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The Relationship between the Stock Market and Economic Growth in Kenya

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ABSTRACT: A well-functioning stock market has been touted to contribute to the growth of an economy. Economic growth has also been argued to contribute to the performance of the stock markets. The stock market capitalization was evaluated from all the NSE companies while economic growth was measured by real GDP growth rates over the same period. A reliable security market index should consistently reflect the performance of their respective stock markets and therefore provide investors and other policy makers with sufficient information on the overall stock market. There is causal relationship identified to run from economic growth to the stock market returns. This shows that current economic growth trends are a reliable stock market returns indicators in Kenya. No causality was identified between to exist between stock market liquidity and economic growth and as such neither of these two variables led the other. CAPM revealed a weak positive relationship between returns and the stock betas where the NSE market above the risk free rate is negative an inverse relationship between beta and return. There is a positive linear relationship is exhibited between beta and exchange rate.

KEYWORDS: Stock Market Exchange, Economic Growth, Capitalization, Security Returns, Liquidity

INTRODUCTION

Economic growth refers to the increase in inflation-adjusted market value of goods and services produced by a country over a specified period of time (usually one year). GDP, a widely used indicator refers to the total gross value added by all resident producers in the economy (World Bank, 2017). It is conventionally measured as the per cent rate of change (increase or decrease) in real GDP. GDP is calculated in real terms to eliminate the distorting effects of inflation on the prices of goods and services produced. Growth this way is measured as an annual per cent rate change in the GDP. To enhance the comparison of economic growth rates across nations by reflecting the variations in the cost of living and inflation rates, GDP at Purchasing Power Parity is more useful.

Global overview of economic growth and the stock markets.

Table 1: Trend of the world GDP average (%) and the global stock market indices (%)

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP*	4.27	4.18	1.80	-1.74	4.36	3.15	2.52	2.65	2.84	2.86
DJIA	16.29	6.43	-33.84	18.82	11.02	5.53	7.26	26.50	7.52	-2.23
S&P500	13.62	3.52	-38.9	23.45	12.78	0.00	13.41	29.60	11.39	-0.73
NASDAQ	9.52	9.81	-40.54	43.89	16.91	-1.80	15.91	38.32	13.40	5.73
FTSE 100	-	-	-	27.3	12.6	-2.2	10.0	18.7	0.7	-1.3

Source: World Bank, Yahoo Finance, Market watch.
GDP* Gross World Product

- Data unavailable

The above table shows the average Gross World Product against yearly stock market returns (per cent) based on three major global stock indices for the period between 2006 and 2017.

A significant decline in the global economic growth was experienced in the years 2008 and 2009. This resulted from the effects of the global financial crisis of 2008 that originated from the burst of the housing bubble in the United States of

America. Banks and other lenders had extended a lot of credit to homebuyers which was later collateralized as back up for loans. When the value of the houses dramatically declined in that period liquidity crisis in the banking sector was experienced. This was further worsened by contagion effect across the entire financial market across the world arising from capital mobility and flexible exchange rates. The currency reserves held by a majority of the emerging-market economies did not effectively suppress the adverse effects of the financial crisis and this further worsened their economic growth prospects (UNCTAD, 2010). Emerging economies consequently suffered reversal capital flows into their economies arising from changes in the stage of the prevailing economic cycle, changes in the monetary policies of developed countries or increased demand for liquidity by the global investors. Ripple effects of the financial crisis slowed the global economy significantly following reduced international trade, suppressed remittances and declining investments. The global stock markets also bore the blunt of this exhibiting contraction in the value of investors' wealth.

The market capitalization of domestic listed companies as a per cent of the GDP for the world between 2011 and 2014 stood at 68.453, 77.961, 89.088 and 91.791. On the other hand, the stock traded turnover ratio of domestic shares was 155.24% in 2011 but significantly declined to 108.42 and 102.08 in 2012 and 2013 respectively. Coincidentally, the average world GDP declined for the two consecutive years. Stock market activity also followed a similar trend with the turnover ratio fluctuating between 109.62% in 2014, 162.73%, 101.96% and 100.35% in 2017. In line with this, the value of stock traded as a per cent of the world GDP was between 2012 and 2017 was 83.297, 90.251, 102.337, 163.288, 124.417 and 117.504. The global economy recorded a fairly flat growth rate with a slump from the projected growth of 3.0% largely due to reduced commodity prices, declined Chinese economy and surged financial market volatility in major economies. The trends between the stock market activity and the overall economy are observed to co-move although at varying proportions when compared to the stock market indices.

The year 2016 was marked by a further decline in world economic activity owing to declining world trade, restrained investment, increased policy uncertainty following Britain's exit from the EU and the USA elections. 2017 saw improved macroeconomic conditions, growth in the labor markets of the developed economies and improved financing conditions that boosted both the stock market returns and capital flow to the overall economy. This is also explained by the gross capital formation (trillion US $) recorded at 20.943 in the year, an increase from 19.509 and 19.416 in 2015 and 2016 respectively.

Of the three most significant markets (capital, product and labor), the global capital market is the most advanced market with significant contribution to economic growth and wealth creation (McKinsey, 2003). For the above period, it can be observed that the stock market activity as recorded by the indices co-moved with the overall economic activity. Volatilities in both the stock market indices and economic growth are seen to fluctuate in a similar fashion as the variations in the global economic growth patterns and hence reveals the existence of an underlying relationship.

Regional overview of Economic Growth and the stock market.

Table 2: Economic growth and the stock markets in Africa

Region	2009	2010	2011	2012	2013	2014	2015	2016
JSE-ALSI	32.1	19.0	2.6	26.7	21.4	10.9	5.1	2.6
SSA	3.01	5.58	4.55	4.53	4.98	4.70	2.92	2.52
Tanzania	5.27	6.34	7.67	4.50	6.87	6.73	6.16	6.87
Kenya	3.03	8.41	6.11	4.56	5.88	5.34	5.72	5.87
Uganda	6.80	5.64	9.39	3.84	3.59	5.11	5.19	4.78
Rwanda	6.29	7.31	7.78	8.82	4.71	7.63	8.87	5.98

Source: Adopted from World Bank, ASEA data.

