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Cointegration Relationship Between Exchange Rate Volatility and Performance of Nairobi Securities Exchange Market, Kenya

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Abstract

The stock exchange markets in developing countries are generally characterized as unstable and shallow. The current international integration of financial markets provides a channel for currency depreciation to affect stock prices, thus there is need to identify if there is any relationship between the two markets. Specifically the study seeks to determine the trend and correlation between the exchange rate and the NSE 20 share index; and establish empirically the long run relationship between the exchange rate and the NSE 20 share index. Based on the theoretical framework on “flow-oriented” and “stock-oriented” models of exchange rates, the study will be able to determine the relationship between the two financial markets. Exploratory and correlational research design was used. The target population consisted of all the 55 stocks listed at NSE as at December 2011 from which NSE 20 share index is derived from. Due to the nature of the study of finding the relationship between the Exchange rate and the NSE 20 share index which are all time series. Correlation analysis, Augmented Dickey Fuller Test, and Engle and Granger (EG) Co integration Test were adopted using the use monthly time series from 1996:1 to 2011:12. The results indicated that there is a significant weak negative correlation between the NSE 20 share index and the exchange rate of -0.224. Both the series are integrated of order one. On the other hand, results from the cointegration regression indicate that the residual (error) series are not stationary at levels but it is stationary in the first difference or is generated by an integrated of order one process at both the 1% and 5% significance levels indicating no long run relationship between the two markets that is the Securities market and the foreign exchange market.

Keywords: Cointegration relationship, Exchange rate Volatility, Nairobi Securities exchange

1. Introduction

The global financial crisis has not spared African stock markets, as equity indices crash, currencies remain volatile and key commodity prices decline. Despite recent theorizing about decoupling and sheltered financial markets, African economies have been deeply shaken by the financial crisis. Nearly every financial and economic indicator has turned from wildly optimistic, to an unclear and turbulent moment at the present. While many African stock markets are struggling, much of the difficulty has to do with reduced external demand, rather than weak internal fundamentals.

The stock market plays a major role in financial intermediation in both developed and developing countries by channeling idle funds from surplus to deficit units in the economy. As the economy of a nation develops, more resources are needed to meet the rapid expansion. The stock market serves as a channel through which savings are mobilized and efficiently allocated to achieve economic growth (Alile, 1984). Large and long term capital resources are pooled through issuing of shares and stocks by industries in dire need of finance for expansion purposes. Thus, the overall development of the economy is a function of how well the stock market performs. Empirical evidences from developed economies as well as the emerging markets have proved that the development of the stock market is sacrosanct to economic growth (Ashaolu and Ogunmuyiwa, 2011).

The stock exchange markets in developing countries are generally characterized as unstable and shallow. These two features lead to the fact that macroeconomic dynamics still have the potential to play a very important role on stock market performances. The Nairobi Securities Exchange (NSE henceforth) is no exception in this context. The low volume of trade and limited publicly available information combined with the unstable and shallow nature of the NSE result in an oversensitivity of stock returns to macroeconomic developments. The Nairobi Securities Exchange (NSE) is the largest market in the East African Community (EAC) and is the only one open to foreign investors. The policy to enhance competitiveness in the smaller financial markets relies on regional integration and the East African centre is in Nairobi.

The financial position of an economy is susceptible to its foreign exchange volatility. Foreign exchange market developments have cost implications for the households, firms and the state at large. Benita and Lauterbach (2004) showed that exchange rate volatility have real economic costs that affect price stability, firm profitability and a country's stability. Exchange rate volatility has implications for financial system of a country

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especially the stock market. Theoretically, exchange rate as a macroeconomic variable is expected to affect the performance of stock market. But over the years, the observed pattern of the influence of this variable (in signs and magnitude) on stock market varies from one study to another in different countries, (Maku and Atanda, 2009).

The internationalization of capital markets has resulted in inflow of vast sums of funds between countries and in the cross listing of equities. The current international integration of financial markets provides a channel for currency depreciation to affect stock prices. Last year the Kenyan shilling was the worst performing currency in the whole world. This has therefore made the researcher more interested in the volatility of exchange rate and its effect on stock market performance.

Given the increasing trend toward globalization in financial markets, the last quarter of a century has witnessed significant changes in the international financial system such as emergence of new capital markets, gradual abolishment of capital inflows barriers and foreign exchange restrictions, or adoption of more flexible exchange rate arrangements in emerging and transition countries. All mentioned features have broadened the variety of investment opportunities but, on the other hand, they have also increased volatility of exchange rates and added a substantial portion of risk to the overall investment decision and portfolio diversification process. Interaction between foreign exchange and stock markets has become thereby more complex. Thus the study strives to investigate empirically the effect and long run relationship between Exchange rate volatility and stock market performance in the Nairobi Securities Exchange (NSE) Market in Kenya.

2.0 Literature Review and Theoretical Framework

2.1 Literature Review

2.1.1 Overview of the Nairobi Securities Exchange (NSE).

The Nairobi Stock Exchange (NSE) can be traced to the 1920's when it started trading in shares while Kenya was still a British colony (IFC/CBK, 1984). While share trading was initially conducted in an informal market, there was a growing desire to have a formal market that would facilitate access to long-term capital by private enterprises and also allow commencement of floating of local registered Government loans.

According to Parkinson, (1984) and Munga, (1974), there was no physical trading floor or specialized stockbrokers. Share trading was a part time job for accountants, auctioneers, estate agents and lawyers who met to exchange prices over a cup of coffee. The first stock brokerage firm was established in 1951 by Francis Drummond. Foreign investors dominated share trading mainly because they had the know-how of operating organized capital markets and also because their high income sufficiently permitted them to accumulate savings and investment in securities, (Aworolo, 1971).

