdeveloped being dominated by government bonds where government debt represents 27 percent of GDP. The prospect of developing an active and liquid debt market seems to be bright given the ongoing government reforms of restructuring existing domestic debt towards long term debt.

1.2 The Statement of the Problem

From background information, it is evident that a well-developed corporate bond market provides a stable and reliable source of finance for both government and non-government borrowers and a secure and flexible investment mechanism for investors (Lewis, 1995). This suggests the importance of promoting growth of the corporate bond market in Kenya that will act as a major engine of growth in order to achieve sustainable economic growth and development. This would provide an avenue to address problems plaguing the

11

Kenyan economy such as chronic fiscal deficits that lead to high government borrowing, high and rising interest rates, inflation, inadequate social and economic infrastructure, unemployment, poverty and scarce resources. These are among the problems that have contributed to the poor state of the Kenyan economy that has experienced a downward shift in the growth trajectory since independence (Mwega and Ndung'u 2002).

From the experiences of the developed economies, it is apparent that movement in macroeconomic variables affects the performance of the corporate bond market, for example market interest rates, inflation, fiscal deficits and change in governments. These could have detrimental or favorable effects on the performance of the corporate bond market depending on their movements.

Despite this apparent recognition and acceptance that a relationship exists between economic growth and the corporate bond market (Lewis, 1995, Hankansson, 1999, Bondt and Marques, 2004), little empirical analysis has been done to assess macroeconomic determinants of development of the corporate bond market in Kenya in connection with the state of the economy. A study to fill this information gap was therefore required. This was in recognition of the fact that a poorly developed bond market might be acting as impediment to economic growth with a well functioning corporate bond market hence required to boost economic growth.

The following research questions were therefore addressed:-

(i)   What are the macroeconomic determinants of development of the corporate bond market?

(ii)   What is the contribution of these determinants on the development of the

market?

(iii)   What are the Policy implications arising out of (i) and (ii)?

1.3 Objectives of the study

The general objective of the study was to conduct an analysis on the macro economic determinants of development of the corporate bond market in Kenya.

The specific objectives were:

(i) To identify determinants of performance of the corporate bond market.

(ii) To examine contribution of these determinants on the corporate bond market.

(iii) To draw policy recommendations.

1.4 Significance of the Study

The study was relevant due to a number of reasons. First, empirical studies have shown the importance of a well functioning corporate bond market (Hankansson, 1999, Bondt and Marques, 2004). Therefore, a study on effects of determinants of development of the corporate bond market was crucial. The study provides useful information on effects of these determinants on the development of the corporate bond market in an attempt to finding out whether this accelerates or decelerates development of the corporate bond market.

The results of the study would help financial market regulatory bodies to make appropriate policy adjustments. For instance, the Capital Markets Authority and the Nairobi Stock Exchange would find the results of the study valuable since the results could form a basis for adjustment, which can in effect move the market in the desired direction.

The study findings may also guide the Central Bank of Kenya in determining which tools of monetary policy are appropriate for financial market development apart from forming a base for further research.

1.5 Scope and Organisation of the Study

This study covered the period 1997-2004. The choice of the period for analysis was influenced by data availability and the start up face of the corporate bond market. The choice of this period was to enable the study capture effects of macroeconomic determinants on the development of the corporate bond market. It was also a period that the economy experienced a slump in terms of growth which enabled the study to clearly capture effects of these variables.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Literature on the issue of corporate bond market performance is not very extensive, since much effort is devoted to explaining bonds market development. In this regard this section reviews theoretical and empirical literature, the works of Beck and Levine (2002), Zervos (2004) and Wagacha (2001). It commences with theoretical literature importance with the empirical part explaining bonds market development and gives the overview

2.2 Theoretical Literature

The development of bond markets in many developing countries has been necessitated by the substantial investments in capital intensive projects that require long term and fixed rate debt capital (World Bank 1995).

A number of variables have been suggested by theoretical studies that can be included as determinants of financial market development. Examples include economic variables that measure the domestic and external economic performance of a country and exogenous shocks that affect liquidity and solvency of developing countries (Edwards, 1986: Sachs. 1985: Haque et al, 1996). An important influence on the downward/upward movements of financial markets in recent years has been broadly based on the importance of the macroeconomic policy discipline.

Macroeconomic fundamentals impact on the long term insolvency problem of a country an important aspect being the macroeconomic policy. Three most important

macroeconomic fundamentals determining the development of bond market are the domestic inflation rate (INF), interest rates and the exchange rate. The inflation rate in any economy can be regarded as a proxy for the quality of economic management, as a result the higher the inflation rate the lower the yield spread on fixed-income securities. Low inflation creates an incentive for investors and therefore facilitates the development of markets in fixed income securities while high inflation and large fiscal deficits distort economic behaviour in favour of short term speculative projects.

Haque et al (1996) investigated the economic determinants of developing country creditworthiness for some 60 developing countries and found that economic fundamentals - the ratio of non gold foreign exchange reserves to imports, the ratio of the current account to GDP, growth, and inflation - explain a large amount of variation in credit ratings and all developing country ratings were adversely affected by increases in international interest rates, independent of domestic economic fundamentals.

Edwards (1986), in his study of bond pricing, compared the pricing of bonds and bank loans to test whether two markets are significantly different and found that the bond data confirmed some of the most important implications of foreign borrowing models. Using data of yields on LDC bonds traded in the secondary market, he found a positive effect of higher debt ratios on the risk premium.

Sachs (1985) investigated the role of various macroeconomic policies and fundamentals for the debt-crisis and provided the empirical rationale for using certain economic fundamentals in the determination of the risk-premium in international capital markets. In

particular, he emphasized the importance of trade and exchange rate policy for a developing country's performance in financial markets.

The real exchange rate can be included to measure the trade competitiveness of an economy. Sachs (1985) demonstrated the importance of the exchange rate management and trade regime, Cline (1983) claimed that inappropriate exchange rate policies in a number of LDC's were among the most important causes of the debt crises. Sustained real appreciation of these countries' currencies played a major role in the process of over borrowing. A less competitive real rate (appreciation) is expected to affect adversely the yield spread. The real exchange rate of an economy measures its trade's competitiveness and is an important cause of debt crises experienced in developing countries. Sustained real appreciation of these countries currencies therefore plays a major role in the process of over borrowing and a less competitive real rate adversely affects the yield spread of bonds. Cline (1983) observed that overvalued currencies in Latin American countries resulted in capital flight.

In theories of finance, one of the longest-standing questions about capital structure is whether firms have target debt ratios. The trade-off theory says that firms have optimal debt-equity ratios, which they determine by trading off the benefits of debt with the costs (Scott, 1976). In traditional trade-off models, the chief benefit of debt is the tax advantage of interest deductibility (Modigliani and Miller, 1963). The primary costs are those associated with financial distress and the personal tax expense bondholders incur when they receive interest income (Miller, 1977).The balance sheets and cash flows of vulnerable firms tend to be unusually susceptible to financial pressures and cyclical influences for example asymmetries of information and agency costs operate as

constraints on the access of such firms to external funding. Such firms are likely to experience both credit and equity rationing in conditions of high interest rates while cash-flow interdependencies may adversely affect dividend and capital expenditure decisions alike.

2.2.1 Theories of Finance.
(a) Modern portfolio Theory.

Markowitz (1952) introduced the modern portfolio theory. Prior to Markowitz's work, investors focused on assessing the risks and rewards of individual securities in constructing their portfolios. Standard investment advice was to identify those securities that offered the best opportunities for gain with the least risk and then construct a portfolio from these. Following such advice, an investor may conclude agricultural stocks offered good risk-reward characteristics and compile a portfolio entirely from these.

However, this is not wise. Markowitz (1952) formalized this intuition by detailing mathematics of diversification, where the study proposed that investors focus on selecting portfolios based on their overall risk-reward characteristics instead of merely compiling portfolios from securities that each individually has attractive risk-reward characteristics. Concisely, investors ought to select portfolios and not individual securities what Markowitz (1952) calls efficient portfolios and assert that investors should select a portfolio that lies on the efficient frontier.

Tobin (1958) expands on Markowitz work by adding a risk- free asset to the analysis. This makes it possible to leverage or de-leverage portfolios on the efficient frontier and leads to concepts of a super-efficient portfolio and the capital market line. Through

leverage, portfolios on the capital market line are able to outperform portfolio on the efficient frontier.

Markowitz (1952) and Tobin (1958) therefore laid the foundations for the development of asset pricing models. Early theories suggested that the risk of an individual security is the standard deviation of its returns-a measure of return volatility. Thus, the larger the standard deviation of security returns the greater the risk. An investor's main concern, however, is the risk of total wealth made up of a collection of securities, the portfolio. Markowitz observed that when two risky assets are combined. their standard deviations are not additive, provided the returns from the two assets are not perfectly correlated and when a portfolio of risky assets is formed, the standard deviation risk of the portfolio is less than the sum of standard deviations of its constituents.

Markowitz was the first to develop a specific measure of portfolio risk and to derive the expected return and risk of a portfolio. The model generates the efficient frontier of portfolios and the investors are expected to select a portfolio, which is most appropriate for them. from the efficient set of portfolios available to them.

(b) Arbitrage Pricing Theory

The pricing equation of Ross (1976) APT model is derived using estimable parameters. The main building block of APT is a factor model also known as a return generating process. Arbitrage pricing theory is based on the law of one price. This approach does not require the assumption of mean-variance utility. It is replaced by the assumption that the process generating asset returns is known. More precisely, it assumes that the return on any stock is linearly related to a set of factors.

Roll and Ross (1995) argues that at the core of the Arbitrage Pricing Theory (APT) is the recognition that only a few systematic factors affect the long-term average returns of financial assets. APT does not deny the myriad factors that influence the daily price variability of individual stocks and bonds, but it focuses on the major forces that move aggregates in large portfolios. By identifying these forces, an intuitive appreciation of their influence on portfolio returns is gained. Returns of an asset depend on anticipated or unanticipated events. Empirical works suggest that a three or four factor model adequately captures the influence of systematic factors on stock market returns. These factors are underlying economic forces that are the primary influences on the stock market.

An alternative to the CAPM, APT differs in its assumptions and explanation of risk factors associated with the risk of an asset. This is a theory that predicts a relationship between the returns of portfolio and the returns of a single asset through a linear combination of variables.

According to Chen (1980), suppose there are n assets and k factors in the economy and a covariance matrix of m assets. Assume further that within the m assets there exists k+1 linearly independent assets. This follows that asset returns are assumed to be generated by a linear factor model:

$$\bar{R}_i = a_i + b_{i1}\bar{F}_1 + b_{i2}\bar{F}_2 \ldots\ldots\ldots + b_{ik}\bar{F}_k + \bar{\varepsilon}_i \qquad (2.4)$$

Return on asset i depends linearly on k factors, that is, $\widehat{F}_1, \widehat{F}_2 ... \widehat{F}_k$ and unsystematic risk $\widehat{\varepsilon}_k$. Factor loadings $b_{i1}, b_{i2} ...., b_{ik}$ give extent to which the return on the asset depends on them, taking in mind all the assumptions of the error term.

Using the above in the linear factor model we obtain:-

$$\widehat{R}_i = E(\widehat{R}_i) + b_{i1}\widehat{F}_1 + b_{i2}\widehat{F}_2 .... + b_{ik}F_k + \varepsilon_i \qquad (2.5)$$

Examples of the k factors could be macro economic variables like GDP growth, unemployment rate, taxes, fiscal policy among others.

Thus implementing the APT involves three steps which are identifying the factors, estimating factor loadings of assets where past asset return are regressed on the factors b_{ik} and estimating factor premia.

While potentially more general, the APT simply provides another, more disaggregated way of writing the expected return premium associated with systematic risk, and thus a decomposition of the CAPM in terms of its fundamental elements.

2.3 Empirical literature

Melendez and Natalia (2005) contributed to the understanding of whether the development of a domestic bond market was key to economic growth and development. The study was necessitated by the lack of an explanation of the lagging performance of market based financing in Colombia and also lack of a model of market participant behaviour with existing empirical literature being largely descriptive. The study adopted a descriptive approach to assess the level of development of the Colombian bond market. In identifying the determinants of development of the bond market the study proposed a threefold empirical approach where a time series model was used to explain the

21

development level of the bond market, a probit model to explain the firms decision to issue bonds and a probit model to explain the institutional investors decision to buy bonds issued by non-financial players. The study highlighted the importance of bond market in economic growth and measures necessary for developing bond market. To elaborate further the study pointed out institutional variables and market participants characteristics as necessary towards the achieving of a robust domestic bond market.