SSA Sub-Saharan Africa

The stock market exhibited a trend similar to that of the GDP growth rates in most of the continent's economies considered. The continent's average stock market capitalization as a percentage of the GDP was 58.16% in 2012, an increase from 42.32% in 2011. In 2013 the DSE (Dar es Salaam) All Share Index had a 14% increase while the GDP growth rate rose to 6.87% from 4.50% in Tanzania. During the same year, the NASI also increased by 38.72% which was accompanied by an increase in the GDP growth rate from 4.56% to 5.88% in Kenya for the year 2013.

For the period between 2013 and 2016 declines in the total year-on-year performance by the JSE-ASI were synonymous with GDP growth declines in the SSA economies for the same period. This however was not reflected by the stocks traded turnover per cent ratio of domestic shares for the period between 2013 and 2018 with the lowest at 24.45% in 2013 and highest in 2016 at 36.61%. In 2015 there was a further decline in the JSE-ASI and SSA's average GDP growth rate from 2.92% in 2015 to 2.52% in 2016. This may be explained by the findings that during the third quarter of 2015, global

investors withdrew US $ 52 billion worth of investments from the emerging markets (World Bank, 2016). The average stock market capitalization in the continent as a percentage of the GDP rose from 64.42% in 2013 to 80.2% in 2017. (African Development Bank, 2016) points out that there was a 1.8% decline in external financing to Africa in 2015. These declines were attributable to decreases in net portfolio equity and commercial bank flows due to falling global liquidity and increased market risk. Excluding South Africa, the capital stock markets in the continent grew from an average of 1.8% annually between 2003 and 2007 to an average of 2.6% between 2008 and 2012 stemming from the stimulus measures adopted to guard against the global financial crisis effects and stimulate economic growth.

(Sy, 2015) hold that the financial framework in the wider SSA has been dominated by banks with the stock and bond markets remaining underdeveloped despite the rapid growth they record. (IFC, 2017) establishes a high correlation between the size of the economy (with respect to the GDP and per capita income) and capital market development levels. PwC (2019) notes that using a benchmark of market capitalization to GDP, capital markets in the continent are underdeveloped. Low liquidity, few listings and poor market infrastructure contribute to the status of the lowly developed African capital markets. IMF (2019) holds that at lower levels of economic development of commercial banks tend to dominate the financial system while at higher levels, domestic stock markets become more active and efficient more than domestic commercial banks. The contribution of investment to real GDP in the continent rose from 14% to 48% in 2018 with the East Africa region recording the fastest economic growth with a projected growth of 5.9% in 2019 (AfDB, 2019).

In the recent past African governments have been compelled to finance their amplifying budget deficits through domestic issuance as a result of scarce concessional foreign loans, the restraining effects of borrowing from banks and the risks accompanying borrowing in foreign currencies. However, when compared to economies with the similar level of development the SSA region still has the lowest level private investment as a percentage of the GDP with the highest quality issuer often being the government using both its short and long term instruments followed by banks (IMF, 2018). This presents an opportunity for the continent to foster financial innovation geared towards financing the growing infrastructure demand by expanding their domestic investor base. This will be achieved by providing the sufficient conditions for well-functioning financial systems that include a sound macroeconomic and policy frameworks in addition to an institutional framework that boosts investor confidence and protects creditors in the system (IFC, 2017).

More attention should be put on infrastructure debt as an asset class based on its potential to bridge the infrastructure investment gap faced by the continent. Government and financial institution guarantees by creating project-puttable bonds would help mobilize long term investments such as pension and life insurance funds that will help lower private sector risks inherent in long term investments such as reinvestment risks. Another important sector in driving economic growth in Africa is the SMEs sector that should not be ignored. (Beck and Cull, 2014) emphasize that small and medium sized firms which hold the largest share of firms on the continent face more hurdles in acquiring financing when compared to those faced by larger firms. The securities markets in the continent continues to play a significant role in meeting financial needs of the key economic drivers.

Economic growth in Kenya and the stock market.

Kenya's economic growth has experienced a relatively stable trend since 2010. Kenya National Bureau of Statistics (KNBS, 2009) reported a real GDP growth of 1.7 % was attained in 2008. This was the lowest economic growth since 2002 and coincided with the global financial crisis of 2008 and further worsened by the post-election violence of 2007/08 over the disputed presidential elections of 2007. Also, returns in the securities market declined as recorded by a significant drop of NSE 20 share index by 35.27% during the year.

A 5.6% economic growth rate was recorded in 2010 was attributed to improved weather conditions, low inflationary pressures, higher investments, low interest rates and increased credit to the private sector. To finance its activities during the financial year the government raised Kshs. 208 billion by issuing twenty one treasury bonds through the NSE. This recorded a 39% rise in the government revenues generated from bonds compared to the previous year. Also, a 30-year Savings and Development bond was issued in the stock market. In 2011 economic growth declined to 4.4% (KNBS, 2012). This dismal growth in the general economy was attributed to volatility in both interest rates and the Kenya shilling, increased inflation and drought. The stock market recorded equity turnover declines in 2011 as given by the NSE 20 Share index, NASI, FTSE NSE 15 Kenya indices recording rates of -27.7%, -30.60% and -3.15% respectively (ASEA, 2012). This decline in the performance of the capital markets was as a result of various factors including a shrink in secondary market activity and adverse macroeconomic factors. The volatility experienced in both the domestic currency and interest rates led to the transfer of investments from equities to government instruments and fixed deposits. To finance its expenditure during the 2012/2013 fiscal year, treasury bonds of varying maturities were issued raising $1.32 billion through the capital markets. In the corporate sector $79.73 million worth of debt, $309.54 worth of rights issue and introductions were issued. In 2013, the economy surged to a 5.88% growth in real GDP (World Bank, 2014). The capital markets also recorded growth of 38.72%, 39.64%, 40.11% increases in NASI, FTSE NSE 25, and FTSE NSE 15 respectively (ASEA, 2013). A decline in the domestic interest

rates during the year resulted into a significant shift of investments from fixed income instruments to equities.

