UNIVERSITY OF NAIROBI

SCHOOL OF MATHEMATICS

ANALYSIS OF THE LONG RUN AND SHORT-RUN DYNAMIC RELATIONSHIP BETWEEN THE STOCK PRICES AND EXCHANGE RATE IN KENYA.

BY

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DECLARATION

DECLARATION BY STUDENT

I declare that this is my own original work to the best of my knowledge it has not been presented to any other university for a degree award

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DECLARATION BY SUPERVISORS

This project has been submitted for the award of a Postgraduate Diploma in Actuarial Science of the University of Nairobi with my approval as the university supervisor.

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Signature …… Date…….

DEDICATION

This research paper is dedicated to my parents Mr. and Mrs. Rwanda Mbungu who have inspired me to be the best I can be and to my siblings Jane, Eric and Michael.

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First and foremost I would like to thank the Almighty God for according me the opportunity to enroll for this program and for taking me through all the difficult times. It's through His Grace and Mercy that I have come this far. To my parents (Mr. and Mrs. Mbungu) and my siblings for their support through prayers, encouragement and advice. They believed in me and have been with me through it all. I thank my supervisor Dr Mwaniki for taking his time out of his busy schedule to guide me through the research.

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ABSTRACT

Stock markets in the world individually and collectively play a critical role in their countries' economies. They provide an avenue for raising funds, for trading in securities including futures, options and other derivatives which provide opportunities for investors to generate returns.

This study examines whether there is a long run and short-run dynamic relationship between the stock prices and exchange rate in Kenya. The study also explores the direction of causation if a long/short-run association is found. The objective is to establish the causal linkages between leading prices in the foreign exchange market and the Nairobi Securities Exchange (NSE). In particular the study uses monthly observations of the NSE 20 share index and the nominal Kenya shillings per US dollar exchange rates as observed by the Central Bank of Kenya from January 1996 to December 2010. Specifically the study uses the monthly prices of the 20 Share index to compute stock returns and the Kenya shilling/ Dollar ratios on a monthly average basis to compute exchange rates which will be used to investigate the causal relationship using granger causality test. The study employs cointegration and standard Granger causality tests based on the vector auto correlative model to examine the long-run and short-run association between stock prices and exchange rates. The unit root Augmented Dickey Fuller test is used to test the stationarity condition for all the time series in the level and first difference. The Johansen co-integration test is used to investigate whether foreign exchange rates and stock prices are co-integrated. Finally a Granger causality test will be performed to find the direction of the relationship between exchange rates and stock prices within the estimated model. The results show that exchange rates Granger-causes stock prices in Kenya and in only that one way are the two related that is a uni-directional causality relationship.

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ABBREVIATIONS

USD- United States Dollar

NSE- Nairobi Securities Exchange

CBK- Central Bank of Kenya

PPP- Purchasing Power Parity

OLS- Ordinary Least Squares

VAR- Vector Auto Regression

GARCH- Generalized Auto Regressive Conditional Heteroscedasticity

ADF- Augmented Dickey Fuller test

ECM- Error Correction Model

DEFINITION OF TERMS

Stock market: The market in which shares are issued and traded either through exchanges or over-the-counter markets. Also known as the equity market.

The NSE 20 share index: a means of evaluating the performance of stocks on the stock exchange by taking the top 20 best performing counters and getting a geometric mean of the share prices.

Stock price: The cost of purchasing a security on an exchange.

Exchange rate: The price of one country's currency expressed in another country's currency. In other words, the rate at which one currency can be exchanged for another.

Co-integration: an econometric technique for testing the correlation between non-stationary time series variables. If two or more series are themselves non-stationary, but a linear combination of them is stationary, then the series are said to be co-integrated.

Correlation: A causal, complementary, parallel, or reciprocal relationship, especially a structural, functional, or qualitative correspondence between two comparable entities

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

In an increasingly complex scenario of the financial world, it is of paramount importance for the researchers, practitioners, market players and policy makers to understand the working the analysis of dynamic and strategic interactions between stock and foreign exchange market. This is because these two markets are the most sensitive segments of the financial system and are considered as the barometers of the economic growth through which the country's exposure towards the outer world is most readily felt. Moreover, the Asian crisis of 1997-1998 made a strong pitch for dynamic linkage between stock prices and exchange rates. During the crisis period, the world has noticed that the emerging markets collapsed due to substantial depreciation of exchange rates (in terms of USD) as well as dramatic fall in the stock prices. This has become important again from the view point of large cross border movement of funds due to portfolio investment and not due to actual trade flows, though trade flows have some impact on stock prices of the companies whose main sources of revenue comes from foreign exchange.

If stock prices and exchange rates are related and the causation runs from exchange rates to stock prices then crises in the stock markets can be prevented by controlling the exchange rates. Moreover, developing countries can exploit such a link to attract/stimulate foreign portfolio investment in their own countries. Similarly, if the causation runs from stock prices to exchange rates then authorities can focus on domestic economic policies to stabilize the stock market. If the two markets/prices are related then investors can use this information to predict the behavior of one market using the information on other market.

In addition, the relationship between stock returns and foreign exchange rates has frequently been utilized in predicting the future trends for each other by investors. Moreover, the continued increase in the world trade and capital movements have made the exchange rates as one of the main determinants of business profitability and equity prices (Kim, 2003). Exchange rate

changes directly influence the international competitiveness of firms, given their impact on input and output price (Joseph, 2002). Basically, foreign exchange rate movement influences the value of the firm since the future cash flows of the firm change with the fluctuations in the foreign exchange rates. When the exchange rate appreciates, since exporters will lose their competitiveness in international market, the sales and profits of exporters will shrink and the stock prices will decline. On the other hand, importers will increase their competitiveness in domestic markets. Therefore, their profit and stock prices will increase. The depreciation of exchange rate will make adverse effects on exporters and importers.

Exporters will have advantage against other countries' exporters and increase their sales and their stock prices will be higher (Yau and Nieh, 2006). That is, currency appreciation has both a negative and a positive effect on the domestic stock market for an export-dominant and an import-dominated country, respectively (Ma and Kao, 1990). Exchange rates can affect stock prices not only for multinational and export-oriented firms but also for domestic firms. For a multinational company, changes in exchange rates will result in an immediate change in value of its foreign operations as well as a continuing change in the profitability of its foreign operations reflected in successive income statements. Therefore, the changes in economic value of firm's foreign operations may influence stock prices.

There are at least two theoretical approaches to the causal relationship between stock prices and exchange rates. The first one is the traditional approach or the flows approach. The flow approach derives from the original work of Dornbusch and Fischer (1980) and Meese and Rogoff (1983) and the simplest version combines an open-economy ISLM-type model with the dividend-discount model (DDM) of stock prices. If the Marshall-Lerner condition holds, a depreciation of the (real) exchange rate (a rise if the exchange rate is measured as the domestic currency price of foreign exchange as we assume) will result in a rise in real output which, via the DDM, will translate into a rise in stock prices as company profitability increases and this is factored into stock prices. In this approach, exchange rate change is expected to lead to a change in stock price. According to this argument, devaluation could either raise or lower a firm's stock price depending on whether that firm is an exporting firm or it is a heavy user of imported inputs. Moreover, Adler and Dumas (1984) showed that even firms whose entire operations are

domestic in nature may be affected by exchange rates, if the movements in currency influence their input and output prices, hence the demand for their goods and services. This model therefore predicts a positive relationship between stock prices and the exchange rate.