To facilitate the registration, stockbrokers obtained clearance from the London Stock Exchange (LSE), which recognized the NSE as an overseas stock exchange, effectively enabling the NSE to gain value and credibility, (Munga, 1974). The NSE was constituted in 1954 as a voluntary association of stockbrokers registered under the Societies Act, (NSE, 1997). The number of stockbrokers increased to six in 1954, with two specialists and others carrying out stock broking as subsidiary activities (Parkinson, 1984). In the Rules and Regulations of NSE 1954 all individuals, firms and limited liability companies transacting brokerage business and whose applications had the approval of the NSE Committee are regarded as members of the Stock Exchange.

According to Ngugi (2003), Securities traded in the NSE during the period 1954- 1963 mainly included Government stocks, loan stocks, preferential and common share. Data available from the yearbooks indicate that loan stocks were unpopular compared to the common and preferential shares. In 1954 for example, two companies issued loan stocks worth Kshs 7.48 million as compared to 28 companies which offered preferential shares worth Kshs 90 million. Issues of Government stocks were made on the London Stock Exchange. The value of stocks increased from Kshs 84.88 million in 1953 to Kshs 95.5 million in 1954 following a listing of 12 public sector stocks and Kshs 295.5 million in 1959. When the NSE started operations, only 5.4% of Government stocks were listed; the rest had listing in the London Stock Exchange (LSE).

The period immediately after independence saw the Government adopt the Kenyanisation policy with a primary goal of transferring economic and social control to citizens by ensuring that majority of businesses were in the hands of citizens except where some overriding national advantage was otherwise demonstrated. Kenyanisation of businesses involved transfer of existing firms to citizens and the creation of new enterprises in the hands of citizens. Foreigners held majority interest in companies if sufficient capital was not available from domestic sources or so long as other advantages to the country, such as technology and skills, could only be obtained this way. This was achieved through trade licensing legislation under which lists of businesses owned by non-Kenyans and targeted for transfer to Kenyans by sale within a specified period were published periodically. Kenyans able to take over such businesses were provided with loan assistance by the Government. Therefore, the Kenyanisation policy saw a change in the ownership structure of various businesses. The previously foreign-dominated market saw an increased share of locally-controlled firms (*Ibid*).

The Government made a first attempt to regulate the stock market with the establishment of the Capital

Issue Committee (CIC) in 1971. The idea was aroused from the observed practice of foreign investors in the process of Kenyanisation. In the Development Plan (1969/70), it is noted that foreign companies selling shares to local investors were following up with the request to remit the funds realized overseas.

Despite the Government realizing that the capital market was playing an insignificant role in the development process in the early 1970s, as characterized by weak development of financial institutions and a thin and inactive stock market, revitalization reforms were only implemented in the 1990s following the IFC/CBK (1984) study whose recommendations became a blueprint in the reform process. The Government reaffirmed its commitment to the reform process in Sessional Paper No. 1 of 1986 (GoK, 1986). The recommendations emphasized the need to develop money and capital markets by diversifying money market instruments and removing taxation differences between the debt and equity finance in order to achieve diversity in the sector. Another proposal made was the need to establish regulatory authority with the powers to provide regulatory measures for improvement and proper functioning of a fair and orderly market.

A statutory regulatory framework was established as part of the on-going capital market reforms in an effort to strengthen the regulatory infrastructure. The Authority was established in 1990 through the Capital Market Authority Act (Cap 485A). The Central Depository and Settlement Corporation Limited (CDSC) was incorporated under the Companies Act (Cap 486) on 23 March 1999. The CDS Act was passed by Parliament and received Presidential assent paving way to implementation of the CDS on 18th August 2000.

2.1.2 Exchange Rate in Kenya.

The exchange rate regimes have evolved along general macroeconomic policies that have been put in place since Kenya gained its independence in 1964. According to Ndung'u (2000), since independence to 1974, the exchange rate for the Kenya shilling was pegged to the US dollar, but after discrete devaluations, the peg was changed to the special drawing rate (SDR). However, during the period of 1974 and 1981 the movement of the nominal exchange rate relative to the dollar was very volatile. This resulted in the shilling depreciating even further when the shilling was devalued again in 1982. However according to Pollin and Heintz (2007) the exchange rate regime was changed to a crawling peg in real terms at the end of 1982. This regime was in place until 1990 when a dual exchange rate system was implemented. This lasted until late 1993, when, after further devaluations. The official exchange rate was merged with the market rate and the shilling was allowed to float.

After the liberalization of the shilling, the real exchange rate, has gone through several phases, most of which have been depreciations due to a number of factors. During the period between January 1995 to October 1999 the shilling real exchange rate depreciated by 21.0 percent. The Shilling declined even further due to the major drought in 1999 to 2000 coupled by increases in the cost of fuel products. There was also an increased demand for foreign currency to cover the rising import bill, brought about by the increased oil price and food imports to mitigate the supply shortage caused by drought. According to CBK Annual Report (2000) the NEER declined by 16.1 percent in 1999 and 3.5 percent in 2000. The depreciation was moderated due to inflows associated with the IMF Poverty Reduction and Growth Facility (PRGF).

In 2002, the Shilling began to depreciate and this was mainly due to speculative pressures associated with the general election that was to take place in December 2002. This obliged the Central Bank to intervene periodically to smooth out volatility. Speculation on the Kenyan shilling eased from September 2004 following a positive assessment of the economy by the IMF. In 2005 according to the CBK Annual Report (2005), the shilling appreciated by 3 percent against the US dollar as a result of strong export receipts and capital inflows in response to the relatively high domestic interest rates. The key exports areas being horticulture, tea, coffee and tourism. From December 2004 to December 2007, the shilling real exchange rate appreciated by 30 percent representing a major deviation from its past levels. According to Kiptui and Kipyegon (2008) this appreciation of the shilling real exchange rate has attracted public attention especially from exporters who have argued that the strengthening shilling is eroding their competitiveness.

