RELATIONSHIP BETWEEN FINANCIAL DEEPENING INDICATORS AND STOCK MARKET PERFORMANCE IN KENYA

By

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MASTER OF SCIENCE IN COMMERCE (FINANCE AND INVESTMENTS)

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE IN COMMERCE (FINANCE AND INVESTMENTS) IN THE SCHOOL OF BUSINESS AND PUBLIC MANAGEMENT AT KCA UNIVERSITY

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DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

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And have approved it for examination.

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ABSTRACT

Financial deepening indicators play a big role in the stock market performance. The relationship between financial deepening and the economic growth in various economies is a well-documented subject but the relationship between financial deepening indicators and the stock market performance has little literature. The purpose of this study therefore was to find out the relationship between financial deepening indicators and the stock market performance in Kenya. The selected financial deepening indicators were financial savings, private sector credit, broad money supply and intermediation ratio on the stock market performance. For this, published quarterly time series data from January 2001 to June 2017 were obtained from the Central Bank and Kenya National Bureau Statistics. Financial savings (in trillions), private sector credit (trillions) and broad money supply (billions) were normalized using quarterly GDP. The intermediation ratio was computed as private sector credit/financial savings and multiplied by 1000 to normalize to the other data. Exploratory research was used to establish the relationship between the variables and as a pre-test analysis, data was tested for stationarity using the DF and Phillip-perron test and the data was found to non-stationary, it was then differences to be order I(1)- which is a requirement for cointegration. Johansen cointegration test was done indicating that the variables co-move towards a long-run equilibrium, a multivariate vector error correction model was run and the estimates obtained. The error correction term was also computed. Empirical results showed that all variables are adequately explained by their own lags and the lags of the other variables,the coefficients are also significant. The error correction model indicated that an increase in private sector credit by one unit in the previous quarter causes the stock market performance to increase by 48% in the current quarter. Variance decomposition tests and impulse response functions indicated how other variables respond to shocks in the other variables and the forecast errors for each of the predicted quarters. The implication of this study is that the policy makers who are; the Government, the Central bank of Kenya and the Capital Markets Authority ought to make policy decisions while considering the effect of the full market. This study concluded that private sector credit is the financial indicator variable that affects the stock market performance the most with a bidirectional relationship. The areas of further study include; comparative studies within the East African countries, use of models that test the volatility of the stock market and application of other indicators of financial deepening.

Key words: Financial deepening indicators, Stock market performance, vector error correction model

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DEDICATION

This dissertation is dedicated to my dear husband, Dennis Simiyu and my daughter, Taraji Nambuba, who have really of inspired me in this endeavor; to my sisters Elizabeth Mukele and Florence Samba and to my good friend, Charles Kyengo for giving me moral support and assisting me to navigate the technical loops.

LIST OF FIGURES AND TABLES

ACRONYMSAND ABBREVIATIONS

ADF:	Augmented Dickey Fuller
AIC:	Akaike information criterion
AR:	Autoregressive
ARCH:	Autoregressive Conditional Heteroskedasticity
ARIMA:	Autoregressive Integrated Moving Average
BXS:	Brussels Stock Exchange
CBK:	Central Bank of Kenya
CMA:	Capital Market Authority
DF:	Dickey Fuller
DFI:	Development Financial Institutions
FEVD:	Forecast Error Variance Decomposition
FPE:	First prediction error
FSD:	Financial Sector Deepening Trust
FS:	Financial Savings
GARCH:	Generalized Autoregressive Conditional Heteroskedasticity
GDP:	Gross Domestic Product
GMM:	Generalized Method of moments
HQIC:	Hannan-Quinn information criterion
IFC:	International Finance Corporation
IPO:	Initial Public Offer
IR:	Intermediation Ratio
IRFs:	Impulse Response Functions
KCB:	Kenya Commercial Bank
M_1:	Narrow Money Supply

M_2:	Broad Money Supply
NASI:	NSE All Share Index
NSE:	Nairobi Stock Exchange
PIC:	Programme Investment Committee
P-P:	Philip Perron
PsC:	Private sector credit
SBIC:	Schwarz Bayesian information criterion
SIDA:	Swedish International Development Agency
SME:	Small and Medium Enterprises
SmP:	Stock Market Performance
STATA:	General-purpose statistical software package
VECM:	Vector Error Correction Model
VAR:	Vector Autoregressive Model

TERMS AND DEFINITIONS

Financial deepening:	This is increasing provision of financial services which includes both a wider choice of services and better access for different socio-economic groups. Financial deepening can have an effect on both individuals' and societies' economic situations.
Broad Money supply:	These are coins and notes plus short-term deposits
Private sector credit:	These are loans from banks to the private sector
Financial Savings:	These are deposits to banks
Stock Market performance:	This is the performance of the Nairobi stock Exchange measured using the NSE 20-share Index

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Financial deepening is the process of financial intermediation. Financial markets undertake this vital role of intermediation process by channeling funds from surplus units (savers) to deficit units (borrowers). When a country's financial intermediation is efficient and effective, the outcome is usually a well-developed and well-functioning financial sector with capacity to promote and support economic growth. In contrast, financial shallowness retards economic development (Goldsmith, 1969). The works of Schumpeter, J., (1911) and other researchers Mckinnon, R. and Shaw, E. (1973) show that the development of the financial sector has productivity and growth-enhancing effects. Nzotta, S. M., and Okereke, E. J. (2009) defined financial deepening as a financial system that mobilizes and allocates savings for productive use and has structures for monetary management. They opine that a financially deepened environment provides a favorable environment for the implementation of economic policies by the government and achieves non-inflationary growth, stability in exchange rates and high employment levels. Okafor, I. G., Onwumere, J. U. J., and Chijindu, E. H. (2016), define financial deepening as a condition of sufficient liquidity and smooth financial intermediation. They also opined that financial deepening is the increase in assets and the provision of needed financial services to the whole economy.

Financial deepening is synonymously used with financial development. This study adopted the definition of Nzotta, S. M., and Okereke, E. J. (2009) who defined financial deepening as a financial system that mobilizes and allocates savings for productive use and has structures for monetary management. They noted that an economy that is financially developed provides a favorable environment for the implementation of economic policies by the government. This definition had also been examined by King, R. G., and Levine, R. (2005).who stated that a

financially deepened economy involves financial intermediaries mobilizing savings, evaluating projects, managing risk, monitoring managers and facilitating transactions. This definition aligns with the study. The financial intermediary that was focused on was banks in Kenya (see Appendix I).

Different studies have looked at different financial deepening indicators. Oh, S. N. (1999)in studying financial deepening in the banking sector in Viet-Nam, defined financial deepening indicators as broad money supply (M_2), deposits and gross domestic savings. Ghildiyal, V., Pokhriyal, A. K. and Mohan, A. (2015) in their studies of the impact of financial deepening on economic growth on India, used ratio of broad money to GDP (M_2) and the banking sector development (the ratio of credit to private sector). King, R. G., and Levine, R. (1993)in studying finance and growth, used four indicators of financial development that are designed to measure the services provided by financial intermediaries- the ratio of liquid liabilities to GDP, the importance of deposit banks relative to the central bank in allocating domestic credit, where the financial system distributes assets using two measures: credit issued to non-financia1 private firms divided by total credit (excluding credit to banks) and credit issued to non-financial private firms divided by GDP. Calderón, C., and Liu, L. (2003)in their study to show the direction of causality between financial development and economic growth used the ratio of broad money to GDP and the ratio of credits provided by financial intermediaries to the private sector to GDP.

Nzotta, S. M., and Okereke, E. J. (2009)looked at the financial deepening and economic development of Nigeria and considered financial savings, private sector credit, value of cheques cleared to GDP, value of cheques cleared to money supply, prime lending rates and the inter-mediation ratio as the indicators of financial deepening. On the other hand Mohan, R. (2006), while studying economic growth, financial deepening and financial inclusion in India applied deposits and credit amounts in scheduled commercial banks as the main indicator of financial

deepening. Okafor, I. G., Onwumere, J. U. J., and Chijindu, E. H. (2016) hypothesized the ratio of broad money to gross domestic product, ratio of private sector credit to gross domestic product and ratio of market capitalization to gross domestic product as financial deepening indicators.

Ndebbio, J. E. U. (2004) in his study of financial deepening, economic growth and development concluded that anoptimal measure of financial deepening mustinclude the total amount of banking and non-bankingfinancial assets including domestic creditto the private sector, liquidity liabilities, stock andbond market capitalization and treasury bills. Dehesa, M., Druck, P. and Plekhanov, A. (2007)maintained that financial deepeningindicator comprises the ratio of private sectorcredit to gross domestic product (GDP). Ang, J. B. (2008)also considered the ratio of private sector credit to GDP as a primary financial deepening measure as well as selecting the money supply relative to GDP as an alternative indicator. Hachicha, N. (2005)in his study of the banking sector controls and financial deepening in Tunisia used the ratio of broad money to the level of nominal GDP as the prime factor of financial deepening. Wachte (2002) in the study of growth and finance in the USA, utilized three financial deepening indicators – ratio of liquid liabilities of the financial system i.e. currency plus demand & interest bearing accounts of banks and non-bank intermediaries, ratio of bank credit and claims on the non-financial private sector to total domestic credit.

This study used financial savings, private sector credit, broad money supply and financial intermediation ratio as the financial deepening indicators. From the 12 papers reviewed, 6 of them have used broad money supply, 10 of them used private sector credit and 5 used financial savings as measures of financial deepening. All the researches on financial deepening seek to explain the concept of intermediation where financial markets undertake this vital role of intermediation process by channeling funds from surplus units (savers) to deficit units (investors) as

per Rahman, M., and Mustafa, M. (2015).These 4 indicators are therefore deemed to be the best measures of financial deepening in this study.

1.1.1 Financial deepening in Kenya

There is a financial Sector Deepening Trust (FSD) in Kenya which was created in 2005 as an independent trust supervised by audit firm KPMG. It uses policy guidance from a Programme Investment Committee (PIC). Current funders include the UK's Department for International Development (DFID), the Swedish International Development Agency (SIDA) and the Bill and Melinda Gates Foundation. Their focus areas include; financial landscape, consumer insights, savings groups, social protection, savings groups, digital finance, payments, SME finance, risk &insurance and credit market development. According to the financial deepening Annual report, (2015), financial deepening includes financial inclusion which is the delivery of financial services at affordable costs to sections of disadvantaged and low-income segments of society. From 2006 to 2016 there has been a 9% increase driven by mobile banking services (e.g. M-Shwari and KCB M-Pesa). Financial exclusion, which is now down to 17.4%, has more than halved since 2006. Financial deepening in Kenya has been experienced in the banking sector through the following; Mobile banking, online banking, agency banking, relationship banking, increase in number of banks and number of branches countrywide. There have also been developments of investment banking services which have provided financial services to all levels of society.

1.1.2 Stock market performance in Kenya

The Nairobi Securities Exchange dates back to the 1920's when trading in shares started; notwithstanding in an informal setting (Kemboi, J. K., and Tarus, D. K. (2013)). Currently, the market has sixty five listed firms which is less than what the country inherited at independence. (See CMA Annual report, 2016). As per Barasa, J. W. (2014)the NSE plays a vital role in the process of mobilizing domestic savings thereby bringing about the redistribution of financial

resources from dormant agents to active agents, long-term investments are made liquid and transfer of securities is facilitated. The NSE 20 Share Index is a price-weight index. The members are selected based on a weighted market performance for a 12 month period as follows: Market Capitalization 40%, Shares Traded 30%, Number of deals 20%, and Turnover 10%. Index is updated at the end of the day (https://live.mystocks.co.ke). It is a representation of the geometric mean of share prices of the NSE's top 20 stocks. There is a recent move by the NSE to use the more broad-based NSE All Share Index (NASI), aimed at capturing the market capitalization of all the NSE's listed equities traded in a day.

On 18 February 1994, the NSE 20-share index recorded an all-record high of 5,030 points. In the same year, the NSE was rated by the International Finance Corporation (IFC) as having the best performance in the emerging markets in the world with a return of 179% booked by investors in the year. In 2007, there was another notable record when the NSE conducted six Initial Public Offers (IPOs). The NASI index started from a low of 92.00 in March 2008 to an all-time maximum of 131 in August in 2008. The rate has been fluctuating depending in various macroeconomic environment as well as the different government and monetary policies in place, Elly, D., and Oriwo, E.A. (2013).

Maskay, B., & Chapman, M.(2007), in their study noted that stock prices tend to go up, when the money supply in an economy is high. When there is a lot of money in circulation in the economy, then there is more money available to invest in stocks. An increase in money supply which results in a drop in interest rates makes stocks an attractive investment. Stocks perform better when the money supply is high, due to the increase in general demand in the economy. When the stock price index is high, it indicates future prosperity which is a good signal to banks to increase their loans. Furthermore, as banks increase their loans, part of the loans find their way to the stock market and result in higher stock prices. Stock price fluctuations alter the demand for loans by signaling changes in future economic activity- a

decline in stock prices may reflect contractionary influences that lower the demand for loans, which include; poor corporate earnings, and excess capacity. Leming, L. (2017) concluded that there is a negative relationship between bank deposits and stock market performance. Bank deposits growth tend to be smaller or even negative when the stock market is booming. There is a substitution relationship between deposits and stock market investment by investors, this is more so in counties with greater stock market participation.

In Kenya, the Nairobi Stock exchange has undergone a lot of developments in recent past including its demutualization. This has made the stock market to grow. There have been many IPOs which have seen members of the public becoming investors in big companies. The introduction of the interest rate capping in late 2016 saw banks in Kenya reducing their lending in form of loans to the private sector and this therefore would have an effect on the NSE performance. The intermediation ratio also reduces with political climate, interest rate capping and introduction of regulatory framework such as reserve ratios; these would have effects on the NSE performance. Money in circulation in Kenya reduces during periods of campaigns and elections and this would reduce the stock indices.

1.2 Statement of the Problem

According to Bakang, M. L. (2015), financial deepening is the increased condition and amount of financial services, with broader alternatives of services that are accessible to every investor, foreign and domestic as well as retail and institutional. Financial deepening has macro effects on the economy as the liquidity and ratio of money supply to GDP is significantly increased. Financial deepening creates more wealth and growth distribution. Broadening access to the financial sector and products can benefit the economy through increasing capital flow and allocation. Countries with well-developed stock markets always have well-developed financial intermediaries (Garcia, V. F., and Liu, L. (1999)). Demirgüç-Kunt, A., and Levine, R.

(2007)found out that most stock market indicators are highly correlated with the financial intermediary development.

There have been studies done in various countries which have shown that financial deepening plays an important function in supporting economic growth, mitigating systemic risk, sustaining financial stability and trimming down poverty and inequality levels. Several studies have been conducted on the relationship between financial deepening and economic growth e.g. Rousseau, L., andWachtel, P. (2011), Hassan, I., Watchtel, P., and Zhou, M. (2009), Darrat, A., (2006), Bhattarai, K. (2015), Calderón, C., and Liu, L. (2003), Gregorio, J. D., and Guidotti, E. P. (1995), Christopolous, D.K. (1995) and Arestis, P., and Demetriades, P. (2012), among others. However, few studies have been conducted on the relationship between financial deepening and the stock market especially in the developing economies. Nnenna, M. (2015) evaluated the relationship between financial deepening and stock market in Nigeria by looking at both the stock market returns and the stock market volatility using the ARCH and GARCH models. He concluded that financial deepening in-creases stock market returns and reduces volatility in the market hence enhancement of consumer confidence to invest in the stock market.

In Kenya, the published study done by Ngugi, R., Amanja, D., and Maana, I. (2006)focused on capital market, financial deepening and economic growth. The study focused on the capital market as a whole (both equity and bond market). The study also used the panel model for data analysis. They observed a positive correlation between capital market, financial deepening and financial access. The study made the assumption on the dependent and independent variables. This study endeavors to show the relationship between the financial deepening indicators on specifically the stock market and utilized time-series analysis. It analyzed the causal relationship between financial deepening indicators and the stock market both in the short-run and long-run therefore determining if the relationship is either unidirectional or bidirectional and this is missing in the Kenyan context.

1.3 Objectives of the Study

The general objective of this study was to examine the relationship between financial deepening indicators and the stock market performance in Kenya.

1.3.1. Specific Objectives

The study was guided by the following specific objectives:

1. To find out the relationship between financial savings and stock market performance in Kenya.
2. To evaluate the relationship between private sector credit and stock market performance in Kenya.
3. To examine the relationship between broad money supply (M_2) and stock market performance in Kenya.
4. To analyze the relationship between the intermediation ratio and stock market performance in Kenya.

1.4 Research Questions

The study focused on answering the following research questions.

1. What is the relationship between financial savings and stock market performance in Kenya?
2. What is the relationship between private sector credit and stock market performance in Kenya?
3. What is the relationship between broad money supply and stock market performance in Kenya?
4. What is the relationship between the intermediation ratio and stock market performance in Kenya?

1.5 Significance of the Study

The study seeks to examine the relationship between financial deepening indicators and the stock market performance in Kenya. Findings from this research therefore are useful to various stakeholders in the following ways:

1.5.1 Policy makers

Policy makers in this case include the Government, the CBK and the NSE. Since this study seeks to find out the causal relationship between financial deepening indicators and the stock market performance in Kenya, this means that the policy makers have to take more precaution when changing/adjusting policies, to pursue economic goals. Any policies that seek to increase financial deepening in the country should put into consideration the economic effects in the stock market.

1.5.2 Stock brokers and financial market players

Having knowledge on the relationship between financial deepening indicators and stock market performance enablesstock brokers and financial consultants to; advise their customers accordingly, observe market behavior and therefore avoid losses/shorts and discern the direction of stock market performance in future.

1.5.3 Investment firms and consultants

For the investment firms and consultants who publish periodic economic briefings/surveys, this study is useful in comparing the financial deepening indicators and the stock market performance to assess how the financial market is performing.

1.5.4 Scholars

The studies on the relationship between financial deepening and stock market performance are few especially in the developing economies, scholars who wish to do further research and studies on this area can use this study as a knowledge base taking keen consideration on the recommendations for further study.

