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The relationship between stock market development and economic growth: A Kenyan case study.

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Proposal contains no material previously published or written by another person except where due reference is made in the Research Proposal itself.

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Abstract

The study employs ARDL Bounds test of cointegration technique and VECM based Granger Causality to determine the short-run and long-run relationship between stock market development and economic growth for the period 2005-2019. Evidence from the model where real GDP growth is the dependent variable reveals that both market capitalization ratio and total value traded ratio are insignificant in explaining growth. The evidence from model 2 where real GDP and only the short run dynamics are considered reveal that only market capitalization ratio is significant in explaining economic growth. Results from the Granger causality test show a unidirectional relationship from economic growth to total value traded ratio (liquidity of the stock market).

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Abbreviations

GDP Gross Domestic Product

ARDL Autoregressive Distribution Lag

ECM Error Correction Model

VECM Vector Error Correction Model

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Chapter 1

Introduction

1.1 Background information

The stock market has a fundamental contribution to the development process in an economy. Through its primary task of trading securities, the stock market carries out an integral economic function of transferring funds from net savers to net borrowers. Through this function, domestic savings are mobilized and reallocation of the funds is done efficiently. This promotes the efficiency and volume of investments and hence expansion of trade and industry. Firms raise financial resources essential for expansion from the stock market because they can cheaply obtain funds for investment (Dailami & Atkn, 1990).

The stock exchange facilitates trading of securities hence promoting liquidity. Levine (1991) argued that liquidity in the stock markets induces investment in longer period investment projects. This means that stock markets with more liquidity facilitate investments in long-run projects that enhance productivity. In Kenya, the value of equity dealings has been increasing through the years and peaked in 2013 with a value of 1.805 billion USD (CEIC Data, 2017). This reflects advancement in equity market liquidity in the years. Additionally, Mohtadi & Agarwal (2001) argued that enhanced liquidity in the equity market positively impacts expansion in economic growth.

Extensive research to determine the connection between economic growth and development in stock market has been carried out; Levine & Zervos (1998), Mohtadi & Agarwal (2001), Frans &Ludo (2005), Guha & Murkherjee(2008) and Abu (2009). However, very few studies have focused on developing economies. Developed economies have more advanced financial systems than less-developed economies (Gurley & Shaw, 1955; Charles & Nicholas, 2006). Pardy (1992) also pointed out that equity markets in less-developed economies can mobilize domestic savings and facilitate re-allocation of savings. The expansion of the financial sector is crucial in the advancement of financial products and services and this induces economic growth (Guha & Murkherjee, 2008).

On the other hand, there exist other pieces of literature with conflicting perspective on the role of development in the stock market on the growth of the economys. Demirguc-Kunt & Levine (1996) challenged the conclusion that equity market liquidity facilitates development in the long- term. The authors argued that increased stock market liquidity discourages growth through encouraging investor

myopia, and, reduced saving due to income and substitution effects and reduced uncertainty of the investments.

Levine & Zervos (1998) suggested that expansion in the stock markets can be estimated through liquidity measures, size of the market and integration of equity markets in the world. The size is given by the proportion of market capitalization to gross domestic product. Market capitalization is calculated by aggregate worth (value) of quoted shares. Liquidity can be measured in two ways; the value of traded stocks and turnover ratio. The ratio of the total worth of stocks traded captures the aggregate value of equity trades in comparison with the economic size. Levine & Zervos (1998) argued that this ratio enhances the market size estimate since it captures the fact that equity markets can be large but dormant. The turnover ratio captures the aggregate value of equity dealings in comparison with the equity market size. This ratio is important since it captures the fact that equity markets can be small however liquid.

The Kenyan securities market was established in 1954. The Nairobi security exchange contributes to economic growth by encouraging and mobilizing savings and facilitating access to capital for both local and international firms. Currently as at July 2020, the NSE has 65 listed companies in eleven industry sectors and nine indices of which three are share indices. The number of listings on the exchange has grown through the years implying a rise in equity financing. The NSE has undergone major changes over the years (Nairobi Securities Exchange, 2020). In 2004 the automation of the clearing and settlement of shares was implemented. In 2006, live equity transactions began and with the implementation of the Wide Area Network in 2007, remote trading of equities became possible. In the year 2008, the NSE All-Share index (NASI) was launched to extensively track the general health of the equity market.

According to Nairobi Securities Exchange (2020), the stock exchange was renamed to Nairobi Securities exchange in 2011 and in 2013; NSE launched the Growth Enterprises Market Segment (GEMS) providing access to capital for growth to small and medium enterprises. In 2015, the Real Estate Investment Trusts (REIT) began operations; REIT can be instrumental in achieving agenda 4 on affordable housing in the Big Four Agenda. In 2018, the Nairobi securities exchange was named a part of the World Federation of Exchanges, hence enhancing international flow of capital because NSE was now attractive to foreign investors. In 2019, the NEXT derivatives market was launched and trading of single stocks and index futures contracts began (Nairobi Securities Exchange, 2020).

There have been substantial advancements of the range of products and services that the NSE has been providing in the Kenyan market over the years. These advancements have been crucial in mobilizing savings and in achieving full efficiency of capital allocation hence fostering economic development. In principle, Kenya is a frontier market and an empirical analysis of the connection between her equity

market and economic development will be crucial in informing policy that will revive expansion of the equity market.

1.2 Problem statement

Kenya is a frontier market and her economy is primarily bank-based (Osoro & Osano, 2014). This indicates that in Kenya, the banking industry is in the frontline in facilitating mobilization of savings and allocation of capital, guiding decision in investment opportunities and facilitating management of risks. The banking industry, with about 60% total assets excluding market capitalization, was the largest in the financial sector as at end 2016 (Central Bank of Kenya, 2017). This shows that the role of the securities market in mobilizing long-run capital has not been fully been delved into. The expansion of the securities market is integral for enhancing growth in the economy, particularly in fostering a savings culture. The Capital Markets Authority(2018), identified low product uptake and low liquidity as main challenges in the capital markets.

