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The Relationship between the Rate of Foreign Exchange and the Stock Prices at the Nairobi Stock Exchange

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Abstract:

This research aimed at investigating whether exchange rates and stock prices are related. The focus was on the effect of the rate of Kenya shilling exchange for the Dollar, the Sterling Pound and the Euro on the Nairobi Stock Exchange 20-share index. The simple linear regression model was fitted where the currencies were treated as independent variables while the 20-share index was treated as the dependent variable, for the daily trading data for three months between July and September 2005.

The ordinary least square method of analysis was carried out and an f-test statistics done. The result showed that there is negative linear relationship between the Kenya shilling exchange rate for both the Dollar and the Euro on the Nairobi Stock Exchange (NSE) 20-share index. This implies that as shilling depreciates against the two currencies, the NSE 20-share index increases and vice versa. However, there was no linear relationship between the Kenya shilling rate of exchange for the Sterling pound and the 20- share index implying that whether the rate of shilling exchange for Sterling pound appreciates or depreciates it does not affect the share pricing at the NSE.

This study has implications for local investors and exporters because it provides a strategy on whether it is appropriate to invest in shares or export commodities at a particular Dollar and Euro rates. Also market regulators may use causality modelling techniques to forecast share prices in short-run.

1. Introduction

1.1. Background of the Problem

The issue of whether stock prices and exchange rates are related or not have received considerable attention after the East Asian crises. During the crises the countries affected saw turmoil in both currency and stock markets. 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 behaviour of one market using the information on other market (Mohammed & Rasheed, 2002)

The phenomenon of transactions and exchange is a basic component of human activity throughout the World. Even in the most remote villages in Africa, people regularly meet in the village market to exchange goods and services. A transaction therefore is an exchange of two things. That is something is given up in return for something else.

Foreign trade involves the conversion of one currency into another currency. Foreign or international trade is that trade which is conducted between two or more countries. All countries export and import goods and services. Kenya exports Agricultural produce and imports Machineries, Industrial goods and Petroleum among others, which makes her engage in foreign currency exchange (Saleemi 1997).

Foreign exchange market is the process according to which currency of one country is exchanged into the currencies of other countries. Foreign exchange also means that the rates at which different currencies are exchanged with one another. The rate of exchange of different currencies is determined according to the forces of demand and supply of the currencies. The rate of exchange always varies with the variation in the supply of and demand of various currencies.

1.1.1. The Stock Market 20 – Share Index

The Stock Market is one of the most closely observed economic phenomena in the world. Market indicators meet the demand for measures of stock market performance. Such indicators quantify movements in stock market prices, and act as a standard in evaluating the returns on money invested in the stock market. Stock market indices as aggregate measures are an instrument to meet the information requirement of investors by characterizing the development of global markets and specified market segments (descriptive function).

Index numbers are applied in the measurement of movements at the stock market. An index number effectively summarizes hundreds of price movements. At NSE there is both price and volume index. The volume of shares traded might be as important as the change in a market index since substantial price increases and decreases are often accompanied by heavy trading activity. To this extent a positive correlation between purely share price based index and volume based index is hypothesised.

The volume of shares traded is the total number of shares traded on the stock exchange on a particular day, which together with the total value of all shares traded, (that is turnover) gives a measure of the amount of business activity on the stock exchange.

1.1.2. The Nairobi Stock Exchange

The Nairobi Stock Exchange was formed in 1954 as a voluntary organisation of stock brokers and is now one of the most active capital markets in Africa. The administration of the Nairobi Stock Exchange Limited is located on the 1st Floor of Nation Centre, Kimathi Street in Nairobi.

As a capital market institution, the Stock Exchange plays an important role in the process of economic development. It helps mobilise domestic savings thereby bringing about the reallocation of financial resources from dormant to active agents. Long-term investments are made liquid, as the transfer of securities between shareholders is facilitated. The exchange has also enabled companies to engage local participation in their equity, thereby giving Kenyans a chance to own shares. Companies can also raise extra finance essential for expansion and development. To raise funds, a new issuer publishes a prospectus, which gives all pertinent particulars about the operations and future prospects and states the price of the issue. A stock market also enhances the inflow of international capital. They can also be useful tools for privatisation programmes.

The members of the Nairobi Stock Exchange transact business mainly on the Nairobi market, with a limited proportion of business conducted in foreign securities through overseas agents. The stockbrokers act as financial advisers to their clients and also carry out their orders.

The Nairobi Stock Exchange deals in both variable income securities and fixed income securities. Variable income securities are the ordinary shares, which have no fixed rate of dividend payable, as the dividend is dependent upon both the profitability of the company and what the board of directors decide. The fixed income securities include treasury and Corporate Bonds, preference shares, debenture stocks - these have a fixed rate of interest/dividend, which is not dependent on profitability.

1.1.3. The Role of the Stock Exchange in the Economy

The Stock Exchange is a market that deals in the exchange of securities issued by publicly quoted companies, corporate bodies and the Government.

The major role that the stock exchange has played, and continues to play in many economies are: -

- That it promotes a culture of thrift, or saving. The very fact that institutions exist where savers can safely invest their money and in addition earn a return, is an incentive to people to consume less and save more.
- Provides investors with an efficient mechanism to liquidate their investments in securities. The very fact that investors are certain of the possibility of selling out what they hold, as and when they want, is a major incentive for investment as it guarantees mobility of capital in the purchase of assets.
- The check against flight of capital which takes place because of local inflation and currency depreciation, which is the focus of this research.

1.2. Problem Statement

Any trading company is exposed to market risks from changes in foreign currency exchange rates, interest rates and commodity prices since it denominates its business transactions in a variety of foreign currencies, finances its operations through long and short term borrowings, and purchases raw materials at market prices. As a result, future earnings, cash flows and fair values of assets and liabilities are subject to uncertainty. The company's operating and financing plans include actions to reduce this uncertainty.

The uncertainty could either be the result of direct or indirect relationship which may exist between the rate of foreign exchange and the stock prices.

The trading company therefore, enters into derivative contracts based on the economic analysis of underlying exposures, anticipating adverse impacts on future earnings, cash flows and fair values due to fluctuations in the foreign currency exchange rates, interest rates and the commodity prices.

This study will try and investigate the type(s) of relationship(s) that exists between the rates of pricing Kenya shilling using the World's major currencies and the stock price 20-share index at the Nairobi Stock Exchange (NSE), while holding the interest rates and the commodity prices constant.