The second is the stock approach which comes in various forms. The first form is the monetary approach, a model with a long history, having started life as the monetary approach to the balance of payments in the days when exchange rates were largely fixed; see, e.g., Canto *et al*. (1983). This model consists essentially of the purchasing-power parity (PPP) condition and an equilibrium condition for the money market in which the demand for money is negatively related to the rate of return. A rise in stock prices raises the rate of return, making money less attractive since it earns a zero return. The fall in the demand for money increases the price level which, via PPP, increases the exchange rate. Thus this model predicts a positive relationship between stock prices and the exchange rate, just as the flow model does.

The second stock model is the portfolio-balance model of Branson and Frankel (1983). In this case we imagine investors holding an internationally diversified portfolio. A rise in domestic stock prices attracts foreign funds into the domestic stock market, putting pressure on the domestic currency to appreciate, that is, the exchange rate to fall. A drop in domestic stock prices causes a reduction in the wealth of domestic investors, which in turn leads to a lower demand for money with ensuing lower interest rates. The lower interest rates encourage capital outflows ceteris paribus, which in turn cause local currency depreciation. In this case, stock price is expected to lead exchange rate with a negative correlation. Thus, this model predicts a negative relationship between the two variables of interest.

Most of the empirical literature that has examined the stock prices-exchange rate relationship has focused on examining this relationship for the developed countries with very little attention on the developing countries. The results of these studies are, however, inconclusive. Some studies have found a significant positive relationship between stock prices and exchange rates for instance Li and Huangh(2008), Smyth and Nandha(2003), Yuah and Nieh(2009) while others have reported a significant negative relationship between the two for instance Richard *et al*(2009), Kutty(2010). On the other hand, there are some studies that have found very weak or

no association between stock prices and exchange rates for instance, Franck and Young (1972), Bartov and Gordon (1994).

On the issue of causation, the evidence is also mixed. Some studies for instance, Abdalla and Murinde (1997) have found causation runs from exchange rates to stock prices while other reported a reverse causation for instance, Ajayi and Mougoue (1996). Bahmani-Oskooee and Sohrabian (1992), however, claim there is a bi-directional causality between stock prices and exchange rates in the short-run but not in the long run.

On the theoretical side there is no consensus on the relationship between stock prices and exchange rates either as seen in the discussion on the portfolio balanced model and the flows approach. From the above discussion, it is also clear that there is no empirical or theoretical consensus on the issue of whether stock prices and exchange rates are related and the direction of causation if they are related. This study provides further empirical evidence on the above two issues (relationship and causation) using Kenya markets data.

1.2 Statement of Problem

The traditional approach to establish the relation between the exchange rate and stock price concluded that exchange rate lead stock price, whereas portfolio approach states, the changes in stock prices will affect the exchange rate, since the decrease in stock prices will lower the demand for domestic assets and currency. Many research papers (Aggarwal (1981), Bartov and Gordon (1994), Baharom, Royfaizal and Habibullah (2008), Rahman and Uddin (2009)) have been published in context to the relationship between the fluctuating exchange rate and stock price movement, but there is no consensus about the relationship and moreover the empirical results are inconclusive. More so, most of the empirical literature that has examined the stock prices-exchange rate relationship has focused on examining this relationship for the developed countries with very little attention on the developing countries. Therefore, there is need to establish the direction and magnitude of the interaction between exchange rates and stock prices at the Nairobi Stock Exchange.

These linkages have implications for the ongoing attempts, by the government to develop the stock market while also impacting the decisions of investors, policy makers, exporters and importers, domestic and multinational firms. Therefore, the aim of this study is to investigate the causal relationship between exchange rates (represented by the Kenya shilling price of one USD) and the stock market prices (proxied by the NSE 20-share index).

1.3 Research Objectives

The general objective of this study is to analyze the correlation between the stock market prices and exchange rate movement in Kenya. From the above outlined general objective, the specific objectives as follows:

i. To investigate the presence of causal relationship between stock market prices and exchange rate movement.
ii. To examine the direction of causal relationship between and stock market prices and exchange rate movement (that is, is it uni-directional or bidirectional).

1.4 Research Hypothesis

The following research hypothesis are formulated in order to study the behavior of the two variables and will then be put to test for the collected data to address the objective of the study:

i) Hypothesis 1: Unit Root exists (that is non stationarity) in both the series.
ii) Hypothesis 2: Correlation exists between the two variables-Stock returns and Exchange rates.
iii) Hypothesis 3: Exchange rates granger leads stock prices.

1.5 Justification of the Study

This study gives an insight of whether there is a long run and short-run dynamic relationship between the stock prices and exchange rate in Kenya and also explores the direction of causation if a long/short-run association is found. The motivation for research in this area comes from the fact that, in times of crisis the world has noticed that many of the emerging markets collapsed due to the substantial depreciation of exchange rate particularly in terms of USD and as well as due to the fall in the stock prices. With the current activities like large cross border movement of funds and various turmoil's and high volatility in commodity prices have made a strong pitch for dynamic linkage between stock prices and exchange rate.

Our empirical findings about the long-run and short-run causal relationship between stock prices and exchange rates have a number of meaningful implications not only for investors and policy makers, but also for exporters, importers, domestic and multinational firms.

If any association between stock prices and exchange rate exists then foreign investors can hedge their portfolios from adverse movements of exchange rate or can increase their portfolio investment in Kenya if they observe favorable movements of exchange rate. Therefore, prior information on the link between the two variables would be helpful in designing their investment strategy in Kenya. Moreover, two markets are associated and if foreign exchange market precedes the stock exchange then the policy maker can use exchange rate as a policy instrument to stimulate foreign portfolio investment and may be able to prevent stock market crash by controlling exchange rate. On the contrary, if causation runs from stock prices to exchange rates then the government can stabilize the currency value by controlling the fluctuations in stock prices. In the absence of any stock price-exchange rate link, financial authorities should use some other variables (say interest rate, economic growth rates) to avoid stock market crash.

For importing firms, if stock prices and exchange rate are associated and foreign exchange market leads (with negative sign) the stock prices, would imply that a depreciation of currency value raises the cost of firm and this adversely affects the value of the import firm (or its stock price). In such cases, the firm can reduced the exchange rate exposure using foreign currency

derivatives (forward contracts, future contracts or options). However, if stock prices and exchange rates are independent (that is, there is absence of co-integration and Granger causality) then exchange rate movements have no impact on firm's value.

For exporter or multinational firms, the causation from exchange rate to stock prices suggests that a depreciation of exchange rate is beneficial and the firm can increase its profit (firm value) by increasing its volume of exports. On the other hand, the firm can produce goods for the foreign market in a foreign country to avoid the risk of changes in exchange rate. However, in case where causation runs from stock prices to exchange rate, the higher stock price stimulates foreign portfolio investment both in existing and new issue stocks. Thus, the firm can easily raise more capital through equity to expand its production.

Domestic firms are those that do not export as well as do not use-imported inputs. This type firms have little foreign competition. However, the value of these firms may significantly be affected by exchange rate fluctuations, if firms' inputs as well as output prices are influenced by currency movements (Adler and Dums, (1984)).

Therefore the study creates new knowledge by investigating the relationship between stock prices and exchange rates movement and offers advice to investors, policy makers, exporters and importers, domestic and multinational firms.

1.6 Scope of Study

The scope of study covers the period from January 1996 to December 2010 giving a total of 180 observations. The Kenyan Government through the Kenya National Bureau of Statistics provides data on monthly observations of the Nairobi Securities Exchange 20 share index. The Central Bank provides the nominal Kenya shillings per US dollar exchange rates with which will be used to study the exchange rate movement.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Stock market plays an important role in the economic development of any nation. Besides serving as an instrument for mobilization of domestic capital for the corporate sector, the mere presence of the market boosts the international investment climate of a country. Theoretically, capital market not only knots the domestic macroeconomic indicators within an economy, but also with the outside economy as well. Trade, capital and other financial flows are all tied to it. A particular link that currently is attracting so much attention is the one between stock prices and the levels of exchange rate of a country. According to the Classical economists, currency appreciation may affect product international competitiveness and trade balance position. The relationship between exchange rates and stock prices is of great interest to many academics and professionals since they play an important role in the economy.