1.6 Scope of the Study

This study analyzed the relationship between financial deepening indicators and the stock market performance for the period January 2001 to June 2017. This is a total of 17 years with quarterly observations summing up to 66 observations**.**The independent variable is the stock market performance while the dependent variables are; financial savings, private sector credit, broad money supply and the intermediation ratio. The geographical scope will cover the country Kenya.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

This chapter has four parts: Theoretical review, empirical review, conceptual framework and operationalization of variables. In the theoretical review, there are detailed reviews of the theories that guide this study and how each theory relates to the study objectives. The empirical reviews looks at the findings of previous studies, noting the authors, year of study, methodology used and the data used to arrive at the various conclusions. The conceptual framework shows the relationship between the variables under study. Finally, operationalization of variables defines and ex-plains the measurement of the variables to be used in the study.

2.2. Theoretical Review

This section looks into the theories that guided the study. These theories linked financial deepening indicators to stock market performance.

2.2.1 The McKinnon and Shaw Theory

Mckinnon, R. and Shaw, E. (1973) analysed the benefits of financial repression, at least reducing its impact on the domestic financial system in the developing countries. Their analyses which are referred to as the complementarity hypothesis, concluded that mitigating financial restrictions in such developing countries, mainly by allowing market forces to determine real interest rates, can exert a positive effect on growth rates as interest rates rise toward their competitive market equilibrium. According to this theory, ceilings on interest rates reduce savings, capital accumulation and discourage the efficient allocation of resources. In addition, McKinnon pointed out that financial repression may lead to dualismin which firms that have access to subsidized funding, tend to go for more capital-intensive technologies; whereas those not favoured by policy, only be able to engage high-yield projects with short maturity.

Another effect of financial repression pointed out by Mckinnon, R. and Shaw, E. (1973) was on credit rationing effect which results from excessive government intervention in money and credit markets in developing countries. Therefore, financial repression means that the quantity of savings and investments are low or irregular and also the level of activity which occurs is of poor quality. If the real interest rate is not allowed to clear the money and credit markets, savings and investment are repressed both in the overall level as well as their quality. According to Gemechand Struthers (2011), the hypotheses of McKinnon and Shaw made the assumption that financial liberalization is associated with higher real interest rates (as controls on these are lifted) hence stimulating savings. The underlying assumption is that savings are responsive to interest rates. The higher saving rates would finance a higher level of investment thus leading to higher growth. Therefore, according to Mckinnon, R. and Shaw, E. (1973), it is expected that a higher saving rate as well as higher levels of investment and growth following financial liberalization follow.

Mckinnon, R. and Shaw, E. (1973) came up with considerable evidence that financial development correlates with growth. If the saving rate rises with the rate of interest, then capital market imperfections lower growth by depressing saving. They argued that financial repression depresses growth; whilst, financial development raises savings and growth. Mckinnon, R. and Shaw, E. (1973) claimed that, financial intermediation raises the level of saving and investment. The indicators used were: (i) the ratio of credit to GDP (measuring total financial size), (ii) the ratio of deposit bank domestic assets to the sum of deposit bank and Central Bank domestic assets (the fraction of credit intermediated by deposit banks): and (iii) the ratio of claims on the non-financial private sector held by deposit banks and the Central Bank to total domestic credit (this is the fraction of credit extended to firms and households) (Pagano, M. (1993)).

The McKinnon and Shaw theory has been used by professor John Struthers who reviewed it thirty years on in his discussions of financial liberalization policies and Pagano, M. (1993) in

his paper on financial markets and growth. This theory addresses all the specific objectives in the study i.e. the relationship between financial savings and stock market performance, the relationship between private sector credit and stock market performance, the relationship between broad money supply and stock market performance and the relationship between the intermediation ratio and stock market performance in Kenya. The McKinnon and Shaw theory addresses all the financial deepening indicators that were used in this study. This theory helped in describing the findings of this study by examining how the interest rate ceiling has affected the savings and investment patterns in Kenya especially in the last quarter of the year 2016 when it was introduced and if higher savings rates have led to higher investment rates due to financial liberalization in Kenya. The theory also explains how financial intermediation raises the level of savings and investments which were observed in the study. This theory explained the relationships between the financial deepening indicators and the stock market performance.

2.2.2 The Tobin Theory

According to Abel, A. B., and Blanchard, J. O. (1983), the Tobin Model was developed in 1965 and provides the theoretical justification for financial repression. The assumptions of the model are that; there exists real money balances in the economy (*M/P*) where *M* denotes nominal money balances and *P* representsthe price level, there is no storage cost of holding money, savings are proportional to disposable income. In the model, disposable incomemay either be consumed or saved. Tobin argued that with the introduction of money balances, agents may either allocate savings by investing in physical capital stock or real money balances. There exists two assets in the economy – physical capital and real money balances. The relative rates of return on capital and money balances are the real rate of interest (which is assumed to equal the marginal product of capital) and the rate of decrease in the price level, respectively.

Tobin argued that the existence of money in an economy may encourage agents to hoard savings in the form of money balances. This situation is likely to occur in less developed

economies where output is more susceptible to shocks, which make individuals to hold precautionary money balances. Tobin argued that, a smaller proportion of savings is now available for the expansion of physical capital stock. Accordingly, the channelling of savings away from investment in physical capital stock deprives developing countries of investment opportunities that may accelerate their economic growth. Some of the proposed policy recommendations that combat the allocation of savings to unproductive money balances are interest rate ceilings, high reserve requirements placed on the banking sector and the reduction of the proportion of income held as money by charging a tax on money holdings (Kularatne, C. (2002)).

This theory addresses three of the specific objectives in the study i.e. the relationship between financial savings and stock market performance, the relationship between private sector credit and stock market performance and the relationship between the intermediation ratio and stock market performance in Kenya. The Tobin model and the Tobin-Keynes models, relate savings and investments to growth. This theory helped in describing the variables in the study i.e. when there is little savings (people are hoarding money for precautionary reasons) then there is a reduction in investment opportunities in the physical capital stock hence stock market performance decreases. When there are interest rate ceilings and high reserve requirements, it means that there is a reduction in the private sector credit and intermediation ratio hence a reduction in growth in this case stock market performance.

2.3. Empirical Review

Several researches have examined the relationship between financial deepening and stock market performance. This study has classified the previous studies into the specific objectives as follows;

2.3.1. Financial savings and stock market performance

Ranciere, R., Tornell, A., and Westermann, F. (2006)decomposed the effects of financial liberalization in terms of crises versus growth. Their data comprised of sixty countries for which they had information on the dates of financial crises and financial liberalization over the period 1980 to 2002. They came up with two contrasting views of financial liberalization. In the first view, financial liberalization boosts financial development and contributes to higher long-run growth. In the second view, liberalization causes excessive risk-taking, increases macroeconomic volatility and leading to more frequent crises. Stock market liberalization and financial frictions in asset markets interact to bring about either investment booms or financial crashes. Financial liberalization induces higher growth by expediting financial deepening and thus increasing the investment of financially constrained firms.

Nieuwerburgh, S., Buelens, F., and Cuyvers, L. (2006)examined stock market development and economic growth using Belgium annual data for the period 1830 to 2000 from the database of the Brussels stock exchange (BXS). Using variables; Deposits in commercial banks, Savings in commercial banks and bank note circulation they concluded that there was no evidence for a long-run equilibrium relation between bank development and stock market development.

Levine, R., and Zervos, S. (1998)studied stock markets, banks and growth in 47 countries using annual data over the period 1976 to 1993. Using output growth, capital stock growth, productivity growth, savings and bank credit as their variables, they concluded that stock market liquidity and banking development both positively predict growth, productivity improvements and capital accumulation when entered together in regressions, this is after economic and political factors have been controlled for. The results were consistent with the views that financial markets provide important services for growth, and that stock markets provide different services from banks.

2.3.2. Private sector credit and stock market performance

Kularatne, C. (2002)using variables; - ratio of total private credit extension to GDP, value-added ratio, measure of the investment rate, the ratio of real government consumption expenditure to real GDP and the real domestic short-term interest rate, and using South African data from 1954 to 1992 developed two models using the Johansen VECM structure and concluded that financial intermediation and securities affected economic growth in both models. A liquid stock market encourages investment since it enables investors to alter their portfolio easily and efficiently. The more easily they are able to vary the composition of their portfolio, the less reluctant agents then subscribe to new share issues.

Nnenna, M. (2012)investigated the nexus between financial deepening and stock market in Nigeria. By applying Nigerian data for annual period 1980 to 2010 and using GARCH model with variables; stock market return and financial deepening measured as the ratio of value of stock traded to GDP, she concluded that financial deepening measured as the ratio of value of stock traded to GDP does not affect the stock market and there is no news about volatility. But financial deepening measured as the ratio of market capitalization to GDP affects the stock market. It was also indicated that financial deepening reduces the level of volatility (risk) in the stock market and that the conditional volatility of returns is slightly persistent.

2.3.3. Broad money supply and stock market performance

Baier, S. L., Dwyer, G. P., and Tamura, R. (2004)who used data in 145 countries, for both developed and developing countries for an average of 57 years, found out that financial deepening is rapid before the creation of a stock exchange and slows down thereafter. They explained the decrease in financial deepening in two ways; one way is that the growth of impersonal cash transactions comes before the growth of impersonal trades of ownership in companies and the second way is that stock in firms is an alternate for banks' liabilities.

Ezeoha, A., Ebele, O., and Okereke, N. (2009)investigated stock market development and private investment growth in Nigeria by using extrapolated macroeconomic quarterly data over a period from 1970 to 2006 and using the vector error correction model (VECM), he opined that a positive and significant relationship exists between stock market development and domestic private investment growth in Nigeria.

B Égerta, B., and E Kočenda, E. (2011)examined the time-varying synchronization of European Stock Markets for three developed (France, Germany, and the United Kingdom) and three emerging (the Czech Republic, Hungary and Poland) European stock markets. Using dynamic conditional correlation GARCH model for five-minute tick intraday stock price data from 2003 to 2006 and monitoring stock co-movements, they concluded that a deeper and higher quality banking system is associated with a lower volatility of stock returns and greater synchronization in the movements of domestic and world returns.

2.3.4. Intermediation ratio and stock market performance

McDonald, C. A. and Schumacher, L. B. (2007) investigated financial deepening in sub-Saharan Africa; they used panel data of 37 sub-Saharan African countries and three data points, which they constructed as averages: 1983–1987, 1993–1997, and 2000–2004. Since not all the information needed was available for all the countries for all the three periods, the panel was unbalanced. The financial deepening indicators used were; private credit ratio, GDP pc and financial intermediation index, they concluded that financial liberalization has promoted deeper financial markets in sub-Saharan African countries. In almost all the specifications (after controlling for macroeconomic factors) the coefficient of the financial liberalization index is positive and significant.

Cetorelli, N., and Gambera, M. (2001)investigated banking market structure, financial dependence and growth in 41 countries and for each of them 36 industries between 1980 and

1990. Using panel analysis found out that bank development is positively correlated to stock market growth.

2.4. Summary of studies

From the literature review, there are many studies that have been done on the effects of financial deepening indicators on the economic growth and on stock market performance. Researchers have used different methodologies- some used time-series analysis while others used panel data analysis. The studies have been done across the globe – Asia, Australia, Europe, South America, North America and Africa. These have yielded different studies and have been analysed on the basis of countries that are developed versus the countries that are developing.

2.5. Critique of existing studies

The literature on this topic is incommensurate; scholars hold varied views as to whether financial deepening indicators and stock market performance affect each other. Nieuwerburgh, S., Buelens, F., and Cuyvers, L. (2006)found no evidence of a long-run equilibrium relation between bank development and stock market development, while Cetorelli, N., and Gambera, M. (2001)found out that bank development is positively correlated to stock market growth.

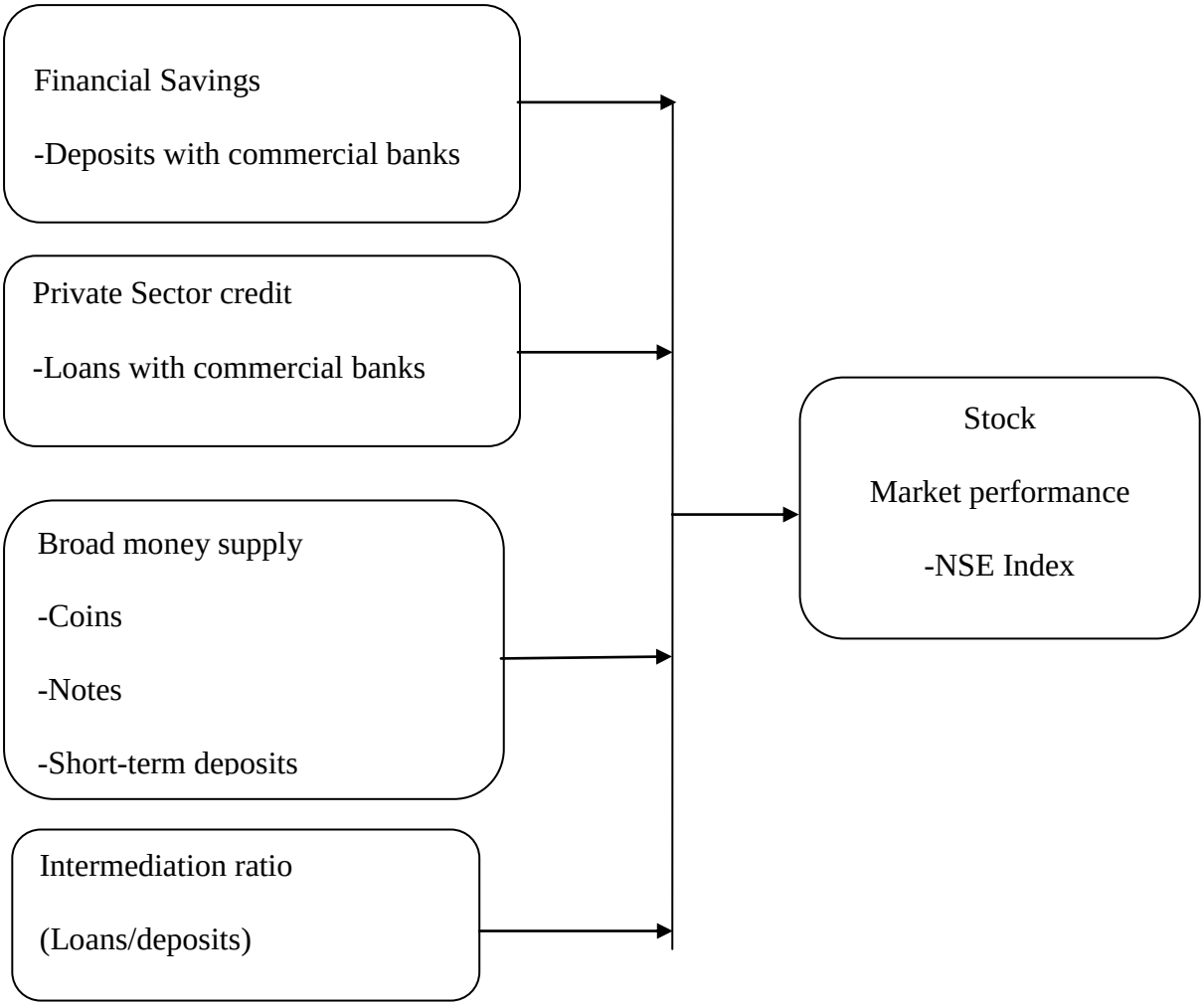
He, D. and Pardy, R. (1993)who used different data analysis methods i.e. panel analysis and time-series analysis came up with different conclusions- panel analysis for 32 countries from 1984 to 1990 showed a significant relationship between stock market development and financial depth while the time-series data from 1978 to 1990 showed significant correlations only for Asian economies. Literature on this topic is also inadequate;little research has been done in the developing markets on financial deepening

indictors and especially the Kenyan context. This study therefore seeks to bridge this knowledge gap.

2.6. Conceptual Framework

This study conceptualizes the relationship between financial deepening indicators and the stock market performance.

Financial deepening indicators



Source: Author (2018)

FIGURE 1: Conceptual Framework

2.7. Definition and measurement of variables

TABLE 2.1
Operationalization of variables

Variable	Initials in the study	Definition	Measurement	Formula	Reference
Financial Savings	FS	These are deposits held by banks for the general public	Kenya shillings (Kshs.) Normalized with the GDP	= Total Deposits in commercial banks/ GDP	Nieuwerburgh and Buelens (2005)
Private Sector Credit	PsC	These are financial resources provided to the private sector by financial corporations (banks) through loans that establish a claim for repayment.	Kenya shillings (Kshs.) Normalized with the GDP	= Total Loans issued to private sector by banks/GDP	Ndikumana (2003)
Broad Money supply	M_2	This is money supply which includes coins and notes plus short-term time deposits	Kenya shillings (Kshs.) Normalized with the GDP	={coins + notes+ short-term deposits}/GDP	He, D. and Pardy, R. (1993)
Intermediation ratio	IR	The ratio of total loans to total deposits.	This was computed from data obtained	=PsC/FS	McDonald and Schumacher (2007)
Stock market performance	SmP	This is the stock market index; it is a price weight index. The indices are published on a daily basis	This was measured using the NSE 20-share index	= Market Capitalization 40%, Shares Traded 30%, Number of deals 20%, and Turnover 10%	Barasa, J. W. (2014)

Source: Author (2018)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology which was adopted in this study. It describes the research design, the target population, the data and data collection procedures and the data analysis methods of the research.

3.2 Research Design

A research design is mostly based on the research question. According to Yin, R. K. (2009) it consists of a logical sequence that links the study objective to the data and the conclusion, it guides the process of data collection, analysis, and interpretation. It provides a dialect for drawing inference on relations. This study used a descriptive research design. In a descriptive research design we aim at answering what, who, where, when, and how questions in order to describe a relationship, a situation, or characteristics. This study aims at finding out the relationship between financial deepening indicators and the stock market performance.

3.3 Target Population

This study is for the country Kenya. The target population is the stock exchange market in Kenya which is the Nairobi stock Exchange (NSE). The study aims to find out the relationship between different financial deepening indicators and the stock market performance in Kenya.