1.3. Objective of the study

1.3.1. General Objective

- The main objective of the study is to investigate the type of relationship that exists between the rate of foreign exchange and the stock prices at the Nairobi Stock Exchange.

1.3.2. Specific Objective

- Investigate whether there is any direct or indirect relationship between the rate of foreign exchange and stock price 20-share index that may guide the investors, policy makers, and the official market regulators in decision-making.

1.4. Hypothesis

- H_0 : The higher the rates of shilling depreciation against the high-transaction currencies the higher the stock price 20-share index meaning negative relationship.
- H_A : Otherwise, positive relationship or no relationship.

1.5. Assumptions

- It is assumed that the major currencies which influence the investors, policy makers and the Official market regulators decisions are The Dollars, Sterling Pound and the Euro
- The Stock market 20-share index is assumed to be representative of all the trading companies at the Nairobi Stock Exchange.
- All the other factors which may guide the investors and the Official market regulators are assumed to be constant and will be represented by a constant factor, β_0
- The model representing the relationship is assumed to be simple linear regression.

1.6. Justification

- Almost all the companies listed at the Nairobi Stock Exchange are either quoted at some international Stock Exchange or are involved in either export or import of commodities which has a bearing on the Kenya's economic performance.
- The major currencies, that is The Dollar, Sterling Pound and the Euro are a global currencies and are universally accepted as a medium of exchange in the international financial transactions.
- Policy makers are concerned about the overall operation of a market and whether there are externalities (unintended side effects) that positively or negatively affect stock market and whether there is need for intervention either directly or indirectly.
- Policy makers require benchmark for interventions in case of mispriced or excessively volatile exchange rates and these acts as a motivating factor to carry out this research.

2. Literature Review

2.1. Introduction

No literature is available on the studies of relationships between the rate of shilling exchange and the stock prices at the Nairobi Stock exchange. However, market performance at the Nairobi Stock Exchange as measured by the percentage of changes in the stock index over the years show that in 1991 when the market opened for trading for the first time, the 20 share stock index was 958.03 points and increased to 2,513 points by the end of 1993. The main reason for the increase was the change from call over system of trading to open outcry system that attracted many market participants. In 1994, the index hit the 4,559 points mark as a result of remarkable growth of the economy from 0.3 per cent in 1993 to 3 per cent in 1994. By the end of 1998, the index reduced to 2,962 points as the economy slumped coupled with perceived uncertainty that scared away foreign investors following an election year. In 1999, 2000, 2001, the index made remarkable losses and closed at 2,302 points, 1,913 points and 1,362 points, respectively. The index fell further to 968 points in the year 2002 when the economy also realized very low rate of growth (-0.2 per cent), high rate of shilling depreciation and perceived insecurity that characterize election years. There has been significant recovery in the year 2003 with the index increasing and hitting the 2,500 mark (IPAR briefs, vol.11.)

2.2. Theoretical Framework

The purpose of this study is to investigate the economic relationships between financial market and the foreign exchange market at the Nairobi stock exchange market. The study aims at providing an understanding of the fundamental factors that influence the stock market with special emphasis on the currency transaction. A model representing economic relationships between the Nairobi Stock exchange share index and the rate of shilling exchange against the Dollar, Sterling Pound and the Euro will be developed using standard Granger's causality regression model.

According to the studies by Thomson and Batten (1985), Hwang et al (1991) and Chang and Lai (1997) Granger's causality test provides more robust results over both arbitrary lag length selection and other systematic methods for determining lag length. Discussions of the limitations and implications of this model for the investors, policy makers and the official market regulators will be analysed while maintaining other influencing factors as constant.

2.3. Definition of the Model

(a). Let the simple regression model representing the relationship be of the form

$$\beta_0 + \beta_1 x_i + e_i = y_i \dots \dots \dots (1)$$

Where,

- β_0 – is a constant factor representing all the other factors affecting the stock Market 20 – share index with the exemption of rate of currency exchange.
- β_i - coefficient relating y_i to x_i
- x_i – the rate of shilling exchange against the selected individual currency
- $i = 1, 2, 3, \dots, n$
- e_i - error term and is assumed to be equal to zero
- y_i – The daily NSE 20 – share index

(b). The bivariate linear regression model representing the relationship is assumed to be of the form

$$y_i = B_0 + B_1x_1 + B_2x_2 + e_i \dots \dots \dots (2)$$

Where

- y_i = the NSE 20- share index
- B_0 = the constant factor representing all the other variables which affect the stock exchange 20-share index
- B_1, B_2 and B_3 are the coefficients relating the Dollar, the sterling pound and the Euro to the 20-share index.
- X_1 = represents the value of the Dollar daily exchange rate for the shilling
- X_2 = represents the value of the Euro daily exchange rate for Kenya shilling
- e_i = expected error term whose sum is assumed to be equal to zero

2.4. Empirical Studies

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 stocks prices and exchange rates (for instance Smith (1992), Solnik (1987), and Aggarwala (1981)). While others have reported a significant negative relationship between the two (e.g., Soenen and Hennigar (1998)). 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)).

Franck and Young (1972) were among the first to study the relationship between stock prices and exchange rates. They use six different exchange rates and found no relationship between these two financial variables.

Aggarwala (1981) explored the relationship between changes in the Dollar exchange rates and change in indices of stock prices. He uses monthly U.S. stock price data and the effective exchange rate for the period 1974-1978. His results, which were based on the relationship, would be negative if many firms use lots of imported inputs in their production. Increase in their cost of production due to currency depreciation might reduce firms' sales and profits that might lead to a fall in their stock prices.

If there are some common factors that affect both stock prices and exchange rates (for instance interest rates) then we might expect an association between these two financial variables. No association can also be explained as follows: domestic currency depreciation raises the price of those firms that export goods to other countries, but if these firms import many of its inputs from abroad the stock price may not rise as the cost of production will increase making these firms less competitive. On the other hand, firms not exporting their products to other countries but importing raw materials may find a fall in their stock prices as currency depreciation may cause their sales/profits to decline. Simple regressions showed that stock prices and the value of the U.S. Dollar are positively related and this relationship is stronger in the short run than in the long run.

Solnik (1987) examined the impact of several variables (exchange rates, interest rates and changes in inflationary expectation) on stock prices. He uses monthly data from nine western markets (U.S., Japan, Germany, U.K., France, Canada, Netherlands, Switzerland, and Belgium). He found depreciation to have a positive but insignificant influence on the U.S. stock market compared to change in inflationary expectation and interest rates.