Hence, there is need to re-examine the contribution of stock market in the economy, by studying the connection between stock market development and economic growth and evaluating the significance of each indicator distinctly on economic growth. Ikikii and Nzomoi (2013) analysed the role of the stock market development in promoting growth in Kenya. The study was done using stock market capitalization and total value of stock traded as measures of development and used linear regressions, this study will however use ARDL Bounds test of cointegration technique and VECM based Granger Causality to empirically determine the link between expansion in the stock market and growth in the Kenyan economy. The analysis employs market capitalization ratio and total value traded ratio as stock market indicators, and trade openness as a control variable.

1.3 Research Objective

To determine the relationship between stock market development and economic growth in the Kenyan economy for the period 2005-2019.

1.4 Research Questions

1. What is the role of market capitalization in determining growth in the Kenyan economy?
2. What is the role of turnover in the stock market in determining growth in the Kenyan economy?

1.5 Significance of the study

This study will be essential in influencing policy decisions by the Kenyan Government and the Capital Market Authority that will that will lead to stable growth and expansion of the stock market. This study will additionally add on to the existing research that aims to establish the link between growth in the financial markets and economic growth.

Chapter 2

Literature review

Over the years, multiple pieces of research have been done to establish the relationship between stock market development and economic growth. There exist both theoretical and empirical arguments that try to explain this link. Levine (1997) argued that the expansion of the financial system facilitates mobilization and allocation of the funds raised to the most productive use. Similarly, through the financial system, there is increased liquidity, better transfer of information, and risk management in the economy (Levine & Zervos, 1998).

The financial system performs financial roles that influence savings and financial resources allocation decisions hence accelerating economic growth. The financial roles are: mobilizing investor's savings, facilitating the trading and pooling of risks, allocating funds, and monitoring managerial decision making. These functions stimulate growth in the economy either through technological innovation or capital accumulation (Levine R. , 1997).

Levine (1991) argued that through stock markets, idiosyncratic risk can be diversified since investors can hold diversified portfolios. The author further suggested that liquid stock markets directly influence economic growth since investors can maturely liquidate their assets when facing liquidity problems. Bencivenga, B, R (1996) also argued that liquid equity markets contributes to economic growth.

Patrick (1996) proposed that the link between stock market development and economic growth and expansion can be either demand led or supply led. The author argued that the direction of the connection between the two variables can be explained by the interaction of demand and supply in both the financial system and in the economy. The supply route implies that the growth of the financial system leads to the expansion of the array of financial products and services available hence induce growth in the economy. Following the demand route, the rapid expansion of the economy leads to a rise in the demand for the products and services and this boosts growth in the financial sector.

There also exist theoretical arguments that show that stock market development can lead to negative impact on economic growth. For instance, highly liquid stock markets lead to decreased levels of savings and hence lead to reduced economic growth (Stiglitz, 1985) & (Bencivenga & Smith, 1991). Also Mayer (1998) argued that mature and robust stock markets are inadequate sources of funds for expansion and growth for firms. Stiglitz (1994) pointed out that stock markets characterized by high levels of

liquidity do not lead to better firm management decisions and do not improve acquisition of information about the quoted firms. There is also an argument that globally integrated equity markets may lead to decreased levels of aggregate savings and ultimately slow down the rate of growth due to increased risk exposures through integrated equity markets (Devereux & Smith, 1994).

Levine & Zervos (1998) empirically investigated the contribution of stock market development to economic growth in the long-term in 41 countries by analysing cross-country growth for the period 1973-1996. The study used stock market size, liquidity, and global integration of the stock markets in the sample as measures of stock market development and controlled for the impact of initial income, education, political instability, inflation rate, and ratio of government consumption expenditure to GDP on economic growth. The results revealed that market liquidity and expansion in the banking sector positively and robustly correlate with economic growth while market capitalization and market integration have a lower significant effect. The authors also found that the banking industry and equity markets have distinct roles in the course of growth in an economy. The general conclusion of the empirical analysis was that the expansion in the stock market positively and significantly influences growth even after taking into account other contributors of economic growth specified in the study.

Mohtadi & Agarwal (2001) used panel data analysis to analyse the long-term contribution of emerging equity markets on economic growth for the period 1977-1997. The study used stock market capitalization, turnover and total value of shares traded ratios to measure development in the stock market while controlling for high- school admissions and foreign direct investment. The analysis was performed using two models. Model one estimated the indirect association between the equity market and economic growth via the investments route since investments via the stock markets lead to reduction of liquidity and productivity shocks that firms may face (Levine R. , 1991). Results revealed that liquidity measured through the turnover ratio is an important determinant of firm-level investments and these investments accelerate economic growth. Model 2 estimated the direct impact of stock markets in stimulating growth in the economy: the results showed that market capitalization and turnover ratio both significantly determine economic growth. The results also showed that foreign direct investment positively and significantly influences growth. In both models the turnover ratio remained highly statistically significant, indicating the importance of liquidity in the equity markets. However, the results showed that the aggregate worth of shares traded have a negative and marginal significant influence on growth implying that this ratio could be inadequate in indicating market liquidity in less-developed economies since the stock markets are highly volatile. The general conclusion from the paper is that stock market development accelerates high rates of economic growth. The direct interconnection is through market liquidity and indirect link is through market capitalization.

Abu (2009) argued that a well- established capital market fosters long-run growth. The study used stock capitalization and stock turnover as indicators of stock market development while controlling for openness of the economy (exports and imports) and the discount rate. The analysis was performed through error-correction econometric model for the period 1981-2007. The study found that size of the equity market estimated by capitalization ratio is important in explaining growth via the equity market while liquidity measured by turnover ratio negatively but significantly contribute to growth. The study also showed that openness-of the economy negatively influences economic growth. The analysis indicated that the stock market development measures were jointly significant thus the equity market development has a significant contribution to economic growth. These results are consistent with Levine (1998) who suggested that expansion of the stock market induces growth.