World Bank (2004) reviewed the development of the Korean bond market exploring five shortcomings of Korea's corporate bond market which included an underdeveloped government bond market, heavy government intervention and overuse of short term bonds. The study highlighted some of the measures necessary for developing a more advanced corporate bond market in Korea. The study findings demonstrated the importance of synchronizing infrastructure and investor base development. This study asserted that coordinating these aspects was a crucial step for developing well- balanced, viable bond market.

Zervos (2004) carried out a study on precise costs of debt and equity issuance, both domestically and internationally for economies of Chile, Brazil and Mexico. The study found out specific features of the demand and supply for bonds, which had impact on costs of issuance, nature of debt and the equity market which provides imminence for development of primary markets in these three economies. The study's findings were made possible through extensive data collection with components of issuing costs for corporate debt and equity domestically and abroad calculated, as well as investment

banking and legal fees, exchange listing and regulatory costs, taxes, rating agency fees and expenditures for marketing and publishing.

Faulkender and Petersen (2003) noted that empirical examinations of capital structure have led to the conclusion that firms are under-levered. Implicit in this argument and much of the empirical work on leverage is the assumption that the availability of incremental capital depends solely on the risk of the firm's cash flows and characteristics of the firm. However, the same market frictions that make capital structure relevant suggest that firms may be rationed by lenders, leading some firms to appear to be under-levered relative to unconstrained firms. Their study examined this theory, arguing that the same characteristics that may be associated with firms being rationed by the debt markets are also associated with financial intermediaries, opposed to bond markets, being the source of a firm's debt capital. The study found that firms had significantly different leverage ratios based on whether they have access to public bond markets as measured by the firm having a debt rating. Although firms with a debt rating were fundamentally different, these differences were not explained by the study's findings. Even after controlling for the firm characteristics previously found to determine observed capital structure and the possible endogeneity of having a bond rating, the study found that firms which were able to raise debt from public markets had 40 percent more debt.

Fabella and Madhur (2003) examined the development of domestic bond markets in post crisis Asia and observed that these markets were increasingly seen as one of the key requirements to strengthening the financial sectors of East Asian countries and to reduce their vulnerabilities to financial crises. The study noted great diversity in terms of the

level of bond market development across East Asian countries. Judged by several indicators of bond market development, Hong Kong, China and Singapore, the study noted that they were ahead of other countries, followed by a second tier consisting of Korea; Malaysia; and Taipei, China and a third tier consisting of People's Republic of China, Philippines, and Thailand. Indonesia's bond market was perhaps the most nascent among East Asian bond markets. To initiate the development of bond markets in East Asia, the study recommended that focus be on: (i) sustaining a stable macroeconomic environment with low inflation and stable interest rates, (ii) developing a healthy government bond market that would serve as a benchmark for the corporate bond market, (iii) completing the post crisis agenda of banking sector restructuring, (iv) improving corporate governance, (v) strengthening the regulatory framework for the bond market, (vi) rationalizing tax treatment of bonds, (vii) broadening the investor base, and (viii) promoting the growth of regional bond market centers.

Asian Development Bank (2002) examined a list of requirements for development of bond markets in East Asia. The study points out that sustaining a stable macroeconomic environment with low inflation and stable interest rates, developing a healthy government bond market that would serve as a benchmark for the corporate bond market, completing the post crisis agenda of banking sector restructuring, improving corporate governance, strengthening the regulatory framework for bond market, rationalizing tax treatment of bonds, broadening the investor base, and promoting the growth of regional bond market centers as key requirements towards robust corporate bond markets in the region. The study pointed out great diversity in the levels of bond market development across countries with these requirements not being uniformly applicable and compelling for all

the countries. The study concluded that significant country-specific deciphering of these requirements was needed for developing country strategies for bond market development.

Beck and Levine (2002) examined whether market based or bank based financial systems were better at financing industries expansion that depended heavily on external financing, at facilitating the formation of new establishments and improving efficiency of capital allocation across industries. The study revealed that while legal system efficiency and overall financial development boost industry growth, efficient capital allocation and new establishment formation, presence of a bank based or market based system by itself did not matter.

Jin and Loh (2002) examined the pervasive "original sin" problem, which was the inability to attract nonresidents to invest in local currency bonds in Singapore. The study pointed out that the long term prospect for its corporate bond market hinges critically on how well the economy addresses the causes that can lead to the "original sin" problem. The study pointed out bank credit, interest rate environment, lack of liquidity and transparency in bond markets, depreciating Singapore dollar and low yields on bonds as factors hindering bond market development in Singapore.

Wagacha (2001) examined why companies listed in the Nairobi Stock Exchange, or, being qualified to do so, desisted from listing. The study identified a random sample of 24 unlisted firms and surveys carried out using a questionnaire. Another random sample of 32 listed firms among the 58 listed on the Nairobi Stock Exchange as of November 1999 was surveyed. The study points out illiquidity, pricing volatility and error, market

efficiency, level of institutional arrangement, regulatory framework, macroeconomic outlook, public awareness, market segmentation and product diversification as factors that emerge and were inimical to the growth of the Kenyan Capital markets.

Sharma (2000) analyzed the underlying institutional constraints to corporate bond market development in Thailand, Malaysia and Indonesia. The study illustrated the interlocking relationships between corporations, banks and governments to have dissuaded bond issuance by companies and also contributed to the underdevelopment of the demand side of the market. The implication of the research was that, in addition to the often-recommended measures to strengthen the market infrastructure, corporate bond market development in these countries is also contingent upon deep-set institutional change.

Erb, et al (1999) examined emerging market bonds that have been a investment option for centuries, but which only in the last decade have had data to enable a study on their behavior. They used these data and found out that emerging market bonds have had high volatility, negative skewness and low, but increasing, correlation with existing asset classes. The study also found that as with other asset classes, country risk plays an important role in the pricing of emerging market bonds. A measure of market sentiment for emerging market bonds was introduced. The study concluded that for many investors the extreme characteristics of emerging market bonds made it difficult for them to invest, for others insight was provided on means for emerging market bond investments.

Min (1998) investigated the determinants of bond spreads in emerging markets for the 1990s. The results showed that strong macroeconomic fundamentals, such as low

domestic inflation rates, improved terms of trade and increased net foreign assets were associated with lower yield spreads. The study noted that, weak liquidity variables of a country, such as high debt-to-GDP ratio, low foreign reserves-to-GDP ratio, low (high) export (import) growth rate and high debt-service ratio, were associated with higher yield spreads. At the same time, it was shown that external shocks, as measured by the international interest rate, mattered little in the determination of bond spreads. The study also concluded that Latin American countries, in the aggregate, had a negative yield curve.

2.2 Overview of literature

The studies reviewed document well developed and functioning bond markets, for example the case of Korea in comparison to Kenya. These studies have tended to focus on explaining the development of bond markets both private and government. These studies have not explicitly focused on the corporate bond market and their analytical approach also has been largely descriptive. The studies have tended to focus on institutional/rules of play variables, firm characteristics variables and market participants variables as determinants of bond market development failing to provide an indepth analysis of the macroeconomic determinants affecting bond market development.

It is from this point of view that this study proceeded to study the relationship between corporate bond market and economic growth in Kenya.

Secondly, most studies reviewed are set in the context of the developed world with relatively well developed bond markets. Owing to this, focus of this study was on the developing world using Kenya as a case study to explain the development of the market.

The study was also necessitated by the fact that problems and goals of these two worlds are different and that corporate bond markets in developing economies are in their embryonic stage.

CHAPTER THREE

CONCEPTUAL FRAMEWORK AND METHODOLOGY

3.1 Introduction

This chapter explains the conceptual framework and methodology, which were applied in the study. It commences with the conceptual framework, model specification and a highlight of the look at data type and sources. The model that was used is explained and specified.

3.2 The Model.

According to the World Bank (2004) a conceptual framework of the development of domestic bond markets should illustrate a comprehensive development agenda involving issuers, investors, intermediaries, market infrastructure, regulation, and consistency with macroeconomic policies. Clearly the development of bond markets requires a systematic plan and a coherent effort from government, investors and other market stakeholders including intermediaries. The governments must play a critical role in formulating and effectuating the development agendas performing numerous functions in the development process including issuer, regulator, coordinator, and perhaps most importantly, catalyst or promoter of the agenda. As a large issuer, the government should help in developing the yield curve, improve standardization and secondary market liquidity and assist in building the necessary market infrastructure required to support the market.

Governments by inducing improvement in financial markets improve competition, limit abuses of vertical integration, and promote transparency and disclosure facilitating effective market making. As a coordinator, the government ensures that bond market

agendas are consistent with debt management mandates, and the objectives of fiscal and monetary policies. There is need also to build consensus within and outside of government facilitated through the creation of task forces that include representatives from the central bank, Treasury and the private sector. To be clear consensus should center on the importance of bond market development for effective debt management, importance of consistency between bond market development and macroeconomic policies and the overall strategy to develop the domestic bond market.

Secondly the development of an effective primary market for government securities should be emphasized. Treasury markets, as part of money market development, should first be developed with the government thereafter encouraged to gradually extend the maturity spectrum of its treasury bonds. It is crucial for primary market development to be consistent with government's sovereign debt management program such as funding strategy and risk management program, and the central bank's open market operations. At this stage, various auction methods are explored with a view to adopting the appropriate model which can serve to enhance bond selling efficiency, and a primary dealer system is established to ensure competitive bidding by participating financial institutions

Thirdly the development of a secondary market for government securities is centerpiece in addressing market liquidity where three aspects should addressed. These are market infrastructure, the market for repurchase agreements and the legal and regulatory framework; Second, a comprehensive demand study should be conducted to identify and remove legal, regulatory, accounting and tax impediments to investing in, and the trading

of, bonds; and Third, the role of intermediaries such as market makers and an inter-dealer brokers is enhanced with the objective of improving market liquidity and facilitating trading.

At the final stage, corporate bond market development is emphasized. Once a reasonably deep and liquid market is achieved, the next step is to develop an efficient corporate bond market. Corporate transparency and disclosure requirements, utilization of credit rating agencies, tax and other regulatory issues should be addressed during this stage.

3.2.1 The linear model

It is from this framework that the study addressed the three research questions and objectives. The study adopted the Melendez and Natalia (2005) approach of a linear model to examine effects of macroeconomic determinants of bond market development. The Arbitrage Pricing Theory of Ross(1976) is also based on a linear model where asset returns are assumed to be generated by a linear factor model. The theory asserts that returns on assets linearly depend on k factors which could be macroeconomic variables, institutional variables or market participants' variables.

A linear model is said to be linear in the variables as well as in the parameters. To elaborate, linearity in variables means that the conditional mean value of the dependent variable is a linear function of the independent variables while linearity in parameters implies that the conditional mean of the dependent variable is a linear function of the parameters. A multiple linear regression model was adopted in which more than one independent variable was used to explain the behaviour of the dependent variable.

This model follows the assumptions:-

(a) Explanatory variables are uncorrelated with the disturbance term.

(b) Variance of each error term is constant or homoscedastic.

(c) Variance of each error term is constant or homoscedastic.

(d) There is no correlation between two error terms (no autocorrelation).

(e) No exact collinearity exists between explanatory variables; and

(f) The error term follows a normal distribution with zero mean and constant variance.

The method used to estimate the parameters was ordinary least squares (OLS) which states that b_1 and b_2 should be chosen in such a way that the residual sum of squares (RSS) is as small as possible (Gujarati 1999).

Algebraically, the least squares principles states

$$\text{Minimize } \sum e_i^2 = \sum \left(Y_i - \overline{Y} \right)^2$$

$$= \sum (Y_i - b_1 - b_2 X_i)$$

such that solutions for b_1 and b_2 are obtained.

It is argued that theory is not strong enough to suggest which functional form to be assumed by a model. In choosing the functional form of a model, a researcher should consider factors such as relevance of the explanatory variable included in the model, which is the underlying theory, the expected signs of the coefficient of the explanatory variables and their statistical significance. These should be the guiding principles in choosing a models functional form (Gujarati 1999).