In 2014 there was an estimated economic growth of 5.4% (World Bank, 2015). This growth was attributed largely to an expansion in the construction, finance and insurance sectors. However, the agricultural sector and the manufacturing sector declined. In the financial sector, bank lending to the government declined significantly while it increased to the private sector. Secondary markets equity turnover rose by 21% driven by demand from investors due to an increase in the profile of the NSE as one of the highest return market in the world. The NSE recorded an annualized return of 24% with eight corporate bonds issued raising Kshs. 100 billion. A 5.7% economic growth was recorded in 2016 (KNBS, 2016) of which the economic outlook of the first half of the year was vulnerable due to deferred investment decisions in anticipation of the 2017 general elections in Kenya. Seventeen treasury bonds were issued during this period raising Kshs. 305 billion with two of them being infrastructure bonds that raised Kshs. 40 billion. This represented a Kshs. 110 billion increase in revenue raised by bonds compared to the previous year. (AfDB, 2019) in its annual African Economic Outlook records an economic growth of 4.9% and 5.9% for the year 2017 and 2018 respectively. Of this growth in 2018, the services sector contributed 52%, agriculture contributed 23.7% with industry contributing 23.8%. Interest capping adopted in Kenya discouraged savings, reduced credit access to the private sector and impeded banking sector competition generally reducing the contribution of the financial sector to the economy.

The capital market has continuously provided the government and local firms with an avenue to raise long term capital for their development activities. Further the exchange has provided the listed firms with a means to raise short term working capital with the domestic financial institutions significantly issuing commercial paper to meet their liquidity obligations. An improvement in the business practices and automation of trading at the NSE has significantly increased liquidity in the secondary markets.

Research Problem

Economic growth is conventionally measured as the per cent rate change in the real GDP. An important aspect is the per capita income (the ratio of the GDP to the population of an economy) and as such it is a powerful instrument for poverty reduction and improving the quality of life of the citizens. GDP growth is measured on an inflation-adjusted basis to eliminate the distorting effects of inflation on prices. However, due to different prevailing conditions, similar rates of economic growth may have varying impacts on poverty reduction and as indicators of human development. Kenya's economic growth patterns albeit stable have exhibited fluctuations over the past decade with different regimes promising double digit growth rates. However, this has not been achieved under the current regime with the highest growth rate of 6.3% recorded in 2018 (KNBS, 2019).

Research Hypothesis

Allocative efficiency exists if the market allocates funds to the best firms. Independence of successive price changes and price changes follow some probability distribution. There exists inadequacies in the current state of knowledge on the applicability of the EMH.

Research objectives

The main objective of this study is to empirically analyze the relationship between the stock market and economic growth in Kenya.

LITERATURE REVIEW

This chapter reviews the empirical work of various scholars already in existence that help the relationship between these two variables.

Theoretical Framework

The study will focus on Arbitrage Pricing Theory and Capital Asset Pricing Model and establishes the relationship between stock market and economic growth.

Arbitrage Pricing Theory

Due to the weaknesses of the capital asset pricing model Ross and Roll (1976) developed this theory. It is multifactor model of asset pricing based on the assumption that a number of factors that influence stock market returns. The theory posits that the expected return of a financial instrument can be modeled as a linear function of a number of financial and macroeconomic variables. Sensitivity to variations in each of the influencing factors is represented by a factor-specific beta coefficient. The rate of return obtained is used to price the security with this price expected to equate to the anticipated end of period price discounted at the rate implied by the APT model. Whenever the prices diverge it is assumed that they will be brought back by the arbitrage process to fulfil the law of one price.

Akwimbi (2003) examined the application of the APT model in predicting stock market returns at the Nairobi Securities Exchange. The study employed indices and unanticipated variations in the economic variables as determinants of security returns. Stock market returns indices were found to be the most important factors in explaining security returns. However, the inclusion of fundamental variables led to a significant improvement in explaining stock returns. This study confirmed that the APT multifactor model had a greater explanatory power on expected stock returns in emerging markets. Jugu and Amodu (2014) performed a comparative analysis between CAPM and the APT with the purpose of identifying the most efficient and accurate stock pricing model. The APT was found to offer a better warning on asset risk and the required rate of return estimates. It provided the most concise explanation of required returns. The study

recommends that investors should utilize the APT model that gives a single and intuitive concept that offer increased efficiency in security pricing.

Ragheb et al (2016) investigated the number of factors to include in an APT model as well as their consistency across markets. The study sought to establish the appropriate financial equilibrium model that would most accurately explain stock market prices using a quantitative research design. The results suggest that the ideal number of factors to incorporate in the APT model range from 4 (four) to 5 (five) across markets. For optimal results the study suggests that an in-depth study of the market economy should be a prerequisite as the factors varied. Dada et al (2021) employed an application of the APT and the test for volatility in the stock market for Nigeria between 1986 and 2018. The OLS method revealed that industrial output had a positive effect on the long run returns while the ARDL revealed that inflation had a negative impact on the returns in the long run. This causality test confirmed a unidirectional causality running from inflation and interest rates to stock market returns while a bi-directional causality ran between exchange rates and returns. These findings confirm the validity of the APT model.

The importance of this theory lies in explaining the fundamental factors that determine stock returns in addition to the inherent systematic risk. These variables are economy specific and therefore reflective of the prevailing economic conditions as well as time periods. The multifactor APT model is useful in revealing the relationship stock returns and the various financial, macroeconomic and political factors. This knowledge is important in in designing policies that enable the optimal functioning of the stock market and eventually the economy at large.