Due to the global financial crisis the NEER began to decline by 1.1 percent between June 2007 and June 2008 by 16.6 percent between June 2008 and June 2009 (CBK Annual Report, 2009). The depreciation of the shilling against the US dollar, which mainly occurred during the first half of the fiscal year 2008/09, initially triggered sale of shares allocated to foreign investors after the shares commenced trading at the Nairobi Stock Exchange. The foreign investors were mostly speculating and this led to huge outflows of foreign exchange. The depreciation of the local unit was further amplified by the international financial crisis (CBK Annual Report, 2009).

The policy of a market determined shilling and the relaxation of exchange controls has exposed the currency to domestic and external shocks consequently increasing its volatility (Monetary Policy Statement, 2009). However, Kenya maintains a flexible exchange-rate system to complement its trade reforms and to ensure appropriate economic incentives for producers. Although the volatility of the shilling has increased considerably since the Central Bank allowed the exchange rate to freely float, the general trend of the NEER has been depreciating apart from the short period of appreciation from 2005-2007. The implications of the exchange rate volatility for ERPT are that the greater the volatility the more importers become wary of changing prices and

the more willing they become to adjust profit margins accordingly to either an appreciation or depreciation.

2.1.3 Empirical Literature between Stock Exchange Market, Exchange rate and other macro-economic variables.

Ajayi and Mougoue (1996) investigated the short and long-run relationship between stock prices and exchange rates in eight advanced economies including UK and US markets. They find that an increase in stock prices causes the currency to depreciate for both the U.S. and the U.K. The authors explain that a rising stock market is an indicator of an expanding economy, which goes together with higher inflation expectations. Foreign investors perceive higher inflation negatively. Their demand for the currency drops and it depreciates. As to the currency effect on the stock market, the authors find that currency depreciation leads to a decline in stock prices in the short run, also consistent with my hypothesis. The authors explain this negative relationship as follows: exchange rate depreciation suggests higher inflation in the future, which makes investors skeptical about the future performance of companies. As a result, the stock prices drop.

Granger *et al* (2000) researched whether currency depreciation led to lower stock prices or whether declining stock prices led to depreciating currencies during the Asian Crisis of 1997. The data on some of the Asian countries support the case of bivariate causality. Stock prices are expected to react ambiguously to exchange rates. The authors explain this with the effect of currency changes on the balance sheets of multinational companies. Depreciation could either raise or lower the value of a company, depending on whether the company mainly imports or mainly exports. When the stock market index is considered, the net effect cannot be predicted.

Ooi *et al* (2009) analyses the causal relationship between exchange rates and stock prices for Thailand and Malaysia. By using daily data from 1993 to 2003, this study attempts to examine the relationship between exchange rates and stock prices in Thailand and Malaysia during pre and post financial crisis. The paper also investigates the long-run relationship between the above-mentioned variables using Johansen-Juselius (1990) cointegration test and short-run dynamic causal relationship by using Toda-Yamamoto (1995) procedure. Likewise, variance decompositions (VDCs) analysis is employed to improve the predictable portion of exchange rate (stock price) changes on the forecast error variance in stock prices (exchange rates). Data from Thailand demonstrates the results predicted by the portfolio balance approach: stock prices lead exchange rates in both pre-crisis and post-crisis periods; however, Malaysian findings support portfolio approach in post-crisis.

Bahmani-Oskooee and Sohrabian (1992) used monthly values of S&P 500 index and US dollar effective exchange rate for the period of 1973-88 and used cointegration and Granger causality test to detect the relationship between the variables. They found bidirectional causality in the short run but found no long-run relationship between the variables.

Nieh and Lee (2001) found no significant long-run relationship between stock prices and exchange rates in G-7 countries, using both the Engle-Granger and Johansen's cointegration tests using the daily data during the period from October 1, 1993 to February 15, 1996. Furthermore, they found ambiguous, and significant, short-run relationships for these countries. Nonetheless, in some countries, both stock indexes and exchange rates may serve to forecast the future paths of these variables. They found that currency depreciation stimulates Canadian and UK stock markets with a one-day lag, and that increases in stock prices cause currency depreciation in Italy and Japan, again with a one-day lag. Roll (1992) also studied the US stock prices and exchange rates and found a positive relationship between the two markets. On the other hand, Chow *et al.* (1997) examined the same markets but found no relationship between stock returns and real exchange rate returns.

Abdalla and Murinde (1997) employed co-integration test to examine the relationship between stock prices and exchange rates for four Asian countries named as India, Pakistan, South Korea and Philippines for a period of 1985 to 1994. They detected unidirectional causality from exchange rates to stock prices for India, South Korea and Pakistan and found causality runs from the opposite direction for Philippines.

Mansor (2000) investigated Malaysian markets and found no long-run relationship between stock prices and exchange rates, but he found a short-run causal relationship from stock prices to exchange rates in bivariate cases. He also found a bi-directional causality in some multivariate models. Bhattacharya and Mukherjee (2003) investigated Indian markets using the data on stock prices and macroeconomic aggregates in the foreign sector including exchange rate concluded that there is no significant relationship between stock prices and exchange rates. In another study, Muhammad and Rasheed (2003) examined the relationship between stock prices and exchange rates of four South Asian countries named as Bangladesh, India, Pakistan and Sri-lanka and found that there is no significant relationship between the variables either in short-run or long-run in Pakistan and India. But they found a bidirectional relationship in case of Bangladesh and Sri-lanka.

Wu (2001) showed that the exchange rate between the Singapore dollar and industrialized countries and stock prices in Singapore had a negative relationship. He also found that more government revenues or more government spending had a positive effect on stock prices. Fang (2002) examined the relationship between currency depreciation and stock returns for the four Asian Tigers and Thailand. He found evidence that the depreciation of their currencies hurt stock returns and caused more market volatility during the 1997-1999 crises

and suggested that governments in Asia maintain a stable exchange rate in order to attract investors and fund managers.