A large number of studies have investigated the relationship between stock prices and exchange rates for a variety of countries, using a variety of approaches. However, results are somewhat mixed as to whether stock indices lead exchange rates and *vice versa* and whether feedback effects (bi-causality) even exist among the two financial variables. This Chapter reviews empirical studies carried out on the relationship between stock prices and exchange in developed, Asian and some African countries. The literatures are grouped based on the theory that their empirical findings support.

2.2 Exchange Rates Granger Causes Stock Prices (Traditional Approach)

Abdalla and Murinde (1997) applied cointegration approach to examine the long-run relation between stock price index and the real effective exchange rate for Pakistan, Korea, India and Philippines. They use month data from January 1985 to July 1994. Their study found no long-run

relationship for Pakistan and Korea but did find a long-run relationship for India and Philippines. They also examine the issue of causation between stock prices and exchange rates. Using standard Granger causality tests they found uni-directional causality from exchange rates to stock prices for both Pakistan and Korea. Since a long- run association was found for India and Philippines they uses an error correction modeling approach to examine the causality for these countries. The results show uni-directional causality from exchange rate to stock prices for India but for Philippines the reverse causation from stock prices to exchange rates was found.

Their result supported the theory proposed by Aggarwal (1981) who examined the relationship between changes in the dollar exchange rates and change in indices of stock price under the floating exchange rate regime. He uses monthly U.S. stock price data and effective exchange rate for the period 1974-1978. His findings, which were based on simple OLS regressions, showed that stock prices and the value of the U.S. dollar is positively correlated and this relationship is stronger in the short-run as compare to in the long-run. He argued that changes in exchange rates provoke changes in profit and loss in multinational firms' balance sheets which induces the stock market prices to change. He concluded that fluctuations in the exchange rate will be reflected in the stock prices since both income and expenses are very likely to be affected.

Meanwhile, Wu (2000) took a unique way to test for the exchange rates-stock prices relationship in Singapore. He divided his sample into four different sub-periods (high-growth period, pre-crisis period, crisis period and recovery period) and test if the relationship is consistent throughout the Asian financial crisis in 1997. Wu claimed that the explanatory power of exchange rate increases as it progressed from high-growth period to the crisis period. Since the Asian financial crisis is later proved to be a currency crisis by Pan *et al*. (2007), it provided a sound explanation on why exchange rate gained its explanatory power throughout the crisis. Hence it would be biased to say that there is uni-directional causal relationship from the exchange rates to stock prices in Singapore consider the sample period involved a currency crisis.

Smyth and Nandha (2003) investigated the bivariate causality between exchange rates and stock prices in South Asia. They looked at Bangladesh, India, Pakistan and Sri-Lanka. They found that exchange rates lead stock prices for India and Sri-Lanka but no causality is found in Pakistan and Bangladesh. The finding is as opposed to Issam Abdalla and Victor Murinde (1997) who applied cointegration approach to examine the long-run relation between stock price index and the real effective exchange rate for Pakistan, Korea, India and Philippines. They use month data from January 1985 to July 1994. Their study found no long-run relationship for Pakistan and Korea but did find a long-run relationship for India and Philippines. They also examine the issue of causation between stock prices and exchange rates. Using standard Granger causality tests they found a unidirectional causality from exchange rates to stock prices for both Pakistan and Korea. Since a long- run association was found for India and Philippines they uses an error correction modeling approach to examine the causality for these countries. The results show a uni-directional causality from exchange rate to stock prices for India but for Philippines the reverse causation from stock prices to exchange rates was found.

For Smyth and Nandha (2003), the sample period is more recent (1995-2001) and takes account of the continued globalization of financial markets which means the financial markets mature and well-developed and it can reflect more on the reality. Therefore the statistical inferences drawn by Smyth and Nandha are more reliable. Besides, Smyth and Nandha's (2003) used high frequency data in their research which is more suitable for testing exchange rates and stock prices because high frequency data can capture their movement more accurately.

Li and Huang (2008) explored the relationship between exchange rates and stock prices of China from year 2005 to 2008 using daily data. Their result from both Engle-Granger cointegration test and causality test supported the findings of Abdalla and Murinde (1997) that exchange rates affect stock market in export-oriented economies. China has been active in foreign trading especially the exporting sector and hence its economy will be more sensitive to the exchange rate fluctuation. Since the selected country in our research is also active in foreign trading hence we should expect to have similar results as these researchers.

Yau and Nieh (2009) examined the cointegration and threshold effect between stock prices and exchange rates in Japan and Taiwan from year 2001 to 2008. They found that there is only long-run cointegration relationship and also causality from exchange rate to stock price in Taiwan which echoed the prior findings (Abdalla and Murinde (1997) and Smyth and Nandha (2003)). Since Taiwan is an open economy and it has a long-run trading relationship with the U.S. hence the authors stressed that "U.S dollar exchange rate may still dominate and play an important role influencing stock prices of Taiwan" (Yau and Nieh (2009)). The result aligned with the findings of all the practitioners of the traditional approach it further proves that the countries with high trading volume are likely to have stock price and exchange rate inter relationships.

2.3 Stock Prices Granger Cause Exchange Rates (Portfolio Approach)

Ajayi *et al*. (1998) did a comparative study of fourteen countries which contains a mixture of advanced economies and emerging markets to see whether the relationship between stock prices and exchange rates varies between them. They found that all the advanced economies' stock market tends to have a larger impact on the exchange rate market than the emerging markets. This is possibly attributed to the structural and institutional differences such as the size of the economy, accessibility of markets for foreign investors, concentration of the market. Moreover, the authors also made a comparison using both daily and weekly data. The weekly data result is claimed to be less significant than daily data. This finding is in line with Smyth and Nandha (2003) which support the use of daily data.

Having the same approach as Wu (2000), Ooi *et al.* (2009) study the exchange rates-stock prices relationship in Malaysia and Thailand using data during the Asian financial crisis. They divided the sample period into two sub-periods and found that in both Malaysia and Thailand the stock prices lead exchange rates in the pre-crisis period. However, in the post-crisis period, they got the reverse results in both countries; exchange rates lead stock prices and it further verifies that the financial crisis did improve the explanatory power of exchange rates.

Richards *et al*. (2009) explored the interaction between exchange rates and stock prices of Australia using daily data from year 2003 to 2006. Their result supported the portfolio approach which is different from what we expected as Australia has been classified as an export-dependent economy in the traditional view. This shows that Australian stock market has integrated that it has "the depth and liquidity to adequately compete for domestic and foreign capital against other larger markets around the world" Richard *et al*. (2009). The authors did a good demonstration on how a transformation of stock market can affect the direction of causality between the variables.

Kutty (2010) explored the exchange rates-stock prices relationship of Mexico and concluded that stock prices lead exchange rates. It is somehow surprising to see that Mexico doesn't support the traditional approach since it is classified as an export-oriented country (WTO report, 2000) and it was very active in foreign trading. This finding does not align with what Abdalla and Murinde (1997) and Smyth and Nandha (2003) who investigated the interaction between exchange rates and stock prices for four South Asian countries (Bangladesh, India, Pakistan and Sri Lanka) using daily data over the period 1995 to 2001. Both Engle and Granger two step and Johansen cointegration methods were used and the results suggest that there is no long-run equilibrium relationship between these two financial variables in any of the four countries. Granger causality tests indicated that there was uni-directional causality running from exchange rates to stock prices in India and Sri Lanka, but in Bangladesh and Pakistan exchange rates and stock prices are independent.