3.4 Data and Data Collection

This study relied on secondary data which was obtained from the NSE database (companies that make up the 20-share index provided in appendix II), the CBK website (list of commercial banks is provided in Appendix I) and the Kenya National Bureau of statistics (GDP). Time-series monthly data was obtained from January 2001 to June 2017, a total of 17 years and 66 observations. Datawas normalized by dividing the variables by the GDP. A data collection worksheet was used (See Appendix III).

3.5 Data Analysis procedures

The data was edited and keyed into an excel worksheet and STATA was used for data analysis, model estimation and financial forecasting. Time-series methodology was adopted with the following steps;

3.4.1 Preliminary analysis

Descriptive analysis was done to give the mean, median, standard deviation, maximum value, minimum value, skewness and kurtosis for all the variables. Transformation of the variables was done because the stock market performance data had a huge standard deviation as compared to the other variables. Trend plots were be plotted for each variable for visual inspection of the variables' observations over time.

3.4.2 Correlation Matrix

After the descriptive analysis, the correlation matrix was run to measure the strength of the relationship between the variables in the study.

3.4.3 Pre-Analysis Tests for time series

Stationarity.Time series data is usually presumed to be non-stationary and so to avoid spurious regression, variables in the model were tested for stationarity by carrying out unit root tests. Visually, trend plots and correlograms were plotted for each variable to check for stationarity. The pioneering work for testing for unit root in time series was done by Dickey, D. A., and Fuller, W. A. (1979). The test statistic under the DF does not follow the common *"t"*-distribution under the null because the null is one of non-stationarity but rather follows a non-standard distribution. Critical values are derived from Monte-Carlo experiments, Fuller (1976). Phillips, P. C. B., and Perron, P (1988) started the commonly known P-P test for stationarity which is a more comprehensive theory of unit root non-stationarity. The approach is non-parametric and therefore allows for a wide class of weakly dependent or even

heterogeneously distributed data. The P-P test allows for models with a fitted drift and time trend hence is used to discriminate unit root non-stationarity and stationarity about a deterministic trend. Cheung, Y.W. and Lai, K. S. (1995) argued that the augmented Dickey Fuller (ADF) test is more commonly used in unit-root test for infinite sample values. The ADF test fits an AR (autoregressive) model by examining the null hypothesis of an ARIMA (autoregressive Integrated moving average) (p,1,0) against the stationary ARIMA (p+1,1,0). For all the stationarity tests, the null hypothesis (H_o) is non-stationarity while the alternative hypothesis (H_a) is for stationarity. The series was non-stationary and therefore was differenced and trend plots plotted for the differenced series to ensure it is stationary. The series was differenced once, and was therefore integrated of order 1.

Lag-length selection.The lag length was selected using the information criteria methods; AIC (Akaike information criterion), FPE (First prediction error), SBIC (Schwarz Bayesian information criterion) and HQIC (Hannan-Quinn information criterion) which are all available in STATA. Once the lag-length selection command was run, the lag length with the most asterisks on the different information criterion was chosen. The lag chosen must was checked for being parsimonious i.e. well identified, well specified, no correlation between the lags, contain fewest parameters and best describes the data set.

Co-integration tests.Several papers have dealt with co-integration in time series; Engle, R. F., and Granger, C. W. J. (1987),Granger, C. W. J., and Weiss, A. A. (1983),Engle, R. F., and Granger, C. W. J. (1987), Johansen, S., and Juselius, K. (1988). Time series are said to be co-integrated if they co-move in the same direction towards a long-term equilibrium. Nielsen, M. O. (2005)stated that co-integration requires the time series be non-stationary and combining such series helps to remove such non-stationarity in multivariate time series without differencing. The Johansen's test was used to test for co-integration between the variables.

3.6 Model specification

After the co-integration test, the appropriate model was fitted which in this case was the vector error correction model (VECM) since there was co-integration.

VEC Model.

The VECM was fitted and since the model has 5 variables with the equations specified as follows;

$$\Delta FS_t = \beta_{10} + \beta_{11}\Delta FS_{t-1} + \sum_{11}\Delta PsC_{t-1} + \Omega_{11}\Delta M_{2,\,t-1} + \pi_{11}\Delta IR_{t-1} + £_{11}\Delta SmP_{t-1} + \infty_{11}$$
$$\{\sigma + FS_{t-1} - \beta_{12}PsC_{t-1} + \beta_{13}M_{2,\,t-1} - \beta_{14}IR_{t-1} + \beta_{15}SmP_{t-1}\} + \mu_{1t} \ldots\ldots\ldots \text{(I)}$$

$$\Delta PsC_t = \beta_{20} + \sum_{21}\Delta PsC_{t-1} + \beta_{21}\Delta FS_{t-1} + \Omega_{21}\Delta M_{2,\,t-1} + \pi_{21}\Delta IR_{t-1} + £_{21}\Delta SmP_{t-1} + \infty_{21}$$
$$\{\sigma + FS_{t-1} - \beta_{12}PsC_{t-1} + \beta_{13}M_{2,\,t-1} - \beta_{14}IR_{t-1} + \beta_{15}SmP_{t-1}\} + \mu_{2t} \ldots\ldots\ldots \text{(II)}$$

$$\Delta M_{2,t} = \beta_{30} + \Omega_{31}\Delta M_{2,\,t-1} + \beta_{31}\Delta FS_{t-1} + \sum_{31}\Delta PsC_{t-1} + \pi_{31}\Delta IR_{t-1} + £_{31}\Delta SmP_{t-1} + \infty_{31}$$
$$\{\sigma + FS_{t-1} - \beta_{12}PsC_{t-1} + \beta_{13}M_{2,\,t-1} - \beta_{14}IR_{t-1} + \beta_{15}SmP_{t-1}\} + \mu_{3t} \ldots\ldots \text{(III)}$$

$$\Delta IR_t = \beta_{40} + \pi_{41}\Delta IR_{t-1} + \beta_{41}\Delta FS_{t-1} + \sum_{41}\Delta PsC_{t-1} + \Omega_{41}\Delta M_{2,\,t-1} + £_{41}\Delta SmP_{t-1} + \infty_{41}$$
$$\{\sigma + FS_{t-1} - \beta_{12}PsC_{t-1} + \beta_{13}M_{2,\,t-1} - \beta_{14}IR_{t-1} + \beta_{15}SmP_{t-1}\} + \mu_{4t} \ldots\ldots \text{(IV)}$$

$$\Delta SmP_t = \beta_{50} + £_{51}\Delta SmP_{t-1} + \beta_{51}\Delta FS_{t-1} + \sum_{51}\Delta PsC_{t-1} + \pi_{51}\Delta IR_{t-1} + \Omega_{51}\Delta M_{2,\,t-1} + \infty_{51}$$
$$\{\sigma + FS_{t-1} - \beta_{12}PsC_{t-1} + \beta_{13}M_{2,\,t-1} - \beta_{14}IR_{t-1} + \beta_{15}SmP_{t-1}\} + \mu_{5t} \ldots\ldots \text{(V)}$$

Definition of the terms;

ΔFS_t, ΔPsC_t, $\Delta M_{2,t}$, ΔIR_t and ΔSmP_t are first differences i.e. $\Delta FS_t = FS_t - FS_{t-1}$,

$\Delta PsC_t = PsC_t - PsC_{t-1}$, $\Delta M_{2,t} = M_{2,t} - M_{2,t-1}$, $\Delta IR_t = IR_t - IR_{t-1}$, $\Delta SmP_t = SmP_t - SmP_{t-1}$

β, $\sum$, Ω, π, £ - These are the coefficients of the variables, they define the short-run relationship between the variables

$\infty_{11,}\ \infty_{21,}\ \infty_{31,}\ \infty_{41,}\ \infty_{51}$ -This are the coefficients for the long-run correlation/relationship between variables

$\mu_{1t}\ ,\mu_{2t,}\ \mu_{3t,}\ \mu_{4t,}\ \mu_{5t}$ – These are the white noise/shock terms

$\beta_{10},\beta_{20,}\ \beta_{30,}\ \beta_{40,}\ \beta_{50}$- These are constants

$\{\varpi + FS_{t-1} - \beta_{12}PsC_{t-1} + \beta_{13}M_{2,\,t-1} - \beta_{14}IR_{t-1} + \beta_{15}SmP_{t-1}\}$- These is the error correction term and corrects values for the previous period. This term corrects the previous errors and ensures differences are not zero.

The VECM was interpreted using Impulse response Functions (IRFs) and Forecast Error Variance Decomposition (FEVD). Swanson and Granger (1996), described how VECM focusses on IRFs and FEVDs to track the evolution of economic shocks through the system. They also discussed on the importance of orthogonalization since the ordering of the variables is important in the interpretation of IRFs and FEVDs. The IRF and FEVD tables and graphs were plotted and interpreted. IRFs explain how shocks in the system last i.e. for how long does a shock in financial deepening indicators affect the stock market performance and the magnitude of the same, and for how long shocks in the stock market affect the financial deepening indicators. Variance decomposition focusses on forecast errors at each period.

3.7 Post-estimation Tests and model stability

After fitting the VEC model, the following diagnostic tests were performed to test if the residuals were white noise processes; testing if the residuals were normally distributed, performed Lagrange-multiplier test for residual autocorrelation. IRFs and FEVDs were then estimated using a given forecast horizon and orthogonalized impulse-response function graphs were be plotted. The VECM model was then tested for stability.

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents the results of the detailed data analysis work. The characteristics of data under consideration were first input into excel and then Stata for analysis. The results were presented using graphs, tables and descriptive statistics. Data was tested for stationarity and co-integration and the VEC model was fitted. Post-estimation analyses were carried out as the final test. The data used for analysis is as per Appendix IV, data collected.

4.2 Preliminary Analysis

Prior to examining the relationship between financial deepening indicators and stock market performance in Kenya, preliminary data analysis was carried out through the use of tables and graphs. This was primarily to examine the basic characteristics of the data representing the different variables.

4.2.1 Descriptive Analysis

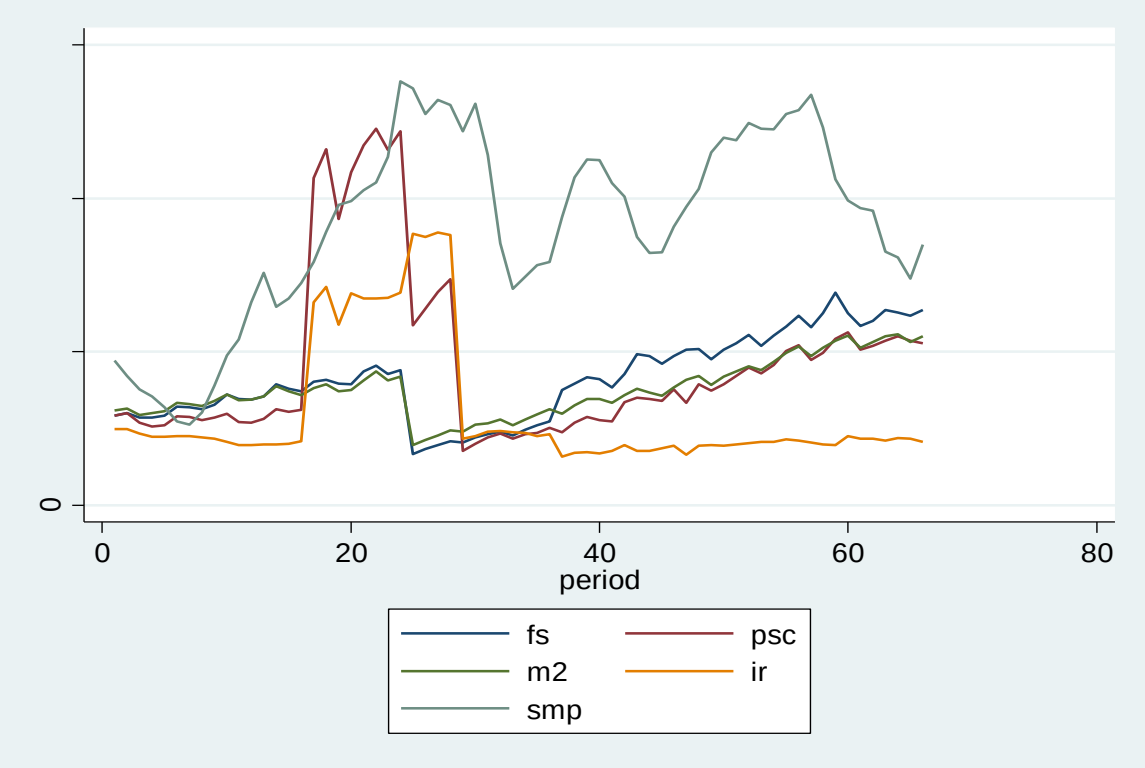
Table 4.1 below presents results of descriptive statistics of the data in this study.

TABLE 4.1

Descriptive Statistics

	FS	**PsC**	**M2**	**IR**	**SmP**
Mean	1650.394	1858.152	1510.939	1219.045	3639.727
Minimum	664	712	788	633	1230.889
Maximum	2768	4913	2229	3558	1056
Std.Dev.	547.5308	1120.604	368.7834	852.3513	5525
Skewness	0.6368	0.0000	0.2419	0.0000	0.0884
Kurtosis	0.0110	0.0286	0.2770	0.0253	0.1996
Observations	**66**	**66**	**66**	**66**	**66**

FIGURE 2: Trend plot for variables



This study considered 66 time series observations for all the variables that is, 66 quarters from January 2001 up to and including June 2017. The summary of their basic characteristics are as presented in Table 4.1 above. The basic characteristics show that there are no outliers and that all the observations are within the acceptable limits. The pictorial presentation in Figure 2 shows the combined trend plots for the variables over the period January 2001 to June 2017. The primary purpose of creating these plots was to visualize the trend of each of the variables in the study. The individual trend plots are in Appendix V. The mean value of the ranges from 1,219 to 3,639.73, minimum values range from 663 to 1,230.89, private sector credit and intermediation ratio are not skewed. The highest standard deviation was 5,525 for the stock market performance. All the kurtosis values are below value one meaning that many values for the variables are leaning towards the central tendency.

4.2.2 Multicollinearity

TABLE 4.2

Correlation Matrix

Variables	FS	PsC	M_2	IR	SmP
FS	1.000				
PsC	0.2209	1.000			
M_2	0.9664	0.2862	1.000		
IR	-0.3347	0.7754	-0.2817	1.000	
SmP	0.2520	0.3585	0.1730	0.3320	1.000

The study examined the study variables' correlation matrix (Table 4.2) to evaluate whether there was multicollinearity in the variables. There was a positive significant relationship between broad money supply and financial savings. This implies an increase in financial savings was associated with an increase in broad money supply.

Further, there was a positive significant relationship between intermediation ratio (IR) and private sector credit (PsC). This implies that an increase in private sector credit leads to an increase in intermediation ratio. This positive relationship can be attributed to the fact that intermediation ratio is private sector credit divided by financial savings; therefore an increase in the private sector credit which is the numerator will increase the intermediation ratio.

There is an inverse relationship between intermediation ration and financial savings and intermediation ratio and broad money supply, though insignificant. This means an increase in deposits (financial savings) compared to loans (private sector credit) will decrease the intermediation ratio and an increase to the ratio of loans to deposits will decrease the money circulating in the economy (broad money supply).

There was an insignificant positive relationship between private sector credit and financial savings meaning that an increase in deposits will lead to an increase in loans which is the principal upon which banks work. There was also an insignificant positive relationship between broad money supply and stock market performance implying that when there is a lot of money in circulation in the economy then investments in the stock market will increase. A significant relationship was found between intermediation ratio and stock market performance, though not significant it suggests that when the ratio of loans to deposits increases then investments in the stock market increase.

4.3 Pre-Analysis Test for Time series

4.3.1 Stationarity

TABLE 4.3

Dickey-Fuller Test for unit root

variables	Null Hypothesis: Variable is Non stationary			
	Level		**First Difference**	
	Test statistic	p-value for Z(t)	Test statistic	p-value for Z(t)
FS	-0.945	0.7729	-8.248	0.0000
PsC	-2.218	0.1999	-8.312	0.0000
M2	-0.984	0.7590	-8.831	0.0000
IR	-2.009	0.2827	-7.820	0.0000
SmP	-1.602	0.4826	-4.894	0.0000

	Critical values			Critical values		
	1%	5%	10%	1%	5%	10%
	-3.559	-2.918	-2.594	-3.560	-2.919	-2.594

Time series data is assumed to be non-stationary, we therefore tested if the variables are stationary. Majority of economic and financial data is assumed to be integrated of order one I (1), there is therefore need to confirm this before proceeding to fit the appropriate multivariate model. Our Null hypothesis (H_o) is non-stationarity while our alternative hypothesis (H_A) is stationarity. Table 4.3 presents the results of the Dickey Fuller test; the critical values at the different levels of significance (1%, 5% & 10%) are also displayed at the bottom of the table.

Table 4.4 below presents the results of the Phillip-Perron unit test, the critical values at the different levels of significance (1%, 5% & 10%) are also displayed at the bottom of the table for both Z(rho) and Z(t).Both tables 4.3 and 4.4, clearly indicate that the series under investigation are not stationary at level but become stationary after differencing once. This therefore means that the series are integrated of order one or I(1). Generally, the Dickey-Fuller and phillipPerron tests have the null hypothesis (H_0) for data having a unit root (non-stationarity) against an alternative hypothesis (H_A) of no unit root (stationarity). The null hypothesis is rejected if the test statistic is less than the critical values at the different levels of significance. Rejecting the null implies that the conclusion of stationarity is made. On the other hand if the null is accepted, it is concluded that the series are not stationary. Both tests imply that the variables are non-stationary at level and stationary when differenced to order 1. The correlograms and trend plots for both the variables and the differenced variables are as per Appendix V, VI, VII and VIII.