Capital Asset Pricing Model

The model was developed by Sharpe (1964) to quantify the trade-off between risk and the expected returns on a security. The theory allows analysts to split total risk inherent in a security into two portions; systematic risk and unsystematic risk. Systematic risk is measured by the beta coefficient of a security. Beta measures sensitivity to market movement and is a linear market measure. Beta is the sole determinant of return and any divergence by events to the specific security are assumed to be diversifiable. The theory is based on a number of assumptions: perfect capital markets with no transaction costs nor taxes, security prices reflect the information available, investors are risk averse willing to take risks on with adequate compensation, investors have homogenous expectations about risk and return and that they borrow and lend at a risk free rate. The expected rate of return of a security is computed by adding the risk free rate to the difference between market rate of return and the risk free rate multiplied by the beta factor. As such the theory is a single factor model of estimating stock market returns.

Fischer et al (1972) carried out empirical tests on model. The study focused on presenting additional tests that would introduce new insights into the nature of the structure of stock market returns. The study documents that expected excess returns on a security is not strictly proportional to its beta. This finding dismisses the assumption that investors are risk-averse with decisions based on single time periods. Also, cross-sectional analysis were found to be subject to measurement error bias with the alternative being grouping procedures. However, the beta factor was found to be a crucial determinant of the returns on securities. Arduino (2002) conducted an empirical study of the capital asset pricing model and the APT in the Italian Stock Exchange. The study utilized a sample of thirty shares traded in the exchange for the period between January 1990 and June 2001. The researcher utilized time series to estimate the betas and regressed the sample mean returns on the beta while employing economic variables based on the categorization of the Italian economy that ensured minimal overlapping and maximum independent information. The asset Pricing Theory produced better results compared to CAPM. The APT was found to be a more effective approach by allowing for risk inherent on addition of systematic variables besides the market portfolio. He concludes that the behavior of the securities' return is complex and cannot be explained by a single factor.

Yasmeen et al (2012) analyzed CAPM with evidence from Pakistan. In the study, the validity of the model was assessed with respect to the Karachi Stock Exchange by utilizing daily stock returns of twenty firms listed on the exchange for the study period running from December 2008 and February 2010.The least squares method was to find the betas of these stocks and run the regression analysis. The study rejected the key assumption of CAPM: the intercept term is equal to zero, a positive relationship between risk and return and the importance of market risk premium in determining the excess returns. The standard CAPM did not account for the excess risk-return trade off in the securities of Karachi Stock Exchange. The study recommended the identification of other factors that explain the divergence in an assets and exchange rates in a more precise way. Okumu and Onyuma (2015) test the applicability of CAPM in the Kenyan securities market. The study aimed at examining the risk-return relationship in the model framework and assess its effectiveness in pricing Kenya's securities between January 2009 and December 2010 using cross-sectional regression. The estimated stock return using CAPM revealed a weak positive relationship between returns and the stock betas. Where the NSE market above the risk free rate is negative an inverse relationship between beta and return and the portfolio is anticipated while a positive linear relationship is exhibited between beta and exchange rate. The original CAPM as presented inadequately explains the local equity market economically and

statistically significant role of market risk in determining expected returns.

The theory is important in explaining the rationale investors follow when deciding sectors of the economy to invest in. Different sectors of the economy provide varying risk-return tradeoffs. This knowledge provides a basis to understand sectors of the economy providing the highest attraction to the investors and the risk prevailing in a portfolio.

Empirical Review

Several studies have shown that various stock market variables depict varying relationships of the stock market and macroeconomic variables. These trends too vary across time periods and economies under consideration. Variables of the stock market employed in this study measure different aspects of the Kenyan stock market with the purpose of unraveling the relationship between the overall stock market and economic growth in Kenya.

Components of Stock Market

Stock market capitalization

Market capitalization is a measure of the total value of all companies listed on the NSE. It measures the market size of the securities exchange and is obtained by the sum of all outstanding shares multiplied by their respective prices at any given point in time. In the NSE this index is given by the NSE All Share Index (NASI). It is a market capitalization weighted index consisting of all stocks on the NSE. The base value of the index is 100 as of January 2008. It was introduced in 2008 to measure the overall market capitalization based on price movements of selected counters with prices based on the last trades from the exchange's Automated Trading System. NASI reflects the total value of all listed companies at the NSE and better reflects the market performance (NSE Press Release, 2008). The index is comprised of the ordinary shares of all firms listed in the NSE under the following eleven sectors: Telecommunication and Technology, Banking, Manufacturing and Allied, Insurance, Energy and Petroleum, Construction and Allied, Commercial and Services, Investment, Agricultural, Automobile and Accessories and Investment services as contained in appendix II. The index is computed by dividing the total market value of listed equity (current total of all outstanding shares*respective current prices) by the initial total market value of the listed equity as at base date (number of outstanding shares as at base date * price as at base date) and the result multiplied by one hundred. Alejekwu and Achugbu (2012) analyzed the role of stock market development on economic growth in Nigeria. The study covered a period of fifteen years running from the year 1994 to 2008. It utilized ordinary least squares method in the analysis on the sample of all firms listed on the Nigeria Securities Exchange for the period to measure the relationship between stock market development indices and economic growth. The study revealed a very weak negative correlation between market capitalization (stock market size) and economic growth. The study further revealed that market capitalization is caused by economic growth. Shabbaz et al (2013) investigated the impact of macroeconomic variables on stock market capitalization in Pakistan for the period between 1974 and 2010. The study employed VECM and causality tests. A long run relationship was established to exist between economic growth and stock market capitalization. Economic growth was also found to improve market capitalization. The causality test revealed that unidirectional causality ran from economic growth to stock market capitalization. The study recommends that the government should provide incentives to induce foreign investments since FDI foster stock market capitalization that enhance economic activity.