Tahir and Wong (2010) investigated the inter relationship between stock prices and exchange rates of Pakistan using exchange rates and stock indices of different industries just like what Aydemir and Demirhan (2009) did in studying Turkey financial markets. They found that causality runs from general stock prices to exchange rates, and exchange rates to services indices. They concluded that authorities in Pakistan can use both exchange rates and stock prices to stabilize the Pakistani rupee while improving the services sector which can enhance the competitiveness of the economy.

2.4 Bi-directional Causality between Exchange Rates and Stock Prices

While many financial literatures can only find supporting evidences for either portfolio or traditional approach, some of them manage to find feedback effect between the two financial variables and prove that the two financial markets are interacting with each other dynamically.

Bahmani-Oskooee and Sohrabian (1992) were the first to utilize both cointegration and causality to explain the relationship of exchange rates and stock prices in the U.S. market using monthly data from year 1973 to 1988. In the research they highlighted the importance of choosing the correct lag length for cointegration and causality tests as these tests are lag length sensitive, different choices can probably lead to the opposite result. Hence they introduced some criterions in their research to help tackle this problem. The list of criterions include F-test, FPE criteria and AIC from which this study will include the Akaike information criteria (AIC) and the Schwartz information criteria (SIC) test in the model to maintain the accuracy of the models.

In the empirical findings, Bahmani-Oskooee and Sohrabian (1992) analyzed the long-run relationship between stock prices and exchange rates using cointegration as well as the casual relationship between the two by using Granger causality test. They employed monthly data on S&P 500 index and effective exchange rate for the period 1973-1988. They found feedback effects between the two financial markets and concluded that they are closely linked together.

Their result is later supported by Ajayi and Mougoue (1996) who investigate the short-and long-run relationship between stock prices and exchange rates in eight advanced economies. They find that an increase in stock prices causes the currency to depreciate for both the U.S. and the U.K., supporting the hypothesis of this paper. Ajayi and Mougoue explain this as follows: 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.

Bahmani-Oskooee and Sohrabian (1992) results are also supported by Nieh and Lee (2001) who investigated the relationship in the G-7 countries. From their findings we can actually see that advanced economies tend to have close linkage between the financial markets.

Nieh and Lee (2001) examined the relationship of G-7 countries from year 1993 to 1996 using the same method as Bahmani-Oskooee and Sohrabian (1992). One of the distinctive features of Nieh and Lee's research is that they used a confirmatory data analysis technique to test for the cointegration between the two financial variables; they employed both the Engle-Granger (EG) and Johansen cointegration test. The researchers pointed out that Johansen test can overcome some of the pitfalls on the EG test and hence this study will follow Nieh and Lee's approach in the empirical analysis. Both of their test results are being consistent with each other and they concluded that there is a lack of long run equilibrium relationship.

Morley (2002) is the first researcher ever in this area to investigate whether the two financial variables (exchange rate movement and stock price movement) are related in the light of European convergence. He found that there are mixed results between across the European countries. The inconsistent result is mainly attributed to the difference in the financial systems. For instance, Morley concluded that the UK has more stable relationship between the two variables than Germany and France. He claimed that it is because "the UK is dominated by financial markets whereas Germany and France is dominated by the banking system". He demonstrated clearly that the economic structure of each economy can be the determinant of the exchange rate and stock price relationship.

Tabak (2006) published the first ever paper to examine exchange rates and stock prices behavior of the nearby economy of the U.S, which is Brazil using daily data from year 1994 to 2002. His result supported the findings of both Bahmani-Oskooee and Sohrabian (1992) and Nieh and Lee (2001) that is, exchange rates and stock prices lead each other but they don't co-move in long run. It is key to note the methodology used by Tabak which is different from the previous literatures that used solely the linear causality test, he adopted non-linear causality tests as well.

The author explained that the major use of the non-linear causality tests is to eliminate any volatility effects caused by the natures of the time series data.

Same as the research area of Ajayi *et al*. (1998), Pan *et al*. (2007) investigated exchange rates-stock prices relationship of a mixture of advanced and emerging economies of East Asian countries from year 1988 to 2008. Pan *et al*. did a similar thing as Wu (2000). They divided its sample period into sub-periods; pre Asian financial crisis period and post Asian financial crisis period. Before the crisis most sample countries either shows causal relationship from stock prices to exchange rate or weak relationship from exchange rates to stock prices. However, as it progressed to the financial crisis, exchange rate gained explanatory power in seven out of eight sample countries which support Wu's findings. Malaysia is the one that no causal relation between variables observed during the crisis period, this is attributed to the capital controls of the Malaysian government which stabilize the economy during the crisis.

Aydemir and Demirhan (2009) carried out research on this topic using different approach from the majority of researchers. Instead of comparison between countries, they made the comparison between various types of price stock market indices in Turkey which includes National 100, services, financials, industrial and technology indices. They believe that each stock market indices consist of companies in different industries; their exposure to risks such as exchange rate risk will be different. Even though our empirical work is different from their approach, this study will incorporate the market indicator (NSE 20 share index) best performing 20 listed companies of different industries at the bourse. This allows the study to give a true and fair view on the performance of the economy.

The causality result shows that besides the technology index, most indices exhibit negative causal relationship from stock prices to exchange rates. Meanwhile, negative causal relationship is captured from the exchange rate to all stock market indices. The researchers found that the sign of the causal relationship varies between the industries indices as each industry might be prone to different risks and government policies. Although this study will not use the similar

approach to study the exchange rates-stock prices relationship, in the future research this method can be used to have a greater understanding of this topic.

2.5 There is No Association between Exchange Rates and Stock Prices (Asset Market Approach)

Ratner (1993) failed to account for any linkages between the two variables in the U.S. market. He claimed that market efficiency plays an important role in the financial markets. That all financial markets are efficient and they will eliminate any patterns in them and will adjust itself by the available information instead. However this point needs further verification since the author didn't offer detailed explanation regarding the application of market efficient hypothesis.

Meanwhile, Kaminsky *et al*. (1998) found that "stock prices are the fourth best predictor of currency crisis, of the variable used and the fourth best in terms of the persistence of the signal." This is an evidence to show that exchange rates and stock prices might not be closely connected as most literatures suggested. There are many macroeconomic variables like interest rate that would have a better connection with exchange rate or stock prices.

Same as Ratner (1999), both Naeem and Rasheed (2002) and Rahman and Uddin (2009) found that there is no exchange rates-stock prices relationship in South Asian Countries between year 1996-2000 and 2003-2008 respectively. They use exactly the same methodology and obtain similar outcome. Both researches stressed that as both foreign exchange market and stock market are totally unrelated, it is not possible for market participants to utilize information to predict the behavior of one market based on information from another market. They believe that innovations that caused changes of foreign exchange market might be different from the ones in equity markets.

Sundaram (2009) examined the causal relationship between stock return with respect to exchange rate and FII in India from year 1994 to 2008. He found that no causal relationship existed between exchange rates and stock prices but a uni-directional causality runs from stock returns to FII which is not within the scope of our study. The statistical result opposed Smyth and Nandha (2003), where causality from exchange rates and stock prices is found in India. Sundaram (2009) stressed that his result is more robust than previous studies because of the use of longer and more updated data set which takes more of the reality of the financial markets.

In general, the empirical findings suggest that there is no empirical consensus on the causal relationship between exchange rates and stock prices. Specifically, the causal direction between the stock prices and exchange rates is not resolved. It is also worth noting that that there is a dearth of existing evidence on this issue for African countries. This research attempts to address the gap in this area by updating the existing evidence for the case of the Kenyan market.

2.6 Overview of the Kenyan Currency Regime and Nairobi Securities Exchange

The purpose of this section is introduce some of the facts and figure of Kenyans currency regime and stock market which will be used as samples in our analysis on the relation between stock price and exchange rate. First we will have a look at the Kenya’s currency regime and finally on its stock market.