Similarly, Ikikii & Nzomoi (2013) using linear regressions showed that expansion of the equity market facilitates economic growth. The authors used stock capitalization and aggregate worth of shares traded over the period as measures of stock market development to empirically analyse the connection between the two variables for the period 2000-2011. The results showed that although the two development indicators are crucial in promoting growth via stock markets, market capitalization is more significant in explaining the effect compared to aggregate value of stocks traded. The results also indicated existence of a feedback effect in the analysis. The conclusion that stock market development has a significant contribution to economic growth is in line with (Abu, 2009) and (Levine & Zervos, 1998).

Charles & Nicholas (2006) performed an analysis on 14 countries to investigate the correlation between development in stock markets and per capita growth considering individual country national income levels and market capitalization. The authors used market capitalization, total value traded and turnover rate to measure development and controlled for investments and openness to trade to perform the analysis. The results suggested that the stock market development is important in explaining changes in the growth of the respective countries under study. The significant role was however through the aggregate value of stocks traded in the market: this signals the significance of liquidity in stimulating growth of the economy via capital markets consistent with (Levine R. , 1991). The results also indicated that advancements in stock markets significantly contribute to expansion of growth for upper middle income and moderately capitalized markets in the Africa continent. This implies that African countries characterized with low income and less established stock markets ought to advance the development of their stock markets to benefit from the growth-promoting role of robust and mature markets. The results revealed that the stock markets can be instrumental in stimulating growth in less developed countries (Pardy, 1992).

Guha & Murkherjee (2008) claimed a significant connection between stock market development and economic growth which runs from the stock market to economic growth. The authors measured stock market development using market capitalization, value of equities traded, and stock market volatility. The results revealed that real per capita GDP and market capitalization have a bi-directional relationship and a one-way relationship from real per capita GDP to liquidity and volatility in the equity market. The results from the study indicated existence of long-term causal link between stock market and economic growth. The results were consistent with the proposition that through the growth and expansion of financial sector, growth in the economy is promoted (Patrick, 1966).

Frans & Ludo (2005) used co-integration analysis to determine the significance of the stock market in promoting economic growth in Belgium in the 19th and 20th centuries. The authors used annual data for the period 1830-2000 and used market capitalization, total number of shares listed, initial public offerings and degree of concentration as indicators of stock market growth. The study also used deposits and savings in commercial banks as measures of bank development. The authors used Granger causality to determine the distinct influence of bank and stock market development on economic growth. The results showed that development in both the stock markets and banks independently promote long-term growth in the economy. The results also showed the effect of stock market development on economic growth remained robust even with the inclusion of bank development indicators. The authors also investigated the long-run association between GDP and the four indicators of stock market development used in the analysis and found a cointegration relationship among the four measures indicating their growth promoting role. The authors additionally estimated a VECM with GDP, market capitalization and bank development indicators. Results of the trivariate VECM showed that the contribution of the stock market development in fostering growth remains robust even on the inclusion of bank development. The results suggested that compared to bank development, stock market development better explains changes in economic growth. The results suggested that stock market development facilitates growth and that the development of banks was important in the initial advancement of growth in the stock market.

On the other hand, there exist other pieces of literature with conflicting views on the role of stock market development on economic growth. For instance, Demirguc-Kunt and Levine (1996) challenged the conclusion that stock market liquidity facilitates growth. The authors argued that increased stock market liquidity discourages growth through encouraging investor myopia, and, reduced saving due to reduced uncertainty of the investments.

Chapter 3

Methodology

3.1 Research design

The study will make use of quantitative descriptive research using correlational method to demonstrate the link between stock market development and economic growth in the Kenyan economy. The descriptive analysis is ideal in this case because the study is focused at determining and describing the exact relationship that exists between the variables in question.

3.2 Target Population

The target population will consist of the quoted firms on the Nairobi Securities Exchange between the year 2005 and 2019.

3.3 Sample size

The sample will comprise of the listed firms from the beginning of 2005 and end of 2019 based on the total value traded ratio and market capitalization of listed firms as measures of stock market development from the population identified. The stock market indicators, economic growth and measure of trade openness will be calculated on a quarterly basis from the year 2005-2019 and this makes 60 observations for the analysis.

3.4 Data collection

The analysis will use time series methods based on quarterly observations of all the variables considered in the study from the year 2005-2019. The data on stock market development measures is collected from Nairobi Securities Exchange, data on economic growth and measure of trade openness is from Kenya National Bureau of Statistics.

Table 1.Summary of the variables considered in the analysis

Variable	Description
Economic growth (RGDPg)	Economic growth is measured by growth in real GDP in this study.
Market capitalization ratio (MCRatio)	This is the aggregate worth of quoted shares. Estimates the size of the equity market based on the assumption that market capitalization

	contributes to mobilization of funds and diversification of risks.
Total value traded ratio (TVTratio)	This is the proportion of the value of equity trades to GDP. It indicates the level of equity trading based on the how large the economy is (size).
Trade openness (Tr)	Sum of imports and exports as percentage of GDP.

The indicators as described in table (1) above are the independent variables, economic growth is the dependent variable and trade openness is a control variable. The econometric investigation is carried out using Stata.

3.5 Model building

The study will employ ARDL Bounds test of cointegration technique and VECM based Granger Causality test to empirically determine the association between stock market development and economic growth.

3.5.1 Stationarity test

Stationarity tests are carried out to counter spurious regression results in time series analysis. Stationarity implies that time series data has time invariant first and second moments. Additionally, ARDL bounds test cointegration is performed on variables that are either I(0) or I(1) or a mix, the presence of I(2) series would make the cointegration approach invalid (Pesaran & Shin, 1998; Pesaran, Shin, & Smith, 2001).

A stationarity test can be achieved using augmented Dickey Fuller test (Dickey & Fuller, 1979). The regression estimated for the test is given by

$$\Delta y_t = \alpha + \beta y_{t-1} + \sum_{i=1}^{k} \delta_t \Delta y_{t-i} + \varepsilon_t$$

The null hypothesis tested is $H_o: \beta = 1$ unit root exists in the data against the alternative $H_1: \beta < 1$ Stationarity in the data.