Soenen and Hanniger (1988) employed monthly data on stock prices and effective exchange rates for the period 1980-1986. They discover a strong negative relationship between the value of the U.S. dollar and the change in stock prices. However, when they analyzed the above relationship for a different period, they found a statistical significant negative impact of revaluation on stock prices.

Mohsen Bahmani- Oskooee and Ahmad 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 concluded that there is a dual causal relationship between the stock prices and effective exchange rate, at least in the short-run. But they were unable to find any long-run relationship between these variables.

Smith (1992) uses a Portfolio Balance Model to examine the determinants of exchange rates. The model considers values of equities, stocks of bonds and money as important determinants of exchange rates. The results show that equity values has a significant influence on exchange rates but the stock of money and bond has little impact on exchange rates. These results imply not only that equities are an important additional factor to include in portfolio balance models of the exchange rate, but also suggest that the impact of equities is more important than the impact of government bonds and money.

LiblyRittenberg (1993) employed the Granger causality tests to examine the relationship between exchange rate changes and price level changes in Turkey. Since causality tests are sensitive to lag selection, therefore he employed three different specific methods for optimal lag selection [i.e, an arbitrarily selected, Hsiao method (1979), and the SMAR or subset model auto regression method of

Kunst and Marin (1989)]. In all cases, he found that causality runs from price level change to exchange rate changes but there is no feedback causality from exchange rate to price level changes.

Eli Bartov and Gordon M. Bodnor (1994) concluded that contemporaneous changes in the dollar have little power in explaining abnormal stock returns. They also, found a lagged change in the dollar is negatively associated with abnormal stock returns. The regression results showed that a lagged change in the dollar has explanatory power with respect to errors in analyst's forecasts of quarterly earnings.

Ajayi and Mougoue (1996) show that an increase in aggregate domestic stock price has a negative short-run effect on domestic currency value but in the long-run increases in stock prices have a positive effect on domestic currency value. However, currency depreciation has a negative short-run effect on the stock market.

Yu Qiao (1997) employed daily stock price indices and spot exchange rates obtained from the financial markets of Hong Kong, Tokyo, and Singapore over the period from January 3, 1983 to June 15, 1994 to examine the possible interaction between these financial variables. His results, based on the Granger causality test, show that the changes in stock prices are caused by changes in exchange rates in Tokyo and Hong-Kong markets. However, no such causation was found for the Singapore market. On the reverse causality from stock prices to exchange rates, his results show such causation for only Tokyo market. Therefore, for Tokyo market there is a bi-directional causal relationship between stock returns and changes in exchange rates. He also uses vector autoregressive model to analyze a long-run stable relationship between stock prices and exchange rates in the above Asian financial markets. His results found a strong long-run stable relationship between stock prices and exchange rates on levels for all three markets.

Issam S.A. Abdalla and Victor 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 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 use an error correction modelling approach to examine the causality for these countries. The results show a unidirectional causality from exchange rate to stock prices for India but for Philippines the reverse causation from stock prices to exchange rates was found.

Clive W.J Granger, Bwo-Nung Huang and Chin Wei Yang (1998) examine the causality issue using Granger causality tests and Impulse response function for nine Asian countries. They use daily data for the period January 3, 1986 to November 14, 1997. The countries included in their study are: Hong Kong, Indonesia, Japan, South Korea, Malaysia, Philippines, Singapore, Thailand and Taiwan. For Japan and Thailand, they found that exchange rates lead stock prices with positive correlation. The data from Taiwan suggests stock prices leads exchange rates with negative correlation. No relationship was found for Singapore and bi-directional causality was discovered for the remaining countries.

Li LianOng and H.Y. Izan (1999) use Nonlinear Least Square method to examine the association between stock prices and exchange rates. They found that U.S. share price returns fully reflect information conveyed by movements in both the Japanese yen and the French France after four weeks. Their results, however, suggest a very weak relationship between the U.S equity market and exchange rates. They concluded that depreciation in a country's currency would cause its share market returns to rise, while an appreciation would have the opposite effect.

Amare and Mohsin (2000) examine the long-run association between stock prices and exchange rates for nine Asian countries (Japan, Hong Kong, Taiwan, Singapore, Thailand, Malaysia, Korea, Indonesia, and Philippines). They use monthly data from January 1980 to June 1998 and employed co-integration technique. The long-run relationship between stock prices and exchange rates was found only for Singapore and Philippines. They attributed this lack of co-integration between the said variables to the bias created by the "omission of important variables". When interest rate variable was included in their cointegrating equation they found co-integration between stock prices, exchange rates and interest rate for six of the nine countries

2.5. Conceptual Framework

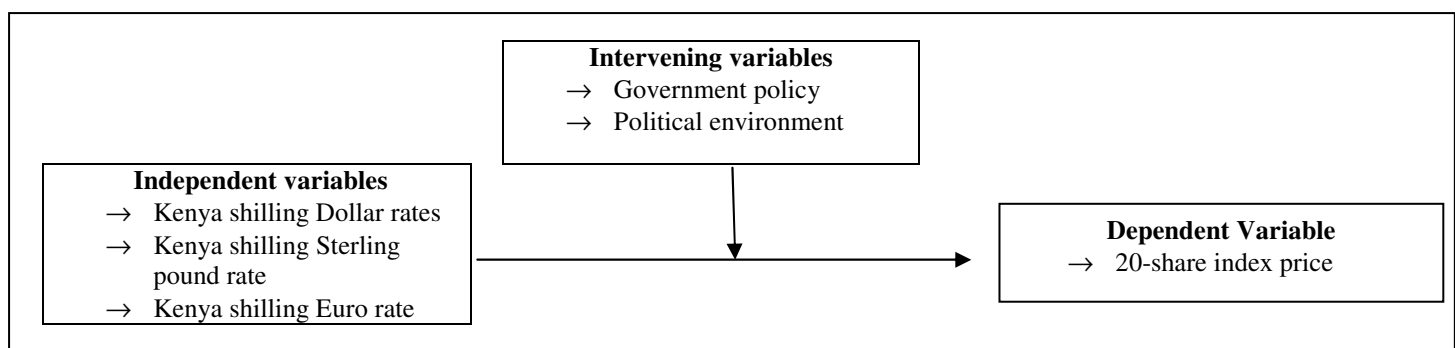


Figure 1

3. Methodology

Secondary data on the foreign currencies and the daily stock price 20-share index from the Nairobi Stock Exchange (NSE) compiled by the three major daily papers in Kenya, namely; The Nation Newspaper, the Standard Newspaper and the People were collected using simple random sampling technique. Specifically, the rate of Kenya shilling exchange rate for the Dollar, Sterling Pound and the Euro was collected and their effect on the Nairobi Stock Exchange 20-share index was analysed. The data was for three months that was from July 1st to September 30th, 2005.