3.2.2 Autoregressive Distributed Lag Model

A feature of time series data is that a dependent variable depends upon the behaviour of its explanatory variables in the previous period. As such while modeling time series data we may include lagged terms of the explanatory variables. A model could also have a lagged dependent variable. Such models are called dynamic models because the effect of a unit change in the value of the explanatory is felt over a number of time periods. More technically these dynamic models are called distributed lag models, for the effect of a unit change in the value of the explanatory variable is spread over or distributed over a number of time periods.

The model adopted by the study was a short run Autoregressive Distributed Lagged (ADL) linear model because the coefficients attached to the explanatory variables gave a short run impact of a unit change in X_t on mean Y_t.

3.3 Model Specification.

The model that was used in the study was an Autoregressive Distributed Lagged (ADL) linear model:-

$$Y_t = f\left(,i^*,TB ,e,BC,In,Eq,\right)$$

where Y_t = corporate bond closing price.

 BC =bank credit (extent of participation of banks in financing corporate organizations operations) which addresses the desirability of a well developed corporate bond market

 i^* = Interest rates levels (Treasury bill).

 TB = Treasury bond closing price which helps to point out whether this market acts as a compliment or substitute to the corporate bond market.

In = Inflation rate(s).

e = Exchange rate.

Eq = Equity returns.

As such an ADL (4,3) linear model was specified as follows:-

$$Y_t = \alpha_0 + \alpha_1 e_{i-n} + \alpha_2 i_{i-n}^{\cdot} + \alpha_3 TB_{i-n} + \alpha_4 BC_{i-n} + \alpha_5 In_{i-n} + \alpha_6 Eq_{i-n} + \varepsilon_t \dots\dots\dots (3.1)$$

3.4 Measurement of Public information variables.

Macro economic variables and other variables to be measured were:-

(i) Interest rates measured in terms of the Treasury bill average monthly rate.

(ii) Exchange rate measured in terms of the U.S dollar trading against the Kenyan

shilling.

(iii) Inflation rate measured as average annual month on month inflation rate.

(iv) Bank Financing measured as credit to the private sector in Kenyan shilling

millions.

(v) Monthly equity returns measured as the log of monthly share index minus the

same monthly log lagged once.

(vi) Treasury bond monthly closing price indices measured as a uniform weighting

of closing prices of the different bonds

3.5 Data Type, Source, Collection and Refinement.

Time series secondary data were used for the analysis. The study used historical data on

bond price indices for the period 1997 to 2004. Data were obtained from Central Bank of

Kenya statistical bulletins. Information on monthly closing prices of the bonds was

obtained from the Nairobi Stock Exchange.

The study used published data with corporate bonds required to have a minimum of two years of data to help ensure estimates of development were not significantly influenced by the start up phase of the bonds as well as providing enough observations to incorporate in the econometric model.

Data from the bonds market was disaggregated. To enable the study to carry out its objectives this data was refined by aggregating it and uniformed weighting of monthly corporate and government bond prices calculated. Data on macro economic variable was divided by one hundred to rid of the percentage rates to clearly capture the effects of these variables on the corporate bond market. Thereafter diagnostic tests were carried out to establish that the data used were stationary and the model in question was stable.

3.6 Data Analysis.

Analysis was enabled by the usage of E-views Econometric package. Diagnostic tests were carried out before the actual estimation to ascertain the models specification and explanatory power.

(a) Normality Tests.

This test was carried out to ensure that variables used in the analysis were normally distributed. The Jarque- Bera statistics test (Jarque and Bera 1980) was used to carry out this test. The test utilized the mean based coefficient of skewness and kurtosis to check for normality of variables used.

(b) Stationarity of Data.

Financial time series exhibit a random walk phenomenon. This implies asset prices are non-stationary because they exhibit upward /downward trends. The study thus tested for time series properties of the variables before estimation.

35

If the regression equation was to be estimated with data that were non-stationary, the t-statistic of estimated coefficients may have been unreliable since the underlying time series was likely to have a time varying mean and variance. The study performed a unit root test on each of the variables to test the order of integration of each series. The study used the Augmented Dickey Fuller test. This test took the form:-

$$\Delta Y_t = \delta Y_{t-1} + \sum_{i=1}^{k} \gamma Y_{t-1} + \mu_t \tag{3.2}$$

where Δ = first difference operator.

Y_t = stochastic variable with a random walk.

δ = coefficient explaining stochastic variable Y_t

in the previous period Y_{t-1}.

The maximum number of lags k should be relatively low enough to save the degrees of freedom and equally large enough to remove the presence of serial autocorrelation. The lags showed the spread necessary for an explanatory variable to exhaust the explanatory influence on the dependent variable. The null and alternative hypotheses were:-

$H_0 : \delta = 0$(non-stationary)

$H_1 : \delta < 0$(stationary)

Also used were the tests of Phillips and Perron(1988) which are based on a relaxation of assumptions about the disturbance term that Dickey and Fuller work with. Statistics proposed(Z statistics) arose from their consideration of the limiting distributions of various Dickey Fuller statistics when the assumption that ε_t is an independently and identically distributed(IID) process was relaxed.

Assuming the estimated equation:-

$$y_t = \rho y_{t-1} + \alpha + \beta_t + \varepsilon_t \quad \text{where t=1,2...} \tag{3.3}$$

Phillips Perron showed that, given the assumptions they make regarding ε_t, the statistic

for $\rho = 1$ in the equation had a limiting distribution that involved

$$\sigma_\varepsilon^2 = \lim_{T \to \infty} \left[\frac{\sum_{t=T}^{t=T} E(\varepsilon_t^2)}{T} \right]$$

$$\text{and } \sigma^2 = \lim_{T \to \infty} \frac{E\left[\sum_{t=1}^{t=T} E(\varepsilon_t^2) \right]}{T}$$

The term ε_t being an IID process then σ_ε^2 and σ^2 were the same and results were similar

to those of Dickey Fuller test. If the two limits were not the same then Dickey Fuller

results and implied critical values for a unit root test based on statistic t would not have

been valid.

Thus Phillips Perron proposed transformation of various statistics considered by Dickey

and Fuller. This meant that if for the t_3 statistic ε_t was IID then the Dickey and Fuller

critical values were used but if the random error term is not IID the $Z(t_3)$ statistic were to

be used which meant consistent estimates of parameters in σ_ε^2 and σ^2 are required (see

Bhaskara 1994).

(c) Cointegration Analysis

Engle and Granger (1987) developed cointegration in an effort to overcome the problem

of spurious regression and inconsistent regression inherent in a non-stationary data series.

Use of error correction mechanism(ECM) overcomes the loss of long run explanatory

power of the model associated with detrending data through differencing to establish a

stationary series.

To test for cointegration the study used the ADF test of cointegration which took the form of:-

$$\Delta V_t = \delta V_{t-1} + \Sigma_{t-1}^k \delta_i V_{t-1} + \in_t$$

where V_t = OLS residual(interpreted as the deviations of Y_t from its long run path.

δ = the coefficient of V_{t-1} measuring deviations of Y_t.

V_{t-1} = OLS residual lagged one period.

ε_t = random error term.

Δ = is the first difference operator.

The null and alternative hypotheses were:

H_0 $\delta = 0$ (non-cointegration)

H_1 $\delta = 1$ (cointegration exists)

(d) Correlation Analysis

One of the assumptions of the classical linear regression model (CLRM) is that exact collinearity should not exist between two or more explanatory variables. Simply put no exact linear relationship between two explanatory variables should exist. When the coefficient of correlation is near to or equal to one then a case of perfect multicollinearity is inferred.

However as long as collinearity is not perfect. Ordinary Least Squares (OLS) estimators still remain Best Linear Unbiased Estimators (BLUE) even though one or more of the partial regression coefficients in a multiple regression can be individually statistically insignificant (Gujarati 1999). Multicollinearity is a question of degree and not of kind. The meaningful distinction is not between the presence and the absence of multicolinearity, but between its various degrees.

Multicollinearity can be detected in different ways. Examples of these are a high R-squared but few significant t ratios which is one symptom of multicollinearity. Another way to detect this problem is to observe high pairwise correlations among explanatory variables. If correlations are high, say in excess of 0.8, there is the possibility that some serious collinearity exists. The study measured the degree of multicollinearity using the explanatory variables to come up with a correlation matrix.

CHAPTER FOUR.

DATA ANALYSIS AND INTEPRETATION.

4.1 Introduction.

This chapter analyses the regression results of the study. The tests carried out before the actual regression analyses are normality, stationarity and cointegration tests.

4.2 Normality Tests.

This test was carried out to ensure that variables used in the analysis were normally distributed. The Jarque-Bera statistics test (Jarque and Bera 1980) is the common test for normality and has a chi-square distribution. It utilizes the mean based coefficient of skewness and kurtosis to check for normality of variables used. Normal distributions take the form of a symmetric bell-shaped curve. Skewness is the tilt (or lack of it) in a distribution. To test for normality descriptive statistics are run to get skewness and kurtosis, and then divide these by the standard errors. When the data is normally distributed the skew should be within the +2 to -2 range. Negative kurtosis indicates too many cases in the tails of the distribution. Positive kurtosis indicates too few cases in the tails

Table 4.1: Normality test results (Jarque Bera tests).

	Corporate bond	Bank credit	Treasury bond	Equity return	Exchange rate	Inflation rate	Interest rate
Mean	82.36	274617.6	103.17	2343.34	0.72	0.06	0.12
Median	100.39	280024.4	102.37	2403.99	0.76	0.06	0.11
Maximum	109.20	368645.4	118.28	3530.43	0.81	0.12	0.27
Minimum	26.00	196669.7	96.31	1043.38	0.53	0.01	0.00
Std. Dev.	26.83	34394.36	4.46	729.47	0.08	0.03	0.07
Skewness	-0.71	-0.20	1.64	-0.18	-0.93	0.14	0.37
Kurtosis	1.72	3.58	5.70	1.89	2.35	1.80	2.22
Jarque-Bera	14.73	2.03	72.52	5.44	15.54	6.09	4.67
Probability	0.00	0.36	0.00	0.06	0.00	0.04	0.09

| Observations | 96 | 96 | 96 | 96 | 96 | 96 | 96 |

Normality test uses the null hypothesis of normality against the alternative hypothesis of non-normality. If the probability value was less than Jarque Bera chi-square at the 5% level of significance, the null hypothesis of the regression is not rejected. A sufficiently low probability value of the estimated Jarque-Bera chi-square statistics leads to no rejection of null hypothesis of a normal distribution. From table 1 all the variables are normally distributed since all the probabilities are less than the Jarque Bera chi-square distribution.

Kurtosis put simply is the peakedness of a distribution and should be within the +3 to -3 range when data is normally distributed. However if a random variables kurtosis is greater than 3, it is said to be leptokurtic. From the normality test the variable Treasury bond monthly price indices (TBP), is seen to be leptokurtic meaning it has a probability distribution function that is simultaneously peaked and has a fat tail. The centre peak is much higher implying a higher frequency of values near the mean and a higher frequency of data which is evident with financial market data that is not independently distributed over time because of volatility clustering.

4.3 Stationarity Test.

If a time series is differenced d times to be stationary, then the original series is integrated of order d, denoted by I (d). In order to establish the order of integration, the study employed the Augmented Dickey Fuller (ADF) and Phillips Perron unit root tests. Stationarity means that the statistical properties of the process do not change over time (Engle and Granger 1987). Usage of non stationary data with stochastic trend may have caused spurious regression problems. Based on the graphs in Appendix 1, it is seen that some variables are non stationary. In Appendix2, it can be seen that all the variables used

41

are now stationary after differencing. However the graphing method is inadequate which calls for a more formal test; the unit root test.

To test for unit roots in the variables the Augmented Dickey Fuller (ADF) and Phillips Perron unit root tests were used. This was done by determining the degree of integration of each variable. The ADF test results are reported in table 4.2 for the levels as well as for the first differences of each of the variables with the Phillips Perron test results reported in table 4.3.

Table 4.2: Unit root test results (A.D.F).

Variable	A.D.F satistic	1%	5%	10%	Order of Integration
Corporate-bond	-6.35	-4.05	-3.45	-3.15	I(0)
Bank credit	-7.57	-4.05	-3.45	-3.15	I(1)
Treasury-bond	-12.20	-4.05	-3.45	-3.15	I(0)
Equity returns	-7.50	-4.05	-3.45	-3.15	I(0)
Exchange-rate	-8.46	-4.05	-3.45	-3.15	I(1)
Interest-rate	-5.60	-4.05	-3.45	-3.15	I(1)
Inflation-rate	-7.09	-4.05	-3.45	-3.15	I(1)

Source: own computation.