3.5.2 ARDL bounds test of cointegration

The autoregressive distributed lag cointegration test is employed to assess the long-term and short-term relationship among the variables in the study. The features that merit the use of this technique include; this method can be used when the sample size is small, it results in unbiased estimators of the long-term and short-term link and takes care of potential serial-correlation and endogeneity in the model (Fan, Ismail, & Md, 2018).

The following ARDL (p, q) specifications have been considered in this study;

$$\Delta RGDPg_t = \alpha_{01} + \beta_{11} RGDPg_{t-1} + \beta_{21} MCRatio_{t-1} + \beta_{31} lnTVTratio_{t-1} + \beta_{41} Tr_{t-1} + \sum_{i=1}^{p} \alpha_{1i}\, \Delta RGDPg_{t-i} + \sum_{i=1}^{q} \alpha_{2i}\, \Delta MCRatio_{t-i} + \sum_{i=1}^{q} \alpha_{3i}\, \Delta lnTVTratio_{t-i} + \sum_{i}^{q} \alpha_{4i}\, \Delta Tr_{t-i} + \varepsilon_{1t} \quad (1)$$

$$\Delta MCRatio_t = \alpha_{02} + \beta_{12} RGDPg_{t-1} + \beta_{22} MCRatio_{t-1} + \beta_{32} lnTVTratio_{t-1} + \beta_{42} Tr_{t-1} + \sum_{i=1}^{p} \alpha_{1i}\, \Delta MCRatio_{t-i} + \sum_{i=1}^{q} \alpha_{2i}\, \Delta RGDPg_{t-i} + \sum_{i=1}^{q} \alpha_{3i}\, \Delta lnTVTratio_{t-i} + \sum_{i}^{q} \alpha_{4i}\, \Delta Tr_{t-i} + \varepsilon_{2t} \quad (2)$$

$$\Delta lnTVTratio_t = \alpha_{03} + \beta_{13} RGDPg_{t-1} + \beta_{23} MCRatio_{t-1} + \beta_{33} lnTVTratio_{t-1} + \beta_{43} Tr_{t-1} + \sum_{i=1}^{p} \alpha_{1i}\, \Delta lnTratio_{t-i} + \sum_{i=1}^{q} \alpha_{2i}\, \Delta RGDPg_{t-i} + \sum_{i=1}^{q} \alpha_{3i}\, \Delta MCratio_{t-i} + \sum_{i}^{q} \alpha_{4i}\, \Delta Tr_{t-i} + \varepsilon_{3t} \quad (3)$$

$$\Delta Tr_t = \alpha_{04} + \beta_{14} RGDPg_{t-1} + \beta_{24} MCRatio_{t-1} + \beta_{34} lnTVTratio_{t-1} + \beta_{44} Tr_{t-1} + \sum_{i=1}^{p} \alpha_{1i}\, \Delta Tr_{t-i} + \sum_{i=1}^{q} \alpha_{2i}\, \Delta RGDPg_{t-i} + \sum_{i=1}^{q} \alpha_{3i}\, \Delta MCratio_{t-i} \sum_{i=1}^{q} \alpha_{4i}\, \Delta lnTVTratio_{t-i} + \varepsilon_{4t} \quad (4)$$

Where Δ represents the first difference operator, α denote the intercepts, β denote the coefficients of the independent variables and ε denote the error terms.

The null and alternative hypotheses considered in the ARDL-Bounds test of cointegration are

H_0: No cointegration

H_1: Presence of cointegration

The cointegration technique is established on the F-statistic under the null described above. In the initial step of the bounds cointegration, the equations above are estimated via Ordinary Least Squares. This determines the presence of long-term link by using the F-statistic to assess whether the lagged coefficients are jointly significant, where;

H_0: $\beta_{1i} = \beta_{2i} = \beta_{3i} = \beta_{4i} = 0$

H_1: $\beta_{1i} \neq \beta_{2i} \neq \beta_{3i} \neq \beta_{4i} \neq 0$

This estimation results in two groups of Critical Values (Pesaran, Shin, & Smith, 2001).The first group is generated based on the assumption that the variables are I (0) (lower bounds) and the second group that the variables are I (1) (upper bounds). The null of no cointegration is rejected if the F-statistic is above the critical values for the upper bounds, the null of no cointegration is not rejected if the F-statistic is less than the critical values for the lower bounds and the results considered inconclusive if the value of the F-statistic is between the lower bounds and upper bounds (Pesaran, Shin, & Smith, 2001).

In order to analyse the short-term link, the following ECM will be specified;

$$\Delta RGDPg_t = \alpha_{10} + \sum_{i=1}^{p} \alpha_{11}\, \Delta MCRatio_{t-i} + \sum_{i=1}^{q} \alpha_{12}\, \Delta lnTVTratio_{t-i} + \sum_{i=1}^{q} \alpha_{13}\, \Delta Tr_{t-i} + \gamma_1 ECT_{t-1} + \varepsilon_t \qquad (5)$$

Long-term causality in the ECM approach is drawn from the negative and significant ECT coefficient while short-term causality is depicted by significant values of the independent variables (Rahman & Kashem, 2017).

3.5.3 Model Diagnostics test

The analysis employs the standard approach to assess the model diagnostics. ARDL bounds test is performed on the assumption that errors are independently and identically distributed. Hence, the Breusch Godfrey Serial Correlation LM and Breusch Pagan Godfrey tests are applied to evaluate serial correlation and heteroskedasticity respectively.

3.5.4 Test of model stability

The CUSUM and CUSUM squared tests are employed to assess the stability of the model (Pesaran & B., 1997). This is done to confirm that the autoregressive features of the model are stable.

3.5.5 Test of Granger Causality

The ARDL technique determines the long-term and short-term relationship between the variables considered in this analysis. However, there is still need to assess whether there is uni-directional, bi-directional or no granger causality between series that are cointegrated. The study therefor employs Granger causality tests to assess the specific nature and direction of the relationship.