The ordinary least square method of estimation was used to analyse the data using the SPSS computer package and test statistics carried out.

Time	NSE 20-share index	Exchange rate for Dollar
1	3972.15	76.21
2	4006.27	76.18
3	4039.17	76.34
4	4071.66	76.34
5	4117.22	76.39
6	4149.22	76.26
7	4203.52	76.20
8	4208.99	76.23
9	4253.22	76.27
10	4280.80	76.32
11	4246.36	76.27
12	4142.80	76.14
13	4130.65	76.29
14	4073.09	76.31
15	4068.23	76.29
16	3985.44	76.27
17	3987.04	76.25
18	3964.78	76.14
19	3953.92	76.13
20	3964.50	76.14
21	3989.74	76.09
22	3982.00	76.04
23	3986.10	76.08
24	4016.74	76.10
25	4030.68	76.07
26	4034.22	76.07
27	4049.95	76.05
28	4059.94	75.74
29	4057.52	75.86
30	4028.45	75.53
31	4035.46	75.61
32	4012.42	75.68
33	4016.32	75.97
34	4035.72	75.82
35	4048.12	75.84
36	4045.20	75.77
37	4047.26	75.75
38	4034.37	75.74
39	4025.14	75.74
40	4017.89	75.70
41	3992.57	75.71
42	3980.37	75.68
43	3949.74	75.71
44	3939.66	75.69
45	3938.00	75.70
46	3924.11	75.78
47	3884.63	75.70
48	3885.88	74.92
49	3875.43	74.89
50	3845.93	74.79

51	3845.97	74.74
52	3847.10	74.44
53	3833.60	74.40
54	3806.32	74.70
55	3786.10	74.56
56	3819.56	74.08
57	3801.87	73.97
58	3791.59	73.55
59	3781.75	73.08
60	3781.03	73.50
61	3797.74	73.77
62	3791.57	72.73
63	3801.74	72.84
64	3816.37	73.29
65	3820.48	73.24

Table 1: Data on NSE 20-share index and the shilling rate for Dollar

Source: Daily Nation, July, August and September 2005

Time: 1-65 means the trading period starting from first of July to the 30th of September 2005.

Note: As Shilling Dollar rate depreciates (increasing in value) the index increases showing some connection between the two.

Time	NSE 20-share index	Exchange rate for Sterling Pound
1	3972.15	137.74
2	4006.27	135.85
3	4039.17	134.49
4	4071.66	134.22
5	4117.22	134.34
6	4149.22	133.47
7	4203.52	132.81
8	4208.99	134.53
9	4253.22	135.34
10	4280.80	134.53
11	4246.36	134.03
12	4142.80	133.84
13	4130.65	132.99
14	4073.09	132.56
15	4068.23	132.60
16	3985.44	133.72
17	3987.04	132.90
18	3964.78	132.27
19	3953.92	132.59
20	3964.50	132.14
21	3989.74	132.73
22	3982.00	133.46
23	3986.10	134.04
24	4016.74	134.75
25	4030.68	134.45
26	4034.22	135.15
27	4049.95	135.11
28	4059.94	134.44
29	4057.52	135.12
30	4028.45	135.08
31	4035.46	135.88
32	4012.42	136.97
33	4016.32	137.80
34	4035.72	137.12
35	4048.12	136.99
36	4045.20	136.68
37	4047.26	135.73
38	4034.37	136.23

39	4025.14	136.19
40	4017.89	135.80
41	3992.57	136.77
42	3980.37	136.49
43	3949.74	135.69
44	3939.66	136.69
45	3938.00	135.19
46	3924.11	136.59
47	3884.63	138.80
48	3885.88	138.35
49	3875.43	137.90
50	3845.93	137.71
51	3845.97	137.26
52	3847.10	136.93
53	3833.60	136.52
54	3806.32	136.11
55	3786.10	136.19
56	3819.56	134.74
57	3801.87	134.09
58	3791.59	132.41
59	3781.75	131.77
60	3781.03	132.67
61	3797.74	133.36
62	3791.57	130.24
63	3801.74	129.37
64	3816.37	129.57
65	3820.48	129.70

Table 2: Data on NSE 20-share index and the shilling rate for Sterling pound

Source: Daily Nation, July, August and September 2005

Time: 1-65 means the trading period starting from first of July to the 30th of September 2005.

Note: throughout the trading period, both the Sterling rate and the index behave as if there is no connect. For instance, looking at time 53 – 55, the Sterling rate seems to be stabilizing but the index is dropping.

Time	NSE 20-share index	Exchange rate for Euro
1	3972.15	92.09
2	4006.27	91.70
3	4039.17	91.01
4	4071.66	90.88
5	4117.22	91.12
6	4149.22	90.94
7	4203.52	90.90
8	4208.99	91.51
9	4253.22	92.72
10	4280.80	93.17
11	4246.36	92.12
12	4142.80	92.22
13	4130.65	92.03
14	4073.09	91.73
15	4068.23	92.08
16	3985.44	92.68
17	3987.04	92.85
18	3964.78	91.78
19	3953.92	91.69
20	3964.50	91.34
21	3989.74	91.82
22	3982.00	92.23
23	3986.10	92.71
24	4016.74	92.92
25	4030.68	92.62

26	4034.22	93.75
27	4049.95	94.09
28	4059.94	93.39
29	4057.52	94.10
30	4028.45	93.45
31	4035.46	93.77
32	4012.42	94.27
33	4016.32	94.16
34	4035.72	93.64
35	4048.12	93.39
36	4045.20	92.95
37	4047.26	92.16
38	4034.37	92.25
39	4025.14	92.43
40	4017.89	92.23
41	3992.57	93.19
42	3980.37	93.19
43	3949.74	93.30
44	3939.66	92.43
45	3938.00	92.42
46	3924.11	93.49
47	3884.63	94.58
48	3885.88	94.20
49	3875.43	93.64
50	3845.93	93.46
51	3845.97	92.87
52	3847.10	92.59
53	3833.60	91.79
54	3806.32	91.90
55	3786.10	91.61
56	3819.56	90.60
57	3801.87	90.93
58	3791.59	89.12
59	3781.75	88.79
60	3781.03	89.58
61	3797.74	90.04
62	3791.57	88.38
63	3801.74	87.66
64	3816.37	88.02
65	3820.48	88.15

Table 3: Data on NSE 20-share index and the shilling rate for Euro

Source: Daily Nation, July, August and September 2005

Time: 1-65 means the trading period starting from first of July to the 30th of September 2005.