The results show that equity returns, the monthly price indices of both the corporate bonds and treasury bonds variables are stationary in their levels. For the other variables they are of the integration order I (0) in their first differences meaning they achieve stationary at first differences.

Table 4.3 Unit root test results (Phillips Perron).

Variable	Phillips Perron statistic	1%	5%	10%	Order of Integration
Corporate-bond	-6.35	-4.05	-3.45	-3.15	I(0)
Bank credit	-7.57	-4.05	-3.45	-3.15	I(1)
Treasury-bond	-12.20	-4.05	-3.45	-3.15	I(0)
Equity returns	-7.50	--4.05	-3.45	-3.15	I(0)
Exchange-rate	-8.46	-4.05	-3.45	-3.15	I(1)
Interest-rate	-5.60	-4.05	-3.45	-3.15	I(1)
Inflation-rate	-7.09	-4.05	-3.45	-3.15	I(1)

Source: own computation

Parallel results were reported from both unit root tests which meant that structural breaks do not exist in the data used by the study.

4.4 Cointegration Analysis

The next step was to test for cointegration if the variables were nonstationary in their levels. Generally, a set of variables is said to be cointegrated if a linear combination of the individual series, which are I(d), is stationary (Johansen 1988). Intuitively, if x_t is I(d) and y_t is I(d), a regression is run, such as:

$$y_t = \beta x_t + \varepsilon_t$$

where β is the cointegrating coefficient, which was tested prior to testing for a unit root in the error correction term.

H_0 : No Cointegration.........non-stationary

H_1 : Cointegration..............stationarity

A test on stationarity was done on the residuals. Static equations of variables at levels were first computed and residuals generated. If the residuals were stationary then the

43

variables were cointegrated. The study used the Engle Granger-two step approach which allowed for the estimation and testing for the presence of a cointegrating relationship.

According to the Engle-Granger cointegration test results shown in Appendix 3, there exists no cointegrating relationship between the variables of the same order I (d) which infers the acceptance of the null hypothesis of no cointegration thus the rejection of the alternative.

This is explained by the fact that the study's period is short that is from 1997 to 2004 and therefore no existence of a long run relationship. Secondly it is worth acknowledging that the corporate bond market in Kenya is still in its embryonic stage and thus conclusions can only be made from the short run. The model thus indicated the existence of a short run relationship meaning that the study was to utilize a short run model to capture the effects of the explanatory variables on the dependent variable.

4.5 Correlation Analysis.

The study tested for the presence of multicollinearity. This was achieved by coming up with a correlation matrix. The results were reported below:-

Table 4.4 Correlation Matrix.

	Corporate bond	Bank credit	Treasury bond	Equity return	Exchange rate	Inflation rate	Interest rate
Corporate bond	1.00						
Bank credit	0.09	1.00					
Treasury bond	0.00	-0.00	1.00				
Equity returns	0.02	0.16	-0.09	1.00			
Exchange	0.01	-0.11	-0.01	0.05	1.00		

rate							
Inflation rate	-0.02	0.33	-0.06	0.04	-0.50	1.00	
Interest rate	-0.03	0.02	0.01	-0.25	-0.63	0.26	1.00

From the correlation matrix table above multicollinearity is not a serious problem despite a correlation coefficient of 0.63 between exchange rate and interest rate. This leads to accepting the null of no existence of multicollinearity. A correlation coefficient in excess of 0.8 shows existence of serious collinearity.

4.6 Specification and Diagnostic Tests.

Empirical research usually being an interactive process begins with a specification of the relationship to be estimated. Selecting a specification usually involves several choices: the variables to be included, the functional form connecting these variables, and if the data are time series, the dynamic structure of the relationship between the variables.

However, there was uncertainty regarding the appropriateness of specification of the model. Once the equation was estimated, E-Views provided tools for evaluating the quality of the model specification along a number of dimensions. In turn, the results of these tests influenced the chosen specification.

The study carried out various tests to ascertain the models specification and stability. In this regard the tests that were carried out were White Heteroskedasticity test, Ramsey Reset test, Breusch-Godfrey Serial Correlation LM test and ARCH test. The results are reported in the table 4.5 below.

4.7 Regression Results.

The data analysis is done using the Autoregressive Distributed Lag (ADL) model. The ADL model is a model in which both the dependent and independent variables are lagged. The study utilizes an ADL (4, 3) short run linear model where both the dependent and independent variables are lagged four and three times respectively.

Table 4.5 Modeling of the corporate bond variable by OLS.

Variable	Coefficient	Std. Error	t-stat	P-value
Constant	0.01	0.04	0.34	0.73
Bank credit	-7.01	3.18	-2.20*	0.03
Bank credit_1	2.52	3.13	0.80	0.42
Bank credit_2	-1.38	3.29	-0.42	0.67
Bank credit_3	-4.16	3.27	-1.26	0.20
Treasury bond	1.46	1.60	0.90	0.36
Tre-bond_2	-1.6	1.70	-0.99	0.32
Tre-bond_3	1.76	1.69	1.03	0.30
Cor-bond_1	-0.40	0.10	-3.85*	0.00
Cor-bond_2	-0.53	0.11	-4.71*	0.00
Cor-bond_3	-0.40	0.11	-3.67*	0.00
Cor-bond_4	-0.22	0.09	-2.36*	0.02
Exchange rate	1.04	2.51	0.41	0.67
Ex-rate_1	9.63	3.24	2.96*	0.00
Ex-rate_2	-9.19	3.53	-2.60*	0.01
Ex-rate-3	7.86	3.00	2.61*	0.01
Inflation rate_2	-3.62	5.88	-0.61	0.53
Inf-rate_3	-7.67	5.86	-1.30	0.19
Interest rate	-6.63	3.75	-1.76	0.08
Int-rate_1	12.35	4.20	2.93*	0.00
Int-rate_2	-10.72	3.57	-3.00*	0.00
S.E=0.34 , AdjR^2=0.42 , D-W=2.05 , F-stat= 4.31 , Prob (F-stat)= 0.00				
ARCH test = 0.10				
Serial Correlation LM test = 0.57				
White test = 0.92				
Ramsey RESET test = 0.64				

The regression results were generated, after elimination of the insignificant variables with probability values greater than 0.6 to get a more parsimonious model. Results indicate that most of the coefficients had the expected signs. The Adjusted R-squared is 0.42 showing that the explanatory variables had a fairly high explanatory power. The results of the study can be interpreted to mean that trading activity in the corporate bond market depends on the bank credit, exchange rate and interest rate variables with inflation rate not showing significance.

However it is worth acknowledging that the observed value of the Adjusted R-squared for a time series is low indicating that some important variables could have been left out in the process of carrying out the estimation. These variables may include Institutional/Rules of play variables notably capital controls regime, exchange rate regime, monetary regime, tax policy instability, bankruptcy regulation, measures of trade openness among other variables. Firm characteristics variables encompassing number of firms by size, number of firms by type of ownership and number of firms by age and sector.

Market participants' characteristics could also have been left out notably measures of size and quality of the government local debt, market participants by type and size among other variables under this category.

The decision to leave out these variables was occasioned by the focus of the study which was to analyze the effects of macroeconomic determinants on bond market development.

Inclusion of these variables could have given outstanding results but would have gone against the objective of the study.

The Durbin Watson statistic is 2.05, signifying no serial correlation. Lagged variables with a probability greater than 0.75 were dropped from the model to give the model more explanatory power and remove insignificance. Variables affected were inflation rate, interest rate and the Treasury bond price indices in the previous two periods.

The probability of F-statistics is zero implying that on average, all coefficients of the variables of the regression analysis are significant at the 5 percent level and do explain the variations in the corporate bond market. The Adjusted R-squared is less than the Durbin Watson statistic which indicates no spurious regression.

The RESET test was such that the study accepted the null that there was no misspecification, with respect to the ARCH test the study accepted the null that there was no heteroskedasticity, hence indicating that the model was correctly specified. The test on serial correlation led to accepting the null since autocorrelation was not a problem with the white test also rejecting the alternative of a presence of heteroskedasticity. These diagnostic tests implied that the model was well specified and estimates consistent.

Bank credit variable is significant as indicated by a probability value of 0.03 which is less than 0.05 at the 5 percent level of significance. Its coefficient has a meaning that when it increases the trading activity is negatively affected in the corporate bond market.

However its lagged values have no significance occasioned by low probabilities with negative signs.

The Treasury bond variable is not significant and this goes against the study's expectations that the Treasury bond market acts as a substitute to the corporate bond market thus crowding it out. This implies that the Treasury bond market compliments the corporate bond market despite a low positive t-statistic in the current period.

Exchange rate in the current period is not significant. However the previous period's exchange rate explains much variations in the current period corporate bond monthly indices. The coefficient -9.2 is the only coefficient coinciding with the expected signs that is a negative relationship with the rest giving a positive relationship.

Inflation rate shows no significance both in the current and previous periods which again goes against the earlier expectations with the interest rate giving both positive and negative signs and showing significance (with probability values of 0.0045 and 0.0037) at the 5% significance level.

The negative signs on variables in the regression results can be interpreted that an increase in these variables negatively impacts trading activity in the corporate bond market. The fact that these variables have negative signs and are statistically significant shows how important they are as variables in explaining variations in corporate bond market activity.

Exchange rate and interest rate have positive signs in current periods implying that sound macroeconomic policies of exchange rate and interest rate targeting were implemented at current time period t. This meant that interest rates appreciation and exchange rate depreciation was contained which created an enabling environment for bond market development.

4.6 Discussion of Results.

Having given a brief summary of the regression results it is important to have a discussion of them so as to give in depth analysis of what economic theory has to offer regarding the behaviour of the observed variables.

In recent years, Kenya's financial market has undergone through major policy reforms aimed at developing the market. However, growth of direct financing is relatively slow and the corporate sector still relies for its financing largely on bank loans. From the results Bank credit shows a negative relationship showing overdependence on bank financing which increases leverage. Overdependence on bank financing by corporations is explained by what Sharma (2000) calls interlocking relationships between Banks and leading companies. The Kenyan economy has a system of relationship banking in which the business arrangements between banks and companies are formed on long-term partnerships based on "trust". This relationship provides companies with secure access to finance to undertake longer-term investments necessary to build capacity and strengthen competitiveness. The nature of such a relationship is to an extent influenced by the conglomerate structure of corporations.

As such, theory has it that the size and growth of corporate bond markets hinge upon the financing patterns of companies. The limited role of the corporate bond market is a function of how companies in Kenya finance their investments especially medium to longer term fixed investments. Corporations in Kenya rely heavily on a combination of internal earnings and bank debt to finance their fixed investments. Funding of these long term fixed investments is done through equity which is appropriate, and through bank loans, which is not always appropriate given that bank loans are short term. It is also relatively easy for companies to obtain bank credit given that issuing bonds is apparently more troublesome and time consuming.

For the exchange rate and inflation rate variables the results indicate a negative relationship between them and the corporate bond market in spite of the latter not being significant as shown by a high probability value of 0.53. This finding on the inflation rate is surprising since from economic theory high inflation levels reduce demand for fixed-income instruments (Asian Development Bank 2002). The results show that this variable is not significant despite that the economy during this period experienced high levels of inflation.

The exchange rate in the previous period and the previous three periods indicate a positive relationship which could be attributed to a policy such as exchange rate targeting by the monetary authorities. At the previous two periods the exchange rate is significant giving a negative relationship implying that depreciation of currency adversely affects the corporate bond market trading activity.

According to economic theory, a depreciating domestic currency reduces the attractiveness of holding domestic currency denominated bonds and thus the negative relationship (Jin and Loh, 2002). A history of excessive inflation and depreciation in a country renders investors reluctant to invest in domestic currency assets and to invest for the long term. Instead investors go for short term assets, for example, the Treasury bill and this was evident in the period before the year 2003. The Kenyan currency has over the years depreciated to 79.77 a dollar in the year ending 2004 up from 54.74 a dollar at the beginning of 1997 with the inflation rate hitting a record high of 12.6 percent in June 1997 and fluctuating around 10 percent in 2004. A permanently low inflation could over time lead to a larger appetite for fixed income instruments which however was not the case as evidenced by the high levels of inflation during the period of study.