2.6.1 Background of Kenya's Exchange Rate Regimes

Up 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). Between 1974 and 1981 the movement of the nominal exchange rate relative to the dollar was erratic. In general the rate depreciated by about 14% and this depreciation accelerated in 1981/82 with further devaluations. 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; a dual exchange rate system was then adopted that lasted until October 1993, when, after further devaluations, the official exchange rate was

abolished. That is, the official exchange rate was merged with the market rate and the shilling was allowed to float. Exchange controls were maintained until the 1990s, initially in response to the balance of payments crisis in 1971 /72. In order to conserve foreign exchange and control pressures on the balance of payments, the government chose controls instead of liberalization. The controls were an easy response to contain balance of payments and inflationary pressures, but they created major distortions in the economy that were not evident until the early 1980s.

The major instruments of monetary policy in Kenya have been open market operations, cash and liquidity ratios, credit ceilings, and reserve requirements. In the 1990s, the authorities have relied more on the indirect instruments, the most active being open market operations. The recurring policy objectives have been to maintain an exchange rate that would ensure international competitiveness while at the same time keeping the domestic rate of inflation at low levels, conducting a strict monetary stance and maintaining positive real interest rates. This has been difficult in practice.

The floating exchange rate system adopted in the 1990s was expected to have several advantages for Kenya. First, it would allow a more continuous adjustment of the exchange rate to shifts in the demand for and supply of foreign exchange. Second, it would equilibrate the demand for and supply of foreign exchange by changing the nominal exchange rate rather than the levels of reserves. Third, it would give Kenya the freedom to pursue its monetary policy without having to be concerned about balance of payments effects. Thus the country would have an independent monetary policy, but one that was consistent with the exchange rate movements. Under the floating system external imbalances would be reflected in exchange rate movements rather than reserve movements. Ndung'u (February 2000).

However, the exchange rate was allowed to float in an environment of excess liquidity, and massive depreciation and high and accelerating inflation ensued. The mopping up process pushed the treasury bill rate up and, because this is the bench mark for other interest rates, all other interest rates shot up to historic high levels. The exchange rate was devalued three times in 1993. After 1993, the exchange rate appreciated under the influence of short-term capital flows taking advantage of the high interest rate on the treasury bills. Those who were importing on

trade credit during this time were uncertain as to what prices they would have to pay for foreign exchange when their letters of credit were called and hence wrote the expected foreign exchange redemption into their price structure. This increased the spiral of inflation.

2.6.2 Background of the NSE

The Nairobi Stock Exchange (NSE) founded in 1954, as a voluntary organization of the stock brokers is now one of the most active capital markets in African where investors buy and sell shares and other securities. The share prices in the stock market usually vary with time and this can be attributed to factors such as changes in the economic growth of the region, threat of war or strikes, government policies or political changes. These factors are non-deterministic in nature and highly auto-correlated. Share prices movements in the NSE market are measured by an index based on 20 representative companies and is calculated on a daily basis. The index is a general price movement indicator based on a sample or upon all the stock market companies and the sale and purchase decisions are based on its movements. The forecasts of future trends of share prices are often based on subjective factors.

2.7 Conceptual Framework

The conceptual framework as brought out from the literature review in this study is illustrated in the figure below.

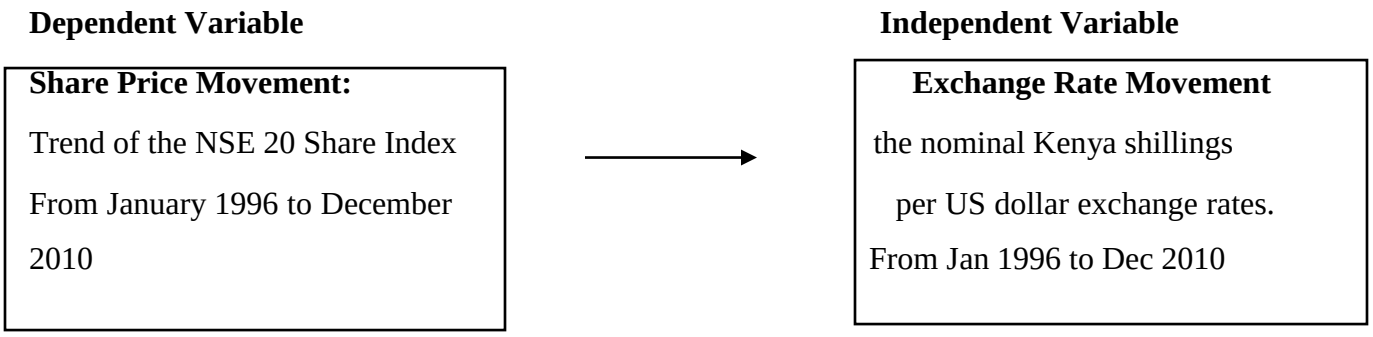

Figure 2.1: Conceptual framework of Nairobi stock prices and exchange rates

Source: Researcher 2013

The study uses monthly observations of the NSE 20 share index and the nominal Kenya shillings per US dollar exchange rates as observed by the Central Bank of Kenya from January 1996 to December 2010. Specifically the monthly prices of the 20 Share index is used to compute stock returns and the Kenya shilling/ Dollar ratios on a monthly average basis to compute exchange rates which will be used to investigate the causal relationship using error correction model.

In the study data is limited to the period until December 2010 because in July 2011, the Nairobi stock exchange underwent some structural transformation. First, the Nairobi Stock Exchange Limited, changed its name to the Nairobi Securities Exchange Limited. The change of name reflected the strategic plan of the Nairobi Securities Exchange to evolve into a full service securities exchange which supports trading, clearing and settlement of equities, debt, derivatives and other associated instruments. In the same year, the equity settlement cycle moved from the previous T+4 settlement cycle to the T+3 settlement cycle. This allowed investors who sell their shares, to get their money three (3) days after the sale of their shares. Such transformation of the stock market according to Richard et al. (2009) affect the direction of causality between exchange rate movement and stock market prices. Therefore limiting the study to periods before the transformations avoids any such discrepancies that would interfere with the results.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This chapter explains the data collection and analysis method used in this study. It covers the following sub-topics: research design, target population, sampling design, data collection, data analysis and presentation.

3.2. Research Design

This study adopts a causal relationship research design to investigate the causal relationship between the stock market prices and exchange rate movement in Kenya. This enabled the researcher to understand how one variable under study affected, or was responsible for changes in another variable. Causal research design was chosen because in business research, the cause-effect relationship is less explicit. According to Cooper and Pamela Schindler (2006) the use of a causal research design eases the understanding, explanation, prediction and control of any relationship between variables under study.

3.3. Target Population

The population of this study was all quoted companies at the Nairobi stock exchange as represented by the closing NSE 20 share index. On the other hand, the exchange rates of the Kenyan shilling against the USD was targeted and measured by the nominal Kenya shillings per US dollar exchange rates as observed by the Central Bank of Kenya.

3.4. Samples and Sampling Design

This study utilized a purposive sampling by employing the most recent data series (data from January 1996 to 2010) on the variables under investigation to meet the objectives of the study.

Purposive sampling is employed as it enables the study to focus on the particular characteristics (causation and direction of causation) of the population that are of interest which enables answer the research questions.

3.5. Data Collection

In order to fulfill the objectives of this study, a data collection guide is used to capture the required data. The study wholly depended on the use of monthly secondary data from January 1996 to December 2010.

3.5.1 Type and Sources of Data

The data used in this paper is secondary data. Secondary data is used since, collecting primary data on the variables would have been difficult, time-consuming and expensive. Also because, it makes sense to use it since the data needed in this study already exists in some form from the government and government agencies.