Note: Throughout the trading period shilling rate for Euro increases meaning that the shilling was depreciating thus pulling the index down.

Time	NSE 20-share index	Exchange rate for Dollar	Exchange rate for Euro
1	3972.15	76.21	92.09
2	4006.27	76.18	91.70
3	4039.17	76.34	91.01
4	4071.66	76.34	90.88
5	4117.22	76.39	91.12
6	4149.22	76.26	90.94
7	4203.52	76.20	90.90
8	4208.99	76.23	91.51
9	4253.22	76.27	92.72
10	4280.80	76.32	93.17
11	4246.36	76.27	92.12
12	4142.80	76.14	92.22
13	4130.65	76.29	92.03

14	4073.09	76.31	91.73
15	4068.23	76.29	92.08
16	3985.44	76.27	92.68
17	3987.04	76.25	92.85
18	3964.78	76.14	91.78
19	3953.92	76.13	91.69
20	3964.50	76.14	91.34
21	3989.74	76.09	91.82
22	3982.00	76.04	92.23
23	3986.10	76.08	92.71
24	4016.74	76.10	92.92
25	4030.68	76.07	92.62
26	4034.22	76.07	93.75
27	4049.95	76.05	94.09
28	4059.94	75.74	93.39
29	4057.52	75.86	94.10
30	4028.45	75.53	93.45
31	4035.46	75.61	93.77
32	4012.42	75.68	94.27
33	4016.32	75.97	94.16
34	4035.72	75.82	93.64
35	4048.12	75.84	93.39
36	4045.20	75.77	92.95
37	4047.26	75.75	92.16
38	4034.37	75.74	92.25
39	4025.14	75.74	92.43
40	4017.89	75.70	92.23
41	3992.57	75.71	93.19
42	3980.37	75.68	93.19
43	3949.74	75.71	93.30
44	3939.66	75.69	92.43
45	3938.00	75.70	92.42
46	3924.11	75.78	93.49
47	3884.63	75.70	94.58
48	3885.88	74.92	94.20
49	3875.43	74.89	93.64
50	3845.93	74.79	93.46
51	3845.97	74.74	92.87
52	3847.10	74.44	92.59
53	3833.60	74.40	91.79
54	3806.32	74.70	91.90
55	3786.10	74.56	91.61
56	3819.56	74.08	90.60
57	3801.87	73.97	90.93
58	3791.59	73.55	89.12
59	3781.75	73.08	88.79
60	3781.03	73.50	89.58
61	3797.74	73.77	90.04
62	3791.57	72.73	88.38
63	3801.74	72.84	87.66
64	3816.37	73.29	88.02
65	3820.48	73.24	88.15

Table 4: Data on NSE 20-share index and the shilling rate for Dollar and Euro

Source: Daily Nation, July, August and September 2005

Time: 1-65 means the trading period starting from first of July to the 30th of September 2005.

4. Discussion of Results

Linearity in variables refers to linear relationship in which the dependent variable (20-share index) is expressed as a linear function of one or more independent variables (x). A simple linear regression models were fitted for all the three currencies i.e. the Dollar, The

Sterling Pound and the Euro against the 20-share index. Each rate of Kenya shilling exchange on the Dollar, Sterling Pound and the Euro was regressed on NSE 20-share index.

4.1. Model for Dollar rate against the NSE 20-share Index

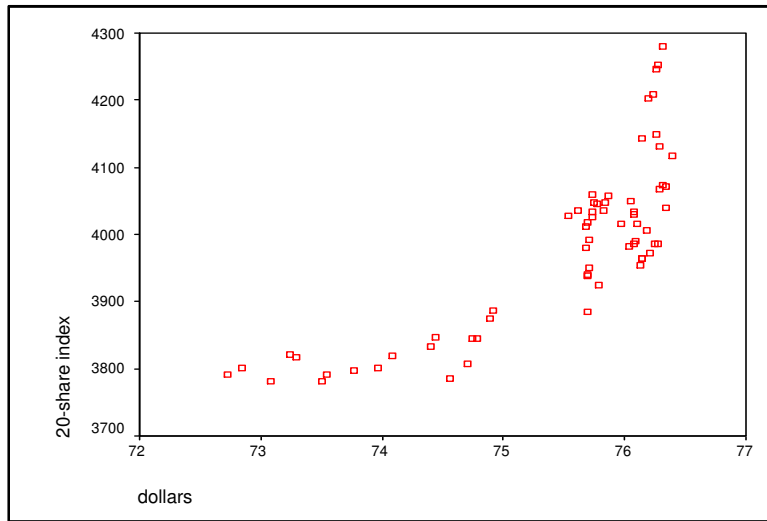


Figure 1: shows the Kenya shilling exchange rate for Dollar against the NSE 20-share index.

From Figure 1, the distribution shows that there is a linear relationship between the rate of Kenya shilling exchange for Dollar and the NSE 20-share index.

The model investigating the relationships between the Kenya Shilling Dollar rate and the NSE 20-share index was obtained as follows

$$Y_1 = -3667.45 + 101.37x_1 \dots\dots\dots (3)$$

The constant factors have negative effect on the 20-share index while the Dollar rate have positive coefficient meaning that as the shilling rate for Dollar increases it increases the share prices which may lead to overpricing and hence distorting the stock market. However, the negative effect of the assumed constant factors such as interest rates, commodity prices, politics, etc. seem to be working against the effect of the Kenya shilling Dollar rate on the Share prices. This is an indication that as the Kenya shilling depreciate against the Dollar it has a tendency of pulling up the share prices, showing that the relationship between the two (depreciation and the share prices) is a negative one.