With exchange rate flexibility, it is most likely that the domestic currency will appreciate in good times and depreciate in bad times which reduce incentive to hold assets in domestic currency because such assets do not provide an insurance against income risk. With a booming economy, income is high and real value of domestic assets rises. In bad times, investors are faced with falling incomes and declining real asset value. This depreciation could be as a result of retaining export markets by conducting policies aimed at checking a high appreciation of currency to counter decrease in demand for exports. Alternatively, depreciation could have been as a result of equilibrating the balance of payments.

However with this in mind it is important to note that such policies also have adverse effects on the development of domestic bond markets with investors not investing in the

long term which calls for a sound mix of policies by the monetary and financial regulatory bodies.

A low unstable interest rate environment makes yields on bonds, particularly government bonds, low and unattractive. In the previous two periods, interest rates indicate a negative relationship with the corporate bond market. This is explained by an unstable interest rate environment that prevailed in the period of the study. The interest rate environment was precarious characterized by fluctuations (recessions and booms) which were not a good recipe for bond market development in the period under study. According to ADB (2002), one of the most crucial requirements for the development of a robust bond market is a stable and predictable macroeconomic environment. Low inflation and stable interest rates are key ingredients of such an environment.

The Treasury bond market does not show any level of significance despite the argument that a healthy government bond market creates an environment conducive for the development of a robust corporate bond market thus a compliment. In the study this variable was expected to indicate that it acts as a substitute but did not live up to the expectations. It neither gave an indication that it acts as a compliment as theory dictates (ADB 2002) leading to not making any conclusions regarding the variable.

With this in mind, it is worth noting that observed effects of these macroeconomic determinants on the corporate bond market have serious policy ramifications that need be addressed to steer development of the corporate bond market towards the desired direction.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction.

In this chapter the conclusion, policy recommendations, areas of further research and limitations of the study are reported. It commences with conclusion, gives the recommended policies, areas of further research and limitations of the study.

5.2 Summary and Conclusion.

The main objective of this study was to examine the effects of macroeconomic determinants on the development of the corporate bond market. The determinants identified were exchange rate, inflation rate, interest rate, bank credit, treasury bond market and equity return.

From study findings, it has been established that the bank credit variable does affect the development of the corporate bond market negatively. Also established is that exchange rate is significant implying that a depreciating currency adversely affects the holding of domestic denominated assets due to falling incomes and reduction in real value of assets. The analysis also shows interest rate as having significant explanatory power.

The study established that effects of inflation rate and Treasury bond market variables are not significant going against the earlier expectations and what economic theory has to offer about them (Asian Development Bank 2002). Equity return was not significant and was dropped altogether from the estimation to settle for a more parsimonious model.

5.3 Policy Recommendations.

The following policy recommendations need be explored -

Government should enhance a greater degree of arms length relationships between banks and companies. The required banking reforms would entail measures to strengthen competition in the corporate sector, encourage change in ownership of some Banks, upgrade supervision and more generally dilute the concentrated oligopolistic structure of the banking sector. The implication of such a policy is that development of the corporate bond market cannot be done in isolation from the banking industry.

Monetary authorities should ensure that a stable currency prevails to attract investors in holding of domestic currency assets. Monetary policy should revolve around the stability of the dollar/Kenyan exchange rate. A policy of exchange rate targeting should be implemented as this will necessitate tracking dollar interest closely regardless of the inflation differential.

The Government through the monetary authorities should pursue an interest rate targeting policy to maintain a stable interest rate environment by giving targeted levels of short term interest rates. An interest rate policy describes how change in interest rates corresponds to changes in the money stock. Interest rate targeting is desirable to avoid large fluctuations in the bond market, contain variability of inflation tax stabilizing the macro economy.

The government should effectively pursue a policy of government debt restructuring toward long term debt to counter reluctance of investing in domestic currency assets due to excessive inflation and depreciation.

5.4 Limitations of the Study and Areas of Further Research.

It was difficult to draw firm conclusions regarding effects of macroeconomic determinants on bond market development in Kenya. This was due to problems of data inconsistency. Accuracy and reliability of data remains in question because different data sources gave different data values for the same variables. To maintain consistency, the study relied on data from the Central Bank of Kenya.

Other areas in which further research should be undertaken is research on institutional variables, firm characteristics variables and market participants' characteristics that were not fully captured by this study.

BIBLIOGRAPHY

Asami T and Mori J (2001) Regional Co-operation in Developing Bond Markets harmonization and standardization of the Regions Bond markets: Institute for international Monetary Studies. Prepared for the International Conference, Regional Financial Markets and Centres held by the Australian National University and the IMF on Nov 15-16, 2001, Sydney.

Asian Development Bank (2002) Bond Market Development in East Asia: Issues and Challenges, the Regional Economic Monitoring Unit *REPORT*.

Batten J. and Y. H. Kim (2001) Expanding Long-Term Financing through Bond Market Development: A Post Crisis Policy Trade. In Y. H. Kim, ed., *Government Bond Market Development in Asia*. Asian Development Bank, Manila.

Beck T. and Levine R. (2002), Industry growth and capital allocation: Does having a market or bank- based system matter? NBER Working Paper 8982.

Bond Exchange of South Africa (BESA), (2004) OECD Policy Seminar How to Reduce Debt Costs in Southern Africa 25th March.

Bondt G and Marques D. (2004) The High Yield Segment of the Corporate Bond Market: A Diffusion Modeling Approach for the United States, United Kingdom and the Euro Area, *European Central bank working paper series No. 313*.

Chen Nai-Fu, (1980) The arbitrage Pricing Theory: Estimation and Applications, Anderson School of Management, University of California, Los Angeles Paper 4'80.

Cline, William, (1983) Interest and Debt: Systematic Risk and Policy Response, Institute for International Economics, MIT Press, Washington, DC.

Davis E.P (2001) Multiple Avenues of Intermediation. Corporate Finance and Financial stability, *IMF working Paper*, No. 01/115.

Edwards (1986) The Pricing of Bonds and Bank Loans in International Markets: An Empirical Analysis of Developing Countries' Foreign Borrowing, *European Economiv Review*, vol 30, 565-589.

Engle R.F and Granger C.W.J (1987) Cointegration and Error- Correction: Representation, Estimation and Testing, Econometrica.

Erb C.B et al (1999), Understanding Emerging Market Bonds, mimeo.

Fabella R. and Madhur S. (2003) Bond Market Development in East Asia: Issues and Challenges, ERD Working Paper No.35.

Faulkender M. and M.A. Petersen (2003), Does the source of capital affect capital structure? NBER Working Paper 9930.

Federal Reserve Bank of San Francisco (2004) *Economic Letter*, No 2004 36, Dec 10.

Gilson S.C and Warner J.B (1997) Junk Bonds, Bank Debt and Financing Corporate Growth, Harvard Business School and University of Rochester, Mimeo.

Gujarati D. (1999) Essentials of Econometrics, Second Edition. McGraw-Hill International Editions.

Haque N.U. M. Kumar N. Mark and D. Matheson (1996) The Economic Contents of Indicators of Developing Country Creditworthiness, *IMF Staff Papers*, 43. no.4, 688-724

Hakansson N.H (1999) The Role of a Corporate Bond Market in an Economy-and in Avoiding Crises-Institute of Business and Economic Research. *Research Program in Finance Working Papers* No. 1.

Herring J and Chaturispitak N, (2000), The Case of the Missing Market: The Bond Market and Why it Matters for Financial Development, *ADB Institute Working Paper.*

Hong G. Min (1998): Determinants of Emerging Market Bond Spread: Do Economic Fundamentals Matters: Development Research Group, World Bank.

International Monetary Fund (1997) International Capital Markets: Developments, Prospects and Key Policy Issues, November-World Economic and Financial Surveys by Folkerts L.D *et al* (IMF staff papers)

Jarque C. M and Bera A.K (1980), Efficient Tests for Normality, Homoskedasticity and Serial Independence of Regression Residuals, Economic Letters.

Jin Ngiam K. and Loh L. (2002), Developing a Viable Corporate Bond Market: The Singapore Experience, Economics and Finance Papers No.2.

Johannesburg Stock Exchange (1994), The mechanics of investment on the JSE for Foreign investors.

Johannesburg Stock Exchange (2000) Annual Report Financial Statements, JSE Securities Exchange South Africa, A Quantum Leap.

Johansen, S. (1988) Statistical Analysis of Cointegrating Vectors. Journal of Economic Dynamics and Control Vol 12(2-3): pp 231-254.

Kibua. T. et al (2005), Prospects for Developing a Regional Bond Market in Eastern Africa. IPAR Discussion Paper No. 063/2005.

Lewis, C. (1995), Financial Markets and Institutions: Guidelines for Emerging Economies, *Chicago Board of Trade Working Paper*.

Markowitz H. (1952), Portfolio selection, *The Journal of Finance*, Vol 7, pp 77-91

Miller, M.H. (1977) Debt and taxes. *Journal of Finance* Vol 32, pp 261-275.

Modigliani, F., Miller, M.H. (1963) Corporate income taxes and the cost of capital: a correction. *American Economic Review* Vol 53, pp433-443.

Mwega, F and Ndung'u S, (2002), Explaining African Economic Growth Performance: The case of Kenya, International Development Research Centre.

Nairobi Stock Exchange Limited (2005) Market Fact File.

Nairobi Stock Exchange (2003) NSE Bulletin, June.

Nairobi Stock Exchange (1996) NSE Bulletin, December.

Rajan R.G and Zingales L. (1998) Financial Dependence and Growth, *American Economic Review*, Vol 88 No 3 pp.559-586.

Rand Merchant Bank and Bond Exchange of South Africa (2001) The Development of the South African Corporate Bond Market.

Ross, S.A (1976), Arbitrage Theory of Capital Asset Pricing, *Journal of Economic Theory*: pp 341-60

Sachs (1985) External Debt and Macroeconomic Performance in Latin America and East Asia." *Brooking papers on Economic Activities*, 2, 523-64.

Sapsford, J. (1997) "Japanese Growth Model Hits a Wall in Asia," *The Wall Street Journal*, October 16th.

Scott, J. H. (1976) A theory of optimal capital structure. *Bell Journal of Economics* Vol 7 (1), pp33-54.

Sharma K. (2000) The Underlying Constraints on Corporate Bond Market Development in Southeast Asia. DESA Discussion Paper No. 14.

The Emerging Markets Committee (E.M.C) of the International Organization of Securities Commissions (I.O.S.C.O), (2002): The Development of Corporate Bond Markets in Emerging Market Countries, mimeo.

Tobin, J. (1958), Liquidity Preference as Behavior towards Risk, *Review of Economic Studies*, Vol 26, pp65-86.

Wagacha, M. (2001) To list or not to list: A Survey of Enterprise attitudes towards Kenya's Capital Market. IPAR Discussion Paper No.028.

World Bank (2004) Study on Korea's Corporate Bond Market and Its Implications on China's Bond Market Development *World Bank Country Study Paper*.

World Bank, (1997) Private Capital Flows to Developing Countries, Washington, D.C.

Wright J and Bollersleve (1999) High Frequency data, Frequency Domain Inference and volatility Forecasting, International Finance Discussion Papers No.649.

Zervos, S. (2004) The Transactions Costs of Primary Market Issuance: The Case of Brazil, Chile and Mexico, World Bank Policy Research Working Paper No.3424.