Osoro and Jagongo (2013) studied investor perspectives on the NASI and the NSE 20 share index as performance measurement indicators at the NSE. The study was inspired by the shortcomings levelled against the index as a measurement indicator. They used the NSE and seventeen stock market analysts for the sample of the study for the period between March 2008 and February 2010. The study employed correlation analysis on secondary and primary data concluding that there was no significant difference between the two indices. However, NASI had a higher correlation with the underlying market capitalization than the NSE 20 Share Index hence the conclusion that NASI performs better.

Stock market returns

Stock market returns refer to stock appreciation and dividend returns. The stock appreciation return is the difference between the buying price and the selling price while dividend returns are obtained from the profit share to the shareholders. The NSE 20 share index is a major stock index that tracks the performance of the twenty best performing companies listed on the NSE. They are selected based on a weighted market performance for a twelve month period based on the number of shares traded, number of deals, market capitalization and turnover. It more specifically tracks the NSE equities market. The NSE 20 share index is a price weighted index calculated as a mean of the twenty selected stocks. The selection criteria is based on: First, the trading activity measures weighted in the ratio 4:3:2:1 for market capitalization, traded shares, liquidity (deals) and turnover respectively. Secondly, a company with a free float of 20%. Thirdly, the company must have a market capitalization of at least Kenya shillings twenty million and finally the company should have superior profitability and dividend record. A company that breaches on any of these requirements for over three years is disqualified from inclusion. The index comprises of two companies from the Commercial and Services sector, six from the Banking sector, four from the Manufacturing and Allied sector, three from Energy and Petroleum sector, two from the Insurance sector, one from the Telecommunication and Allied sector, one from the Investment sector and one from the Investment services sector as shown in appendix III.

Olweny and Kimani (2011) investigated the relationship between stock market performance and economic growth in Kenya. This study covered the period between 2001 and 2010 while employing quarterly data. The VAR model was utilized together with a Granger causality test. Causality was found to run unilaterally from the stock market returns as measured by the NSE 20 share index to economic growth. Hence, stock market returns as measured by the NSE 20 share index reflected macroeconomic activities of the economy and can thus be used to forecast the future trend of Kenya's economy.
Komain (2012) studied the predictive role of stock market returns for real activity in Thailand. The study utilized monthly data on all listed firms for the period between 1993 and 2011. Using the Granger causality test, the stock market returns were found to perform the predictor role on the economy for a short period running between three and four months.
Onakoya (2013) examined stock market volatility and economic growth in Nigeria for the period running from 1980 to 2010. Using EGARCH the study revealed that Nigeria's stock market performance is hardly reflected in the real economy. As such, the stock market returns were not responsive to changes in macroeconomic factors and it is therefore very difficult to forecast stock market returns through macroeconomic changes. Kaimba (2010), studied the relationship between NSE-20 share index and selected macro-economic variables that influence growth in Kenya. He used the GDP, interest rates, inflation rates, exchange rates and domestic savings. Using a descriptive design to establish the causal relationship between the independent variables and the stock market he used annualized data of the NSE-20 share index and the macro-economic variables for the period between 1990 and 2009. The study concluded that a significant relationship exists between the NSE and macro-economic variables. This evidence supported the assertion that the stock markets are important predictors of the direction of the economy.

Liquidity

Liquidity refers to the ability or ease of investors to trade financial instruments. It is an indicator of stock market development as it signifies how the market aided in the capital allocation function of driving prospects of long run economic growth. A liquid stock market enables traders/ investors execute a large number of trades without any effect on the market. Market liquidity is characterized by marketability of financial instruments and price continuity across transactions. The FTSE Russell Company runs a number of indices both global and local indices. In Kenya, the FTSE NSE 25 share index was launched in 2011. (NSE, 2018) affirms that the index aims to provide performance of the NSE listed companies, provide transparent and complementary benchmarks for key industry and capital segments to market participants. FTSE NSE 25 index captures the performance of the twenty five (25) most liquid stocks. To be incorporated into this index a listed firm must meet the free float and liquidity criteria. Given that a security's full market capitalization is greater than or equal to 1% of the entire market's capitalization, a security with a free float of more than 5% but less than 15% are eligible for indexing. This study will utilize the index to examine the role of liquidity of the stock market on economic growth. However, since the introduction of the FTSE index series in the NSE only a single study has evaluated the performance of this index series in any of its roles.
Andong et al (2002) in their work on stock market liquidity and economic growth conducted a cross-country analysis on forty seven (47) countries for the period between 1976 and 1993. The study shows that when outliers are properly controlled for, stock market liquidity does not statistically influence economic growth. As a result, economies cannot derive any significant economic growth rates from operating in stock markets with higher liquidity. Onyango (2011) investigated the relationship between stock market liquidity and economic growth in Kenya between 2010 and 2014 using quarterly data. Using an Error Correction Model and causality tests a unidirectional relationship between stock market liquidity and economic growth was established. This causality ran from the stock market to GDP growth. Stock market liquidity was found to positively and significantly impact economic growth both in the short run and long run. Stock market liquidity and market capitalization were found to be crucial factors towards attainment of the 10% per annum GDP rates envisioned in the Kenya Vision 2030 and as such policy interventions should be geared towards promoting stock market liquidity.
Shatha (2013) analyzed the impact of stock market liquidity on economic growth in Jordan between 1991 and 2011. The study adopted a simple linear regression model on a sample of all listed firms in the Amman Stock Exchange. Stock market liquidity was found to lead to increase in economic growth. Also, liquidity of the stock market was established to have a more positive impact on economic growth than market capitalization. Stemming from these findings the researcher recommended that the government should promote stock market liquidity as a means of enhancing both domestic and foreign investments geared towards growing the domestic economy.

Conceptual Framework

The conceptual model represented below is derived from the existing literature on the expected relationship between the stock market and economic growth. The relationship portrayed is how the stock market influences economic growth in Kenya. The dependent variable is economic growth as measured by the Gross Domestic Product (GDP). The independent variables are the three NSE variables (market capitalization, stock market returns and liquidity) used in the study. The aim is to explain how these independent variables influence economic growth.