TABLE 4.4

Phillip-Perrons unit root Test

variables	Null Hypothesis: Variable is Non stationary						
		Level			**First Difference**		
		Test statistic	p-value for Z(t)		Test statistic	p-value for Z(t)	
FS	Z(rho)	-2.087	0.8106		-62.357	0.0000	
	Z(t)	-0.829			-8.294		
PsC	Z(rho)	-9.009	0.2095		-62.790	0.0000	
	Z(t)	-2.191			-8.364		
M2	Z(rho)	-2.084	0.8313		-66.141	0.0000	
	Z(t)	-0.757			-8.946		
IR	Z(rho)	-8.755	0.2394		-61.873	0.0000	
	Z(t)	-2.113			-7.818		
SmP	Z(rho)	-5.761	0.3457		-35.790	0.0000	
	Z(t)	-1.734			-4.876		
		Critical values			Critical values		
		1%	5%	10%	1%	5%	10%
	Z(rho)	-19.170	-13.420	-10.790	-19.152	-13.412	-10.784
	Z(t)	-3.559	-2.918	-2.594	-3.560	-2.919	-2.594

4.3.2 Lag selection

Table 4.5 below presents results of the number of lags to be included in the model as presented by the various information criteria techniques.

TABLE 4.5

Lag Selection Criteria

Selection-order criteria
Sample: 6 - 66 Number of obs = 61

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-2062.17				1.9e+23	67.776	**67.8438***	**67.949***
1	-2043.93	36.485	25	0.065	2.3e+23	67.9976	68.4044	69.0357
2	-2032.8	22.26	25	0.621	3.8e+23	68.4523	69.1982	70.3556
3	-2021.75	22.086	25	0.631	6.2e+23	68.9099	69.9949	71.6783
4	-1925.57	**192.36***	25	0.000	**6.5e+22***	**66.5762***	68.0001	70.2096

Endogenous: D.fsD.psc D.m2 D.ir D.smp
Exogenous: _cons

FPE: Final Prediction Error
AIC: Akaike Information Criterion
SBIC: Schwarz Bayesian Information Criterion
HQIC: Hannan-Quinn Information Criterion

The results in Table 4.5 above indicate that the SB Information Criterion and HQ Information Criterion choose no lag for the model; while the LR, FPE and AIC suggest that four lags be included in the model. The decision criterion usually is to choose and use the number of lags preferred by most criteria. As per the above results, the most criteria i.e. LR, FPE and AIC have chosen four lags and therefore four lags will be used in the model.

4.3.3 Co-integration test

Time series are said to be co-integrated if they co-move towards long run equilibrium. The determination of stationarity of the series is there the first step before co-integration. The Johansens methodology was adopted to carry out co-integration tests and fit the appropriate model which in this case should be vector autoregressive (VAR) model if no co-integration is found and a vector error correction model (VECM) if the series has co-integration.

In order to investigate and determine the existence of both short-run and long-run equilibrium relationships among the variables under consideration, the Johansen co-integration test was done as per Table 4.6 below in Stata V.12.0 and using four lags as determined above.The null hypothesis (H_o) is that there is no co-integration while the alternative hypothesis (H_A) is that there is co-integration. From the first table above, the trace statistics for maximum ranks 0, 1, 2 and 4 are more than the critical values at 5% and therefore we reject the null hypothesis and conclude there is co-integration. At maximum rank 3, the trace statistic is less than the critical value; we therefore conclude that there are 3 co-integrating equations. From Table 4.6, the model has 4 lags and 3 co-integrating equations.

FIGURE 3: Trend plot for co-integration

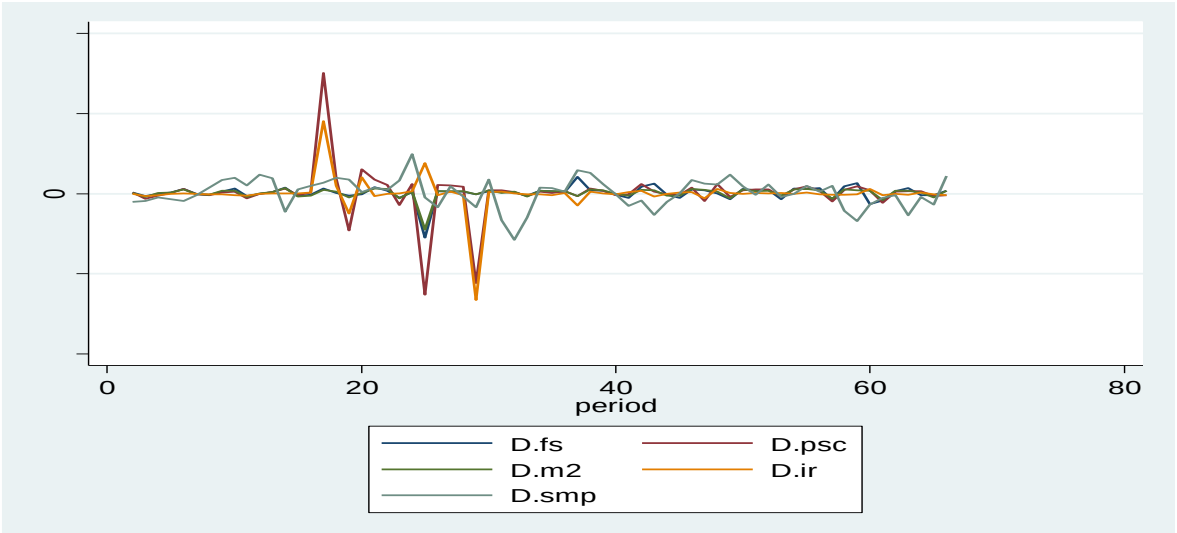


TABLE 4.6

Johansen co-integrating Test

Trend: constant — Number of obs = 61
Sample: 6 - 66 — Lags = 4

Maximum rank	parms	LL	eigenvalue	Trace statistic	5% Critical value
0	80	-2022.4768	-	193.8080	68.52
1	89	-1958.446	0.87747	65.7465	47.21
2	96	-1943.9105	0.37909	36.6756	29.68
3	101	-1932.5733	0.31045	**14.0011***	15.41
4	104	-1928.6738	0.12002	6.2021	3.76
5	105	-1925.5728	0.09668		

Maximum rank	parms	LL	eigenvalue	SBIC	HQIC	AIC
0	80	-2022.4768	-	71.70202	70.01861	68.93366
1	89	-1958.446	0.87747	70.20918	68.33638	67.12938
2	96	-1943.9105	0.37909	70.20434	68.18425	66.88231
3	101	-1932.5733	0.31045	**70.16959***	**68.04428***	66.67453
4	104	-1928.6738	0.12002	70.24391	68.05547	66.64504
5	105	-1925.5728	0.09668	70.20963	68.00015	66.57616

Figure 3 above shows the trend plots for the integrating series. Graphically, the variables are seen to be moving together towards a long-run equilibrium.

4.4 VEC Model

From section 4.3.3, the results of the Johansen co-integration test revealed that the variables are co-integrated and therefore the vector error correction model is the appropriate model to be run for the variables.

The Johansen test showed that the variables have 4 lags with three co-integrating equations. The full results of the VECM model are in Appendix XI, Table 4.9 (b), which shows the vector error correction estimates for short-run relationships between variables. The VECM model has various parts which have been sub divided into various tables and each of the values generated described after each table.

TABLE 4.7

MODEL FITNESS

Sample: 6 - 66 No. of obs = 61
AIC = 67.12938
Log likelihood = -1958.446 HQIC = 68.33638
Det(Sigma_ml) = 5.30e+21 SBIC = 70.20918

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D2_fs	17	205.225	0.5655	57.26146	0.0000
D2_psc	17	635.425	0.6298	74.85158	0.0000
D2_m2	17	146.538	0.6398	78.16142	0.0000
D2_ir	17	296.891	0.8308	216.0326	0.0000
D2_smp	17	356.862	0.3855	27.60249	0.0498

The Parms is the number of parameters which for this study is seventeen while the RMSE is the root mean square error which represents the standard deviation. The R-squared explains the proportions; financial savings this quarter, is explained by 56.55% of its own lags and the lags of private sector credit, broad money supply, intermediation ratio and stock market performance.

Private sector credit this quarter is explained by 62.98% of its own lags and the lags of financial savings, broad money supply, intermediation ratio and stock market performance. Broad money supply this quarter is explained by 63.98% of its own lags and the lags of

financial savings, private sector credit, intermediation ratio and stock market performance. The intermediation ratio this quarter is explained by 83.08% of its own lags and the lags of financial savings, private sector credit, broad money supply and stock market performance. The stock market performance in Kenya, this quarter is explained by 38.55% of its own lags and the lags of financial savings, private sector credit, broad money supply and intermediation ratio.

Variables financial savings, private sector credit, broad money supply and intermediation ratio are significant 1% since the P>chi2 = 0.0000 which is less than 0.05. Variable stock market performance is significant at 5% since P>chi2 = 0.0498.

TABLE 4.8

Speed of Adjustment

_Cel L1

	Coef.	Std.Dev.	z	p>|z|	[95% Conf. Interval]
D2_fs	.2526498	.0979337	2.58	0.010	.0607032 .4445964
D2_psc	-.2612824	.3032257	-0.86	0.389	-.8555939 .333029
D2_m2	.2013738	.0699282	2.88	0.004	.064317 .3384305
D2_ir	-1.112766	.1416771	-7.85	0.000	-1.390448 -.8350842
D2_smp	.0983898	.1702951	0.58	0.563	-.2353825 .432162

Table 4.8 explains the long-term relationship and the coefficient (Coef.) represents the speeds of adjustment. Financial savings is moving downwards at a speed of 25.26% towards the equilibrium, private sector credit moves upwards at a speed on 26.12% towards the equilibrium, broad money supply is moving downwards at a speed of 20.13% towards the long-term equilibrium. Intermediation ration and stock market performance are moving at speeds of 111% (downwards) and 9.8% (upwards) respectively towards the long-term equilibrium. The speeds of adjustment for financial savings, broad money supply and

intermediation ratio are significant. The speeds of adjustment for private sector credit and stock market performance are not significant as their p>|z| values are more than 5%.

TABLE 4.9 (a)

VECTOR ERROR CORRECTION ESTIMATES

(FOR SIGNIFICANT VALUES OF LAG1)

		Coef.	Std.Err.	z	p>|z|	[95% Conf. Interval]	
D2_FS	FS LD2.	-.9179568	.28519	-3.22	0.001	-1.476919	-.3589946
	IR LD2.	-.466732	.1955261	-2.39	0.017	-.8499561	-.0835079
	SmP LD2.	-.1768679	.0901995	-1.96	0.050	-.3536557	-.0000801
	Constant	1.003311	26.29381	0.04	0.970	-50.53161	52053823
D2_PsC	SmP LD2.	-.6376522	.2792788	-2.28	0.022	-1.185029	-.0902758
	Constant	-3.015761	81.41177	-0.04	0.970	-162.5799	156.5484
D2_M_2	PsC LD2.	.2321391	.0993397	2.34	0.019	.0374369	.4268413
	M_2LD2.	-1.035	.2857085	-3.61	0.000	-1.590479	-.470522
	IR LD2.	-.4123269	.1396126	-2.95	0.003	-.6859626	-.1386911
	SmP LD2.	-.1344976	.0644057	-2.09	0.037	-.2607304	-.0082648
	Constant	0.1030359	18.77472	0.01	0.996	-36.69474	36.90081
D2_IR	FS LD2.	1.019573	.4125738	2.47	0.013	.2109427	1.828202
	PsC LD2.	-1.007226	.2012659	-5.00	0.000	-1.4017	-.612752
	IR LD2.	1.063484	.2828603	3.76	0.000	.5090875	1.61788
	Constant	1.474425	38.03828	0.04	0.969	-73.07923	76.02808
D2_SmP	PsC LD2.	0.4881586	.2419205	2.02	0.044	.0140032	.9623141
	IR LD2.	-.7035966	.3399966	-2.07	0.039	-1.369978	-.0372156
	Constant	5.879576	45.7218	0.13	0.898	-83.73351	95.49266

Table 4.9(a) above is an extract of Appendix XI, Table 4.9 (b), which gives all the values of the vector error correction estimates. The table above only gives the estimates of significant Lag1 variables. The equations for estimating the model have been obtained from all the lag 1 values in Table 4.9 (b).

Estimating the model;

$$\Delta FS_t = 1.003 - 0.918\,\Delta FS_{t-1} + 0.252\Delta PsC_{t-1} - 0.167\,\Delta M_{2,t-1} - 0.467\Delta IR_{t-1} - 0.177\Delta SmP_{t-1}$$
$$(26.294)\quad (0.285)\quad (0.139)\quad (0.400)\quad (0.196)\quad (0.090)$$
$$+ 0.253\,\{5.517 + FS_{t-1} - 1.174PsC_{t-1} + 0.184M_{2,t-1} + 2.089IR_{t-1} - 0.166\Delta SmP_{t-1}\} \quad \textbf{(VI)}$$
$$(0.098)\quad (0.177)\quad (0.682)\quad (0.215)\quad (0.070)$$

$$\Delta PsC_t = -3.016 - 0.814\,\Delta PsC_{t-1} + 0.562\,\Delta FS_{t-1} - 1.273\,\Delta M_{2,t-1} - 0.248\Delta IR_{t-1} - 0.638\Delta SmP_{t-1}$$
$$(81.411)\quad (0.431)\quad (0.883)\quad (1.239)\quad (0.605)\quad (0.279)$$
$$- 0.262\,\{5.517 + FS_{t-1} - 1.174PsC_{t-1} + 0.184M_{2,t-1} + 2.089IR_{t-1} - 0.166\Delta SmP_{t-1}\} \quad \textbf{(VII)}$$
$$(0.303)\quad (0.177)\quad (0.682)\quad (0.215)\quad (0.070)$$

$$\Delta M_{2,t} = 0.103 + 1.035\Delta M_{2,t-1} + 0.113\,\Delta FS_{t-1} - 0.232\,\Delta PsC_{t-1} - 0.412\Delta IR_{t-1} - 0.134\Delta SmP_{t-1}$$
$$(18.77)\quad (0.286)\quad (0.204)\quad (0.099)\quad (0.140)\quad (0.064)$$
$$+ 0.201\,\{5.517 + FS_{t-1} - 1.174PsC_{t-1} + 0.184M_{2,t-1} + 2.089IR_{t-1} - 0.166\Delta SmP_{t-1}\} \quad \textbf{(VIII)}$$
$$(0.070)\quad (0.177)\quad (0.682)\quad (0.215)\quad (0.070)$$

$$\Delta IR_t = 1.474 + 1.063\Delta IR_{t-1} + 1.02\Delta FS_{t-1} - 1.01\Delta PsC_{t-1} - 0.395\Delta M_{2,t-1} - 0.066\Delta SmP_{t-1}$$
$$(38.038)\quad (0.283)\quad (0.413)\quad (0.201)\quad (0.579)\quad (0.130)$$
$$- 1.113\,\{5.517 + FS_{t-1} - 1.174PsC_{t-1} + 0.184M_{2,t-1} + 2.089IR_{t-1} - 0.166\Delta SmP_{t-1}\} \ldots \quad \textbf{(IX)}$$
$$(0.142)\quad (0.177)\quad (0.682)\quad (0.215)\quad (0.070)$$

$$\Delta SmP_t = 5.880 - 0.266\,\Delta SmP_{t-1} + 0.025\Delta FS_{t-1} + 0.488\Delta PsC_{t-1} - 1.294\Delta M_{2,t-1} - 0.704\Delta IR_{t-1}$$
$$(45.72)\quad (0.157)\quad (0.496)\quad (0.242)\quad (0.696)\quad (0.340)$$
$$+ 0.0984\,\{5.517 + FS_{t-1} - 1.174PsC_{t-1} + 0.184M_{2,t-1} + 2.089IR_{t-1} - 0.166\Delta SmP_{t-1}\} \ldots \quad \textbf{(X)}$$
$$(0.170)\quad (0.177)\quad (0.682)\quad (0.215)\quad (0.070)$$

Table 4.8 shows the short-run relationships of the variables. None of the constant values are significant; they are all above 5%. From equation VI, if financial savings increased by one unit (1%) in the last quarter then financial savings in this quarter will decrease by 91.8%. If

intermediation ratio increased by one unit (1%) in the last quarter then financial savings in this quarter will decrease by 46.67%. If stock market performance increased by one unit (1%) in the last quarter then financial savings in this quarter will decrease by 17.7%. The t-statistic values are all significant at 5% level.

As per equation VII, if stock market performance increased by one unit (1%) in the last quarter then private sector credit in this quarter will decrease by 63.76%. This is the only significant test statistic in the private sector credit below 5%. According to equation VIII, if private sector credit increased by one unit (1%) in the last quarter then broad money supply will increase by 23.21% in this quarter. If broad money supply increased by one unit (1%) in the last quarter then it will decrease by 103.2% in this quarter. When intermediation ratio increases by one unit (1%) in this quarter then broad money supply will decrease by 41.23% in the next quarter. When stock market performance increases by one unit (1%) in this quarter then broad money supply will decrease by 13.45% in the next quarter. The t-statistic values (p>|z|) are significant, below 5%.

According to equation IX; if financial savings increased by one unit (1%) in the last quarter, then the intermediation ratio will increase by 101% in this quarter.If private sector credit increased by one unit (1%) in the last quarter, then intermediation ratio will decrease by 100% in this quarter. If intermediation ratio increased by one unit (1%) in the last quarter then it will increase by 106% in this quarter. Following equation X, when private sector credit increases by one unit (1%) in this quarter then stock market performance will increase by 48.82% in the next quarter. When the intermediation ratio increases by one unit (1%) in this quarter then stock market performance will decrease by 70.4% in the next quarter. The t-statistic values (p>|z|) are significant, below 5%.

The error correction term- $\{5.517+ FS_{t-1} - 1.174PsC_{t-1}+ 0.184M_{2,t-1} + 2.089IR_{t-1} - 0.166\Delta SmP_{t-1}\}$ corrects values for the previous period and ensures that the differences are

not zero. The coefficients for long term relationship are 1.174 for private sector credit, 0.184 for broad money supply, 2.089 for intermediation ratio and 0.166 for stock market performance.