APPENDICES

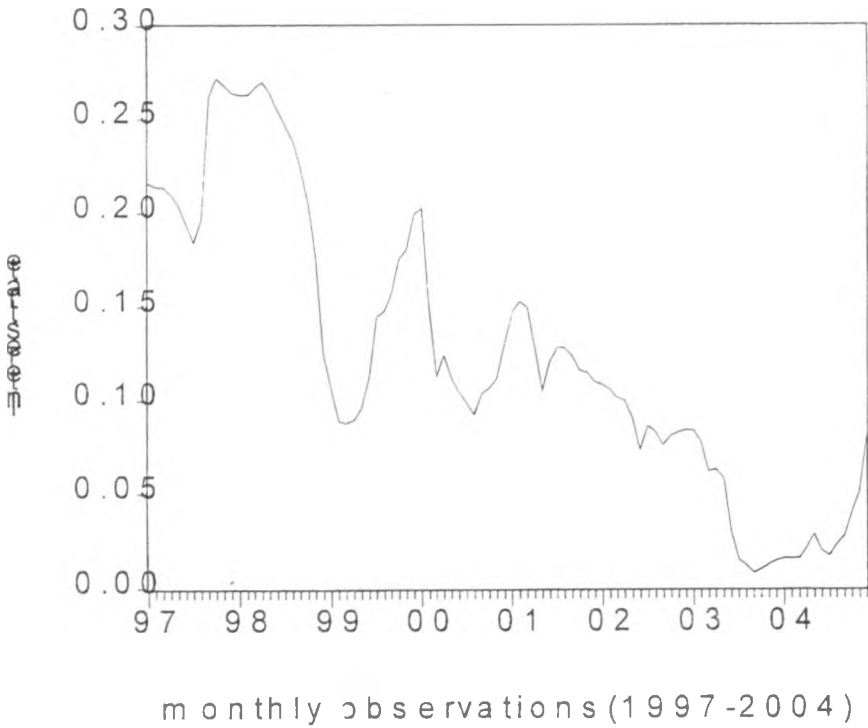## Appendix 1: Non-stationarity

Figure A.1 Exchange rate

monthly observations (1997-2004)

Figure A.2 Interest rat e

monthly observations (1997-2004)
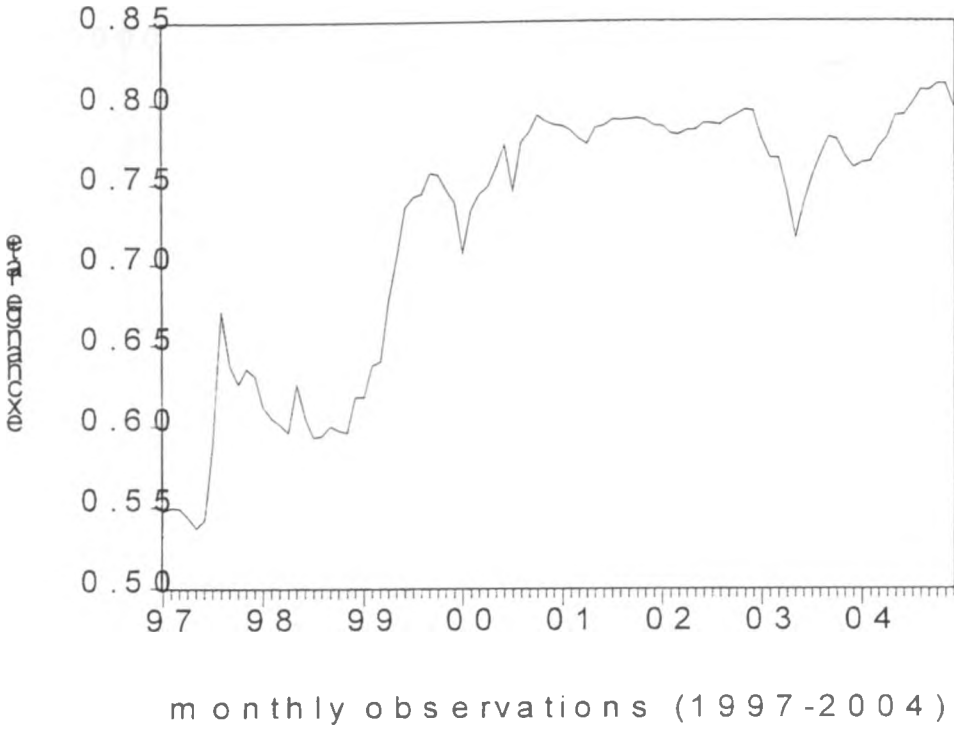
Figure A.3 Credit to the Private Sector.

monthly observations (1997-2004)
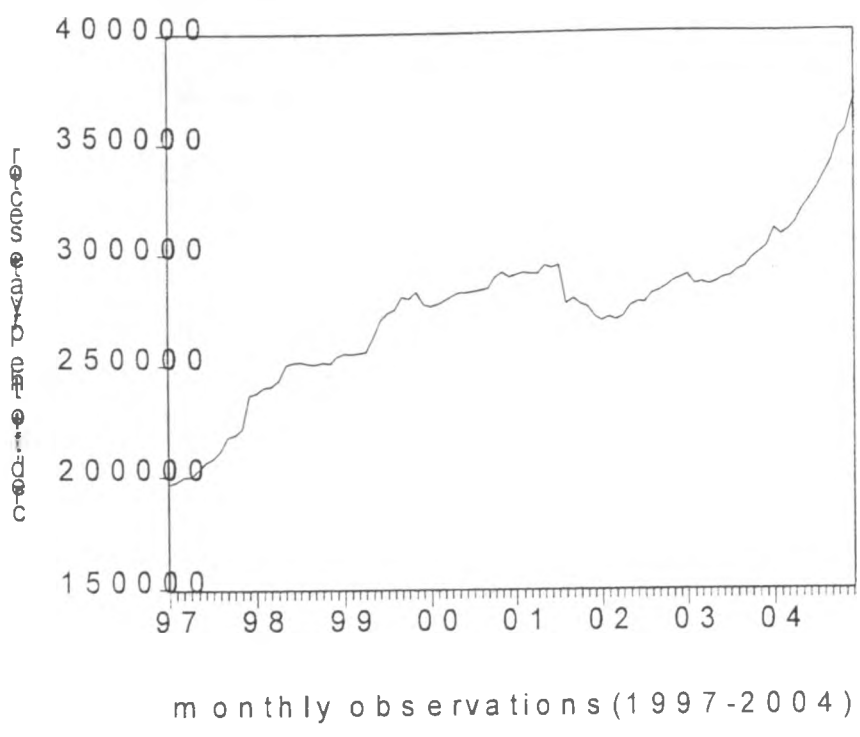
Figure A.4 Inflation rate

monthly observations (1997-2004)
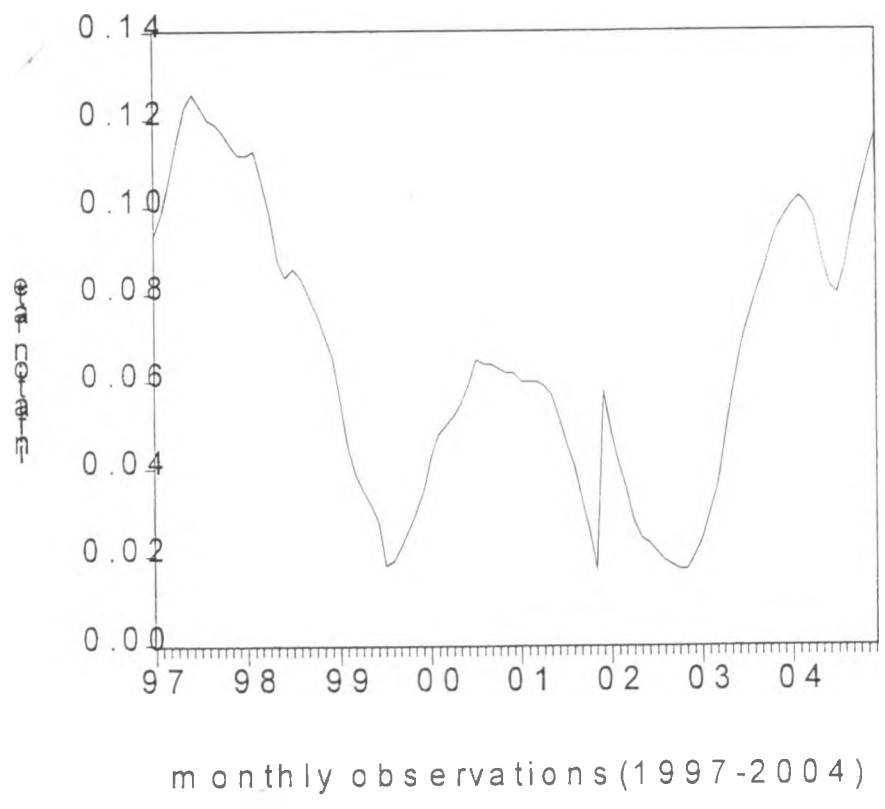
Appendix 2-Stationarity

Figure A.5 Exchange rate

monthly observations (1997-2004)
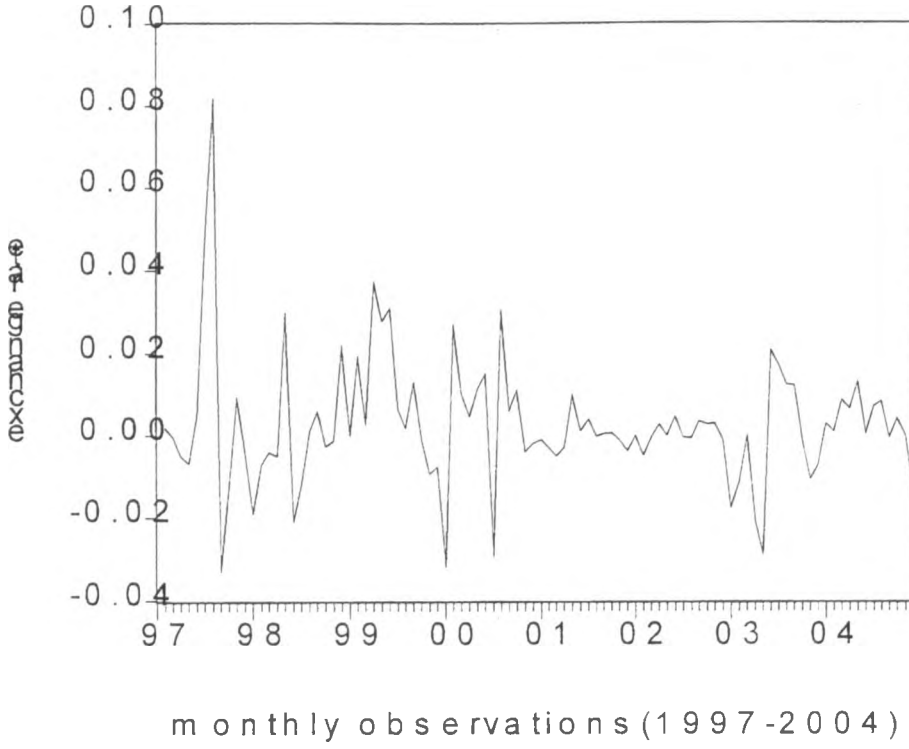
Figure A.6 Inflation rate

monthly observations (1997-2004)
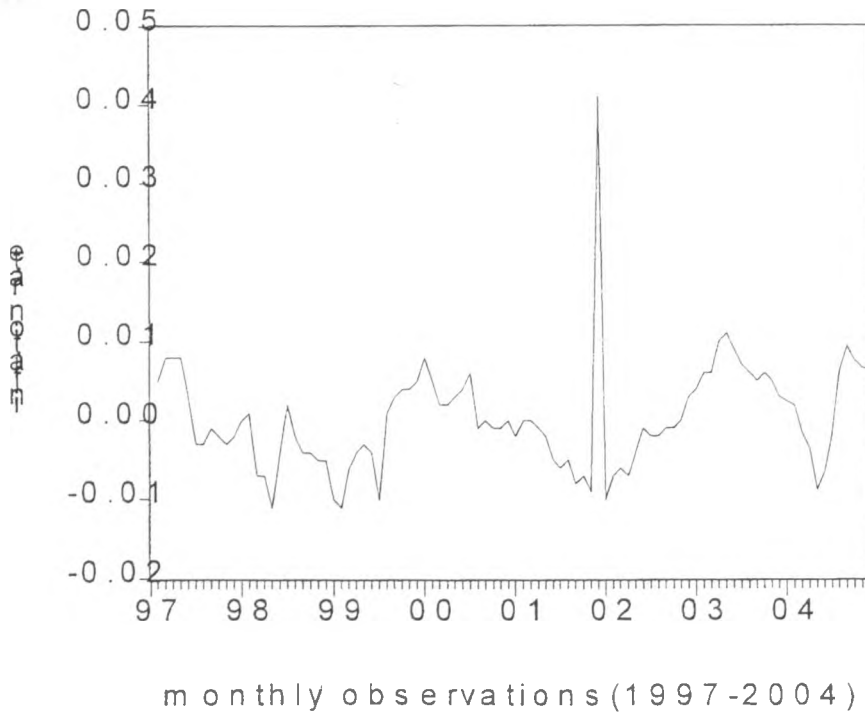
Figure A.7 Interest rates