The NSE 20-share index was obtained from the Nairobi securities exchange and the nominal Kenya shillings per US dollar exchange rates is as observed by the Central Bank of Kenya.

In this study, Stock prices data used is as observed from the data issued by the Nairobi stock exchange is such that an average of the daily NSE 20 share index over a period of 30 days (a month) is analyzed to give a monthly index for the period between January 1996 and December 2010. The NSE 20-share index was chosen as a proxy for the stock market because it is able to measure price movements in selected, relatively stable and best performing 20 listed companies at the bourse.

The nominal Kenya shillings per US dollar exchange rates was picked as the preferred exchange rate indicator because it's widely used by economists and policy makers alike to gauge the currency value of a country in relation to another country's currency, and on this account its variations are also relatively and quickly identified.

3.5.2 Data Collection Procedure

As established earlier in the previous sections this study adopts the use of secondary data. Once the topic of study and the objectives were established, the researcher identified other documents, journals and economic papers that studied the variables studied in this paper. Then after reading through the papers and journals, the study selected those that are relevant and can provide data and information that is relevant and efficient to adequately explain and analyze the variables in the study. This data is then used to reflect and gear towards achieving the objectives of the study.

3.6. Data Processing and Data Analysis

The data used in this study was transformed into natural logarithms in order to improve its interpretability, and consequently the statistical analysis.

3.6.1 Test for Stationarity

Empirical work based on time series data assumes that the underlying time series is stationary. Broadly speaking a data series is said to be stationary if its mean and variance are constant (non-changing) over time and the value of covariance between two time periods depends only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed. Gujrati (2003).

In order to avoid the possibility of biased results emanating from a likely existence of unit roots in the variables under study, the researcher performed stationarity using the ADF (Augmented Dickey Fuller) test procedure.

3.6.2 Testing for Cointegration

To perform this, the Johansen-Juselius test procedure was used to test for the possibility of a long-run equilibrium relationship among the variables under examination. This way, the researcher was able to analyze whether the time series under study share a common stochastic drift or not.

3.6.3 Testing for the Causality

The Granger-causality test was also used to investigate direction of causation between stock market prices and exchange rates. The outcome from the Granger-causality test was used to determine whether the variables under study can be used to predict each other or not. At the same time, the variables used in the granger-causality test were all assumed to be stationary.

3.7. Model Specification

The study employed a vector autoregressive (VAR) model to estimate and provide empirical evidence on the nature of causal relationship between the NSE 20-share index and exchange rates. The VAR model provided a systematic way to capture rich dynamics between the variables under study. Sims (1980) argued that VAR held out the promise of providing a coherent and credible approach to data description, forecasting, structural inference and policy analysis. VARs have proven to be powerful and reliable tools because VARs involve current and lagged values of multiple time series, and their ability to capture co-movements that cannot be detected in uni-variate or bivariate models.

For the purpose of this paper and from theoretical, intuitive, and review of empirical studies, we specify the final VAR model between stock prices (*sp)* and exchange rate (*er)* as follows:

$Sp = f(ER)$ (3.1)

$LN\_SP_t = \alpha_0 + \beta_i LN\_ER_{t-i} + \varepsilon_t$ (3.2)

Where LN_SP is the natural log of NSE 20 Share index and LN_ER is the natural log of nominal exchange rate. α*'s* and β*'s* are the constants and elasticity's of the independent variables; exchange rate and stock prices and are expected to be negative and positive respectively. ε error term.

3.8. Limitations of Study

A limitation of this paper is that the study neglected the movements of interest rates, which may exert considerable influence on stock prices. In general, stock prices inversely move with interest rates, while exchange rates move in the same direction as interest rates. We suggest that this research may be extended in a future study to investigate the linkages and causal relationships among the three variables of stock prices, foreign exchange rates, and interest rates.

3.9. Ethical Consideration

Ethics refers to the moral principles or values that govern the behavior of an individual or group. This study does not require consent for the data being used since the data is publicly available. However, it addresses the issue of plagiarism by giving credit where it is due by recognizing all previous studies that have contributed to the development of this paper. This study also does not reflect the opinion of the researcher but the results and information used in this study is based on analysis of the variables using the various statistical methods as stated in the methodology.

CHAPTER FOUR

DATA ANALYSIS AND INTEPRETATION

4.1. Introduction

This chapter presents the trends of the variables adopted in the study in chart form. It also contains time series results for model estimation. It is argued that, time series or panel data are more suited to addressing the relationship between stock prices and exchange rates because their regression is able to capture the specificity of an individual country.

The tool used to determine the causal relationship between stock market prices and exchange rates includes descriptive statistics, the unit root Augmented Dickey Fuller (ADF) test proposed by Dickey and Fuller, Johansen cointegration test and Granger-causality test proposed by Granger. However, in order to produce dynamic results, after the researcher finds the variables under study to be co-integrated, we shall conduct a Vector Error Correction Model which is marginally superior to an unrestricted VAR and much better in predicting the short-run as well as the long-run dynamics between stock market prices and exchange rate movement.

Statistical characteristics of the variables (stock prices that is NSE 20 share index and exchange rates) are as shown in table 4.1.

Statistically, this study employed the Jarque-Bera test to test for normality in the time series data variables used. The study set the hypothesis below:

$$H0: JB=0 \text{ (normally distributed)}$$

$$H1: JB\neq 0 \text{ (not normally distributed)}$$

The Jarque-Bera (JB) test statistic is used to test whether stock prices and exchange rates individually follow the normal probability distribution. We conclude that all the variables are normally distributed that is no evidence against the null hypothesis and the data appears to be consistent with the null hypothesis.

4.2. Test for Stationarity

An important concern in data analysis is to know whether a series is stationary (do not contain a unit root) or not stationary (contains a unit root). This concern is important because you want both the left hand side and right-hand side variables of your regressions to balance. 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 employs a quantitative analysis. For the testing of unit roots, the Augmented Dickey-Fuller test (ADF) is used.

The Augmented Dickey-Fuller (ADF) test is specified here as follows:

$$\Delta Yt = b_0 + \beta Y_{t-1} + \mu_1 Y_{t-1} + \mu_2 Y_{t-2} + \ldots\ldots\ldots + \mu_p Y_{t-p} + \varepsilon_t \quad (4.1)$$

where, Yt represents time series to be tested, b_0 is the intercept term, β is the coefficient of interest in the unit root test, μi is the parameter of the augmented lagged first difference of Yt to represent the pth-order autoregressive process, and εt is the white noise error term. In carrying out the unit root test, we seek to test the following hypothesis:

H0: $\alpha=0$ (non-stationary)

H1: $\alpha\neq0$ (stationary)

If the null hypothesis is rejected, this means that the time series data is stationary.

On application of the ADF test, on the level series as shown in table 4.2 and 4.3, none of the variables under study: namely log of exchange rates, log of NSE 20 share index is stationary (they all contain a unit root) as indicated by the fact that their respective critical values are all

smaller (in absolute terms) than the calculated ADF statistics and hence we do not reject the null hypothesis: that the time series data variables are non-stationary.

After the application of the ADF test on the first difference series as shown on table 4.4 and 4.5 , the computed Tau (ADF) Statistics are more negative than the MacKinnon critical Tau values; we therefore reject the null hypothesis that the time series data variables are non-stationary (have a unit root). The time series exhibit difference stationarity (i.e. stationary at first difference).

4.3. Testing for Cointegration

Once a unit root has been confirmed for a data series, there arises a question whether there is any possibility for the existence of a long-run equilibrium relationship among a given set of variables. Granger (1969) states that a test for cointegration can be thought of as a pre-test to avoid spurious regression situations. In this study and in order to test for the co-integrating relationship between the variables under study, the general to specific approach was taken to search for a suitable lag length. Since it has been determined in the unit root test that the variables under examination are integrated of order 1, the cointegration test is performed. Cointegration analysis is therefore used to investigate the long-term relationship between stock market prices and exchange rates.