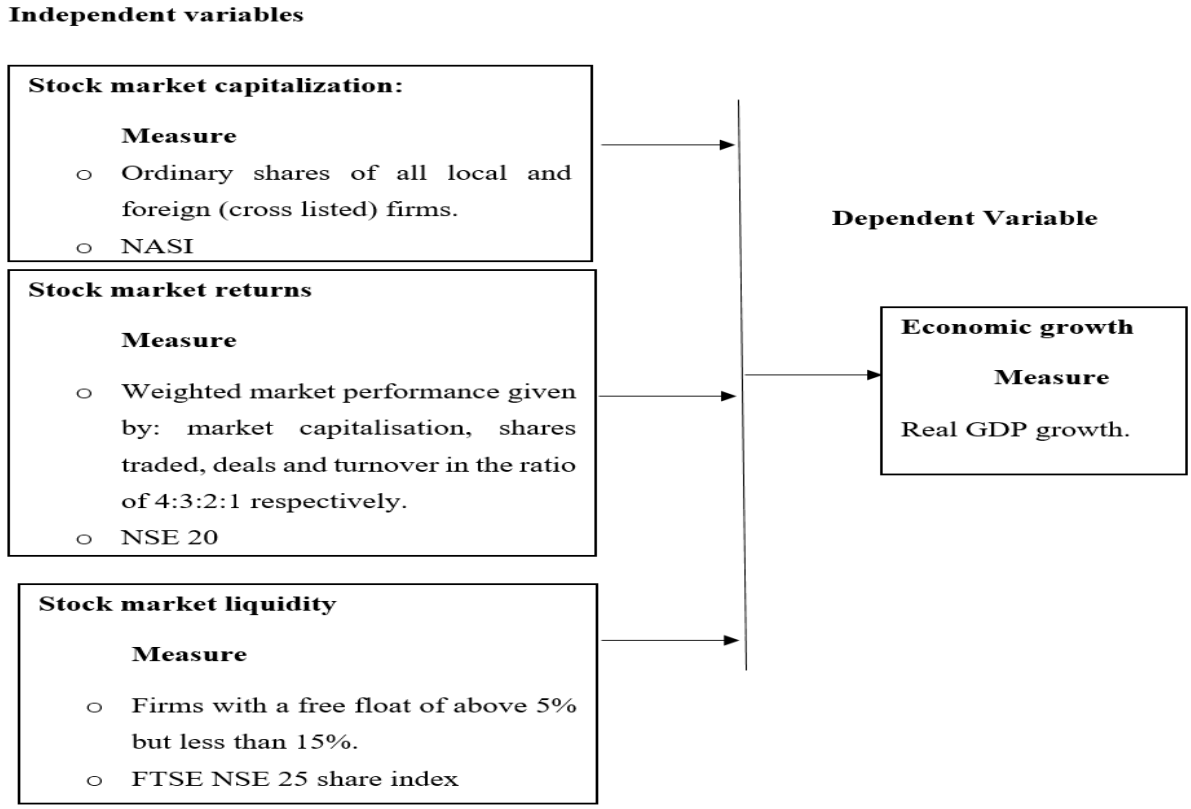

Figure 1: Conceptual Framework

RESEARCH METHODOLOGY

Research Design

Research design is an outline of all procedures selected by a researcher to assess the relationship between variables (Khan, 2008). This study employed a causal relationship to analyze the direction of causality between the stock market and economic growth in Kenya. This will help in understanding how the variable(s) in the study are responsible for changes in the other variable(s). Cooper and Pamela (2011) notes that the ideal standard of causation requires that one variable always causes another and no other variable has the same causal effect with empirical conclusions based on inference-induction.

Target Population

The target population for this study are all the quoted NSE companies for the period under study. Economic growth will be measured by real GDP growth rates over the same period. The real GDP is used as a proxy indicator of economic growth changes over time for an economy.

Sampling Technique

Purposive sampling was employed and the most recent economic growth and stock market time series data was used to achieve the objectives of the study. Data for all variables in the study was collected from the first quarter of 2011 to the fourth quarter of 2019. This data provided a means for drawing conclusions on the existing relationship as well as the leading economic indicator role of the stock market.

Data Collection

To meet the objectives of the study a data collection schedule guided this process for the period of the study. To determine this relationship stock market time series data on the NASI, NSE 25 and FTSE NSE 25 indices data was collected by the researcher from the NSE periodical hand books and My Stocks Limited for the period between the fourth quarter of 2011 and the fourth quarter of 2019. Time series data on economic growth was drawn from GDP growth rates provided on a quarterly basis by the KNBS which is the principal government agency for collecting and analyzing statistical data.

Data Analysis

The data collected was be analyzed using both regression analysis and causality tests. Inferential statistics was used to estimate the sample parameters. To estimate the causality direction between the stock market indicators and economic growth, Granger-causality tests were used as applied by Comincioli (1996) and Olweny and Kimani (2011). These analysis were carried out by use of the Eviews 11 statistical software.

DATA ANALYSIS AND FINDINGS

Tools used in unravelling the relationships include diagnostic tests, multivariate regression analysis, descriptive analysis, co-integration tests, causality tests and hypotheses testing. The data analyzed for this study runs quarterly for the period

between quarter one of 2012 and quarter three of 2019 creating a sample size of thirty one observations.

Descriptive Statistics

Table 3: below presents the summary of the descriptive statistics of all the variables employed in the study.