monthly observations (1997-2004)
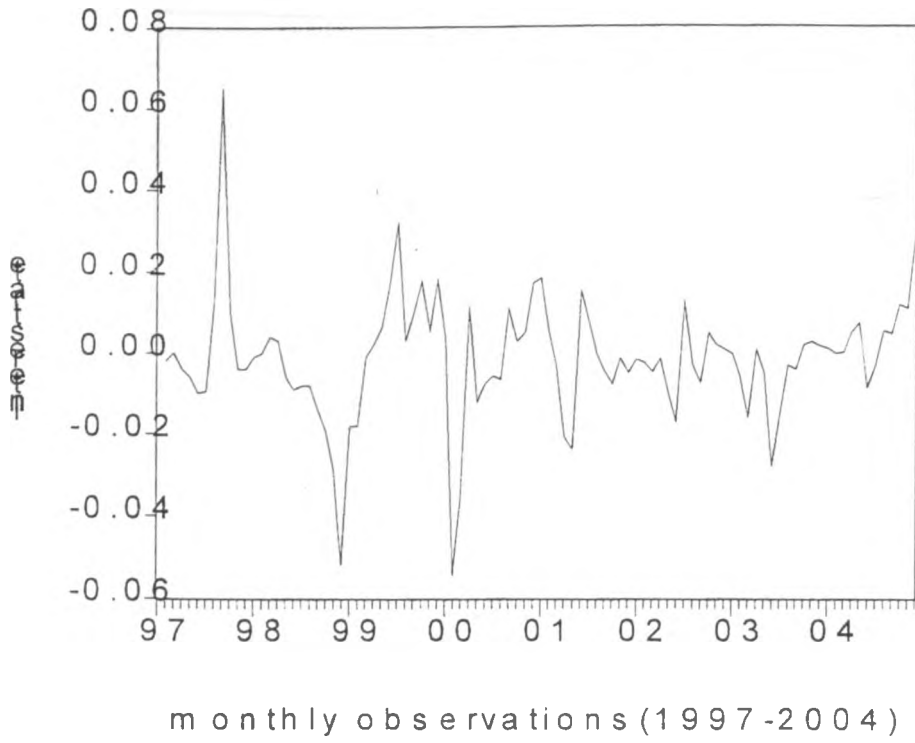
Figure A.8 Credit to the private Sector

monthly observations (1997-2004)
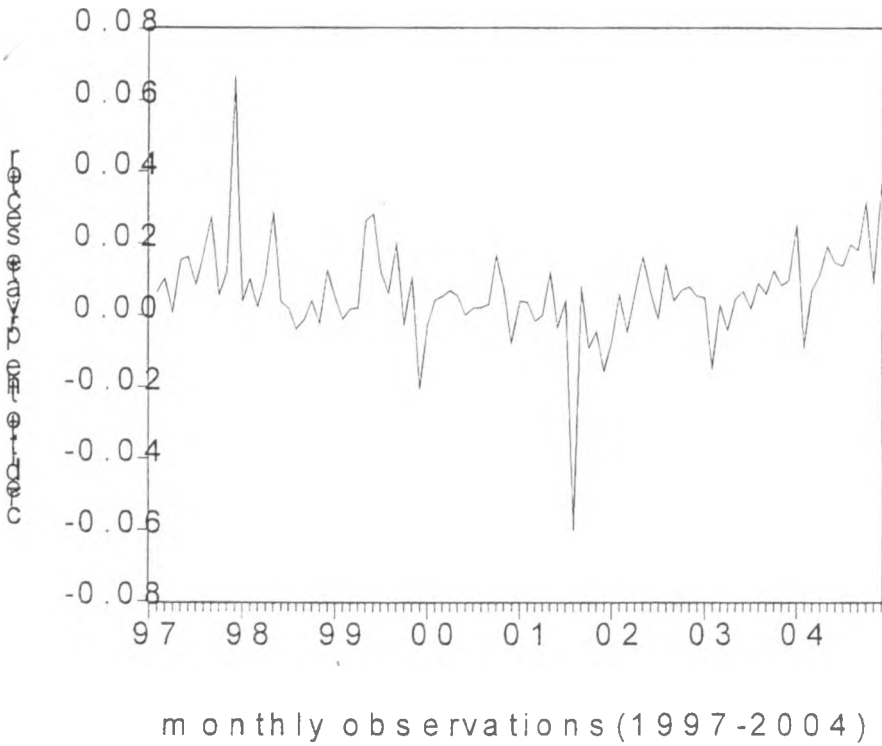
Figure A.9 Treasury bond price indices.

monthly observations (1997-2004)
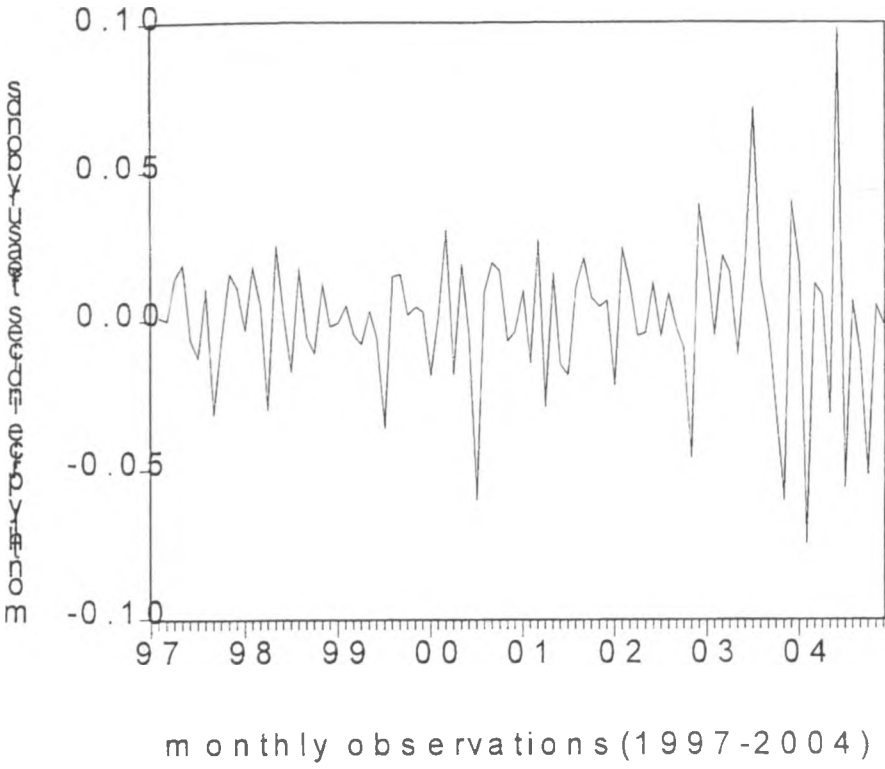
Figure A.10 Corporate bond Price Indices

monthly observations (1997-2004)

Figure A.11 Equity Returns

monthly observations (1997-2004)

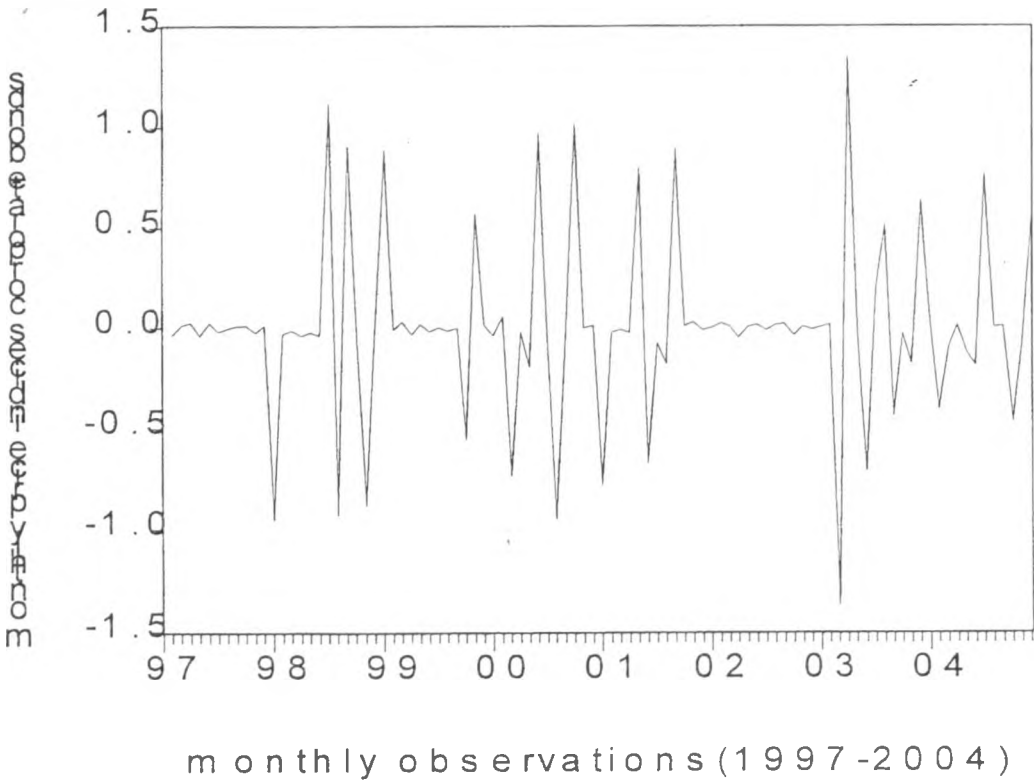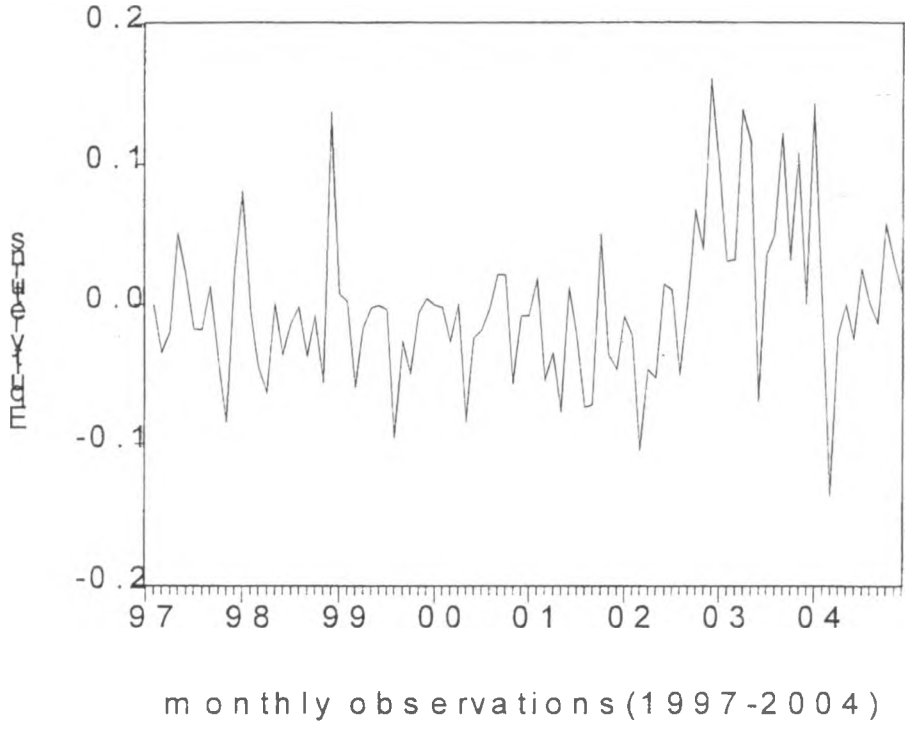**Appendix 3 Unit Root Test- Phillips Perron Statistics.**

Variable	lag	P.P statistic	1 percent critical value	5 percent critical value	10 percent critical value	Stationarity
Corporate Bond	0	**-12.83**	**-4.05**	**-3.45**	**-3.15**	**Stationary at levels**
Bank Credit	0	-0.18	-4.05	-3.45	-3.15	Not Stationary
	1	-0.35	-4.05	-3.45	-3.15	Not Stationary
	2	-0.37	-4.05	-3.45	-3.15	Not Stationary at levels
	0	**-7.57**	**-4.05**	**-3.45**	**-3.15**	**Stationary at first difference**
Treasury Bond	0	**-12.20**	**-4.05**	**-3.45**	**-3.15**	**Stationary at levels**
Equity Return	0	**-7.50**	**-4.05**	**-3.45**	**-3.15**	**Stationary at levels**
Exchange Rate	0	-1.80	-4.05	-3.45	-3.15	Not Stationary
	1	-1.91	-4.05	-3.45	-3.15	Not Stationary
	2	-1.92	-4.05	-3.45	-3.15	Not Stationary at levels
	0	**-8.46**	**-4.05**	**-3.45**	**-3.15**	**Stationary at first difference**
Interest Rate	0	-1.66	-4.05	-3.45	-3.15	Not Stationary
	1	-2.16	-4.05	-3.45	-3.15	Not Stationary
	2	-2.38	-4.05	-3.45	-3.15	Not Stationary at levels
	0	**-5.63**	**-4.05**	**-3.45**	**-3.15**	**Stationary at first difference**
Inflation Rate	0	-0.09	-4.05	-3.45	-3.15	Not Stationary
	1	-0.34	-4.05	-3.45	-3.15	Not Stationary
	2	-0.52	-4.05	-3.45	-3.15	Not Stationary at levels
	0	**-7.09**	**-4.05**	**-3.45**	**-3.15**	**Stationary at first difference**

Appendix 3 (a) Unit Root Tests- Augmented Dickey Fuller.