The testing hypothesis is the null of non-cointegration against the alternative that is the existence of cointegration relationship.

To conduct cointegration test, this study uses the method developed by Johansen and Juselius. The Johansen-Juselius test gives better results and test cointegration by applying maximum likelihood estimation procedure. Furthermore, the test procedure is based on the VAR model. The Akaike information criteria (AIC) and the Schwartz information criteria (SIC) are used to select the number of lags required in the cointegration test. Using individual significance, a lag length of k = 1 is suggested based on these criteria's.

The results of the Johansen's cointegration test as shown in Table 4.6, uses the test statistic: maximum eigenvalue proposed by Johansen and Juselius. The maximum Eigen-value is an

alternative test statistic which tests the null hypothesis that the number of r co- integrated vectors is r against the alternative of (r+1) co-integrated vectors. (That is the null hypothesis r = 0 is tested against the alternative that r = 1; r = 1 against the alternative r = 2 etc.). If the estimated value of the characteristic root is found to be close to zero, then the maximum Eigen-value will be small.

The maximum eigenvalue rejects the null hypothesis of r = 0 co-integrating vector at 5% significant level and accepts the alternate hypothesis of one co-integrating vector. Therefore, suggest the presence of one co-integrating vector, we can conclude that the variables are co-integrated and follow long-run equilibrium relationship. Engle and Granger (1987) stated that the evidence of cointegration rules out spurious correlation and suggests the presence of at least one direction(s) of Granger causality.

4.4. Testing for the Causality

Granger (1969) proposed that if causal relationship exists between variables, these variables can be used to predict each other. He pointed out that in causality approach, a variable say Y, is caused by X if Y can be predicted better from past values of Y and X than from past values of Y alone. The causality test helps to ascertain whether a uni-directional or bi-directional (feedback) relationship exists between stock prices and exchange rates. This study's choice for the granger procedure is because it consists the more powerful and simpler way of testing causal relationship.

In order to carry out the Granger causality test, the following bivariate model is estimated:

$$r\Delta SP_t = \beta_0 + \sum_{k=1}^{M} \beta_k \, r\Delta SP_{t-k} + \sum_{l=1}^{N} \alpha_l \, \Delta ER_{t-l} + u_t \qquad (3.3)$$

$$\Delta ER_t = \gamma_0 + \sum_{k=1}^{M} \delta_k \, \Delta ER_{t-k} + \sum_{l=1}^{N} \gamma_1 \, r\Delta SP_{t-l} + v_t \qquad (3.4)$$

Where: $r\Delta SP_t$ = the dependent in Equation (3.3) above,

ΔER_t = the explanatory variable,

u_t and v_t = mutually uncorrelated error terms (that is zero mean white noise error terms)

ΔER_t = the dependent in Equation (3.4) above

$r\Delta SP_t$ = the explanatory variable

'k' and 'l' = the number of lags

The null hypothesis is $\alpha l = 0$ for all l's and $\delta k = 0$ for all k's versus the alternative hypothesis that $\alpha l \neq 0$ and $\delta k \neq 0$ for at least some of the l's and k's. If the coefficients αl's are statistically significant but δk's are not, then exchange rate granger causes stock prices. In the reverse case, stock prices granger causes exchange rates. If both αl and δk are significant, then causality runs both ways. The decision rule of the causality test states that if the probability value of the estimate is higher than the 10% (0.1) level of significance, we do not reject the null hypothesis, and vice versa.

The results in table 4.7 show Granger causality between LN_ER and LN_SP in only one direction, no Granger causality between LN_SP and LN_ER but granger runs from LN_ER to LN_SP. Overall the study finds that there is no bi directional causality. This is from the fact that, based on the probability values reported in Table, LN_SP does not Granger cause LN_ER cannot be rejected, but the hypothesis that LN_ER does not Granger cause LN_SP can be rejected. This shows the Granger causality to run in one way from LN_ER to LN_SP but not the other way.

4.5. Results

Since no autocorrelation is detected based on the Durbin-Watson statistics (DW =1.999 and 2.00), the values of the p-value, which are used to test the significance of the results. At 5% level of significance, the results show a significant positive effect on stock prices. A 1% increase in the exchange rates raises stock prices by approximately 0.19%. The goodness of fit of the model as measured by R2 corresponding to the optimal lag lengths m = 2, is within the acceptable range at 0.101097. In the estimation, all the lagged values of LN_ER (proxy for exchange rate movement) have a positive sign and all of them are statistically significant. The SIC determined

lag length for the variable LN_ER of four lags is quite consistent with the real world practical observations. As a result, the p-value statistic (measured at the 5% significance) associated with the Granger causality results allows us to reject the hypothesis that there is no causal relationship stock prices and exchange rates (LN_SP and LN_ER). This findings lead to the conclusion of our second and third hypothesis where we detect a causal influence running from the LN_ER to LN_SP.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1.Summary of the Findings

The main objective of this research study was to test the direction of causality between stock market prices and exchange rates for Kenya. The technique employed was the Granger Causality Test approach. It was envisaged that there were four probable results: (a) stock market prices cause exchange rates; (b) exchange rates cause stock prices; (c) the bi-directional causal link and finally, (d) the absence of any causal link. The empirical results of the Granger causality test, conducted here support the view of presence of a causal link between stock market prices and exchange rate movement. The results also show that exchange rate causes stock prices. That is changes in exchange rates affect stock prices which is according to the traditional approach by Dornbusch and Fischer (1980).

The direction of Granger-causality from exchange rates to stock prices has a number of implications for individual investors, corporate investors, financial regulators and market intermediaries. Foreign investors can hedge their portfolios from adverse movements of exchange rate or can increase their portfolio investment in Kenya if they observe favorable movements of exchange rate. Therefore, prior information on the link between the two variables would be helpful in designing their investment strategy in Kenya. For exporter or multinational firms, the causation from exchange rate to stock prices suggests that a depreciation of exchange rate is beneficial and the firm can increase its profit (firm value) by increasing its volume of exports. On the other hand, the firm can produce goods for the foreign market in a foreign country to avoid the risk of changes in exchange rate.

Publicly owned companies that heavily rely on imports will suffer from depreciation in the Kenyan currency, this ultimately affects their earnings due to the reliance on imports for their activities. Corporate profitability is also affected. This will be evidenced by contraction in EPS. High volatility in the foreign exchange market and hence in the stock market will have a great impact on the development of the Nairobi Securities Exchange. If the government through the Central Bank of Kenya cannot intervene in the foreign exchange market, this may lead to

disruption in market development. There is also greater need for introduction of derivatives in the market to help investors manage risk cost-effectively. Instruments like options and futures should be introduced in the local financial market.

Moreover, the policy maker can use exchange rate as a policy instrument to stimulate foreign portfolio investment and may be able to prevent stock market crash by controlling exchange rate. This direction of causation is also important as crises in the stock markets can be prevented by controlling the exchange rates. Moreover, developing countries can exploit such a link to attract/stimulate foreign portfolio investment in their own countries.

For regulators, like the government, this study indicates that the market is prone to cross- asset volatility spillover, specifically, from the currency market to the stock market. This has implications for securities regulators. There is a need for expansion in the scope of their traditional responsibilities, particularly those that involve cross-asset effects. More important, however is for regulators to consider the adequacy, capacity and structure of the current regulatory environment to accommodate a wider and complex set of objectives.