Wongbangpo and Sharma (2002) examined the relationship between stock prices and several major macroeconomic variables such as output, interest rates, exchange rates, the quantity of money, and prices for five ASEAN countries including Singapore. They indicated that stock prices and these variables had significant relationships in the short run and long run and Granger caused each other. Therefore, they suggested that good economic policies would help stock market performance, and vice versa.

Pan *et al.* (2000) find that daily exchange rate Granger-cause daily stock price based on the data from seven East Asian countries namely Hong Kong, Japan, Korea, Malaysia, Singapore, Taiwan and Thailand. They report that the impact is even stronger after the Asian Currency Crisis. Wu (2000) employs cointegration analysis evidences that Singapore currency's appreciation against the US dollar and Malaysian ringgit, and depreciation against the Japanese yen and Indonesian rupiah have positive long-run effects on stock prices.

A number of studies investigate the short-run and long-run relation between stock and FX markets. Jang and Sul (2002) prove that the relationship between stock markets is not strong enough in long-run because they find that there is a decrease in effects after a crisis. Doong *et al.* (2005) examines relation and pricing between stock and exchange rate for six Asian emerging countries including Indonesia, Malaysia, Philippines, Korea, Thailand, and Taiwan and find that there is no long-run relationship between the stock prices and exchange rates. Similar result is found in Malaysia using a bivariate model (Ibrahim, 2000).

Phylaktis and Ravazzolo (2005) also illustrate a temporary effect on the long-run co-movement of stock and FX markets. The bi-directional causality is found in Indonesia, Korea, Malaysia and Thailand. Another study uses data from 7 Asian countries including Hong Kong, Japan, Korea, Malaysia, Singapore, Taiwan and Thailand to present a significant causality from exchange rate to stock price in Hong Kong, Japan, Malaysia and Thailand before the Asia crisis 1997 (Pan *et al.*, 2007). Pan *et al.* (2007)'s empirical tests also confirm the same results for all above 7 countries except Malaysia during the Asian Financial Crisis. However, no country expresses causality from reverse direction during that time (Pan *et al.*, 2007).

Adjani *et al.* (2008) looked at the relationship between Stock Markets and Foreign Exchange market, and determined whether movements in exchange rates have an effect on stock market in Ghana. The Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH) model was used in establishing the relationship between exchange rate volatility and stock market volatility. It was found that there is negative relationship between exchange rate volatility and stock market returns - a depreciation in the local currency leads to an increase in stock market returns in the long run. Where as in the short run it reduces stock market returns. Additionally, there is volatility persistence in most of the macroeconomic variables: current period's rate has an effect on forecast variance of future rate.

Rahman and Uddin (2009) investigated the interactions between stock prices and exchange rates in three emerging countries of South Asia named as Bangladesh, India and Pakistan. Using average monthly nominal exchange rates of US dollar in terms of Bangladeshi Taka, Indian Rupee and Pakistani Rupee and monthly values of Dhaka Stock Exchange General Index, Bombay Stock Exchange Index and Karachi Stock Exchange All Share Price Index for period of January 2003 to June 2008 empirical show that exchange rates and stock prices data series are non stationary and integrated of order one. The results also show that there is no cointegrating relationship between stock prices and exchange rates.

Agrawal *et al.* (2010) analyze the relationship between Nifty returns and Indian rupee-US Dollar Exchange Rates. Several statistical tests have been applied in order to study the behavior and dynamics of both the series. The authors also investigated the impact of both the time series on each other for the period from October, 2007 to March, 2009 using daily closing indices. The results indicate that Nifty returns as well as Exchange Rates were non-normally distributed. Through unit root test, it was also established that both the time series, Exchange rate and Nifty returns, were stationary at the level form itself. Correlation between Nifty returns and Exchange Rates was found to be negative. Further investigation into the causal relationship between the two variables using Granger Causality test highlighted unidirectional relationship between Nifty returns and Exchange Rates, running from the former towards the latter.

Parsva and Lean (2011) investigates the relation between stock returns and exchange rate for six Middle Eastern countries, namely Egypt, Iran, Jordan, Kuwait, Oman, and Saudi Arabia before and during the 2007 global financial crisis. Sample period runs from January 2004 to September 2010. The empirical results show bidirectional causality among stock prices and exchange rates in both the short-run and long-run for Egypt, Iran, and Oman before the crisis. They also found no interaction among the markets in Jordan and Saudi Arabia in the short-run, while a causal relation from the exchange rates to stock prices exists in Kuwait. Further, the interactions between the markets have increased during the crisis, as the bidirectional causal relation is found for all countries except Iran.

Olugbenga (2012), examines the long-run and short-run effects of exchange rate on stock market development in Nigeria over 1985:1–2009:4 using the Johansen cointegration tests. A bi-variate model was

specified and empirical results show a significant positive stock market performance to exchange rate in the short-run and a significant negative stock market performance to exchange rate in the long-run. The Granger causality test shows a strong evidence that the causation runs from exchange rate to stock market performance; implying that variations in the Nigerian stock market is explained by exchange rate volatility.

The empirical debate regarding the interaction between stock prices and exchange rates has been started few decades ago on the international markets. Since then a good number of empirical studies so far have been conducted to investigate the relationship between stock exchange and the exchange rate. But the researchers have found contradictory results regarding the existence of relationship and the direction of relationship which has made the area disconcerted environs of finance literature. Secondly, the results of these previous empirical works are contingent on the methodologies, data series and sample periods employed.

2.1.4 Literature on the Nairobi Securities Exchange and Other macroeconomic variables.

During the period 1971-1976, the economy experienced macroeconomic instability especially following the first oil crises. The government adopted a controlled policy regime, which was not conducive to stock market development. For example, taxation policy changes adopted during the period adversely affected returns on share trading and listing of new issues. For example, dividend income was double taxed and because dividends were not deductible expenses, corporate earnings distributed as dividends had a high effective tax rate. This made it more expensive for corporations to provide adequate after-tax-return on equity and therefore the preference for debt financing, (Ngugi and Njiru, 2005). In the period 1992-2002, this was the reform period when the market witnessed various changes at both policy and institutional level. The market also faced various challenges, with deteriorating government-donor relationship and declining economic growth (*ibid*).