Granger (1969) proposed that, with stationary time series, a series y (t) causes series x (t) if the forecast on series x (t) can be improved by using all the information available including information on series y (t). Additionally, a feedback effect occurs when series x (t) causes y (t) and also x (t) causes y (t). The null hypothesis of a granger causality test is that series x (t) does not granger cause y (t), that is, the lagged values of series x (t) cannot explain changes in series y (t).

The ECM specified in equation (5) is tested by applying Engle and Granger causality test.

The following vector error correction model is specified:

$$\Delta RGDPg_t = \alpha_{10} + \sum_{i=1}^{q} \alpha_{11}\, \Delta RGDP_{t-i} + \sum_{i=1}^{p} \alpha_{12}\, \Delta MCRatio_{t-i} + \sum_{i=1}^{q} \alpha_{13}\, \Delta lnTVTratio_{t-i} + \sum_{i=1}^{q} \alpha_{14}\, \Delta Tr_{t-i} + \gamma_1 ECT_{t-1} + \varepsilon_{t1} \quad (6)$$

$$\Delta MCRatio_t = \alpha_{20} + \sum_{i=1}^{q} \alpha_{21}\, \Delta RGDP_{t-i} + \sum_{i=1}^{p} \alpha_{22}\, \Delta MCRatio_{t-i} + \sum_{i=1}^{q} \alpha_{23}\, \Delta lnTVTratio_{t-i} + \sum_{i=1}^{q} \alpha_{24}\, \Delta Tr_{t-i} + \gamma_2 ECT_{t-1} + \varepsilon_{t2} \quad (7)$$

$$\Delta lnTVTratio_t = \alpha_{30} + \sum_{i=1}^{q} \alpha_{31}\, \Delta lnTVTratio_{t-i} + \sum_{i=1}^{p} \alpha_{32}\, \Delta RGDPg_{t-i} + \sum_{i=1}^{q} \alpha_{33}\, \Delta MCRatio_{t-i} + \sum_{i=1}^{q} \alpha_{34}\, \Delta Tr_{t-i} + \gamma_3 ECT_{t-1} + \varepsilon_{t3} \quad (8)$$

$$\Delta Tr_t = \alpha_{40} + \sum_{i=1}^{q} \alpha_{41}\, \Delta TR_{t-i} + \sum_{i=1}^{p} \alpha_{42}\, \Delta RGDPg_{t-i} + \sum_{i=1}^{q} \alpha_{43}\, \Delta MCRatio_{t-i} + \sum_{i=1}^{q} \alpha_{44}\, \Delta lnTVTratio_{t-i} + \gamma_1 ECT_{t-1} + \varepsilon_{t4} \quad (9)$$

Where denotes Δ the first difference, α denote the short-run coefficients, q and p denote the optimal lag length, γ are the coefficients of the ECT. The coefficients explain the long-term causality and adjustment of errors to equilibrium while the coefficients of the independent variables explain short-term causality (Rahman & Kashem, 2017).

Chapter 4

Empirical Results and Analysis

The analysis of the study is presented in two parts. The first part reports the analysis based on real GDP growth as the dependent variable and part 2 is where the logged value of real GDP at constant prices is the dependent variable.

4.1 Model 1: real GDP growth as the dependent variable

4.1.1 Descriptive statistics

The table gives a brief overview of the data considered in the analysis.

Table 2: Descriptive statistics

Variable	N	Mean	Std Dev	Min	Max	Skewness	Kurtosis
RGDPg	60	0.052	0.018	0.000	0.084	-0.925	3.910
MCRatio	60	2.032	0.533	1.054	3.767	0.482	3.842
lnTVTratio	60	6.312	0.797	4.495	9.070	0.36	4.081
Tr	60	0.607	0.140	0.436	0.988	1.044	3.045
lnRGDP	60	13.383	0.567	12.537	14.068	-0.325	1.294

Table (2) reports the summary of the descriptive statistics of the data. The total value traded ratio and real GDP have been logged to minimize the effect of outliers. The findings show that real GDP growth and the log of Real GDP are negatively skewed with values of -0.925 and -0.325 respectively while market capitalization ratios, total value traded ratio and trade openness are positively skewed with skewness of 0.482, 0.36 and 1.044 respectively. The log of real GDP is normally distributed with a kurtosis of 1.294 while the rest of the variables report kurtosis that exceeds 3 implying non-normality. For instance, real GDP growth has a kurtosis of 3.910, market capitalization ratio 3.842, logged value of total value traded ratio 4.081 and trade openness 3.045. Non-normality of the data can affect statistical inferences, but the problem can be eliminated by first differencing as done in ARDL estimation.

4.1.2 Test of unit root

The ADF tests of unit root were carried out to test for stationarity in the series.

Table 3: ADF test on level variables

Variable	ADF(Level)		
	Lag	T-statistic	C.V at 5%
RGDPg	1	-3.429	-2.924
MCRatio	1	-2.753	-2.924
lnTVTratio	1	-3.507	-2.924
Tr	1	-1.836	-2.924

The results show that the Real GDP growth and the logged total value traded ratio are significant at 5% level I (0) while the remaining variables are insignificant.

Table 4: ADF test on first differences of the variables

Variable	ADF(First Differences)		
	Lag	T-statistic	C.V at 5%
MCRatio	1	-4.884	-2.924
Tr	1	-7.311	-2.924

The remaining variables, market capitalization ratio and trade openness, become significant at 5% level after taking their first differences I(1). The results reveal I (0) and I (1) series. Additionally none of the series contain a significant I (2) therefore meeting the conditions for an ARDL estimation in the analysis (Pesaran, Shin, & Smith, 2001).

4.1.3 ARDL Bounds test of cointegration

This study employs the autoregressive distributed lag (ARDL) cointegration technique to assess the short-term and long-term link among the variables under study.