5.2. Conclusions of the Study

From the findings of the study, it can be concluded that there is a one-way causality relationship running between stock market prices and exchange rates is established. This means that the present value of exchange rate today is the discounted sum of the expected future cash flows (dividends and capital gain from stocks). As such, today's exchange rates therefore reflect the expected future dividends from stocks. Therefore exchange rate movement can be used to forecast future changes in stock prices all other factors held constant. The findings from this study are consistent with other studies as discussed earlier in Chapter two.

5.3. Recommendations

Based on the findings of the study, the study presents recommendations pertinent to the policy makers, financial market regulators and future researchers. It is universally accepted that higher stock prices enhance household wealth which in turn encourages consumers to spend more. A rise in stock prices also makes it cheaper for firms to raise funds and invest more. Meanwhile, the rise in the value of collateral, such as real estate, increases banks' enthusiasm to lend. As

such therefore, the policy makers may as a policy reform tool use the stock market institution, and especially the listed stocks as a policy instruments.

In order to develop the Kenyan stock market further, this study recommends that the government should emphasize on the elimination of any impediments to the growth and development of the Nairobi stock exchange including any regulatory barriers that may act as disincentives to investment. The capital markets authority should check and avert any sharp practices by market operators (particularly the speculators) in order to safeguard the interests of shareholders.

Additionally, more companies and especially the small and medium enterprises should be encouraged to get listed in the stock exchange market and allowed access in order to access investible funds from the masses thereby stimulating and boosting the financial system and the stock market in particular and consequently raise economic growth.

More so the government should put in place structures and policies aimed at stabilizing the Kenya Shilling against foreign currency to be able to control not only stock prices but the trade portfolio and potential of both domestic and foreign investors.

5.4. Suggestions for Further Research

This study sought to investigate the nexus between stock market prices and exchange rates in Kenya. The findings of this study have concluded that exchange rates have a positive effect on stock market prices. The results of this paper can be extended in several other ways among them to check whether further to the findings, how devoted the Nairobi stock exchange has been in transmitting information as well as channeling funds into productive areas. This will help to shed light on whether the allocative efficiency of the market has been fully achieved. Further work may also be done to establish whether other aspects of the stock market such as size, volatility, trade volume and, depth in terms of instruments on offer exhibits different results from the ones reached in the conclusion of this study. Another direction for future research is establishing the relationship between stock market prices and other macroeconomic and microeconomic factors as inflation, money supply, interest rates Foreign Direct Investment and more. This is important as the government will be able to set up policies that will be helpful in developing the stock market.

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APPENDIX I: TABLES

Table 4.1: Descriptive Statistics

	SP	**ER**
Mean	4.300662	7.974884
Median	4.320670	8.027774
Maximum	4.464726	8.661162
Minimum	4.127602	6.934397
Std. Dev.	0.089621	0.414714
Skewness	-0.224489	-0.613987
Kurtosis	2.082738	2.869478
Jarque-Bera	7.822138*	11.43717*
Probability	0.020019	0.003284
Observations	180	180

*insignificant at 5% level

Table 4.2: Results of Augmented Dickey Fuller (ADF) stationarity test at level ADF Test at Level (Trend and Intercept) for Ln_Sp

ADF Test Statistic	-1.397771	1%	Critical Value*	-4.0119
		5%	Critical Value	-3.4357
		10%	Critical Value	-3.1416

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LN_SP)
Method: Least Squares
Date: 07/11/13 Time: 17:03
Sample(adjusted): 1996:02 2010:12
Included observations: 179 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_SP(-1)	-0.016925	0.012109	-1.397771	0.1639
C	0.121532	0.093397	1.301247	0.1949
@TREND(1996:01)	0.000165	9.69E-05	1.705300	0.0899

R-squared	0.019446	Mean dependent var	0.001466
Adjusted R-squared	0.008304	S.D. dependent var	0.061299
S.E. of regression	0.061044	Akaike info criterion	-2.737814
Sum squared resid	0.655849	Schwarz criterion	-2.684394
Log likelihood	248.0344	F-statistic	1.745213
Durbin-Watson stat	1.686742	Prob(F-statistic)	0.177616

Table 4.3: Results of Augmented Dickey Fuller (ADF) stationarity test at level ADF Test at Level (Trend and Intercept) for ln_er

ADF Test Statistic	-3.652070	1%	Critical Value*	-4.0119
		5%	Critical Value	-3.4357
		10%	Critical Value	-3.1416

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LN_ER)
Method: Least Squares
Date: 07/11/13 Time: 17:01
Sample(adjusted): 1996:02 2010:12
Included observations: 179 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_ER(-1)	-0.141316	0.038695	-3.652070	0.0003
C	0.599667	0.164282	3.650241	0.0003
@TREND(1996:01)	9.80E-05	6.69E-05	1.464092	0.1450
R-squared	0.070508	Mean dependent var		0.000802
Adjusted R-squared	0.059946	S.D. dependent var		0.044296
S.E. of regression	0.042948	Akaike info criterion		-3.441052
Sum squared resid	0.324632	Schwarz criterion		-3.387632
Log likelihood	310.9741	F-statistic		6.675374
Durbin-Watson stat	2.245817	Prob(F-statistic)		0.001606

Table 4.4: Results of Augmented Dickey Fuller (ADF) stationarity test at level ADF Test at first difference (Trend and Intercept) ln_sp

ADF Test Statistic	-11.39126	1%	Critical Value*	-4.0122
		5%	Critical Value	-3.4359
		10%	Critical Value	-3.1417

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LN_SP,2)
Method: Least Squares
Date: 07/11/13 Time: 16:59
Sample(adjusted): 1996:03 2010:12
Included observations: 178 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LN_SP(-1))	-0.849947	0.074614	-11.39126	0.0000
C	-0.006060	0.009246	-0.655455	0.5130
@TREND(1996:01)	8.42E-05	8.90E-05	0.946448	0.3452

R-squared	0.425800	Mean dependent var	0.000351
Adjusted R-squared	0.419237	S.D. dependent var	0.079729
S.E. of regression	0.060760	Akaike info criterion	-2.747065
Sum squared resid	0.646058	Schwarz criterion	-2.693439
Log likelihood	247.4888	F-statistic	64.88584
Durbin-Watson stat	2.014148	Prob(F-statistic)	0.000000

Table 4.5: Results of Augmented Dickey Fuller (ADF) stationarity test at level ADF Test at first difference (Trend and Intercept) ln_er

ADF Test Statistic	-16.39039	1%	Critical Value*	-2.5771
		5%	Critical Value	-1.9415
		10%	Critical Value	-1.6166

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LN_ER,2)
Method: Least Squares
Date: 07/11/13 Time: 16:57
Sample(adjusted): 1996:03 2010:12
Included observations: 178 after adjusting end points

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LN_ER(-1))	-1.211125	0.073892	-16.39039	0.0000

R-squared	0.602807	Mean dependent var	-0.000435
Adjusted R-squared	0.602807	S.D. dependent var	0.068904
S.E. of regression	0.043425	Akaike info criterion	-3.429946
Sum squared resid	0.333779	Schwarz criterion	-3.412071
Log likelihood	306.2652	Durbin-Watson stat	2.033525

Table 4.6: Johansen co-integration tests (Ln_sp, Ln_er)

Series: LN_EX LN_SP
Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.051279	11.53621	18.17	23.46	None
0.012096	2.166187	3.74	6.40	At most 1

*(**) denotes rejection of hypothesis at 5%significant level.
L.R rejects any cointegration at 5% significant level

Table 4.7 Granger Causality Tests

Date: 07/11/13 Time: 13:43
Sample: 1996:01 2010:12
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability	
LN_SP does not Granger Cause LN_ER	178	0.938565	0.82575	Causality
LN_ER does not Granger Cause LN_SP		0.39319	0.19167	No Causality