McPherson and Rakovski (2000) expand on an earlier paper which had discussed the relationship between economic growth and exchange rate in Kenya. Based on data for the period 1970 to 1996, they analyze the possible direct and indirect relationship between the real and nominal exchange rates and GDP growth. They derive these relationships in three ways: within the context of a fully specified (but small) macroeconomic model, as a single-equation instrumental variable estimation, and as a vector-autoregression model. The estimation results from the three different settings show that there is no evidence of a strong direct relationship between changes in the exchange rate and GDP growth. Rather, Kenya's rate of economic growth has been directly affected by fiscal and monetary policies, the availability of foreign aid and other economic variables, particularly the growth of exports. Together, these factors have tended to sustain a pattern of real exchange rate over-valuation, which has been unfavorable for growth. The authors looked at the relationship between exchange rate and economic growth leaving out the stock exchange.

Kandil (2004) examines the effects of exchange rate fluctuations on real output growth and price inflation in a sample of twenty-two developing countries (including Kenya). The analysis introduces a theoretical rational expectation model that decomposes movements in the exchange rate into anticipated and unanticipated components. The model demonstrates the effects of demand and supply channels on the output and price responses to changes in the exchange rate. In general, exchange rate depreciation, both anticipated and unanticipated, decreases real output growth and increases price inflation. The evidence confirms concerns about the negative effects of currency depreciation on economic performance in developing countries. Whereas Kandil tries to look at the relationship and effect of between exchange rate on prices responses, the author does not specifically look at the price response on the stock exchange market.

Enisan and Olufisayo (2008) examined the long run and causal relationship between stock market development and economic growth for seven countries in sub-Saharan Africa. Using the autoregressive distributed lag (ARDL) bounds test, the study found that the stock market development is cointegrated with economic growth in Egypt and South Africa. Moreover, this test suggested that stock market development had a significant positive long run impact on economic growth. Granger causality test based on vector error correction model (VECM) further showed that stock market development Granger caused economic growth in Egypt and South Africa. However, Granger causality in the context of VAR showed evidence of bidirectional relationship between stock market development and economic growth for Cote D'Ivoire, Kenya, Morocco and Zimbabwe. In Nigeria, there was a weak evidence of growth-led finance using market size as indicator of stock market development. Whereas these authors analyze the stock market, they did it in connection with economic growth and not exchange rate thus this current study analyses the relationship between stock market and exchange rate in Kenya.

Aroni (2011) analyzes factors influencing stock prices for firms listed in the Nairobi stock exchange covering the period the period from January 2008 to December, 2010 using inflation, exchange rates, interest rates and money supply. The period is selected so as to use the most recent data, to make the findings more current. The study uses secondary data the main source of which is the NSE and the Central Bank of Kenya statistics. Multiple regression formula was applied to estimate effect of the selected factors on stock prices. The regression results show that the factors of inflation, exchange rates, and interest rates were significant except money supply which although it had a positive correlation, the relationship was not significant. The result shows

that exchange and interest rates had negative correlation to stock prices whereas inflation and money supply had a positive correlation. Factor models observe the sensitivity of an asset return as a function of one or more factors. Although this author tries to show the existence of relationship between the stock prices of firms and inflation, exchange rates, and interest rates, he doesn't show if there exists the long run relationship between the variables of interest, secondly s/he does not check for stationarity of the series and uses the multiple regression analysis which sometimes produces inefficient and inconsistent. What remains as a gap is to determine empirically the existence of the long run relationship between stock exchange market and Exchange rate market using the cointegration methodology.

On the basis of the respective studies, which have been reviewed, it is evident that some research work on the stock exchange and exchange rate has been conducted. However, one short coming in this body of literature is that not enough attention has been accorded to issues relating to stock exchange and exchange rate. Finding the empirical long run relationship between stock exchange and exchange rate has been ignored. The main purpose of this study is to address these crucial issues.

2.2 Theoretical Framework

Theoretical links between stock prices and exchange rates have taken two forms. First, the "flow-oriented" models of exchange rates (Dornbusch and Fischer, 1980) focus on the current account or the trade balance. These models posit that changes in exchange rates affect international competitiveness and trade balances, thereby influencing real income and output. Stock prices, generally interpreted as the present values of future cash flows of firms, react to exchange rate changes and form the link among future income, interest rate innovations, and current investment and consumption decisions. Innovations in the stock market, on the other hand, affect aggregate demand through wealth and liquidity effects, thereby influencing money demand and exchange rates (Gavin, 1989).

The second approach involves the "stock-oriented" models of exchange rates (Branson, 1983 and Frankel, 1983). These models view exchange rates as equating the supply and demand for assets such as stocks and bonds. This approach gives the capital account an important role in determining exchange rate dynamics. Since the values of financial assets are determined by the present values of their future cash flows, expectations of relative currency values play a considerable role in their price movements, especially for internationally held financial assets. Therefore, stock price innovations may affect, or be affected by, exchange rate dynamics. The study adopted the two theoretical approaches in analyzing the relationship between the stock exchange and foreign exchange rate.

3.0 Research Methodology

3.1 Research design

In the quest to answer the puzzle on the relationship and effect of exchange rate on the performance of the Nairobi Securities Exchange, the study adopted the explanatory and correlational research design. The target population consisted of all the 55 stocks listed at NSE as at December 2011 from which NSE 20 share index is derived from. This was an appropriate population and gave a clear picture of the situation in the market with all participants included. Due to the nature of the study used the unit root test and the Engle and Granger cointegration methodology. The study period was from January 1996 to December 2011. This was aimed at achieving comprehensive coverage and gives much accurate results.

