IPRPD
International Journal of Business & Management Studies
ISSN 2694-1430 (Print), 2694-1449 (Online)
Volume 05; Issue no 08: August, 2024
DOI: 10.56734/ijbms.v5n8a6

RELATIONSHIP BETWEEN FINANCIAL DEEPENING INDICATORS AND STOCK MARKET PERFORMANCE IN KENYA

Joyce Khasacha Omina[1], Christine Nanjala Simiyu[2]

[1]KCA University, Nairobi, Kenya

Abstract

The purpose of this study 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. 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.

Keywords

Financial Deepening Indicators, Stock Market Performance, VECM

1. Introduction

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 (19NBKJB 11) and other researchers Mckinnon and Shaw (1973) show that the development of the financial sector has productivity and growth-enhancing effects. Nzotta and Okereke (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. Okafore, Onwumere and Chijindu (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 and Okereke (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 and Levine (2005).who stated that a financially deepened economy involves financial intermediaries mobilizing savings, evaluating projects, managing risk, monitoring managers and facilitating transactions.

Different studies have looked at different financial deepening indicators. Oh (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, Pokhriyal, and Mohan (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 and Levine (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 and Liu (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 and Okereke (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 (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, Onwumere and Chijindu (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.

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.

The Nairobi Securities Exchange dates back to the 1920's when trading in shares started; notwithstanding in an informal setting (Kemboi and Tarus 2013). As per Barasa (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.

Maskay and Chapman (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 (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.

2. Data and Methodology

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. Data was normalized by dividing the variables by the GDP. A data collection worksheet was used (See Appendix III).

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 and Fuller (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 and Perron (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 and Lai (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 and Granger (1987), Granger and Weiss (1983), and Johansen and Juselius (1988). Time series are said to be co-integrated if they co-move in the same direction towards a long-term equilibrium. Nielsen (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.

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;

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

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

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

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

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

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
$\{\ddot{O} + FS_{t-1} - \beta_{12}PsC_{t-1} + \beta_{13}M_{2,t-1} - \beta_{14}IR_{t-1} + \beta_{15}SmP_{t-1}\}$- 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. Empirical Results

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.

Table 3.1 below presents results of descriptive statistics of the data in this study.

	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**

TABLE 3.1: Descriptive Statistics

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 3.1 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.

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

TABLE 3.3: Dickey-Fuller Test for unit root

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 3.3 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 3.4 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 phillip Perron 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.

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

Lag selection

Table 3.5 below presents results of the number of lags to be included in the model as presented by the various information criteria techniques.

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.fs D.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

TABLE 3.5: Lag Selection Criteria

The results in Table 3.5 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.

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 3.6 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 3.6, the model has 4 lags and 3 co-integrating equations.

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

TABLE 3.6 :Johansen co-integrating Test

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.

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

TABLE 3.7: MODEL FITNESS

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.

_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 3.8: Speed of Adjustment

Table 3.8 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%.

		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 3.9 (a) VECTOR ERROR CORRECTION ESTIMATES (FOR SIGNIFICANT VALUES OF LAG1)

Table 3.9 (a) above is an extract of Appendix XI, Table 3.9 (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 3.9 (b).

Table 3.8 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.

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. 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.

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; 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 5th quarter and thereafter rises and stays positive to the 10th 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.

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.

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.

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 instantly and 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.

4. Conclusions

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. They used; 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.

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.

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.

References

Abel, A. B., and Blanchard, J. O. (1983). An intertemperal Model of saving and Investment. *Econometrica*, Vol. 51, Issue 3, pp. 675-692.

B Égerta, B., and E Kočenda, E. (2011). Time-varying synchronization of European stock markets. *Empirical Economics*, 14.

Baier, S. L., Dwyer, G. P., and Tamura, R. (2004). Does opening a stock exchange increase economic growth? *Journal of International Money and Finance*, No. 2003-36.

Barasa, J. W. (2014). Macro-economic determinants of stock market performance in Kenya: case of Nairobi securities exchange. *Unpublished Masters Research Project . erepository.uonbi.ac.ke*

Calderón, C., and Liu, L. (2003).The direction of causality between financial development and economic growth. *Journal of development economics*.

Cetorelli, N., and Gambera, M. (2001). Banking market structure, financial dependence and growth: International evidence from industry data. *The Journal of Finance.*

Cheung, Y.W. and Lai, K. S. (1995). Lag order and critical values of the augmented Dickey–Fuller test. *Journal of Business & Economic statistics*, vol.13 no.3.