Variable	lag	ADF statistic	1 percent critical value	5 percent critical value	10 percent critical value	Stationarity
Corporate Bond	0	**-12.83**	**-4.05**	**-3.45**	**-3.15**	**Stationary at levels**
Bank Credit	0	-0.18	-4.05	-3.45	-3.15	Not Stationary
	1	-0.35	-4.05	-3.45	-3.15	Not Stationary
	2	-0.37	-4.05	-3.45	-3.15	Not Stationary at levels
	0	**-7.57**	**-4.05**	**-3.45**	**-3.15**	**Stationary at first difference**
Treasury Bond	0	**-12.20**	**-4.05**	**-3.45**	**-3.15**	**Stationary at levels**
Equity Return	0	**-7.50**	**-4.05**	**-3.45**	**-3.15**	**Stationary at levels**
Exchange Rate	0	-1.80	-4.05	-3.45	-3.15	Not Stationary
	1	-2.06	-4.05	-3.45	-3.15	Not Stationary
	2	-2.01	-4.05	-3.45	-3.15	Not Stationary at levels
	0	**-8.46**	**-4.05**	**-3.45**	**-3.15**	**Stationary at first difference**
Interest Rate	0	-1.66	-4.05	-3.45	-3.15	Not Stationary
	1	-3.13	-4.05	-3.45	-3.15	Not Stationary
	2	-2.79	-4.05	-3.45	-3.15	Not Stationary at levels
	0	**-5.63**	**-4.05**	**-3.45**	**-3.15**	**Stationary at first difference**
Inflation Rate	0	-0.09	-4.05	-3.45	-3.15	Not Stationary
	1	-0.72	-4.05	-3.45	-3.15	Not Stationary
	2	-1.13	-4.05	-3.45	-3.15	Not Stationary at levels
	0	**-7.09**	**-4.05**	**-3.45**	**-3.15**	**Stationary at first difference**

Appendix 4 - Cointegration Tests.

1.Exchange rate and interest rate.

Residuals	A.D.F	1%	5%	10%	lag	t-probabilty
RC1	-1.92	-4.05	-3.45	-3.15	0	0.057
RC1	-2.91	-4.05	-3.45	-3.15	1	0.004
RC1	-2.98	-4.05	-3.45	-3.15	2	0.003

2. Inflation rate and interest rate.

Residuals	A.D.F	1%	5%	10%	lag	t-probability
RC2	-0.42	-4.05	-3.45	-3.15	0	0.671
RC2	-1.05	-4.05	-3.45	-3.15	1	0.295
RC2	-1.44	-4.05	-3.45	-3.15	2	0.152

3. Exchange rate and Inflation.

Residuals	A.D.F	1%	5%	10%	lag	t-probabilty
RC3	-2.066	-4.057	-3.457	-3.154	0	0.0416
RC3	-2.300	-4.058	-3.457	-3.154	1	0.0237
RC3	-2.224	-4.059	-3.458	-3.154	2	0.0287

Residuals not stationary therefore no cointegration.

Appendix 5: Data used in Analysis (monthly observations 1997-2004)

Corporate bond	Treasury bond	Bank Credit	Inflation rate	Interest rate	Exchange rate	Share index
104.086	99.9	196,669.74	0.094	0.216	0.5474	3476.67
100.3263	100	197,926.28	0.099	0.214	0.5493	3473.99
101.5722	100	199,962.50	0.107	0.214	0.5489	3354.72
104.1319	101.41047	200,094.45	0.115	0.21	0.5438	3288.84
100.113	103.332035	203,196.91	0.123	0.204	0.537	3460.55
102.672	102.680297	206,530.64	0.126	0.194	0.542	3530.43
100.7432	101.4179	208,284.88	0.123	0.1845	0.58914	3466.92
100.61286	102.4987	211,906.48	0.12	0.197	0.671	3403.22
101.5024	99.32232	217,779.06	0.119	0.262	0.638	3447.41
102.5973	98.650727	218,954.04	0.117	0.272	0.626	3314.85
100.18608	100.20383	221,623.50	0.114	0.268	0.63539	3046.60
101.2	101.28666	236,874.95	0.112	0.264	0.631	3115.14
59.2	100.9528	237,813.90	0.112	0.263	0.612	3377.34
58	102.803	240,262.21	0.113	0.263	0.605	3362.23
57.6	103.3142	240,823.97	0.106	0.267	0.601	3213.30
56.2	100.2618	243,446.35	0.099	0.27	0.596	3015.01
55.4	102.8043	250,534.61	0.088	0.264	0.626	3016.44
54	103.0667	251,486.31	0.084	0.255	0.605	2907.55
104.175	101.3296	251,974.96	0.086	0.247	0.593	2868.22
51.3	103.1116	250,978.02	0.084	0.239	0.594	2862.66
102.7052	102.53403	250,673.31	0.08	0.225	0.6	2756.58
104.02	101.4084	251,708.27	0.076	0.206	0.59731	2733.68
53.2	102.6443	251,120.64	0.071	0.177	0.596	2583.73
52.3	102.42	254,301.44	0.066	0.125	0.618	2962.06
102.975	102.3331	255,517.22	0.056	0.107	0.618	2983.48
102.0395	102.8408	255,212.82	0.045	0.089	0.63739	2988.88
105.23904	102.3342	255,675.11	0.039	0.088	0.64	2815.29
101.8	101.5025	256,170.33	0.035	0.09	0.67722	2767.89
103.5659	101.819	263,008.78	0.032	0.0963	0.705	2760.05
101.73	101.2113	270,522.07	0.028	0.113	0.736	2756.43
101.85	97.6268	273,735.66	0.018	0.145	0.74231	2744.55
100.3551	99.057	275,382.73	0.019	0.148	0.744	2493.50
100.425	100.5851	280,948.79	0.022	0.158	0.757	2428.09
58	100.7527	280,138.49	0.026	0.176	0.756	2309.33
102.964	101.1837	283,148.35	0.03	0.1814	0.74661	2294.12
104.2	101.4618	277,403.35	0.035	0.1997	0.739	2303.18
100.42	99.62	276,677.07	0.043	0.203	0.707	2301.07
106.4	99.6989	277,823.73	0.048	0.1484	0.73397	2294.96

71

54.2	102.7501	279,306.60	0.05	0.1128	0.744	2233.18
52.2	100.89	281,231.32	0.052	0.1244	0.74856	2233.18
51.3	102.7784	282,746.07	0.055	0.1122	0.76	2052.90
109.2	102.2733	282,732.02	0.059	0.1047	0.775	2003.10
99.99	96.3142	283,311.16	0.065	0.099	0.74561	1966.52
48.9	97.2161	283,900.49	0.064	0.0925	0.77608	1958.96
47.1	99.1063	284,742.40	0.064	0.1036	0.782	2001.32
102.95	100.7454	289,613.51	0.063	0.1065	0.793	2043.47
102.9577	100.0573	291,779.28	0.062	0.1117	0.789	1929.65
104	99.6638	289,477.74	0.062	0.129	0.787	1913.35
67.8	100.651	290,611.75	0.06	0.1476	0.786	1897.46
66.8	99.2142	291,643.94	0.06	0.153	0.783	1932.85
66.4	101.9395	291,177.18	0.06	0.1497	0.778	1830.53
65.3	99.02826	291,160.79	0.059	0.129	0.775	1767.89
101.025	100.5916	294,663.92	0.057	0.1052	0.785	1636.47
56.9	99.1132	293,590.41	0.052	0.1207	0.786	1657.14
55.2	97.3094	294,858.28	0.046	0.1287	0.79	1620.70
40.3	98.3647	277,668.94	0.041	0.1284	0.78979	1505.50
99.1	100.4346	279,910.35	0.033	0.1239	0.79021	1400.87
100	101.1747	277,343.95	0.026	0.1163	0.79081	1472.91
102.99255	101.6213	276,118.50	0.017	0.115	0.78973	1420.45
101.8378	102.2868	271,807.25	0.058	0.1101	0.786	1355.04
101.862433	100.0793	269,924.92	0.048	0.1085	0.78597	1343.41
104.3348	102.5383	271,513.52	0.041	0.1061	0.7811	1313.57
105.1135	103.7393	270,218.19	0.035	0.1014	0.78058	1183.10
100	103.1871	271,843.78	0.028	0.1001	0.78333	1129.33
100.616	102.7548	276,309.40	0.024	0.0904	0.78321	1071.07
102.0298	104 0363	278,185.07	0.023	0.0734	0.78786	1086.62
100.7649	103.4751	277,903.19	0.021	0.0863	0.78736	1097.73
102.1744	104.4115	281,932.44	0.019	0.0834	0.78677	1043.38
104.303287	104.137	283,076.57	0.018	0.076	0.79026	1,043.40
100.512167	103.1668	285,023.36	0.017	0.081	0.793	1116.36
101.002367	98.5292	287,291.65	0.017	0.083	0.796	1161.12
100.1069	102.4518	288,831.46	0.02	0.084	0.795	1362.85
100.51837	104.3736	290,237.49	0.024	0.0838	0.77743	1510.63
102.072	103.8297	285,918.48	0.03	0.078	0.76603	1557.74
26	106.1059	286,761.03	0.036	0.062	0.766	1608.34
100.3716	107.8001	285,545.11	0.046	0.063	0.74498	1846.63
100.8564	106.572	286,882.25	0.057	0.058	0.71607	2074.67
59.6	108.6444	288,828.29	0.066	0.03	0.737	1934.96
60	116.7237	289,342.92	0 073	0.015	0.75431	2,005.08
:00.4466	118.2891	291,979.50	0.079	0.012	0.76678	2,107.43
69.8	117.9728	293,698.46	0.084	0.008	0.779	2379.91

66	114.4619	297,402.62	0.09	0.01	0.77765	2457.21
56.8	107.7698	299,860.13	0.095	0.0128	0.767	2736.96
100.2649	112.1414	302,793.97	0.098	0.0146	0.76	2737.58
103.379	114.2171	310,563.44	0.1004	0.0158	0.763	3157.88
88.9	105.9753	307,735.84	0.1023	0.0157	0.7639	3175.36
77.6	107.2742	309,911.17	0.1007	0.0159	0.7726	2770.6
68.2	108.155	313,384.14	0.0972	0.0211	0.7791	2707.6
55.9	104.8291	319,446.55	0.0884	0.0287	0.7924	2707.6
46.3	115.6367	324,139.64	0.0818	0.0201	0.7927	2639.75
100.165	109.3157	328,620.49	0.08	0.0171	0.7999	2708.03
100.29	110.0279	335,136.24	0.0862	0.0227	0.8083	2708.86
101	108.7917	341,260.16	0.0956	0.0275	0.8078	2670.69
68	103.2813	352,154.90	0.1032	0.0395	0.812	2829.65
78	103.806	355,301.22	0.1098	0.0506	0.812	2918.34
100.5673	103.673	368,645.37	0.1162	0.0804	0.7977	2945.58

Source: Central Bank of Kenya, Nairobi Stock Exchange