3.2 Data Collection instruments and procedure

3.2.1 Type of Data and Sources

Time series data was used in the study. The data was collected from Nairobi Securities Exchange, Central Bank of Kenya and Kenya National Bureau of Statistics.

3.2.2 Data Analysis.

The study adopted correlation, cointegration. The study also used the descriptive statistics in its analysis. Models used in the study analyzed the collected data so as to get accurate results. The models were of great importance in data analysis and captured the effect of exchange rate on the performance of the NSE. Eviews version 7 statistical software was used as an aid in the analysis.

3.2.2.1 Correlation

In order to determine the correlation between the two time series variables Exchange rate and the NSE 20 share index, the study used the correlation coefficient (Pearson correlation) $[r]$ at 5% significance level.

$$r_{xy} = \frac{\sum x_i y_i}{\sqrt{\sum x_i^2} \cdot \sqrt{\sum y_i^2}} \quad (3.1)$$

Where $x_i = X_i - \bar{X}$ and $y_i = Y_i - \bar{Y}$ (deviations from the mean of the variables).

3.2.2.2 Stationarity test

Time series data are often assumed to be non-stationary and thus it is necessary to perform a pretest to ensure there is a stationary co-integrating relationship among the variables in order to avoid the problem of spurious regression. Spurious regression exists where the test statistics show a significant relationship between variables in the regression model even though no such relationship exists between them. Therefore, in order to address the issue of non-stationarity and avoid the problem of spurious regression, the study employed a quantitative analysis. The Augmented Dickey-Fuller (ADF) test was used to test for stationarity in the NSE 20 share Index and Ksh/USD exchange rates. In general an ADF (p) test is represented as;

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + \alpha_i \sum_{i=1}^p \Delta Y_{t-i} + \varepsilon_t \quad \varepsilon_t \sim IID(0, \sigma_\varepsilon^2) \quad (3.2)$$

The testing for stationarity is formulated in the statistical hypothesis testing framework as a test of the null hypothesis is non-stationary and the alternative hypothesis is series is stationary.

3.2.2.3 Engle and Granger (EG) Cointegration Test

In order to investigate the existence of long run relationship between two variables i.e. NSE 20 share index and Ksh/USD exchange rates, the study employed the Engle and Granger (1987) single equation methodology. The study preferred to use this method rather than the Johansen Cointegration test because of the simplicity of the Engle and Granger test and moreover, there were two variables under investigation, and hence there could be at most one cointegrating vector.

In first step, the study estimated the following cointegration regression.

$$NSE_t = \beta_0 + \beta_1 FX_t + \varepsilon_t \quad \varepsilon_t \sim N(0, \sigma^2) \quad (3.3)$$

Where NSE_t at levels is NSE 20 share index and FX_t is Ksh/USD exchange rates respectively.

The second step we obtained the error terms and run the ADF tests on the error terms. If the error series is stationary that is $I(0)$, then null hypothesis of no-cointegrating vectors is rejected. The study used tables and graphs in data presentation.

4.0 Results and Discussions

4.1 Descriptive statistics

Table 4.I shows the descriptive statistics for the sample period. NSE 20 share index data series has a positive skewness and the distribution is not normal as shown by the kurtosis. The nonzero skewness and the kurtosis of the NSE 20 share index and FX variables suggest that the two data series are weakly skewed.

The index has a large difference between its maximum and minimum returns. The standard deviation is also high indicating a high level of fluctuations of the NSE 20 share index monthly data. There is also evidence of negative skewness in the FX series, which means that the left tail is particularly extreme, and indication that the FX is non symmetric .On the other hand the NSE 20 share index has a positive skewness. NSE 20 share index are platykurtic) relative to the normal, given its large kurtosis.

Table 4.1: Descriptive statistics for NSE and FX

| | FX | NSE 20 share |
|------------------|-----------|--------------|
| Mean | 72.79263 | 3181.824 |
| Median | 75.63064 | 3114.625 |
| Maximum | 101.2698 | 5774.240 |
| Minimum | 53.74933 | 1027.000 |
| Std. Dev. | 8.858672 | 1151.107 |
| Skewness | -0.274952 | 0.172612 |
| Kurtosis | 3.067555 | 2.432031 |
| Jarque-Bera | 2.455662 | 3.534142 |
| Probability | 0.292927 | 0.170833 |
| Observations (N) | 192 | 192 |

The reported Probability is the probability that a Jarque-Bera statistic exceeds (in absolute value) the observed value under the null hypothesis—a small probability value (less than 0.05) leads to the rejection of the null hypothesis of a normal distribution at 5% significance level. The probability values in table 4.1 are all greater than 0.05 which leads the study to accept the null hypothesis of a normal distribution at 5% and even 1% significant level for both the exchange rate and NSE 20 share index.

4.2 Trend of the NSE 20 share Index and the FX

From the figure 4.1 and 4.2 respectively, it indicates that the two series the NSE 20 share index and the FX series have both an upward trend represented by their respective trend equations.