Table 5: Results of the bounds test cointegration technique

Dependent Variable	AIC lags	ARDL-AIC lags	F-statistic	Decision
F_{RGDg}(F\RGDPg, MCR, lnTVTr, Tr)	2	(1 0 0 0)	6.684	Cointegration
F_{MCR}(F\MCR, RGDPg, lnTVTr, Tr)	2	(1 0 02)	5.965	Cointegration
F_{lnTVTr}(F\lnTVTr, RGDPg, MR,Tr)	2	(1 0 0 0)	15.149	Cointegration
F_{Tr}(F\Tr, RGDPg, MCR,lnTVTr)	2	(2 0 1 1)	3.999	Inconclusive

The results show that there exist long-term relationships among the variables in the cases that real GDP growth, market capitalization ratio and logged total value traded ratio are dependent variables in their respective equations. The null hypothesis of no cointegration is rejected at the 5% level given that the F-statistics of the respective equations are greater than the I (1) bounds. However in the case that trade openness is the dependent variable, the result is inconclusive because the F-statistic reported lies between the lower bounds and the upper bounds (Pesaran & Shin, 1999; Pesaran, Shin, & Smith, 2001).

4.1.4 Model diagnostics

In order to determine how stable and robust the model is, Breusch Godfrey LM test for serial correlation and the white test for heteroskedasticity are applied.

Table 6: Diagnostic tests

Test	F-test (Probability)
Breusch-Godfrey LM test for serial correlation	0.1973
JB- Skewness	0.0602
JB- Kurtosis	0.0615

The results indicate that the model does not suffer from serial correlation and non- normality, although the null hypothesis of homoscedasticity was rejected at the 5% level of significance in the white test for heteroskedasticity. This is however corrected for using Newey-West Standard Errors (Newey & West, 1994).

4.1.5 Estimation of the Error Correction Model

The findings of the bounds test showed that when the target variable, real GDP growth, is the dependent variable, there is presence of a long-term link between the variables. This therefor implies than an ECM should be estimated to determine the long-term and short-term dynamics associated with it.

4.1.5.1 Long Run Dynamics

The results of the long-term analysis of the equilibrium relation using ARDL-ECM (1 0 0 0) are shown in the table below.

Table 7: Coefficients of the long run analysis of ARDL (1 0 0 0)

Variable	Coefficient	t-statistic	Probability
MCRatio	-0.0070	-0.80	0.429
lnTVTratio	0.0034	0.76	0.451
Tr	-0.0302	-1.04	0.302
Constant	0.0419	2.06	0.044

The results indicate that the variables have insignificant long-term impact on real GDP growth. The market capitalization ratio and trade openness indicate negative impact while logged total value traded ratio shows a positive impact although these effects are insignificant at the 5% level.

4.1.5.2 Short run dynamics

The results from short-run causality from the ARDL (1 0 0 0) are summarized in table (8) below.

Table 8: Coefficients of the short run analysis of the ARDL-ECM (1 0 0 0)

Variable	Coefficient	Newey-West Standard Errors	t-statistic	Probability
D(RGDPg(-1))	0.4177	0.1291	3.24	0.002
D(MCRatio)	-0.0000	0.0057	-0.01	0.996
D(lnTVTratio)	0.0006	0.0038	0.20	0.845
D(TradeOpenness)	-0.276	0.0243	-1.40	0.167
CointEq(-1)	-0.6568	0.1288	-5.10	0.000

The results show that the error correction term is negative and statistically significant at the 5% level implying existence of a long-term relationship in the model. The value of the adjustment coefficient -0.6568 indicates that about 66% of the disequilibrium is corrected for in the current period. Additionally, the results show that only the lagged value of real GDP growth is significant in explaining the short run dynamics of growth in real GDP given the positive and statistical significant coefficient.

Results from both the short-term and long-term analysis indicate that the market capitalization ratio, logged total value traded ratio and trade openness have statistically insignificant influence on growth in real GDP at the 5% level.

The ECM technique in this case reveals that the model contains significant long-term causality. This is in line with (Guha & Murkherjee (2008) who showed the presence of long-term causal link between stock market development and economic growth. However, since the independent variables do not reveal coefficients that are statistically significant, this implies that short run causality cannot be inferred.

4.1.6 Model Stability

The cumulative sum of recursive residuals (cusum) and cumulative sum of recursive residuals of squares (cusumsq) tests were employed to determine whether the model is robust. This is usually done to determine parameter stability in the long-term and short-term analysis of a model.

Figure 1: CUSUM test at the 5% level of significance

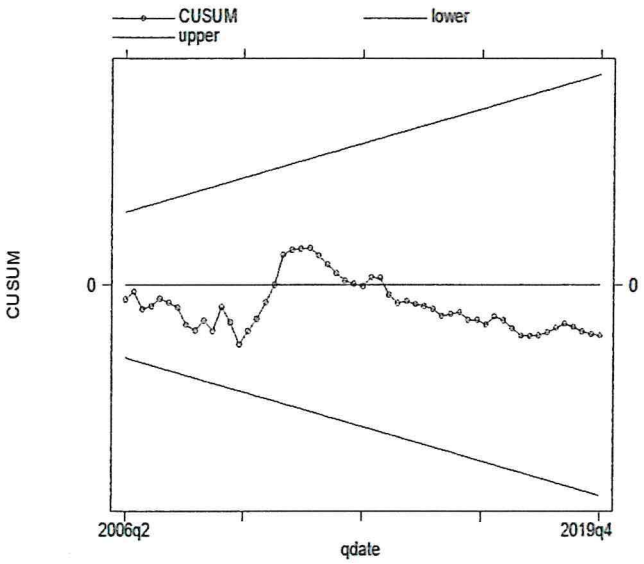
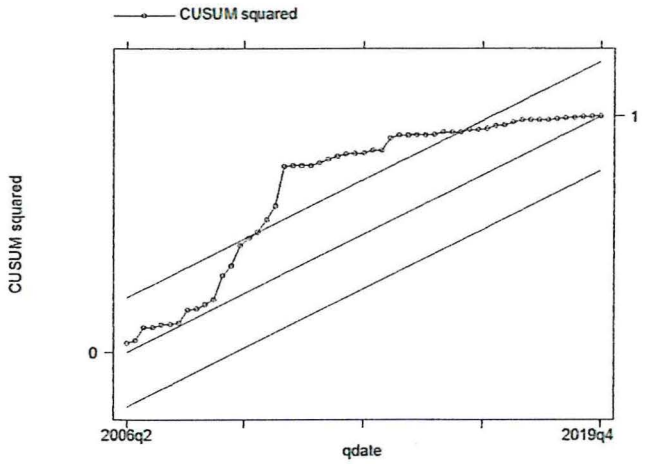