4.5Post estimation tests

4.5.1 Normal distribution of residuals

TABLE 4.10

Jarque-Bera test

Equation	chi2	Df	Prob> chi2
D2_ fs	565.116	2	0.00000
D2_ psc	322.131	2	0.00000
D2_ m2	25.204	2	0.00000
D2_ ir	0.114	2	0.94441
D2_ smp	0.138	2	0.93344
ALL	912.703	10	0.00000

For the Jarque-Bera test**,** null hypothesis (H_o) is that the residuals are normally distributed while the alternative hypothesis (H_A) is that the residuals are normally distributed are not normally distributed. For variables financial savings, private sector credit and broad money supply, the Prob> chi2 is less than 5% meaning their residuals are not normally distributed. For variables intermediation ratio and stock market performance the Prob> chi2 is more than 5% showing that their residuals are normally distributed.

4.5.2 Serial Autocorrelation

The residuals were tested for serial autocorrelation.

TABLE 4.11

Langrange-multiplier Test

Lag	chi2	df	Prob> chi2
1	26.1232	25	0.40105
2	21.0375	25	0.69052

The null hypothesis (H_o) is that there is no serial autocorrelation while the alternative hypothesis (H_A) is there is serial autocorrelation. From Table 4.11 above, at lag order 1, the Prob> chi2 = 0.40105 which is more than 5%, we therefore accept the null hypothesis meaning that there is no autocorrelation of the residuals. At lag order 2, the Prob> chi2 = 0.69052 which is also more than 5%, we accept the null hypothesis as well, implying that there is no autocorrelation/serial correlation of the residuals.

4.5.3 Impulse Response Functions (IRFs)

Immediately there is a shock in financial savings, financial savings itself increases by 205 units and by 14 units in the first quarter. A shock in financial savings also causes an immediate increase in private sector credit, broad money supply and stock market performance but a decrease in the intermediation ratio by 57 units.

TABLE4.12

IMPULSE RESPONSE FUNCTION TABLES

Financial savings IRFs

step	(1) oirf	(2) oirf	(3) oirf	(4) oirf	(5) oirf
0	205.225	382.97	122.568	-56.9621	84.072
1	14.8839	55.4762	2.73285	46.5537	100.311
2	19.6978	-14.5317	.480959	-46.5537	52.3752
3	31.0137	85.9492	2.31367	48.4895	102.682
4	52.8289	314.052	25.0105	310.346	41.4303
5	42.4234	97.1802	13.9862	9.9185	-24.786
6	25.4174	93.2419	9.03176	35.4066	113.507
7	47.155	152.8	12.677	53.2527	135.711
8	80.7359	129.867	54.0496	-5.59925	67.2396
9	48.3865	59.4373	12.8706	12.6813	48.9851
10	37.6494	104.93	17.1929	24.7982	74.7415

Private sector credit IRFs

step	(6) oirf	(7) oirf	(8) oirf	(9) oirf	(10) oirf
0	0	507.049	34.0676	262.354	19.6067
1	-15.1396	114.973	-3.02361	64.949	28.8857
2	9.57428	45.6111	10.9067	-5.56985	8.64207
3	-11.4158	183.33	9.92811	119.454	-19.8156
4	-4.4256	298.419	12.4547	190.475	-7.55639
5	-13.9553	135.866	-2.03592	74.8511	.942473
6	-9.28622	165.116	6.08424	111.591	9.844
7	-1.90702	201.646	12.8333	110.539	-3.84616
8	-.788712	199.197	14.2021	106.027	-2.9715
9	-9.76167	158.933	2.23387	85.2805	6.1173
10	-4.50757	176.41	11.6034	92.9085	9.89334

Broad Money supply IRFs

step	(11) oirf	(12) oirf	(13) oirf	(14) oirf	(15) oirf
0	0	0	72.7308	-109.984	21.6132
1	-20.1929	-76.1854	-4.06309	-12.3927	-22.5346
2	-7.86372	3.14584	15.6475	-33.3268	-37.3195

3	-23.4831	-29.8836	4.62398	-1.41231	-49.0391
4	-14.1329	116.172	25.6866	132.264	-14.675
5	-25.6287	-72.8946	2.31248	-40.3302	-80.8153
6	-22.3076	50.5505	10.9906	48.3051	-15.611
7	-14.1863	-5.83027	12.1956	-16.5192	-11.4773
8	1.89378	25.2185	34.7917	-3.27417	-25.5129
9	-18.6187	-45.0994	7.3537	-28.2776	-42.224
10	-15.6659	4.2747	17.8318	-8.23599	-25.3801

Intermediation ratio IRFs

step	(16) oirf	(17) oirf	(18) oirf	(19) oirf	(20) oirf
0	0	0	0	63.0383	-13.6143
1	6.82208	-10.6941	2.8077	-18.0475	-41.1712
2	.295592	15.0359	4.2401	6.05291	7.46377
3	7.43048	-2.8385	2.04188	-13.3912	19.1288
4	17.9824	-31.5155	16.9495	-52.458	-2.16532
5	6.99897	-25.5402	2.64301	-16.4476	-10.1601
6	4.95316	-5.27325	5.49496	-12.719	-6.07152
7	.729236	-7.39479	-1.4042	3.81339	-4.67535
8	5.89892	8.5558	5.52297	17.4866	-4.53955
9	-20.928	-20.928	3.14998	-15.095	-17.8974
10	4.61044	4.61044	4.98861	.697239	-1.18772

Stock Market performance IRFs

step	(21) oirf	(22) oirf	(23) oirf	(24) oirf	(25) oirf
0	0	0	0	0	345.319
1	-75.5298	-205.246	-57.9651	40.7993	247.875
2	-23.0117	-1.58755	-27.1793	71.0141	198.247
3	-1.82032	-142.379	-7.43564	-71.0031	239.947
4	-8.07851	-36.7475	-8.1156	23.0742	257.14
5	-17.8031	-152.937	-14.5638	-124.656	251.156
6	-9.20269	-133.848	-14.4621	-70.8897	284.549
7	-7.91586	-107.645	-12.7971	-27.8799	252.511
8	-11.8998	-107.307	-9.97903	-30.1359	210.154
9	-30.7683	-97.9536	-30.7337	5.21106	239.2
10	-22.4852	-91.1883	-21.083	-10.595	254.172

At the instant when there is a shock in private sector credit, private sector credit itself increases by 507 units and then by 115 units in the first quarter; broad money supply increases by 34 units and then decreases by 3 units in the first quarter; intermediation ratio increases by 262 units and then by 65 units in the first quarter.At the point when there is a shock in broad money supply, financial savings and private sector credit are not affected but both reduce in the first quarter; broad money supply itself increases by 73 units and then decreases by 4 units; intermediation ratio decreases by 110 units and then 12 units in the first quarter; stock market performance increases by 21 units and then decreases by 23 units in the first quarter. Right after a shock in the stock market performance, financial savings, private sector credit, broad money supply and the intermediation ratio are not affected; but the stock market performance itself increases by 345 units. There is a positive increase in the intermediation ratio which decreases in the first quarter. A shock in the intermediation ratio does not affect financial savings, private sector credit or broad money supply at once.

When there is a shock in financial savings, there is a positive permanent effect on financial savings itself and broad money supply but the shock on financial savings has a transitory effect on private sector credit, intermediation ratio and stock market performance. The values in the ten quarters after the shock are both positive and negative and graphs show they oscillate around the zero value. An impulse in private sector credit has a permanent positive effect in financial savings; financial savings will always have a positive effect. The same impulse on private sector credit has a transitory effect on private sector credit itself, broad money supply, intermediation ratio and stock market performance. Their values move around the zero mark.

A shock in broad money supply has a transitory effect on all the variables i.e. broad money supply itself, financial savings, private sector credit, intermediation ratio and stock market performance. The variables decrease in the first quarter after the shock and then continuing increasing (positive) and decreasing (negative) with time.

An impulse in the intermediation ratio has a positive permanent effect on intermediation ratio itself. The shock causes the intermediation ratio to remain positive over the next ten quarters. The same shock on the intermediation ratio has a transitory effect on all the other variables i.e. financial savings, private sector credit, broad money supply and stock market performance will have values that swing around the zero mark showing that the shock has a non-permanent effect on them.

A shock in the stock market performance has a negative permanent effect on the stock market itself, financial savings and private sector credit; all the values in the ten quarters are negative. The same shock on stock market performance has a transitory effect on broad money supply; values oscillate around the zero mark and are either positive or negative. This impulse on stock market performance has a permanent positive effect on the intermediation ratio, values continue being positive from immediately the shock is felt to the next ten quarters.

4.5.4 Factor Error Variance Decomposition (FEVDs)

The factor error variance decomposition determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. Table 4.13 below presents summarized results of the variance decomposition test. The factor error variance decomposition graphs are given in Appendix X, Figure 9.

TABLE 4.13

FEVD TABLES

step	(1) fevd	(2) fevd	(3) fevd	(4) fevd	(5) fevd
0	0	0	0	0	0
1	1	.363247	.699611	.036811	.055501
2	.868897	.319893	.604257	.055981	.084849
3	.857999	.318622	.578215	.072421	.080964
4	.848318	.295309	.574338	.078482	.096031
5	.846635	.347632	.559874	.379139	.083495
6	.833603	.33445	.5584	.350555	.071944
7	.825666	.322465	.551967	.331497	.083055
8	.82836	.321322	.545446	.324139	.101382
9	.84252	.316061	.559769	.312761	.100672
10	.831074	.307001	.545706	.305868	.095533

step	(6) fevd	(7) fevd	(8) fevd	(9) fevd	(10) fevd
0	0	0	0	0	0
1	0	.636753	.054048	.780872	.003019
2	.004704	.577471	.047026	.755611	.006037
3	.006443	.578787	.049575	.695365	.00527
4	.008761	.574333	.05299	.688119	.005323
5	.008575	.53653	.055138	.441041	.00453
6	.011491	.521079	.05446	.425876	.003832
7	.012687	.518544	.054839	.436387	.003351
8	.012234	.520073	.05923	.4516	.002938
9	.011046	.524009	.057385	.46445	.002738
10	.01179	.527727	.055603	.47658	.00256

step	(11) fevd	(12) fevd	(13) fevd	(14) fevd	(15) fevd
0	0	0	0	0	0
1	0	0	.24634	.137234	.003668
2	.008368	.012399	.213323	.126715	.04829
3	.00943	.012354	.213545	.12713	.009646
4	.019826	.012588	.212855	.10527	.015068
5	.022237	.027438	.222794	.11008	.01296
6	.032419	.032154	.219654	.107046	.025306
7	.040085	.033024	.220196	.107235	.021409
8	.041726	.030361	.220461	.102963	.018827
9	.037695	.028901	.227124	.099351	.018418
10	.040533	.029725	.221045	.099231	.019287

step	(16) fevd	(17) fevd	(18) fevd	(19) fevd	(20) fevd
0	0	0	0	0	0
1	0	0	0	.045083	.001455
2	.000955	.000244	.00317	.044475	.009314
3	.000936	.000723	.000995	.04126	.007888
4	.001977	.000654	.001147	.035573	.007268
5	.007745	.001822	.011344	.025926	.005994
6	.008188	.002513	.01142	.024841	.005294
7	.008417	.002379	.012276	.023715	.004453
8	.008086	.002243	.012077	.022636	.003908
9	.007803	.002162	.011388	.022701	.003655
10	.00781	.002499	.011289	.022798	.00 3782

step	(21) fevd	(22) fevd	(23) fevd	(24) fevd	(25) fevd
0	0	0	0	0	0
1	0	0	0	0	.936357
2	.117076	.089992	.135077	.017219	.894971
3	.125191	.089514	.157671	.063824	.8962323
4	.121118	.117116	.15867	.092557	.87631
5	.114808	.086579	.150851	.043814	.893022
6	.114299	.109805	.156067	.091682	.893624
7	.113145	.123588	.160722	.101166	.887731
8	.109595	.126001	.162786	.098611	.872946
9	.100937	.128867	.144333	.097742	.874518
10	.108792	.133049	.166358	.095524	.878838

The results above display the evidence of relationships among the variables under investigation and the proportion of the forecast error of one variable due to another. Normally the forecast errors should add upto 100%. This means that these variables are more exogeneous and they have to be explained by the shocks of the other variables. However, the stock market performance were less exogenous in relation to other variables i.e. financial savings, private sector credit, broad money supply and intermediation ratio, because 93.64% of its variance was explained by its own shocks or innovations after one quarter or one year. The forecast error for financial savings to broad money supply is 70% explained in the first

quarter while that of private sector credit to intermediation ration is 78% also explained in the first quarter.

4.5.5 Model Stability

TABLE 4.14

Model stability

Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1
1	1
1	1
-.935331	.935331
.04040148 + .889999339*i*	.889852
.04040148 - .889999339*i*	.889852
.6218385 + .6269072*i*	.883004
.6218385 - .6269072*i*	.883004
-.6328402 + .5125476*i*	.814366
-.6328402 - .5125476*i*	.814366
-.08906894 + .7842317*i*	.789274
-.08906894 - .7842317*i*	.789274
-.6702866 + .2366179*i*	.710825
-.6702866 - .2366179*i*	.710825
.03035796 + .703246*i*	.703901
.03035796 - .703246*i*	. 703901
-.2980616 + .5958478*i*	.66624
-.2980616 - .5958478*i*	.66624
.2216479	.221648

The VECM specification imposes 4 unit moduli

The output in Table 4.14 contains a table showing the eigenvalues of the companion matrix and their associated moduli. The table shows that three of the roots are 1. The table footer reminds us that the specified VECM imposes four unit modulus on the companion matrix.

The output indicates that there is a real root at about 0.935. Although there is no distribution theory to measure how close this root is to one, per other discussions in the literature, we conclude that the root of 0.95 supports our earlier analysis, in which we concluded that the predicted co-integrating equation is probably not stationary.

4.6 Discussion of Findings

The main objective of this study was to find out the relationship between financial deepening indicators and stock market performance. Specific objectives and their results are discussed as below;

4.6.1 Financial savings and stock market performance

Financial savings this quarter is explained by 56.55% of its previous lags and the lags of private sector credit, broad money supply, intermediation ratio and the stock market performance. Financial savings adjusts at a speed of 25% downwards to the long-term equilibrium.

If the stock market performance increased by one unit (1%) in the last quarter then financial savings in the current quarter will decrease by 17.7%. Immediately there is a shock in financial savings, stock market performance increases and continues being positive over the subsequent four quarters but becomes negative in the 5^{th} quarter and thereafter rises and stays positive to the 10^{th} quarter. The shock of financial savings on stock market performance is transitory. A shock on the stock market performance on the other hand, has a permanent negative effect on financial savings; values remain negative over the next ten quarters.

4.6.2 Private sector credit and stock market performance

Private sector credit this quarter is explained by 62.98% of its previous lags and the lags of, financial savings, broad money supply, intermediation ratio and the stock market performance. Private sector credit adjusts at a speed of 26% upwards to the long-term equilibrium.

If the stock market performance increased by one unit (1%) in the last quarter then private sector credit in the current quarter will decrease by 63.76%. If private sector credit increases by one unit (1%) this quarter then stock market performance will increase by 48.82% in the next quarter. At the instant of a shock in private sector credit, stock market performance increases and stays positive for 2 quarters then becomes negative in the 3rd and 4th quarters. The shock on private sector credit has a transitory effect on stock market performance as the effects move around negative and positive values over the succeeding ten quarters. A shock on stock market performance has a permanent negative effect on private sector credit; values remain negative over the next ten quarters.

4.6.3 Broad money supply and stock market performance

Broad money supply this quarter is explained by 62.98% of its previous lags and the lags of financial savings, private sector credit, intermediation ratio and the stock market performance. Broad money supply adjusts at a speed of 20.14% downwards towards the long-term equilibrium.

When stock market performance increases by one unit (1%) this quarter, then broad money supply will decrease by 13.45% in the next quarter. At the point of a shock on broad money supply, the stock market performance increases then decreases in the first quarter. The shock on broad money supply has a non-permanent effect on stock market performance as values oscillate around the zero mark.

4.6.4 Intermediation ratio and stock market performance

Intermediation ratio this quarter is explained by 83.08% of its previous lags and the lags of financial savings, private sector credit, broad money supply and the stock market performance. Intermediation ratio adjusts at a speed of 111% upwards towards the long-term equilibrium.

If the intermediation ratio increases by one unit (1%) in the current quarter then the stock market will decrease by 70.4% in the subsequent quarter. When there is a shock in the intermediation ratio, the stock market performance decreases both instantlyand in the first quarter but increases in the second quarter. The impulse on intermediation ratio has a transitory effect on stock market performance. A shock on stock market performance has a permanent positive effect on intermediation ratio; the values of intermediation ratio remain positive over the consequent ten quarters.

CHAPTER FIVE: DISCUSSION AND CONCLUSION

5.1 Introduction

This chapter presents the findings of the study, the conclusion and recommendations from the study findings. Discussions of the findings relate to the four specific objectives. The main objective of the study was to find out the relationship between financial deepening indicators and the stock market performance in Kenya.

5.2 Discussions

From the theoretical analysis discussed in chapter 2, McKinnon and Shaw (1973) came up with a lot of evidence about financial development correlating with growth. If the rate of interest rises, then capital market imperfections lower growth by depressing savings. They found out that financial repression depresses growth; whilst, financial development raises savings and growth. Mckinnon, R. and Shaw, E. (1973) claimed that, financial intermediation raises the level of saving and investment. Theyused; the ratio of credit to GDP (measuring total financial size), the ratio of deposit bank domestic assets to the sum of deposit bank and Central Bank domestic assets (the fraction of credit intermediated by deposit banks): and the ratio of claims on the non-financial private sector held by deposit banks and the Central Bank to total domestic credit (this is the fraction of credit extended to firms and households). The findings of this study are consistent with this theory as an increase in financial savings leads to an increase in the stock market performance.

The results of this research are inconsistent with the Tobin theory which argued that the existence of money in an economy may encourage agents to hoard savings in the form of money balances. This situation is likely to occur in less developed economies where output is more susceptible to shocks, which make individuals to hold precautionary money balances. Tobin argued that, a smaller proportion of savings is now available for the expansion of physical capital stock. Accordingly, the channelling of savings away from investment in physical capital stock

deprives developing countries of investment opportunities that may accelerate their economic growth. The inconsistency arises due to the fact that Tobin considered savings which a household hoards for precautionary purposes hence reducing amounts available for investment, while this study has considered savings as being deposits in the banks.