Also at 5% level of confidence there is an Indication of the negative relationship between the rate of Kenya shilling appreciation on the Dollar and the share prices at the Nairobi Stock exchange. (See, Appendix I)

4.2. Model for Sterling Rate against the 20-share Index

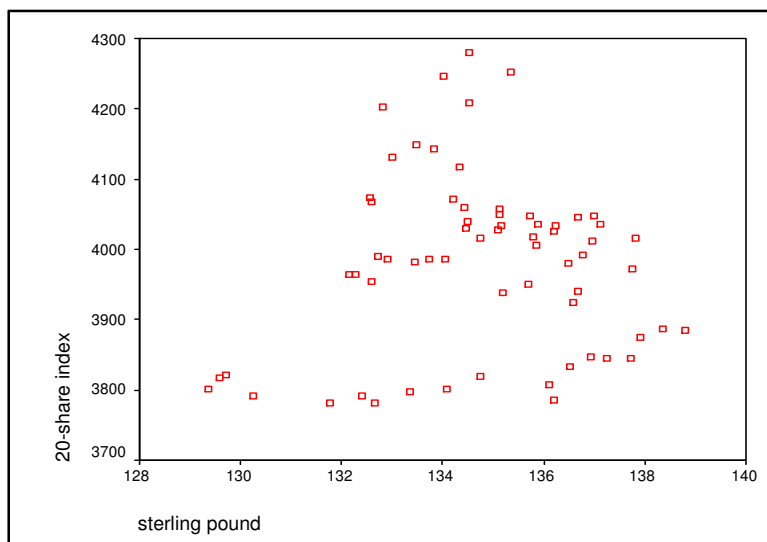


Figure 2: shows the Kenya shilling exchange rate for Sterling pound against the NSE 20-share index.

From Figure 2, above, the data distribution shows that there is no linear relationship between the rates of Kenya Shilling exchange for Sterling pound and the NSE 20-share index. This could be attributed to the fact that most of the business transactions in Europe and the rest of the World is either conducted in Dollars or Euros and a such Euro is accepted as a continental currency as opposed to Sterling pound which is a national currency for Great Britain (See, Appendix II)

4.3. Model for Euro Rate against the 20-Share Index

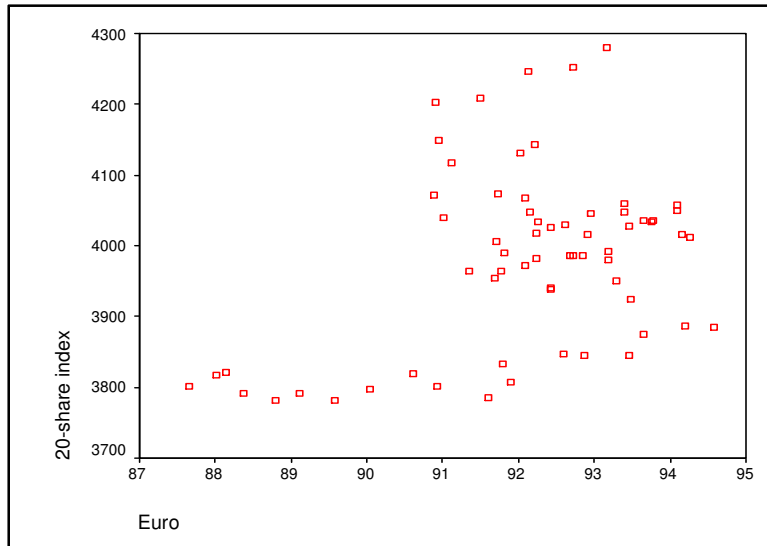


Figure 3: shows the Kenya shilling exchange rate for Euro against the NSE 20-share index.

The model investigating the relationships between the Euro rates and the NSE 20-share index was obtained as follows

$$Y_i = 1106.097 + 31.215X_2 \dots\dots\dots(4)$$

The assumed constant factors and the coefficient of the Shilling Euro rate both have positive values meaning that as shilling Euro rate increases it also increases the share prices but does not act alone. It joins forces with other assumed factors to raise the share price. This shows that depreciating shilling against Euro increases the share prices even higher due to the effect of other factors. Therefore, the relationships between the two (Shilling depreciation against the Euro and the share price) seem to be a negative one.

Also at 5% level of confidence there is an Indication of a negative relationship between the rate of Kenya shilling appreciation on the Euro and the share prices at the Nairobi Stock exchange. (See, Appendix III).

4.4. Model for Dollar and Euro Rates against the NSE 20 – Share Index

The model investigating the relationships between the Kenya shilling exchange rates for Dollar and the Euro rates on the NSE 20-share index was obtained as follows

$$Y_i = -3398.41 + 119.95X_1 - 18.14X_2 \dots\dots\dots (5)$$

The constant factors and the coefficient of Euro rates have negative effect on the 20-share index while the coefficient of Dollar rates has positive value on the index. This could mean that as the shilling depreciates against the Dollar the 20-share index will keep raising, however the Euro and the other factors like interest rates, inflation rates, politics and etc. seem to be a check against the Dollar rate not to distort the market.

Also at 5% level of confidence the f calculated was 70.023, which is greater than the tabulated f at 3.84. Indicating that there is negative relationship between the rate of Kenya shilling appreciation on the Dollar and the Euro against the share prices at the Nairobi Stock exchange. The magnitude of f calculated is higher as compared to tabulated f; this could be attributed possibly to the nature of difference between a single currency rate and the aggregation of the share index. (See, Appendix IV)

5. Conclusions and Recommendations

5.1. Conclusions

As the Kenya shilling exchange rates for the Dollar and Euro depreciates, the NSE 20-share index increases this explains the negative relationship between the rate of shilling exchange and the share prices. Implying that the share prices for the listed companies increase as the Kenya shilling depreciates against these two major currencies. The depreciating shilling against the Dollar will keep on raising

the 20-share index; however, the Euro seems to be a check against the Dollar rate not to distort the market but may not act alone. If there are some common factors that affect both stock prices and exchange rates (for instance interest rates, inflation rates and politics) further research should be done to see if they have any impact. In the short-run, the depreciating Kenya shilling against the Dollar and the Euro has a positive impact for investors as it raises the share prices and encourage domestic investment and vice versa in case of appreciation. The investors at the Nairobi Stock Exchange may use this existing relationship between the rates of Kenya Shilling Exchange for the two currencies (Dollar and Euro) and make short-term prediction of the share prices.