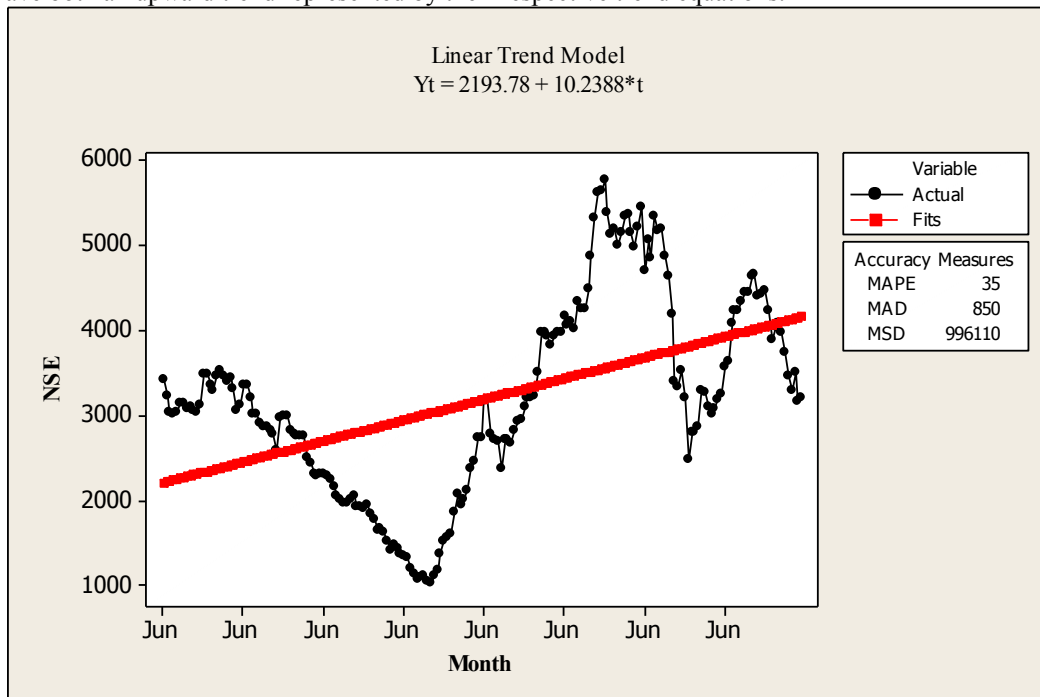


Figure 4.1: Trend Analysis for NSE 20 share Index

The implication for the upward trend in the NSE 20 share index is that there is a growth in the stock market activity with time during the period of the sample. On the other hand the FX series is also having an upward trend indicating that the Kenyan shilling has been depreciation in value in respect to the US dollar for the sampled period that is Jan 1996-Dec 2011.

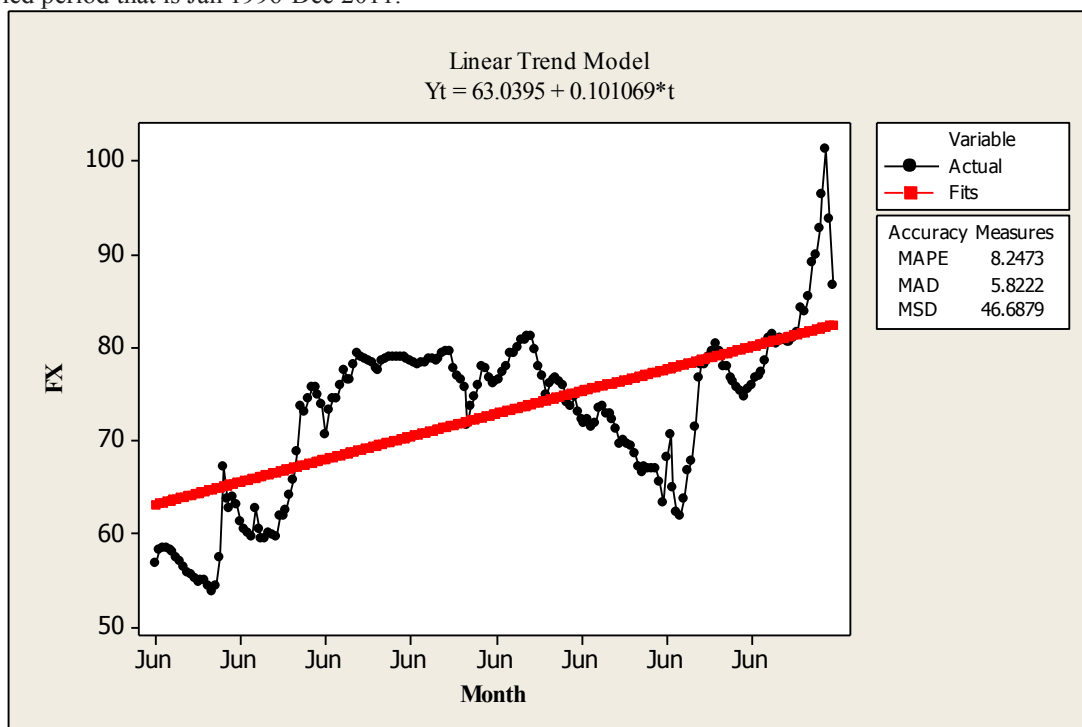


Figure 4.2: Trend Analysis for Foreign Exchange

4.3 Correlation

To identify if there exists correlation between the NSE 20 share index and the Exchange rate (FX) variables, the

study used the Pearson correlation coefficient. The results summarized in table 4.2 show that there is a relatively significant weak negative correlation between the variables thus -0.224 with a p-value of 0.002 this implies that NSE 20 share index move in the opposite direction with FX .From the results the study rejects the null hypothesis of no correlation, thus $r \neq 0$ at both 1% and 5% significance level.

This results are consistent with the results of Agrawal et al (2010) who were studying exchange rates movement and stock market volatility for India Stock market, they observed the coefficient of correlation to be - 0.088, which was indicative of negative correlation between the two series. Thus, they stated that the two series were weakly correlated as the coefficient of correlation depicts some interdependency between the two variables.

Table 4.2: Correlation matrix for Exchange rate and NSE 20 share Index

| Variable | NSE 20 share Index | FX |
|--------------------|--------------------|---------|
| NSE 20 share Index | 1 | -0.224* |
| FX | -0.224* | 1 |

*P-Value = 0.002

4.4 Unit Root Test

To identify possible unit roots, the Augmented Dickey-Fuller (ADF) test was performed on levels and then on first differences both with constant and constant & linear trend. The ADF test takes the form of equation (3.2). From the results in table 4.3, the study fails to reject the null hypothesis of non stationarity at level including the constant and Constant & trend for both the variables. The results for stationarity at difference level involving the constant and constant & trend successfully reject the null hypothesis of non stationarity and accept the alternate that the data is stationary at first difference level at both 1% and 5% significance level. These results indicate that Exchange rate (FX) and NSE 20 share index are stationary in the first difference or all the series are generated by an I (1) process. The results of the unit root test for the exchange rate indicate that the policies on the exchange rate are not able to bring it back to a stable path.