From the results of this study, when financial savings increase, stock market performance decreases. This is in line with the studies of Ranciere, R., Tornell, A., and Westermann, F. (2006)that broke down the effects of financial liberalization in terms of crises versus growth, their data which comprised of sixty countries, came up with two contrasting views of financial liberalization. This study is consistent the first view which stated that financial liberalization boosts financial development and contributes to higher long-run growth and that financial liberalization induces higher growth by expediting financial deepening and thus increasing the investment of financially constrained firms.The results of this study are contradicting with those of Nieuwerburgh, S., Buelens, F., and Cuyvers, L. (2006)who viewed stock market development and economic growth using Belgium annual data for the period 1830 to 2000 and used variables; Deposits in commercial banks, savings in commercial banks and bank note circulation and opined that there was no evidence for a long-run equilibrium relation between bank development and stock market development. This study determined that there is a long-run equilibrium (co-integration) between the financial deepening indicators used and the stock market performance. This is due to the fact that Kenya is a developing country while Belgium is a developed country and therefore relationships would differ.

Results of this study show that when stock market performance increases this quarter then private sector credit will decrease in the next quarter; this is in line with the studies of Leming, L. (2017) who concluded that there is a negative relationship between bank deposits and stock market performance. Bank deposits growth tend to be smaller or even negative when the stock market is booming. There is a substitution relationship between deposits and stock

market investment by investors, this is more so in counties with greater stock market participation. In Kenya, the Nairobi stock exchange has been expanding and participation has been high in the recent past.

This study is in accordance with the results of Levine, R., and Zervos, S. (1998)who studied stock markets, banks and growth in 47 countries using annual data over the period 1976 to 1993 and used output growth, capital stock growth, productivity growth, savings and bank credit as their variables, they found out that stock market liquidity and banking development both positively predict growth, productivity improvements and capital accumulation when entered together in regressions, this was after economic and political factors were controlled for.

5.3 Conclusions

The most important variable in this study's results is private sector credit. This is because private sector credit and stock market performance have a significant bidirectional relationship; when the stock market performance increases by one unit (1%) in this quarter then private sector credit will decrease by 63.76% in the next quarter but if private sector credit increases by one unit (1%) this quarter then stock market performance will increase by 48.82% in the next quarter. There is therefore need to increase provision of financial services for banks which are the biggest financial intermediaries in Kenya. The efforts should be geared towards provision of financial services (both deposits and loans) to the unbanked and under-banked in Kenya.Based on the findings, policies for the banks under the Central bank of Kenya (CBK) should be formulated with the Capital Markets Authority (CMA) and in particularly the Nairobi Stock Exchange (NSE) in close consideration. Monetary and fiscal policies geared towards expansionary and contractionary measures should also have the stock market performance in mind.

5.5 Recommendations

The findings from this study are important and of benefit to policy changers both in the stock markets and in the banking sectors. From the impulse response functions, financial savings, private sector credit and intermediation ratio have permanent effects on the stock market performance. It is therefore important that as the Central bank of Kenya makes policies such as; interest rate capping {which increases loans and decreases deposits}, increasing percentage of minimum reserves {reduce deposits held by banks as well loans}, minimum capital requirements {which reduce the deposits as well as funds to issue as loans}, stringent rules on opening bank branches and ATMs {this will limit the number of people who can access banking services} and so forth, takes into consideration the effects of these on the stock market performance.

The Government of Kenya and the relevant authorities should put in place measures to ensure that they are more cautious in making policy changes in a bid to bring stability to the macroeconomic environment through influencing variables such as inflation, interest rates and Government spending, either for expansionary or contractionary purposes. This is because whereas this may be done in good faith to correct a single macroeconomic problem such as increase in inflation or decrease in money circulation, may lead to negative effects on the stock market performance (index) and therefore have an impact on the other financial deepening indicators.

Financial consultants and investment firms will also be able to advise their clients on the best investment strategy as either financial savings (deposits) or stock market, depending on the previous trends in the market. Stock brokers will be able to make speculative decisions on the market and decide on any hedging strategies. Stock brokers can also make arbitrage decisions i.e.the simultaneous buying and selling of securities, currency, or commodities in different markets in order to take advantage of differing prices for the same asset which may

be caused by the differences in the effects of financial deepening indicators on the stock market performance.

5.7 Recommendation for further study

This study sought to out the relationship between financial deepening indicators and the stock market performance i.e. the NSE, in Kenya. However, there is need for a comparative analysis to be carried out amongst different sectors in the NSE as per the market categorizations. Furthermore, there are other alternative methods of analysis which can be used to analyze the stock market performance such as the GARCH model which measure volatility since the stock market performance is very volatile.

The current study was limited to local level (Kenya) and since they are plans of forming the East Africa community market, a similar study ought to be carried out to examine the relationship between financial deepening indicators and the stock market performance on the other East African countries (i.e. Uganda, Tanzania, Rwanda and South Sudan).

A study examining the different rates of these variables should also be conducted i.e. investment rate for returns, loan rates and savings rate in relation to the stock market performance. Political and macroeconomic factors should be moderated for.

5.6 Limitations

This study encountered a literature gap since there are very few studies that have been done on financial deepening indicators specifically on the stock market performance and more so in the developing economies. The studies used are also not recent as they date back to few years and some to decades back. The study was limited to the five selected variables. Therewas the challenge of using historical data as this data might be a bit inefficient in examining the current state of affairs.

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APPENDIX I

Licensed Commercial Banks

1	African Banking Corporation Limited	22	Guaranty Trust Bank (K) Ltd
2	Bank of Africa Kenya Limited	23	Giro Commercial Bank Limited
3	Bank of Baroda (K) Limited	24	Guardian Bank Limited
4	Bank of India	25	Gulf African Bank Limited
5	Barclays Bank of Kenya Limited	26	Habib Bank A.G Zurich
6	CfCStanbic Bank Limited	27	Habib Bank Limited
7	Charterhouse Bank Limited	28	Imperial Bank Limited
8	Chase Bank (K) Limited	29	I & M Bank Limited
9	Citibank N.A Kenya	30	Jamii Bora Bank Limited
10	Commercial Bank of Africa Limited	31	KCB Bank Kenya Limited
11	Consolidated Bank of Kenya Limited	32	Middle East Bank (K) Limited
12	Co-operative Bank of Kenya Limited	33	National Bank of Kenya Limited
13	Credit Bank Limited	34	NIC Bank Limited
14	Development Bank of Kenya Limited	35	M-Oriental Bank Limited
15	Diamond Trust Bank Kenya Limited	36	Paramount Bank Limited
16	Ecobank Kenya Limited	37	Prime Bank Limited
17	Spire Bank Ltd	38	Sidian Bank Limited
18	Equity Bank Kenya Limited	39	Standard Chartered Bank Kenya Limited
19	Family Bank Limited	40	Trans-National Bank Limited
20	Fidelity Commercial Bank Limited	41	UBA Kenya Bank Limited
21	First Community Bank Limited	42	Victoria Commercial Bank Limited

Source;https://www.centralbank.go.ke/commercial-banks/

APPENDIX II

The components of the Kenya NSE 20-Share Index for 2017

1	ARM Cement
2	Bamburi Cement
3	Barclays Bank Kenya
4	Britam
5	British American Tobacco Kenya
6	Centum Investment
7	CfC Stanbic
8	Co-operative Bank
9	East African Breweries
10	Equity Group
11	KCB Group
12	Kenol Kobil
13	Kenya Airways
14	Kenya Electricity Generating
15	Kenya Power Lighting
16	Nation Media
17	Safaricom
18	Sasini
19	Standard Chartered Bank
20	WPP-Scangroup

Source: http://topforeignstocks.com/indices/the-components-of-the-kenya-nse-20-share-index/

APPENDIX III

Data collection worksheet

Variable	**Data to be collected**	**Workings**	**January 2001– June 2017**
			Kshs
Financial savings	Commercial Bank deposits	a	xxxx
Private sector credit	Commercial Bank loans	b	xxxx
Financial intermediation	Ratio of bank loans to bank deposits	c = b/a	xx
Broad money supply	M2		xxxx
Stock market performance	NSE 20-share index		xx
	Gross Domestic Product (GDP)		xxxx

Source: Author 2018

APPENDIX IV

Data collected

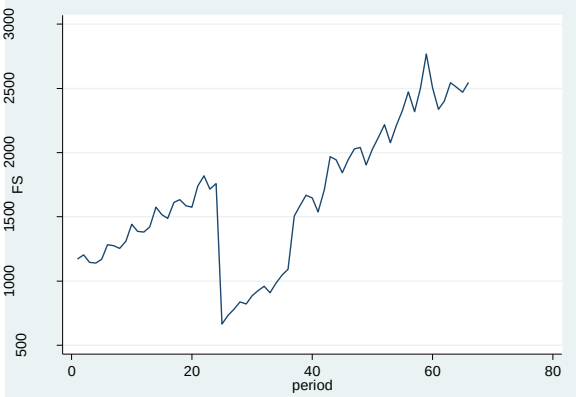
Year	Period	FS (Normalized with GDP)	PsC (Normalized with GDP)	M_2 (Normalized with GDP)	IR (Multiplied with 1,000)	SmP (NSE 20 share Index)
		Kshs	Kshs	Kshs	Kshs	Kshs
2001	1	1,172	1,169	1240	997	1,887
	2	1,204	1,199	1259	996	1,687
	3	1,145	1,074	1179	938	1,509
	4	1,141	1,024	1200	897	1,416
2002	5	1,170	1,042	1231	891	1,280
	6	1,284	1,160	1335	904	1,096
	7	1,276	1,151	1321	902	1,056
	8	1,254	1,113	1292	887	1,214
2003	9	1,309	1,141	1363	872	1,559
	10	1,442	1,197	1442	830	1,953
	11	1,387	1,084	1366	782	2,164
	12	1,381	1,079	1378	781	2,644
2004	13	1,421	1,124	1421	790	3,035
	14	1,576	1,252	1557	794	2,589
	15	1,516	1,220	1486	805	2,696
	16	1,487	1,248	1433	839	2,898
2005	17	1,612	4,265	1531	2,646	3,172
	18	1,633	4,643	1578	2,843	3,568
	19	1,585	3,732	1487	2,355	3,918
	20	1,575	4,345	1501	2,760	3,962
2006	21	1,741	4,696	1627	2,697	4,110
	22	1,820	4,913	1742	2,699	4,212
	23	1,715	4,636	1628	2,703	4,542
	24	1,759	4,873	1680	2,770	5,525
2007	25	664	2,349	788	3,536	5,432
	26	732	2,564	853	3,502	5,099
	27	781	2,777	913	3,558	5,286
	28	836	2,947	973	3,524	5,217
2008	29	822	712	957	866	4,876
	30	885	798	1048	902	5,232
	31	926	888	1070	959	4,566
	32	960	932	1119	971	3,416
2009	33	908	868	1045	956	2,826
	34	982	924	1122	940	2,982
	35	1,046	947	1188	905	3,127
	36	1,091	1,010	1249	926	3,174

2010	37	1,506	953	1193	633	3,756
	38	1,589	1,081	1304	681	4,271
	39	1,669	1,154	1387	691	4,508
	40	1,647	1,114	1383	676	4,496
2011	41	1,539	1,098	1336	713	4,197
	42	1,711	1,344	1436	786	4,025
	43	1,968	1,399	1518	711	3,495
	44	1,945	1,386	1473	712	3,289
2012	45	1,842	1,362	1425	740	3,298
	46	1,945	1,512	1540	777	3,634
	47	2,029	1,334	1635	658	3,890
	48	2,041	1,577	1688	773	4,121
2013	49	1,904	1,498	1571	787	4,599
	50	2,026	1,580	1679	780	4,790
	51	2,116	1,684	1744	796	4,760
	52	2,218	1,793	1813	808	4,988
2014	53	2,076	1,720	1761	828	4,912
	54	2,210	1,830	1866	828	4,905
	55	2,330	2,011	1988	863	5,100
	56	2,472	2,090	2069	845	5,155
2015	57	2,319	1,895	1945	817	5,350
	58	2,503	1,987	2053	794	4,928
	59	2,768	2,167	2143	783	4,251
	60	2,505	2,256	2216	901	3,975
2016	61	2,338	2,028	2055	867	3,875
	62	2,401	2,080	2131	866	3,839
	63	2,544	2,146	2203	844	3,304
	64	2,510	2,208	2229	879	3,228
2017	65	2,470	2,146	2133	869	2,956
	66	2,547	2,109	2203	828	3,402