	GDP	MCAP	RET	LIQ
Mean	1621.128	139.7161	3946.257	180.7074
Median	1601.347	144.8000	3856.390	183.5900
Maximum	2498.037	181.0400	5291.580	229.0600
Minimum	841.0790	70.51000	2542.420	97.22000
Std. Dev.	552.1050	28.43979	813.9759	34.98847
Skewness	-0.029662	-0.947001	0.087281	-0.825896
Kurtosis	1.754792	3.282862	1.793995	3.056259
Jarque-Bera	2.007332	4.736875	1.918021	3.528294
Probability	0.366533	0.093627	0.383272	0.171333
Sum	50254.96	4331.200	122334.0	5601.930
Sum Sq. Dev.	9144597.	24264.65	19876705	36725.80
Observations	31	31	31	31

The data comprised of a sample size of thirty one (31) observations from quarterly observations for each variable in the study. The GDP mean for the period was recorded at 1621.128 (Ksh. billions). The lowest economic growth was recorded at 841.0790 in 2012 Q1 and highest at 2498.037 in Q2 of 2019. Market capitalization registered an average of 139.7161 with a minimum of 70.5100 in Q1 of 2012 and a maximum of 181.0400 in 2018 quarter 2. Stock market returns averaged 3946.257 with a maximum of 5291.580 recorded in Q1 of 2015 and a minimum return of 2542.420 in Q3 of 2019. On the other hand, stock market returns had a mean of 180.7074 for the period with the highest liquidity recorded in Q2 of 2018 at 229.0600 and lowest at Q1 of 2012.

Unit root tests

Table 4: ADF Unit root test

Variable	**ADF**	**critical values**	**Inference**	**Status**
GDP	-0.185627	-2.976263	I(0)	Not stationary
	-8.386342	-3.587257	I(1)	Stationary
CAPITALISATION	-2.238761	-3.574244	I(0)	Not stationary
	-3.795250	-3.574244	I(1)	Stationary
STOCK MARKET RETURNS	-2.460194	-3.574244	I(0)	Not stationary
	-3.652649	-3.574244	I(1)	Stationary
LIQUIDITY	-2.333886	-3.574244	I(0)	Not stationary
	-4.085049	-3.574244	I(1)	Stationary

The null hypothesis for the existence of a unit root (non-stationarity) for all the variables in the study (gross domestic product, market capitalization, stock returns and liquidity) was accepted at levels. However, on first differencing all the variables exhibited no unit root (were stationary) at 5 per cent significance level as their respective absolute critical values were less than the computed ADF statistics in absolute terms.

Lag length selection

Table 5: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-626.5677	NA	9.05e+13	43.48743	43.67602	43.54649
1	-519.8369	176.6579*	1.76e+11*	37.23013*	38.17309*	37.52546*

2	-504.6546	20.94105	2.00e+11	37.28653	38.98386	37.81811

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (5% level)

FPE: Final prediction error

AIC: Akaike information criterion

The researcher applied the various criterion in obtaining a suitable lag length- the sequential modified LR statistic at 5%, Final Predictor Error (FPE), Akaike Information Criterion, Schwarz Information Criterion and the Hannan-Quinn Information criterion. The VAR model was applied in determining the optimal lag length yielding an optimal lag length of one (1) for all the variables. For all the variables in this study, a lag length of one (1) was selected for all criteria as shown in the table 4.3.1 above. These results reveal that it takes one period for the current values to be correlated with the past values for each variable.

Co-integration test

This test was carried out using the Johansen-Juselius co-integration test that is based on the VAR model utilized by the researcher. The Eigenvalue test statistic tests the null hypothesis that the number of r co-integrated vectors is zero against the alternative hypothesis of r+1 co-integrated vectors, that is,

H_o: r=0 No co-integrating equation

H_1: r=1; r=2 etc Co=integrating equation exist

Table 6. Johansen co-integration tests (GDP, CAPITALISATION, STOCK RETURNS, and LIQUIDITY)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.568562	47.99130	47.85613	0.0486
At most 1	0.422097	23.61299	29.79707	0.2173
At most 2	0.210168	7.710864	15.49471	0.4968
At most 3	0.029512	0.868743	3.841465	0.3513

Trace test indicates 1 co-integrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

This test was carried out by incorporating the lag length m=1 to cater for the sensitivity of the test to lag length specification. The rejection criteria is at 5% significance level with the rejection of the null hypothesis given by an asterisk (*). The null hypothesis of no co-integration is rejected at 5% significance level for the Eigen value revealing that at least one co-integrating vector exists among the four variables in the long run and suggests the existence of at least one direction of causality.

Serial correlation

The Breusch-Godfrey LM test was conducted and the results presented in table 5. The null hypothesis for this test is that there exists no serial correlation between residuals while the alternative hypothesis states that serial correlation exists. This null hypothesis was not rejected (there exists no serial autocorrelation) with two lags at 5% significance level given the F-statistic of 11.61957 and a p-value approaching zero.

Table 7: Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	11.61957	Prob. F(2,26)	0.0002
Obs*R-squared	14.63091	Prob. Chi-Square(2)	0.0007

Normality test

Table 8: Jarque-Bera test normality test

	GDP	M.CAP	RET.	LIQ
Mean	1621.128	139.7161	3946.257	180.7074
Median	1601.347	144.8000	3856.390	183.5900
Maximum	2498.037	181.0400	5291.580	229.0600
Minimum	841.0790	70.51000	2542.420	97.22000
Std. Dev.	552.1050	28.43979	813.9759	34.98847
Skewness	-0.029662	-0.947001	0.087281	-0.825896
Kurtosis	1.754792	3.282862	1.793995	3.056259
Jarque-Bera	2.007332	4.736875	1.918021	3.528294
Probability	0.366533	0.093627	0.383272	0.171333
Sum	50254.96	4331.200	122334.0	5601.930
Sum Sq. Dev.	9144597.	24264.65	19876705	36725.80
Observations	31	31	31	31

$JB= n [s^2/6 + (k-3)^2/24]$

Where n=sample size, s=skewness coefficient and k=kurtosis coefficient

H_0: Jarque-Bera=0 Normally distributed

H_1: Jarque-Bera≠0 Not normally distributed

Table 8 above presents the descriptive statistics for the four variables in the study

Heteroskedasticity

Table 9: Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoscedasticity

F-statistic	2.437090	Prob. F(3,27)	0.0863
Obs*R-squared	6.605682	Prob. Chi-Square(3)	0.0856
Scaled explained SS	2.697655	Prob. Chi-Square(3)	0.4406

The null hypothesis that the residuals are homoscedastic is accepted since the calculated F-test statistic of 2.437090 and p-value of 0.0863 are greater than the significance level of 5%.