Dickey, D. A., and Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical Association*, Vol 74, 366, 427-431.

Engle, R. F., and Granger, C. W. J. (1987), Co-Integration and Error Correction: Representation, Estimation, and Testing. *Econometrica*, Vol. 55, No. 2, pp. 251-276

Ezeoha, A., Ebele, O., and Okereke, N. (2009). Stock market development and private investment growth in Nigeria. *Journal of Sustainable Development in Africa*, Vol 11 no.2, ISSN: 1520-5509.

Ghildiyal, V., Pokhriyal, A. K. and Mohan, A. (2015). Impact of Financial Deepening on Economic Growth in Indian Perspective: ARDL Bound Testing Approach to Cointegration. *Asian Development Policy*, 3(3):49-60.

Granger, C. W. J., and Swanson, N. (1996). Future developments in the study of cointegrated variables. *Oxford Bulletin of Economics and Statistics*, Volume 58, 3,537–553.

Granger, C. W. J., and Weiss, A. A. (1983). Time series analysis of error-correction models. London: Cambridge University Press.

Johansen, S., and Juselius, K. (1988). Hypothesis testing for cointegration vectors: With application to the demand for money in Denmark and Finland. *Journal of Economic Dynamics and Control*, i: 2-3: 231-254.

Kemboi, J. K., and Tarus, D. K. (2013). Macroeconomic determinants of stock market development in emerging markets: Evidence from Kenya. *Research journal of finance and accounting*, Vol. 3, No. 5, 2012.

King, R. G., and Levine, R. (1993). Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics*, Vol. 108, No. 3, pp. 717-737.

Kularatne, C. (2002). An Examination of the Impact of Financial Deepening on Long-Run Economic Growth: An Application of a VECM Structure to a Middle-Income Country Context. *South African Journal of Economics*, DOI: 10.1111/j.1813-6982.2002.tb01185.

Leming, L. (2017). Bank Deposits and the Stock Market. *2017 Chicago Financial Institutions Conference*, PA 15260.

Levine, R., and Zervos, S. (1998). Stock markets, banks, and economic growth. *The American Economic Review*, Vol. 88 no. 3, 537-558.

Maskay,B.,& Chapman,M.(2007). Analyzing the Relationship between Change in Money Supply and Stock Market Prices. *Department of Economics, Illinois Wesleyan University.*

McDonald, C. A. and Schumacher, L. B. (2007). Financial deepening in Sub-Saharan Africa: Empirical evidence on the role of creditor rights protection and information sharing.

Mckinnon, R. and Shaw, E. (1973). Financial deepening in economic development. *Washington D.C.: Brookings Institution*

Mohan, R. (2006). Economic growth, financial deepening, and financial inclusion. *Reserve Bank of India Bulletin*, 1305.

Nielsen, M. O. (2005). Semiparametric Estimation in Time-Series Regression with Long-Range Dependence. *Journal of Time Series Analysis*

Nieuwerburgh, S., Buelens, F., and Cuyvers, L. (2006). Stock market development and economic growth in Belgium. *Explorations in Economic history*, NY 10012

Nnenna, M. (2012). Evaluating the nexus between financial deepening and stock market in Nigeria. *European Scientific Journal*, vol. 8 no.15.

Nzotta, S. M., and Okereke, E. J. (2009). Financial deepening and economic development of Nigeria: An Empirical Investigation. *African Journal of Accounting, Economics, Finance and Banking Research*, Vol. 5, no. 5.

Oh, S. N. (1999). Financial deepening in the banking sector–Viet Nam. *Rising to the challenge in Asia: A Study of Financial Markets.*

Okafor, I. G., Onwumere, J. U. J., and Chijindu, E. H. (2016). Dynamics of monetary policy targets and economic growth under the direct monetary policy regime and market based regime: A case study of Nigeria. *American Research Thoughts*, Volume 2, issue 11. ISSN: 2392 – 876X.

Pagano, M. (1993). Financial markets and growth: An overview. *European Economic Review*, 37:1993 , pp. 613-622.

Phillips, P. C. B., and Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75, pp 335-46.

Ranciere, R., Tornell, A., and Westermann, F. (2006). Decomposing the effects of financial liberalization: Crises vs. growth. *Journal of Banking & Finance*, 74.