Figure 2: CUSUM squared test at the 5% level of significance



The CUSUM graph reveals that the parameters are constant and that the model is stable. The CUSUM squared graph on the other hand indicates that there is a slight deviation from the mean and then the model goes back to the mean. However, since the model has passed the other diagnostic tests, it is considered stable.

4.1.7 Results of the Granger Causality Tests

The results of the Wald tests of the Granger Causality are as indicated in table (9) below.

Table 9: Granger Causality

	F-statistic				Direction of causality
Dependent Variable	D(RGDPg)	D(MCRatio)	D(ln(TRatio))	D(Tr)	
D(RGDPg)	-	0.3262	0.4703	0.9115	-
D(MCRatio)	0.5935	-	0.2173	0.7620	-
D(ln(TVTratio))	0.0760**	0.7040	-	0.9598	RGDPg→lnTVRratio
D(Tr)	0.3869	0.1486	0.2099	-	-

** represents significance at the 10% level

The results indicate short-term uni-directional Granger causality from real GDP growth to liquidity (measured by total value traded ratio) at the 10% level of significance. These results are in line with (Guha & Murkherjee, 2008) who found a one-way relationship from real per capita GDP to liquidity.

The F-statistics in the above table also show no Granger causality between real GDP growth and market capitalization; market capitalization and real GDP growth, and between real GDP growth and trade openness; trade openness and real GDP growth. These results are in line with ARDL-ECM estimation (table 8) that revealed that short-run causality cannot be inferred due to the insignificant explanatory variables at the 5% level.

4.2 Model 2: logged value of real GDP at constant prices as the dependent variable

4.2.1 Test of unit root

The results of the ADF test are as shown in the table below.

Table 10: ADF test on level variables

Variable	ADF(Level)		
	Lag	T-statistic	C.V at 5%
lnRGDP	1	-1.044	-2.924
MCRatio	1	-2.753	-2.924
lnTVTratio	1	-3.507	-2.924
Tr	1	-1.836	-2.924

The results show that only the logged total value traded ratio is significant at 5% level I (0) while the remaining variables are insignificant.

Table 11: ADF test on differenced variables

Variable	ADF(First Differences)		
	Lag	T-statistic	C.V at 5%
lnRGDP	1	-5.975	-2.924
MCRatio	1	-4.884	-2.924
Tr	1	-7.311	-2.924

The logged value of real GDP ,market capitalization ratio and trade openness become significant at 5% level after taking their first differences I(1). The results reveal I (0) and I(1) series. Additionally none of the series contain a significant I (2) therefore meeting the conditions for an ARDL estimation.

4.2.2: Bounds test of cointegration

Table 12: Bounds test of cointegration

F-statistic	1.510	
Critical Values	Lower bound	Upper bound
1%	3.23	3.77
5%	3.69	4.35
10%	4.29	5.61

The results reveal that the F Statistic is less than the critical value for the lower bound. Hence fail to reject the null of no cointegration. A short run model is thus estimated using an ARDL model.

4.2.3: Model Diagnostics

Table 13: Diagnostic tests

Test	F-test (Probability)
Breusch-Godfrey LM test for serial correlation	0.1634
JB- Skewness	0.0558
JB- Kurtosis	0.1555

The results show that the model does not suffer from serial correlation and non-normality at the 5% level of significance. However, the null hypothesis of homoscedasticity is rejected at the 5% level in the white test of heteroskedasticity. This is however corrected for using Newey-West Standard Errors (Newey & West, 1994).

4.2.4: Short run analysis of the ARDL estimation

The conclusion of the bounds test of cointegration when the dependent variable is logged value of real GDP at constant prices is that the null hypothesis of no cointegration cannot be rejected. This implies that a short run analysis is done using an autoregressive distributed lag (ARDL) model.

The results of the ARDL (1 1 1 1) model are shown in the table below.

Table 14: Results of the ARDL (1 1 1 1) short run analysis

Variable	Coefficient	Newey- West Standard Errors	t-statistic	Probability
D(lnRGDP(-1))	0.9772	0.0209	46.69	0.000*
D(MCRatio)	-0.0871	0.0229	-3.81	0.000*
D(MCRatio(-1))	0.1211	0.0239	5.06	0.000*
D(lnTVTratio)	0.0054	0.0072	0.53	0.598
D(lnTVTratio(-1)	-0.0179	0.0101	-1.78	0.082**
D(Tr)	-0.8771	0.0961	-9.13	0.000*
D(Tr(-1)	0.8308	0.1146	7.82	0.000*

Constant	0.3654	0.0431	1.01	0.316*

*represents 5% level of significance

** represents 10% level of significance

R-squared 0.9936

Adjusted R-squared 0.9927

Prob>F 0.0000

The results from the table (14) above show that the lag 1 real GDP, market capitalization ratio and trade openness have a positive and significant effect on real output at the 5% level, while total value traded ratio is significant at 10%. However, contemporaneous market capitalization ratio and trade openness have a negative and statistical significant effect on real GDP.