Causality test

Table 10: Pairwise Granger Causality Tests
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
MCAP does not Granger Cause GDP	30	0.72654	0.4015
GDP does not Granger Cause MCAP		0.19079	0.6657
RET does not Granger Cause GDP	30	0.11825	0.7336
GDP does not Granger Cause RET		15.5229	0.0005
LIQ does not Granger Cause GDP	30	0.36457	0.5510
GDP does not Granger Cause LIQ		0.00054	0.9816

These results revealed that economic growth "Granger caused" stock returns.

Model specification

To estimate the linear relationship between the variables of the study, a multivariate regression equation stated below was adopted.

Economic growth =f (MARKET CAPITALISATION, MARKET RETURNS, LIQUIDITY)

$GDP= C+\beta_1 MCAP+\beta_2 RET+ \beta_3 LIQ+\varepsilon$

Where: C Constant

β_i coefficients

ε Error t

Table 9. Below shows the regression results used in estimating the linear equation for the relationship between the GDP and the stock market indices.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1429.678	157.0359	9.104149	0.0000
MCAP	13.89649	7.821205	1.776771	0.0869
RET	-0.466211	0.032903	-14.16924	0.0000
LIQ	0.496239	6.395554	0.077591	0.9387

R-squared	0.951862	Mean dependent var	1621.128
Adjusted R-squared	0.946514	S.D. dependent var	552.1050
S.E. of regression	127.6860	Akaike info criterion	12.65694
Sum squared resid	440200.3	Schwarz criterion	12.84197
Log likelihood	-192.1826	Hannan-Quinn criter.	12.71725
F-statistic	177.9634	Durbin-Watson stat	1.829342
Prob(F-statistic)	0.000000		

FINDINGS

A unit root test was conducted using the ADF test that measures the extent of stochasticity in time series data. All the four variables are non-stationary at levels implying that the data had spiking statistical properties over time. An optimal lag length of one was selected by the VAR lag order selection criteria. This means that it took one period (quarter) for the current values of each variable to be correlated with their past values. The Breusch-Godfrey serial correlation confirmed that no serial correlation existed between the errors and hence the residuals were pairwise independent. The dependent and the independent variables were also found to be normally distributed with their p-values exceeding the 5% significance level.

The multivariate regression analysis carried out revealed that the stock market explained 95.19% of the changes in economic growth in Kenya for the period of the study while the rest (4.81%) was explained by factors not captured in the model. Market capitalization had a coefficient 13.896 implying that a unitary change in market capitalization led to a corresponding change of 13.896 in economic growth in Kenya for the period. These findings of a positive correlation between economic growth and stock market capitalisation were consistent. Stock market returns recorded an inverse relationship with economic growth in Kenya as given by a coefficient of -0.466. This means that growth in the stock market returns by a single unit translates into a decline in growth of the Kenyan economy by 0.466 units. Stock market liquidity recorded a positive relationship with economic growth with a coefficient of 0.496 leading to the observation that a uit change in stock market liquidity at the NSE lead to a corresponding positive change of 0.496 units in the growth of the economy. All these variables were found to be statistically significant in the model when considered jointly as given by the high F-statistic.

The Johansen-Juselius co-integration test revealed that at least one co-integrating relationship existed among the four variables in the long run given one (1) lag. Pairwise Granger-causality test confirmed that only one causal relationship existed in the model. Economic growth was established to "Granger-cause" stock returns for one lagged quarter at 5% significance level. For the other two stock market variables, no causality was established to exist between them and economic growth in Kenya. Therefore, current economic growth trends are a reliable leading indicator of the future stock market returns in the NSE.

A positive correlation was identified between market capitalization and economic growth in Kenya with a unit change in market capitalization leading to a corresponding change of 13.89649 units in economic growth. An inverse correlation was established between stock market returns and economic growth. A unit increase in the stock market returns would eventually lead to a decline in economic growth by 0.466211 and vice versa. On the correlation between stock market liquidity and economic growth, the research confirms that a positive relationship exists between the two variables.

There is no causality relationship was identified to run between market capitalization of the NSE and economic growth in Kenya.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

The time series data for all the four variables in the study were found to have unit roots at levels and thus their null hypotheses were rejected by the ADF test. The null hypothesis for the Johansen co-integration test that there existed no long run equilibrium relationship between economic growth and the stock market in Kenya. A unilateral causality relationship without a feedback mechanism was established to run from economic growth to the stock market through stock market returns. The unilateral causality running from economic growth to the stock market returns of the NSE imply that prevailing economic growth trends determined the expected stock market returns. Stock market liquidity had a significant positive correlation with the GDP. The FTSE NSE 25 share index was utilized as a proxy for stock market liquidity and the researcher concludes that stock market liquidity has positive effect on economic growth.

Conclusion

Economic growth may be used as a policy tool in driving the stock market in Kenya. Growth of the economy is therefore a key catalyst of stock market activity and hence the government should incorporate favorable stock market policies in their overall economic strategies. These include but not limited to elimination of the recently introduced capital gains tax that is a deterrence to stock market investment.

Recommendations

Government policy makers should incorporate policies that minimize macroeconomic volatility and distortions with the aim of fostering stock market growth. Investors should take into consideration the effect of economic growth on the stock market when making decisions on their investment strategies. Based on these results there arises the need to re-examine the computation of the NSE 20 share index geared towards improving its efficiency as a stock market index.

Areas for further Research

The researcher recommends further research on the accuracy of stock market variables in performing their economic barometer role in Kenya for longer time periods. There is need seek to establish why the three stock market variables did not act as leading economic indicators for the period and the underlying factors required for the stock market to lead economic growth. It is important to determine the optimum factors for each given relationship to prevail for a given level of economic development. there is need to evaluate the factors that result into an inverse relationship between economic growth and stock market returns.

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