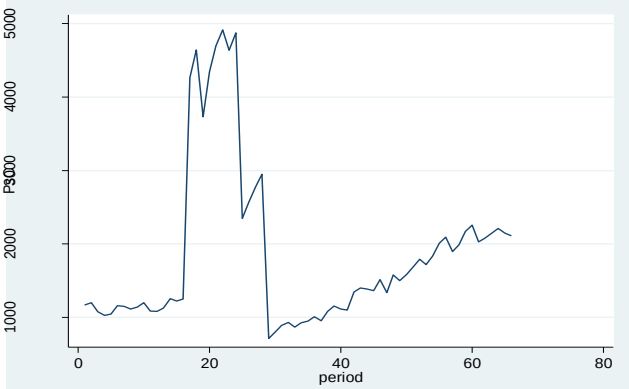
APPENDIX V

FIGURE 4: TRENDPLOTS FOR VARIABLES

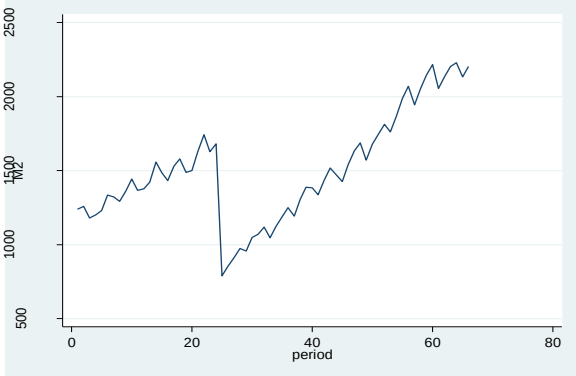
FS



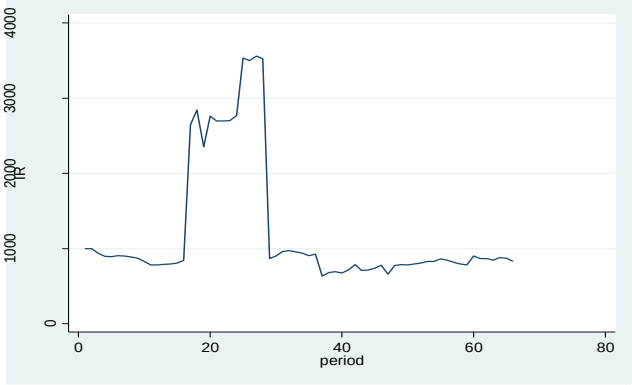
PsC



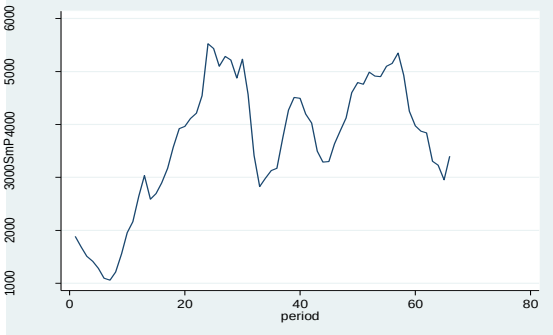
M_2



IR



SmP

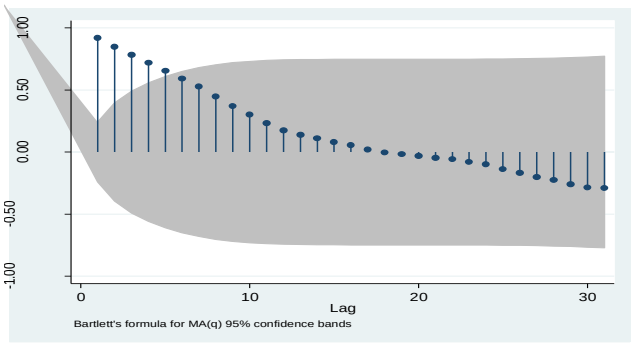


Source: Author 2018

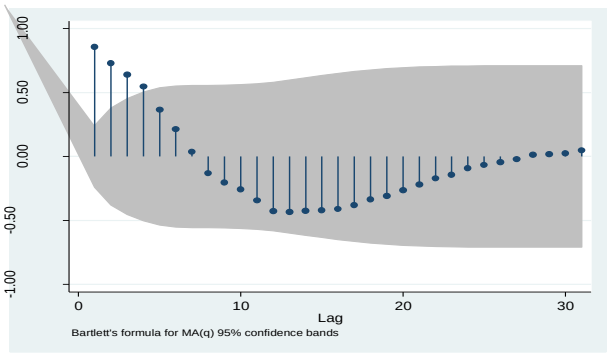
APPENDIX VI

FIGURE 5: CORRELOGRAMS FOR VARIABLES

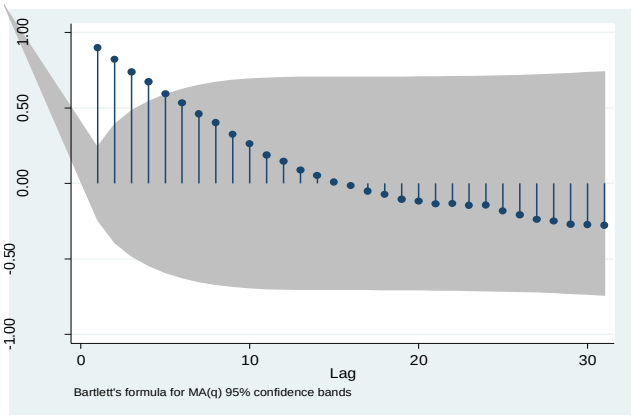
FS



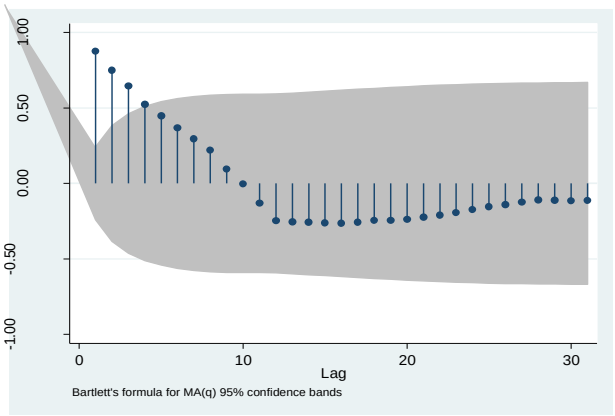
PsC



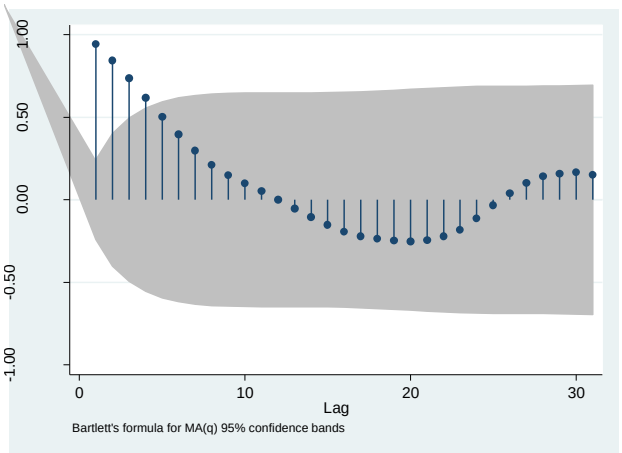
M_2



IR



SmP

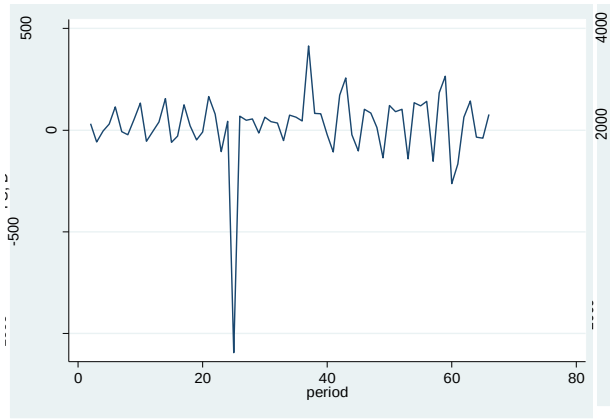


Source: Author 2018

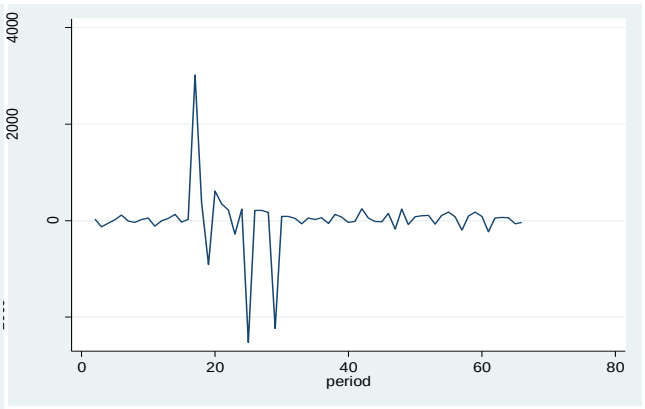
APPENDIX VII

FIGURE 6: TRENDPLOTS FOR DIFFERENCED VARIABLES

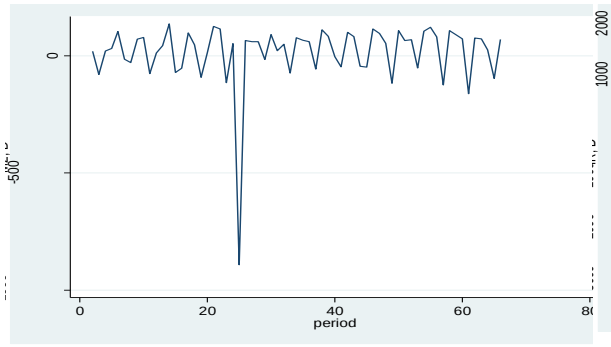
d.fs



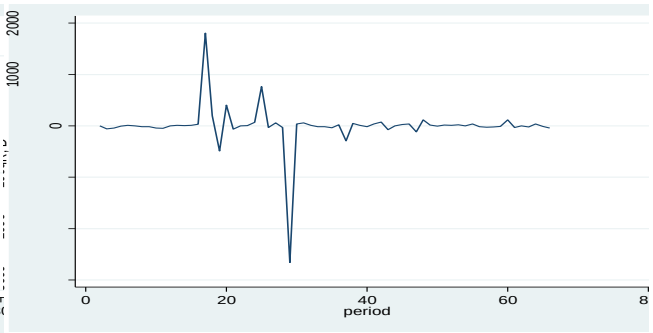
d.PsC



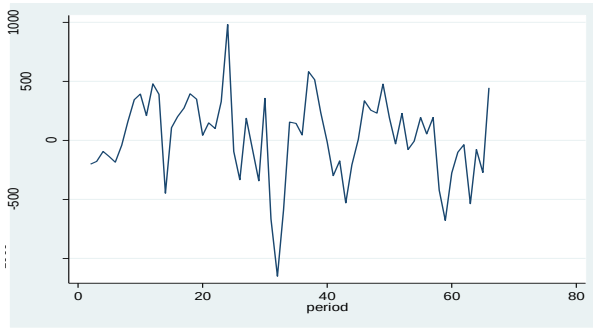
d.M_2



d.ir



d.SmP

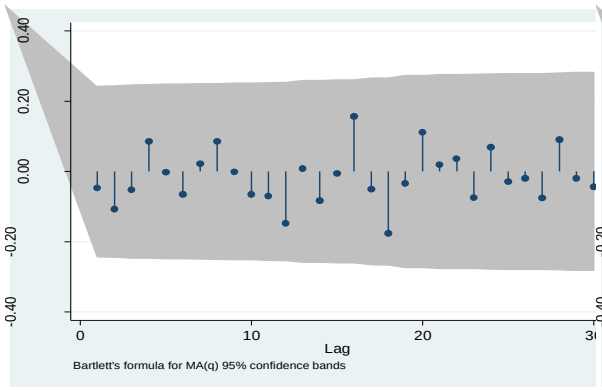


Source: Author 2018

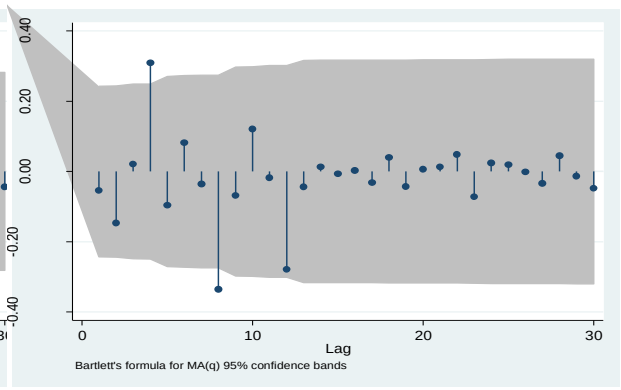
APPENDIX VIII

FIGURE 7: CORRELOGRAMS FOR DIFFERENCED VARIABLES

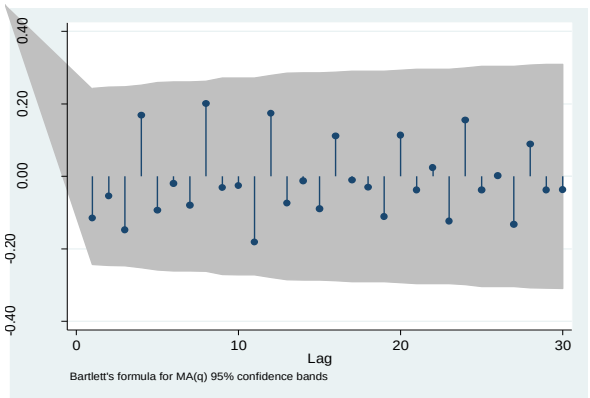
d.fs



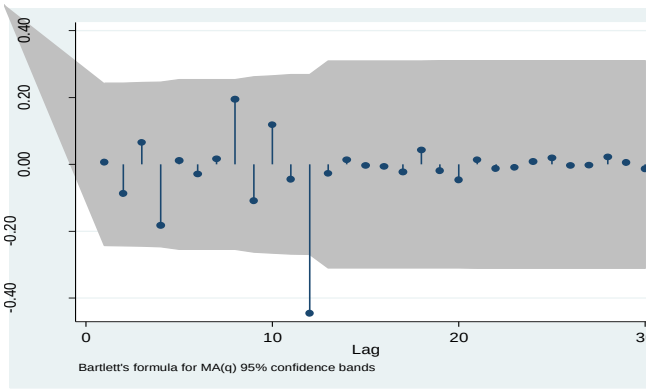
d.PsC



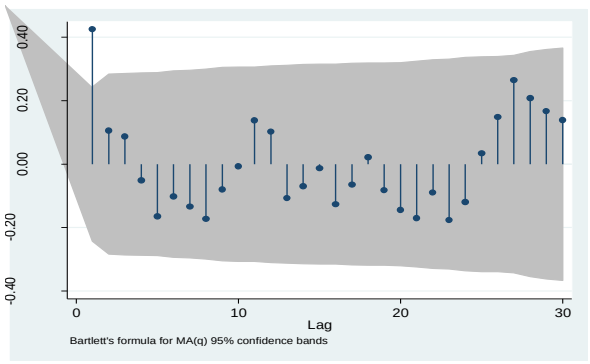
d.M_2



d.ir



d.Log_SmP

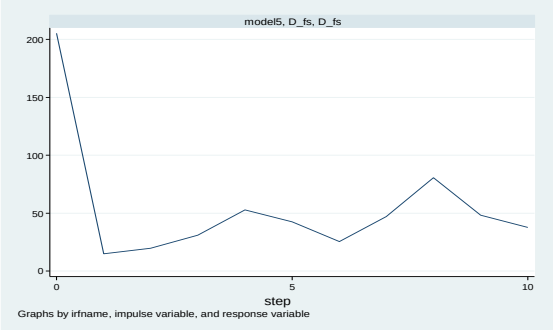


Source: Author 2018

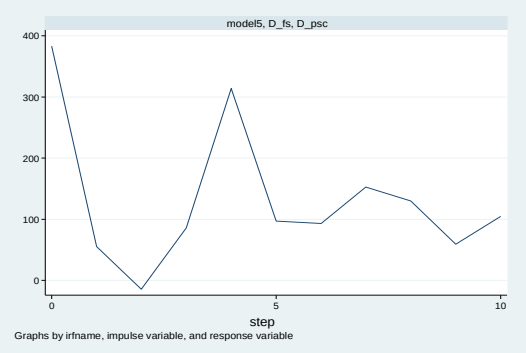
APPENDIX IX

FIGURE 8: IMPULSE RESPONSE FUNCTION GRAPHS

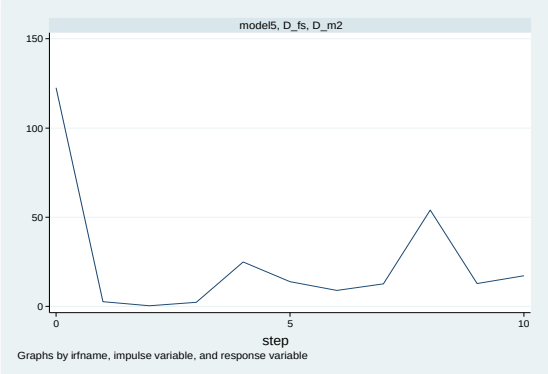
D_fs,D_fs



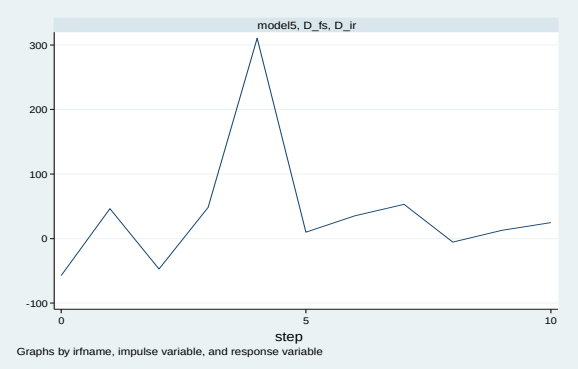
D_fs,D_psc



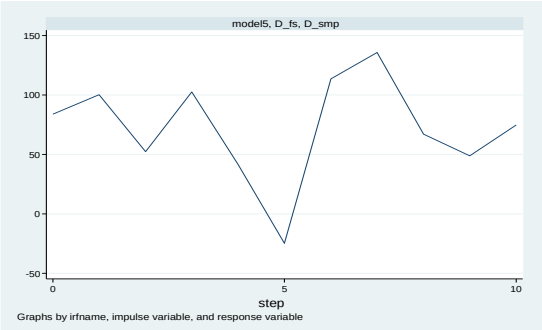
D_fs,D_m2



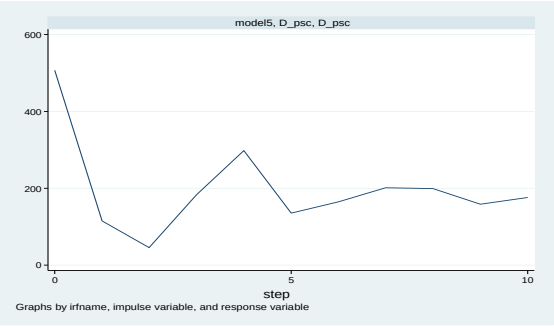
D_fs,D_ir



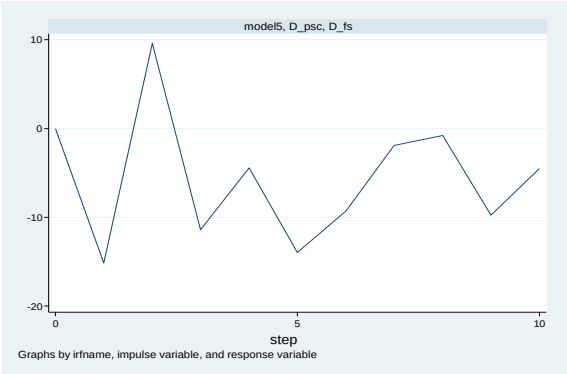
D_fs,D_smp



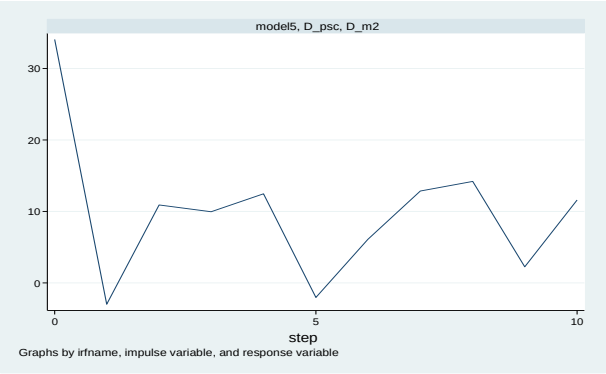
D_psc,D_psc



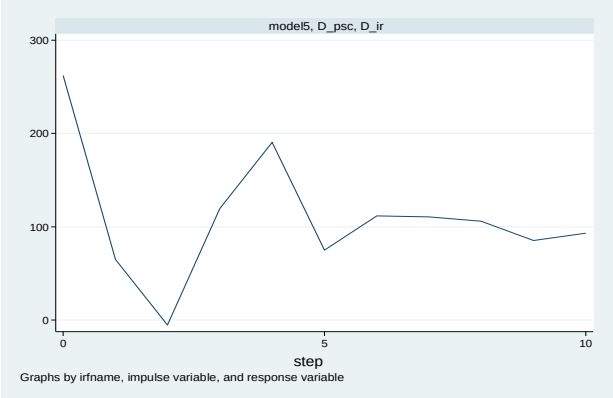
D_psc,D_fs



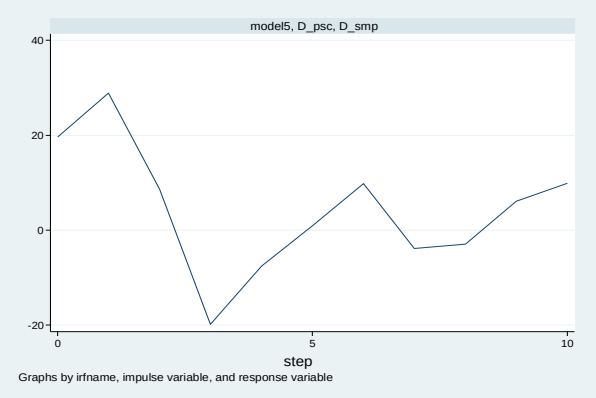
D_psc,D_m2



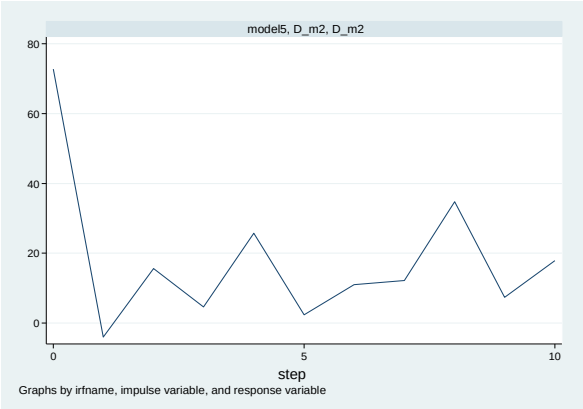
D_psc,D_ir



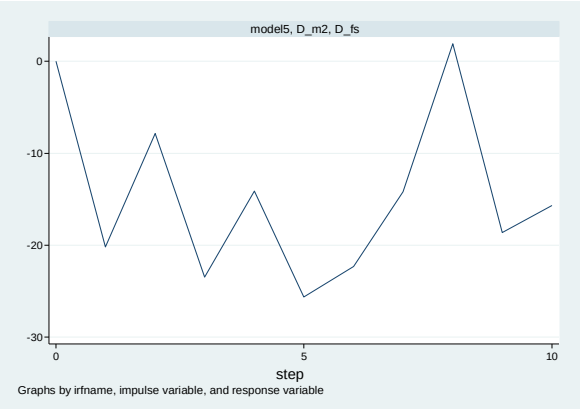
D_psc,D_smp



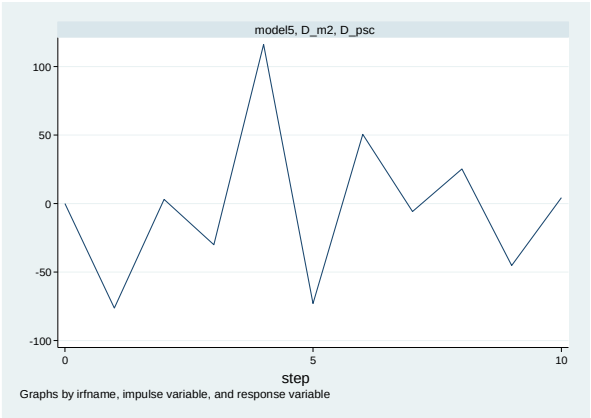
D_m2,D_m2



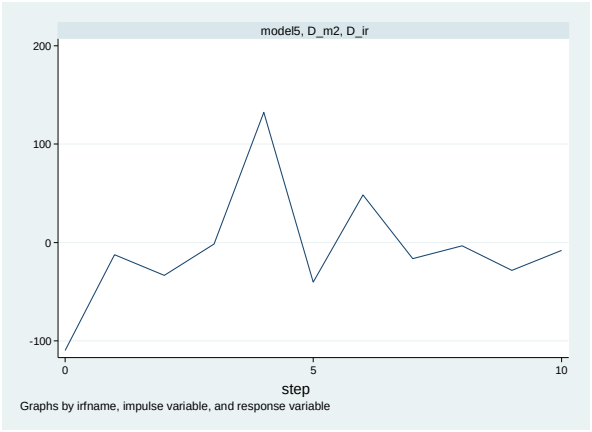
D_m2,D_fs



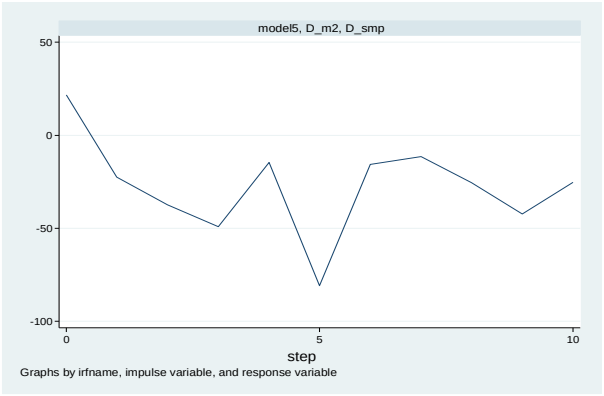
D_m2,D_ psc



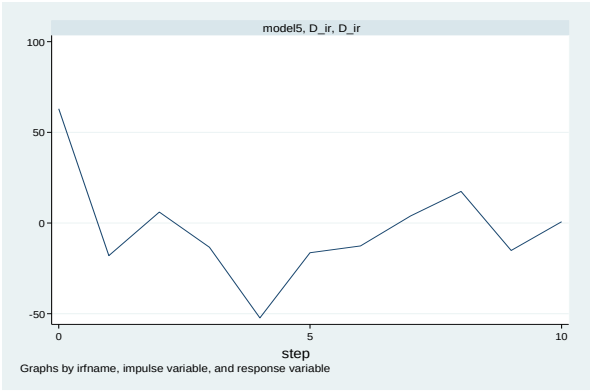
D_m2,D_ir



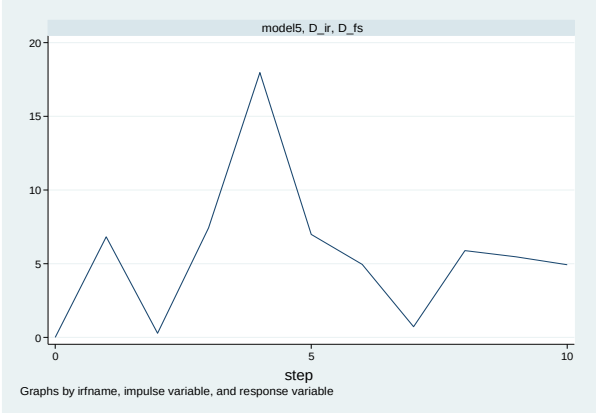
D_m2,D_smp



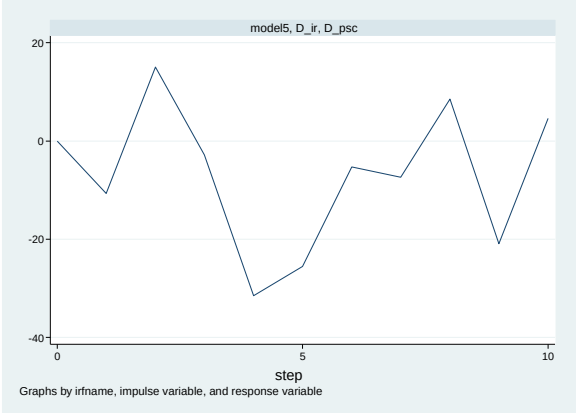
D_ir,D_ir



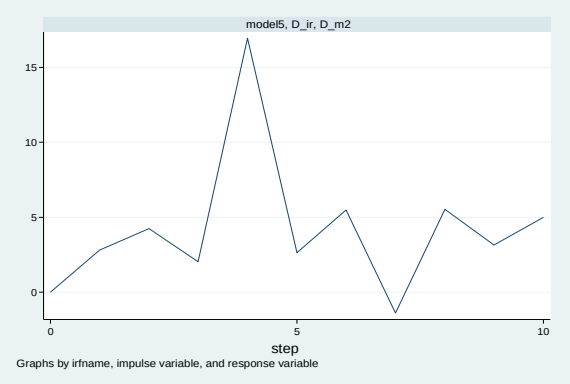
D_ir,D_fs



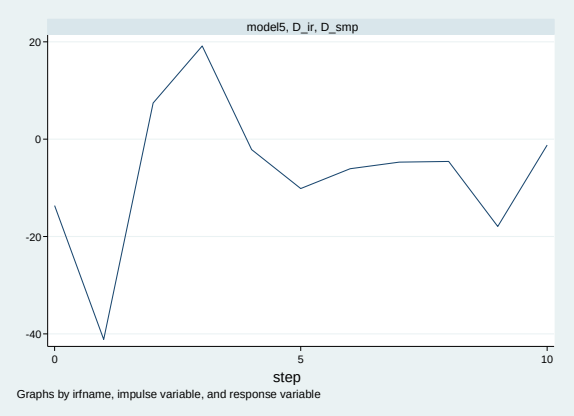
D_ir,D_psc



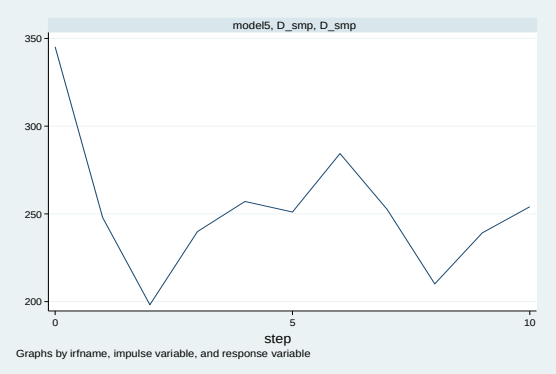
D_ir,D_m2



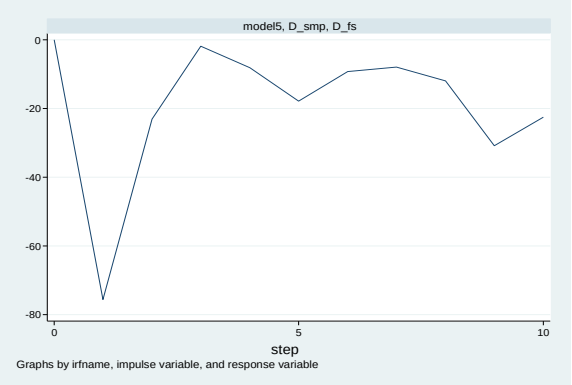
D_ir,D_smp



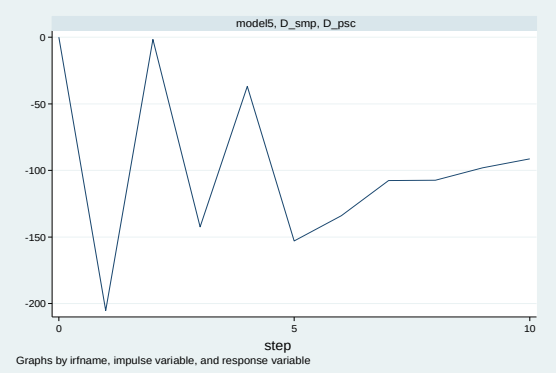
D_smp,D_smp



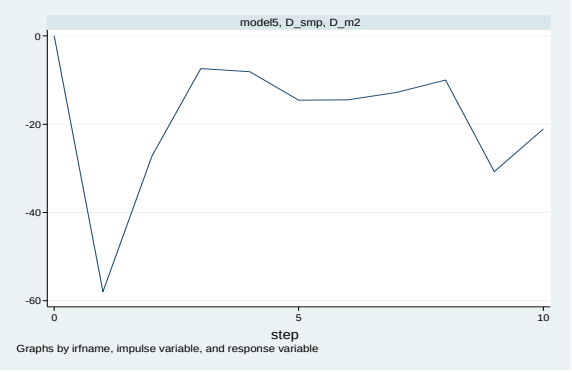
D_smp,D_fs



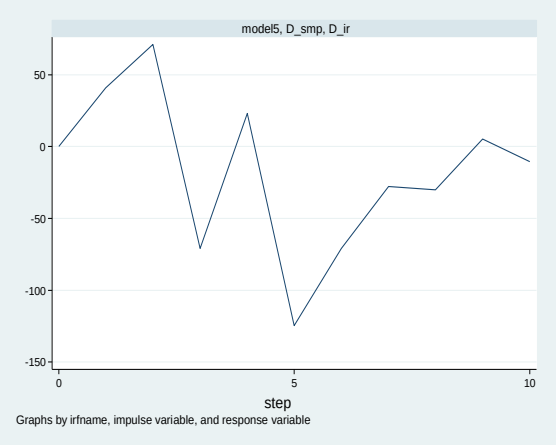
D_smp,D_psc



D_smp,D_m2



D_smp,D_ir



Source: Author 2018

APPENDIX X

FIGURE 9: VARIANCE DECOMPOSITION GRAPHS

APPENDIX XI

TABLE 4.9 (b)

VECTOR ERROR CORRECTION ESTIMATES -FULL

		Coef.	Std.Err.	z	p>|z|	[95% Conf. Interval]	
D2_fs	fs						
	LD2.	-.9179568	.28519	-3.22	0.001	-1.476919	-.3589946
	L2D2.	-.8534164	.316439	-2.70	0.007	-1.473625	-.2332074
	L3D2.	-.4559567	.2787012	-1.64	0.102	-1.002201	.0902875
	PsC						
	LD2.	.2516553	.1391242	1.81	0.070	-.0210232	.5243338
	L2D2.	.3849619	.145287	2.65	0.008	.1002047	.6697192
	L3D2.	.2111941	.1219989	1.73	0.083	-.0279193	.4503076
	M_2						
	LD2.	-.1669048	.4001318	-0.42	0.677	-.9511487	.6173392
	L2D2.	-.530672	.4989892	-1.06	0.288	-1.508673	.4473289
	L3D2.	-.3908772	.4124098	-0.95	0.343	-1.199186	.4174312
	IR						
	LD2.	-.466732	.1955261	-2.39	0.017	-.8499561	-.0835079
	L2D2.	-.6022526	.1914232	-3.15	0.002	-.9774351	-.2270701
	L3D2.	-.3631132	.1512912	-2.40	0.016	-.6596386	-.0665878
	SmP						
	LD2.	-.1768679	.0901995	-1.96	0.050	-.3536557	-.0000801