5.2. Policy Recommendation

(The argument is made on the basis that Kenya is a small country and cannot determine the World prices)

The Kenya government has put forward various direct and indirect policies since independence pertaining to stock market development. The main policies include: fiscal and monetary policies, financial sector policies, regulatory policies, and regional integration policies. Indeed, the policy environment has changed substantially over the years. There have been positive developments that favour the expansion and deepening of the Kenyan capital market. However, these policy developments, have achieved little success in developing the stock market. The establishment of the Capital markets Authority (CMA) as a market regulator has not achieved much either. The stock market made significant gains between 1990-1994. Since 1995, the performance has been dismal. There is a multiplicity of regulators and regulations at play in the Kenyan capital market. They include the Central Bank of Kenya (CBK), Retirement Benefits Authority, Capital Markets Authority (CMA), and the Commissioner of Insurance. All these bodies enact policies that affect the development of the stock market.

It is imperative that the numerous policy challenges be given a fresh focus and a coordinated look with a view of identifying critical bottlenecks and making policy adjustments that would make the stock exchange flexible. Therefore, if the study finds that there is a relationship between foreign exchange rates and the stock pricing, then the policy regulators may use this model to monitor the market and harmonise their policies on how best they can intervene in case of over valuation or under valuation of shares at the Nairobi stock exchange.

Domestic currency depreciation is likely to favour those firms that export goods to other countries. The exporters may export more and increase their export earnings while the producers will produce more exportable commodities. This will in turn attract more revenue for the Government to meet current expenditure and also create more employment opportunities. People's purchasing power will increase as they access more income. Thus resulting in economic growth through a multiplier effect. But if the exporting firms import many of its inputs from abroad, the stock price may not rise due to high cost of production rendering export firms less competitive.

On the other hand, firms not exporting their products to other countries but importing raw materials may find a fall in their stock prices as currency depreciation may cause their sales/profits to decline. Simple regressions showed that stock prices and the value of the U.S. Dollar are positively related and this relationship is stronger in the short run than in the long run. However, this study can be repeated for a longer period than three months to establish whether the behaviour between the two markets holds

6. References

- i. AGGARWALA, R. (1981), 'Exchange Rates and Stock Prices: A Study of the US Capital Markets under Floating Exchange Rates', *Akron Business and Economic Review*, 12: 7-12.
- ii. AJAYI, A.R. and M. MOUGOUE. (1996), 'On the Dynamic Relation between Stock Prices and Exchange Rates', *The Journal of Financial Research*, XIX (2), Summer: 193-207.
- iii. AKAIKE, H. (1969), 'Fitting Auto regressions for Prediction', *Annals of the Institute of Statistics Mathematics*, 21: 245-247.
- iv. AKAIKE, H. (1970), 'Autoregressive Model Fitting for Control', *Annals of Statistics Mathematics*, 22: 163-180.
- v. APTE, P.G. (1997), 'Currency Exposure and Stock Prices', *Journal of Foreign Exchange and International Finance*, XII (2): 135-143.
- vi. APTE, P.G. (2001), 'The Interrelationship between Stock Markets and the Foreign Exchange Market', *Prajnan*, XXX (1): 17-29.
- vii. BAHMANI-OSKOOEE, M. and A. SOHRABIAN. (1992), 'Stock Prices and the Effective Exchange Rate of the Dollar', *Applied Economics*, 24(4): 459-464.
- viii. BHATTACHARYA, BASABI and JAYDEEP MUKHARJEE. (2002), 'Causal Relationship between Stock Market and Exchange Rate, Foreign Exchange Reserves and Value of Trade Balance: A Case Study for India'
- ix. BODART, V. and P. REDING. (2001), 'Do Foreign Exchange Markets Matter for Industry Stock Returns? An Empirical Investigation',
- x. CHIANG, T.C, S.Y. YANG and T.S. WANG. (2000), 'Stock Return and Exchange Rate Risk: Evidence from Asian Stock Markets Based on a Bivariate GARCH Model', *International Journal of Business*, 5(2): 97-117.
- xi. DONNELLY, R. and E. SHEEBY. (1996), 'the Share Price Reaction of UK Exporters to Exchange Rate Movements: An Empirical Study', *Journal of International Business Studies*, 27(1): 157-165.
- xii. FANG, WENSHWO and STEPHEN M. MILLER. (2002), 'Currency Depreciation and Korean Stock Market Performance during the Asian Financial Crisis',
- xiii. FRANK, P. and A. YOUNG. (1972), 'Stock Price Reaction of Multinational Firms to Exchange Realignment', *Financial Management*, Winter: 66-73.

- xiv. GRANGER, C.W.J, B.N. HUANG and C.W. YANG. (2000), 'A Bivariate Causality between Stock Prices and Exchange Rates: Evidence from Recent Asian flu', *The Quarterly Review of Economics and Finance*, 40(3): 337-354.
- xv. GRANGER, C.W.J. (1969), 'Investing Causal Relationship by Econometric Models and Gross-Spectral Methods', *Econometrica*, 37: 424-439.
- xvi. GUJARATI, D. (1995), *Basic Econometric*, Third edition. New York: McGraw-Hill.
- xvii. JUDY PEARSALL (1999), *the concise Oxford dictionary*. 10th edition, Oxford University Press
- xviii. KANAS, A. (2000), 'Volatility Spillovers between Stock Returns and Exchange Rate Changes: International Evidence', *Journal of Business Finance and Accounting*, 27(3-4, April/May).
- xix. KARMARKAR, Y. and G. KAWADIA. (2002), 'The Relationship between Stock Index and Exchange Rate: Empirical Evidence Based on Indian Stock Markets', *The ICFAI Journal of Applied Finance*, 8(2), March.
- xx. MA, K.C. and G.W. KAO. (1990), 'On Exchange Rate Changes and Stock Price Reactions', *Journal of Business Accounting*, 17(3), Summer: 441-449.
- xxi. MUHAMMAD, N. and A. RASHEED. (2002), 'Stock Prices and Exchange Rates: Are they Related? Evidence from South Asian Countries', Karachi University.
- xxii. NATH, GOLAK C. and G.P. SAMANTA. (2003), 'Dynamic Relation between Exchange Rate and Stock Prices—A Case for India',
- xxiii. ONG, LI LIAN and H.Y. IZAN. (1999), 'Stocks and Currencies: Are they Related?' *Taylor and Francis Journal*, 9(5): 523-532.
- xxiv. QIAO, YU. (1997), 'Stock Prices and Exchange Rates: Experience in Leading East Asian Financial Centres: Tokyo, Hong Kong and Singapore', *Singapore Economic Review*, 41: 47-56.
- xxv. RAMASAMY, B. and M. YEUNG. (2001), 'The Causality between Stock Returns and Exchange Rates: Revisited', *Research Paper Series*, The University of Nottingham in Malaysia.
- xxvi. SMITH, C. (1992), 'Stock Markets and the Exchange Rate: A Multi-Country Approach', *Journal of Macroeconomics*, 14(4): 607-629
- xxvii. SOENEN, L. and E. HENNIGAR. (1988), 'An Analysis of Exchange Rates and Stock Prices—The US Experience between 1980s and 1986', *Akron Business and Economic Review*, 19(4): 71-76.
- xxviii. SOLNIK, B. (1987), 'Using Financial Prices to Test Exchange Models. A Note', *Journal of Finance*, 42.
- xxix. TAYLOR, M.P. and I. TONKS. (1989), 'The Internationalisation of Stock Markets and the Abolition of UK Exchange Control', *Review of Economics and Statistics*, 71: 332-336
- xxx. IPAR policybriefs volume 11, issue 4,2005