Table 4.3: Unit root Using Augmented Dickey-Fuller (ADF) test

| Variables | Level | | First difference | |
|-----------------|-----------------------|-------------------------|------------------------|-------------------------|
| | Constant | Constant & Linear Trend | Constant | Constant & Linear Trend |
| Test statistics | | | | |
| FX | -1.969676 (0.3001) | -2.412438 (0.3719) | -9.183920* (0.0000) | -9.135336* (0.0000) |
| NSE | -1.195299 (0.6765) | -1.468881 (0.8369) | -12.35352* (0.0000) | -12.32043* (0.0000) |

Notes:

1. The values in the parenthesis are probabilities found from critical values by MacKinnon (1996)
2. Maximum lag length chosen using SIC
3. Null hypothesis: Series has a unit root
4. *indicates stationarity at 1%, ** indicates stationarity at 5%, *** indicates stationarity at 10%,

4.5 Cointegration Analysis

Cointegration analysis is used to test whether there exists a long run relationship between the two variables which contain a unit root. After testing for the unit root in the two series, we applied the two steps Engle and Granger cointegration tests on the levels of the two series and tested its residuals for stationarity. The study first estimated the regression equation 3.3, of which the results are shown in table 4.4, and later tested the stationarity of the residuals of the cointegration equation of which the results are shown in table 4.5

Table 4.4 Engle-Granger Cointegration Equation

Dependent Variable: NSE 20 share Index
 White Heteroskedasticity-Consistent Standard Errors & Covariance
 $NSE=C(1)+C(2)*FX$

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------------------|-------------|-------------------------|-------------|----------|
| C(1) | 5300.009 | 529.5498 | 10.00852 | 0.0000 |
| C(2) | -29.09890 | 7.386322 | -3.939566 | 0.0001 |
| R-squared | 0.750149 | Mean dependent variance | | 3181.824 |
| Adjusted R-squared | 0.045149 | S.D. dependent variance | | 1151.107 |
| S.E. of regression | 1124.821 | Akaike info criterion | | 16.89900 |
| Sum squared residual | 2.40E+08 | Schwarz criterion | | 16.93293 |
| Log likelihood | -1620.304 | Hannan-Quinn criterion. | | 16.91274 |
| F-statistic | 10.03129 | Durbin-Watson stat | | 1.980120 |
| Prob(F-statistic) | 0.001793 | | | |

Notes: Sample: 1996M01- 2011M12

Included observations: 192

From the results in table 4.4 above, show that the parameter estimates for the equation are all significant at both the 1% and 5% significant levels. The coefficient of FX is -29.09890 which indicates that there is an inverse relationship between the FX and the NSE 20 share index.

INSERT TABLE 4.5

These results from table 4.5 indicate that the residual (error) series is not stationary at levels but it is stationary in the first difference or is generated by an integrated of order one [$I(1)$] process at both the 1% and 5% significance levels. Thus we accept the null hypothesis that there is no long run relationship between Exchange rate and NSE 20 share index.

The study supports the findings of Tahir and Keung (2003) that did a study on the Linkage between stock market prices and Exchange rate for Pakistan and Abdalla & Murinde (1997) who looked at Exchange Rate and Stock Prices Interactions in Emerging Financial Markets of India, Korea, Pakistan and Philippines'. The study is also consistent with the results of Rahman and Uddin (2009) who investigated the interactions between stock prices and exchange rates using monthly values in three emerging countries of South Asia named as Bangladesh, India and Pakistan; and also Nieh and Lee (2001) who found no significant long-run relationship between stock prices and exchange rates in G-7 countries.

The results in the regression show that parameter estimates for the equation are all significant at both the 1% and 5% significant levels. The coefficient of FX is -29.09890 which indicates that there is an inverse relationship between the FX and the NSE 20 share index. On the basis of economic theory the coefficient β_1 can either take a positive or a negative value. From the results $\beta_1 = -29.09890$. The behavior of the real exchange rate is one of the major determinants of economic activity. A fall in the real exchange affects the competitiveness of domestic goods versus foreign goods and the balance of trade of a country. This increases the level of domestic aggregate demand and the level of output. On the other hand, economic activity also affects the level of stock prices. The stock price of a firm reflects the expected future cash-flows, which are influenced by the future internal and external aggregate demand. Consequently, stock prices will incorporate present and expected economic activity as measured by industrial production, real economic growth, employment rate or corporate profits. Thus, a fall in real exchange rate may increase stock prices through its effect on economic activity. Thus the relationship between the exchange rate and Securities market in Kenya follows the "flow" approach in the short run.

5.0 Conclusions and Recommendations

5.1 Conclusion

From the findings the study can conclude that there is a weak negative correlation between the NSE and exchange rate for the period under study. There is no long run relationship between the two markets that is the Securities market and the foreign exchange market. However the regression equation confirms that the two markets follow a flow oriented model of exchange rate. This supports the hypothesis that a depreciation of the

currency increases (boosts) the activities on the stock market.

5.2 Recommendations

Based on the findings of the study, the study presents recommendations pertinent to the policy makers, investors, financial market regulators and future researchers. The study recommends the government through its policy makers when formulating the policies on foreign exchange should look at its trade off (effect) on the stock market. The regulator should ensure that all the market players comply with the policies and regulations in a bid to ensure efficiency and effectiveness of the bourse. The study also recommends that the authorities can use exchange rate as a policy tool to attract foreign portfolio investment in the country through the Securities markets in the short run.

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