	L2D2.	-.0673816	.0929597	-0.72	0.469	-.2495793	.1148161
	L3D2.	.022703	.0859574	0.26	0.792	-.1457703	.1911763
D2_psc	fs						
	LD2.	.5621792	.8830148	0.64	0.524	-1.168498	2.292856
	L2D2.	.3430381	.9797689	0.35	0.726	-1.577274	2.26335
	L3D2.	.4715957	.8629238	0.55	0.585	-1.219704	2.162895
	PsC						
	LD2.	-.8139329	.4307611	-1.89	0.059	-1.658209	.0303433
	L2D2.	-.7981106	.4498425	-1.77	0.076	-1.679786	.0835644
	L3D2.	-.6540234	.377737	-1.73	0.083	-1.394374	.0863275
	M_2						
	LD2.	-1.273452	1.238902	-1.03	0.304	-3.701655	1.15475

	L2D2.	-1.110999	1.544987	-0.72	0.472	-4.139118	1.917119
	L3D2.	-.8807507	1.276917	-0.69	0.490	-3.383462	1.621961
	IR						
	LD2.	.2477372	.6053944	0.41	0.682	-.938814	1.434288
	L2D2.	.2509404	.5926907	0.42	0.672	-.9107121	1.412593
	L3D2.	.5685721	.468433	1.21	0.225	-.3495397	1.486684
	SmP						
	LD2.	-.6376522	.2792788	-2.28	0.022	-1.185029	-.0902758
	L2D2.	-.0435579	.287825	-0.15	0.880	-.6076847	.5205688
	L3D2.	-.5731423	.266144	-2.15	0.031	-1.094775	-.0515096
D2_m2	fs						
	LD2.	-.1130658	.2036359	-0.56	0.579	-.5121848	.2860532
	L2D2.	-.2176356	.2259488	-0.96	0.335	-.660487	.2252158
	L3D2.	-.1827469	.1990026	-0.92	0.358	-.5727848	.2072911
	PsC						
	LD2.	.2321391	.0993397	2.34	0.019	.0374369	.4268413
	L2D2.	.2756937	.1037401	2.66	0.008	.0723668	.4790206
	L3D2.	.2171702	.0871116	2.49	0.013	.0464346	.3879057
	M_2						
	LD2.	-1.035	.2857085	-3.61	0.000	-1.590479	-.470522
	L2D2.	-.9201958	.3562961	-2.58	0.010	-1.618523	-.2218682
	L3D2.	-.7537622	.2944754	-2.56	0.010	-1.330923	-.1766011
	IR						
	LD2.	-.4123269	.1396126	-2.95	0.003	-.6859626	-.1386911
	L2D2.	-.4502019	.136683	-3.29	0.001	-.7180956	-.1823081
	L3D2.	-.343598	.1080274	-3.18	0.001	-.5553278	-.1318683
	SmP						
	LD2.	-.1344976	.0644057	-2.09	0.037	-.2607304	-.0082648
	L2D2.	-.0757744	.0663766	-1.14	0.254	-.2058702	.0543213
	L3D2.	-.0124091	.0613766	-0.20	0.840	-.1327051	.1078869
D2_ir	fs						
	LD2.	1.019573	.4125738	2.47	0.013	.2109427	1.828202
	L2D2.	1.016979	.4577805	2.22	0.026	.1197458	1.914213
	L3D2.	.721524	.4031867	1.79	0.074	-.0687073	1.511755
	PsC						
	LD2.	-1.007226	.2012659	-5.00	0.000	-1.4017	-.612752
	L2D2.	-1.198227	.2101813	-5.70	0.000	-1.610175	-.786279
	L3D2.	-.8489118	.1764913	-4.81	0.000	-1.194828	-.5029952
	M_2						
	LD2.	-.395118	.5788559	-0.68	0.495	-1.529655	.7394187
	L2D2.	-.3201938	.7218691	-0.44	0.657	-1.735031	1.094644

	L3D2.	-.5000395	.596618	-0.84	0.402	-1.669389	.6693104
	IR						
	LD2.	1.063484	.2828603	3.76	0.000	.5090875	1.61788
	L2D2.	10294448	.2769248	4.67	0.000	.7516849	1.83721
	L3D2.	1.110401	.2188674	5.07	0.000	.6814288	1.539373
	SmP						
	LD2.	-.0662031	.1304883	-0.51	0.612	-.3219555	.1895492
	L2D2.	.1419416	.1344814	1.06	0.291	-.1216372	.4055203
	L3D2.	-.4081377	.1243513	-3.28	0.001	-.6518618	1.539373
D2_smp	fs						
	LD2.	0.0249122	.4959114	0.05	0.960	-.9470563	.9968807
	L2D2.	0.3299141	.5502497	0.60	0.549	-.7485554	1.408384
	L3D2.	0.8962571	.4846281	1.85	0.064	-.0535965	1.846111
	PsC						
	LD2.	0.4881586	.2419205	2.02	0.044	.0140032	.9623141
	L2D2.	0.0767289	.2526368	0.30	0.761	-.4184301	.5718879
	L3D2.	-.1896333	.2121415	-0.89	0.371	-.6054231	.2261564
	M_2						
	LD2.	-1.294459	.6957816	-1.86	0.063	-2.658166	.0692478
	L2D2.	-.4785092	.8676827	-0.55	0.581	-2.179136	1.222118
	L3D2.	-.3030139	.7171316	-0.42	0.673	-1.708566	1.102538
	IR						
	LD2.	-.7035966	.3399966	-2.07	0.039	-1.369978	-.0372156
	L2D2.	-.1194416	.3328621	-0.36	0.720	-.7718393	.532956
	L3D2.	.286891	.2630775	1.09	0.275	-.2287313	.8025134
	SmP						
	LD2.	-.2658847	.1568462	-1.70	0.090	-.5732976	.0415283
	L2D2.	-.113964	.1616459	-0.71	0.481	-.4307842	.2028561
	L3D2.	-.0382343	.1494696	-0.26	0.798	-.3311894	.2547207