Appendix I: Output from Table 1

Correlations

Pearson correlation (Sig. (1-tailed))		20-share index	Dollars	Remarks
	20-share index	1.000	0.814	There is a positive correlation between the Shilling Dollar rate and the NSE 20-share index. The relationship between the two is a negative one because a high dollar rate (depreciation of the shilling) means increase of the Index.
	Dollar	0.814	1.000	

Number of samples (N = 65)

Model summary

	R	R square	Adjusted R square	Standard error of the estimate	F change	Durbin Watson	Remarks
Model 1	0.814	0.663	0.657	74.07	123.711	0.222	Though at 5% confidence level the magnitude of F-test was large; the model was a good fit. The high magnitude may be due to the big differences between the values of the 20-share index and the shilling Dollar rate.

- a) Predictors: (Constant), Dollars
 b) Dependent Variable: 20-share index

Residual statistics

	Minimum	Maximum	Mean	Std. Deviation	Remarks
Predicted Value	3705.34	4076.36	3980.18	102.98	The residual value is negative possibly due to the introduction of the constant factors, which may in a bid to counter the effect of dollar end up distort the stock market even further. May be, a model without constant factors could be tried by other researchers.
Residual	-121.78	211.65	-2.43E-12	73.49	
Std. Predicted value	-2.67	0.93	0.000	1.000	
Std. Residual	-1.64	2.86	0.000	0.99	

N = 65

- a) Dependent Variable: 20-share index

Therefore, the effect of shilling Dollar rate on the Stock market will always be evened out by other market forces thus may not easily distort the market. However, the investors and the economists may use this modelling approach to forecast the general performance of the Nairobi stock exchange 20-share index.

Appendix II: Output from Table 2

Correlations

		20-share index	Sterling pound	Remarks
Pearson correlation	20- share index	1.000	0.089	There seems to be no correlation between the 20-share index and the shilling sterling pound rates. This could be possibly due to the introduction of Euro which is becoming an international currency as opposed to Sterling pound.
	Sterling pound	0.089	1.000	

Appendix III: Output from Table 3

Descriptive Statistics

	Mean	Std. Deviation	N
20-share index	3980.1751	126.5134	65
Euro	92.0742	1.6025	65

Correlations

	20-share index	Euro
Pearson Correlation	1.000	.395
	Euro	1.000
Sig. (1-tailed)	20-share index	.001
	Euro	.001
N	20-share index	65
	Euro	65

Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
Model					R Square Change	F Change	df1	df2	Sig. F Change	
1	.395	.156	.143	117.1235	.156	11.673	1	63	.001	.084

- a) Predictors: (Constant), Euro
b) Dependent Variable: 20-share index

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	160132.167	1	160132.167	11.673	.001
	Residual	864228.694	63	13717.916		
	Total	1024360.862	64			

- a) Predictors: (Constant), Euro
b) Dependent Variable: 20-share index

Coefficients

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations		
Model		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	1106.097	841.333		1.315	.193	-575.173	2787.368			
	Euro	31.215	9.136	.395	3.417	.001	12.958	49.472	.395	.395	.395

- a) Dependent Variable: 20-share index

Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3736.2312	4101.8584	3980.1751	105.8667	65
Residual	-127.7904	201.6689	-2.7775E-12	69.2668	65
Std. Predicted Value	-2.304	1.149	.000	1.000	65
Std. Residual	-1.816	2.866	.000	.984	65

- a) Dependent Variable: 20-share index

Therefore the effect of shilling Euro rate on the Stock market is a factor to be monitored vis-vis other factors and thus it's always appropriate for the policy makers and the official market regulators to put measures in place to monitor the performance of the Kenya shilling against the Euro on the Share prices in order to avoid overpricing.

Appendix IV: Output from Table 4

Descriptive Statistics

	Mean	Std. Deviation	N
20-share index	3980.1751	126.5134	65
Dollars	75.4412	1.0159	65
Euro	92.0742	1.6025	65

Correlations

	20-share index	Dollars	Euro
Pearson Correlation	1.000	.814	.395
	Dollars	1.000	.649
	Euro	.395	1.000
Sig. (1-tailed)	20-share index	.000	.001
	Dollars	.000	.000
	Euro	.001	.000
N	20-share index	65	65
	Dollars	65	65
	Euro	65	65

Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	F	df1	df2	Sig. F	Durbin-Watson
Model					R Square Change	Change			Change	
1	.833	.693	.683	71.2037	.693	70.023	2	62	.000	.244

- a) Predictors: (Constant), Euro, dollars
 b) Dependent Variable: 20-share index

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	710023.273	2	355011.637	70.023	.000
	Residual	314337.588	62	5069.961		
	Total	1024360.862	64			

- a) Predictors: (Constant), Euro, Dollars
 b) Dependent Variable: 20-share index

Coefficients

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.	95% Confidence Interval for B	Upper Bound
	B			Beta			Lower Bound	
1	(Constant)	-3398.409	669.841		-5.073	.000	-4737.402	-2059.416
	Dollars	119.948	11.517	.963	10.414	.000	96.925	142.971
	Euro	-18.142	7.301	-.230	-2.485	.016	-32.738	-3.547

- a) Dependent Variable: 20-share index

Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3721.9949	4111.2949	3980.1751	105.3286	65
Residual	-115.8472	215.2252	-1.9239E-12	70.0823	65
Std. Predicted Value	-2.451	1.245	.000	1.000	65
Std. Residual	-1.627	3.023	.000	.984	65

- a) Dependent Variable: 20-share index