The results show that market capitalization is important variable in explaining economic growth. A unit increase in market capitalization leads to 12.11% change in real GDP. The results are similar with the argument that that market capitalization has a significant effect on economic growth (Mohtadi & Agarwal, 2001). Trade openness negatively and significantly influences economic growth at 5 percent level of significance. A unit increase in trade openness leads to 87.71% reduction in economic growth. These results are similar to (Abu, 2009). However at lag 1, a unit increase in trade openness leads to 83.08% increase in real GDP.

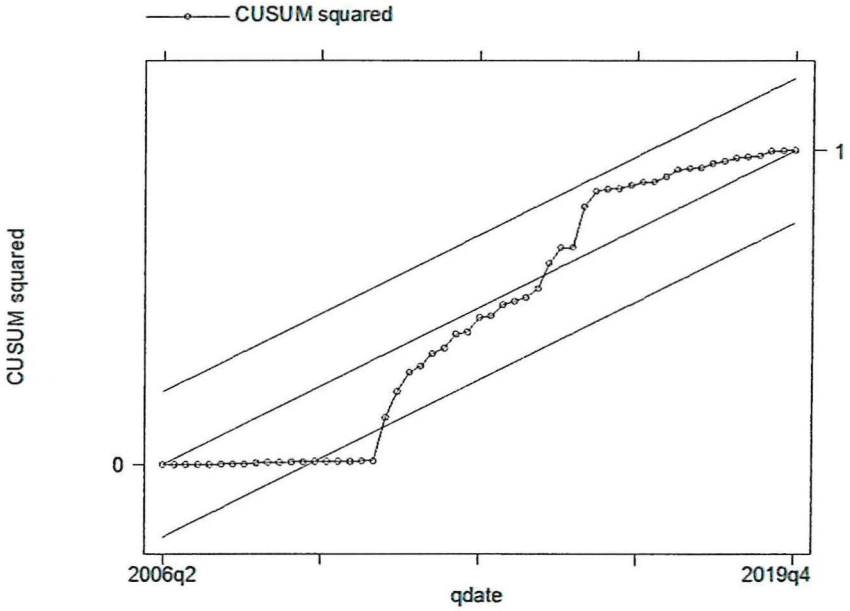
The results also reveal that total value traded ratio is insignificant in explaining growth at the 5% level of significance. The results are similar to (Mohtadi & Agarwal, 2001) who showed that the aggregate worth of shares traded have a negative impact on growth implying that this ratio could be inadequate in indicating market liquidity in less-developed economies since the stock markets are highly volatile. Additionally, (Ikikii & Nzomoi, 2013) showed that market capitalization is more significant in explaining the impact of stock market development on economic growth compared to total value of stocks traded.

The R-squared and Adjusted R-squared suggest that about 99% of the variation in the model can be explained by the independent variables. The Prob>F 0.000 indicates that the independent variables are jointly significant in explaining changes in the dependent variable.

4.2.5: Model Stability tests

The CUSUM squared graph of stability reveals that the model is stable, although it deviates and returns back to the mean as shown in figure (3) below.

Figure 3: CUSUM squared test at the 5% level of significance



Chapter 5

Conclusion and recommendations

5.1 Conclusion

The evidence from model one (ARDL-ECM) reveals that the stock market development indicators considered in this model are statistically insignificant in explaining economic growth at the 5% level of significance. However, the negative and significant adjustment coefficient reveals that there exists long-run causality between stock market development and economic growth. The Granger causality tests reveal uni-directional Granger causality from real GDP growth to liquidity at the 10% level of significance. However, there are no other feedback effects between the other variables as suggested by the short-run analysis of the ARDL-ECM model.

The evidence from model 2 (ARDL) reveals that the relationship between stock market development and economic growth can only be explained via a short-run model. The results from the short-run model indicate that market capitalization and trade openness have significant effects on economic growth. The evidence further indicates that market capitalization is a significant stock market development indicator. However, total value traded ratio as a measure of liquidity in the stock market is insignificant in explaining economic growth.

The general econometric results indicate that when real GDP growth is modeled as the dependent variable, the stock market development through market capitalization and total value traded ratio has insignificant impact on economic growth. The result that stock market development is insignificant in influencing economic growth is in line with (Demirguc Kunt & Levine, 1996).

However, when real GDP at constant prices is used as the dependent variable, stock market development is significant in explaining growth in the Kenyan economy. The results are in line with the conclusion that development in the stock market has an impact on economic growth (Levine & Zervos, 1998; Mohtadi & Agarwal, 2001).

5.2 Policy recommendation

Given the insignificant relationship between stock market development and real GDP growth, the Kenyan Government together with the Capital Market Authority should develop strategic policies geared toward the stability of the stock market. A stable stock market will enhance efficiency in the development of the stock market and hence lead to significant impact the on the growth of the economy in the long-term.

Given the significant relationship between market capitalization and real GDP, the Kenyan Government together with the Capital Market Authority should pursue strategies to warrant the efficiency and stability of this specific variable in order to enhance performance of the stock market and therefore growth in the economy.

Additionally, the Kenyan Government should come up with strategies and policies to ensure that the bank-based and market –based economy are both key in ensuring savings and investments. This will stimulate savings and lead to effective capital allocation hence promoting economic growth and enhancing the people standards of living.

5.3 Areas of further research

The aim of the study was to determine the relationship between stock market development and economic growth. However, further research can be pursued by using other stock market indicators such the volume of stocks traded, volatility and integration of the stock market with global stock markets, and assess whether the findings are similar to conclusion of this study. Similarly, additional research can be performed based on a sample of developing countries such as the East African Community to examine the impact of stock market development on economic growth on the developing nations.

5.4 Limitations of the study

The results obtained in the analysis above are not universal. I was expecting to find that the stock market via its indicators has a significant and robust impact on economic growth; however, the results stipulate that the stock market has a significant but lower effect on economic growth for the period under study. The significant effect is in fact only via the market capitalization. There is reason to believe that if I considered a larger sample in the time series analysis, I would be able to do a more robust analysis and adequately capture the effect of stock market development on economic growth in Kenya.

There was limited data on stock market development indicators. This therefore led to a small sample considered in the time series analysis.

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