Effect of Foreign Exchange Rates Fluctuation on Performance of Nairobi Securities Exchange Market.

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ABSTRACT: *Performance of Nairobi Securities Exchange market has remained unpredictable as observed in February, 2006 when the index rose from 4057 to 5774 in January, 2007 and declined to 2475 in February, 2009. This could have led to past investor losses as witnessed between January to June 2009 when the market was bearish leading to collapse of some investment firms leaving investors in despair. If this undesirable situation is not addressed, it could lead to continued loss of investor confidence in Nairobi securities exchange market which is one of the leading markets in Africa. However, literature links foreign exchange rates fluctuation to securities market performance. In Kenya, exchange market is active due to globalization. For instance, between 2007 and 2008, value of total exports and imports increased by 25.6% and 27.4% respectively. Despite this, exchange rates fluctuation has hitherto not been considered as influencing securities market performance. Moreover, reviewed literatures have left theory building impoverished due to contradictory results. The purpose of the study was to determine the effect of foreign exchange rates fluctuation on performance of Nairobi Securities exchange market. Secondary data between January, 2006 and December, 2010 was utilized. Regression analysis revealed that US dollar ($\beta_1 = -0.261$, $p<0.05$) was negative and significant predictor of performance, the Euro ($\beta_3 = -0.124$, $p>0.05$) was negative and not significant predictors while the pound ($\beta_2 = 0.233$, $p<0.05$) was positive and significant predictor. The three exchange rates accounted for 73.7% of the variance in performance. The study concludes that foreign exchange rates have significant effect on securities market. The study recommends that the investors in the Nairobi securities exchange market to closely monitor the trends in the foreign exchange markets to use the strongest currency that will ensure maximum returns.*
Keywords: Exchange rates, fluctuations, performance, securities, market

I. INTRODUCTION

Economists have traditionally concentrated on the role of financial development to the economic growth of countries. Overall, there exists an overwhelming consensus that well-functioning financial intermediaries have played a significant role in economic growth (King and Levine, 1993 (a, b); Levine and Zervos, 1998; Levine *et al*, 2000 (a, b); Seetanah, 2008). More recently, the emphasis has been increasingly shifted to stock market indicators and the effect of stock markets on economicdevelopment1 and the latter has been the subject of recent theoretical interest (Demirguc-Kunt and Levine, 1996; Levine and Zervos,1998). Although some analysts view stock markets in developing countries as "casinos" that have little positive impact on economic growth; recent evidence suggests that stock markets may give a big boost to economic development. In fact, the focus on stock markets as an engine of economic growth is a new opening in financial literature. Going further, its benefits had been largely ignored in the past, but now there is consensus concerning the positive effects brought about by stock markets (Levine and Zervos, 1998).Performance of Securities market and its improvement has been the focus of almost all financial market studies (Adjasi and Biekpe, 2005).

II. THEORETICAL LITERATURE REVIEW
2.1 Foreign Exchange Rates Fluctuation

Exchange rate is the price of one country's currency expressed in another country's currency. In other words, it is the rate at which one currency can be exchanged for another. It is the process of trading the currency of one country for the currency of another. This process is necessary for international trade to take place in a world of different currencies. Exchange rate is a national and international political, social and economic indicator. In developed countries, it reacts quickly to events like war, terrorism, and also to the changes in the political situation as well as to main economic indicators like unemployment and interest rate. From a macro perspective, foreign exchange rate has an effect on the country's economy whereas from a micro perspective it affects the firms, (Mumcu, 2005). The foreign exchange market is the largest and oldest financial market in the world. The value of one currency versus another is determined by the international exchange rate and, in most cases, is subject to fluctuation based on open trading of currency in foreign exchange markets, (Leader Investment Kenya, 2007). The market for foreign exchange involves the purchase and sale of national

currencies. A foreign exchange market exists because economies employ national currencies. If the world economy used a single currency there would be no need for foreign exchange markets. In Europe for example, more than eleven economies have chosen to trade their individual currencies for a common currency. But the Euro will still trade against other world currencies. For now, the foreign exchange market is a fact of life (Benita, 2004).

2.2 Performance of Nairobi Securities Exchange Market.

The performance of Nairobi Securities Exchange market continues to remain unpredictable such as the case observed in February 2006 when there was a rise in the index to 4057, further to 5774 in January 2007 and to as low as 2475 in February 2009 (Kenya Economic Survey Report, 2008). This could have led to past losses incurred by investors in Kenya as witnessed during the period January to June 2009 when the market was bearish leading to the collapse of a number of brokerage and investment firms leaving investors in total despair. If this undesirable situation is not addressed, it could lead to continued loss of investor confidence in Nairobi Securities exchange market which has been hailed as one of the leading securities market in Africa. However literature links foreign exchange rates fluctuation and interest rates with the performance of securities markets. In Kenya Foreign Exchange market is active, a situation which is expected to remain the same due to globalization of the economy and increased cross border transactions. For example, the value of total exports from Kenya increased by 25.6% between 2007 and 2008 and that of imports to Kenya increased by 27.4% during the same period (Kenya Economic Survey Report, 2008). To add, favorable and stable interest rates are considered to attract both local and foreign investors who may be willing to either deposit their funds as saving with the hope of earning additional money or borrow funds from financial institutions and put into investment like purchase of shares from securities market oblivious of the risks involved. Despite this situation, foreign exchange rates fluctuation and interest rates have hitherto not been considered as factors influencing performance of Nairobi Securities exchange market. Moreover, literature linking the two has left theory building impoverished because of contradictory results such as: Kolawole *et al*, (2010) that the exchange rate volatility generated via GARCH process exerts a stronger negative impact on the Nigeria stock markets. However the rate of inflation and interest rate did not have long run relationship with stock market capitalization since the major participant in the market is government; Zia *et al*., (2011) that using Engle-Granger Co-integration test there is no long run relationship between stock market index and exchange rate and while applying Granger Causality (GC) Test indicated no causal relationship between the variables; (Tulin, 2012) while using multiple regression technique indicated that changes in domestic U.S. Dollar and Canadian dollar are positively related to changes in ISE 100 while fluctuation in domestic interest rates and Saudi Arabia Riyal has a negative impact on the index and finally Adjasi *et al*., (2005) through co integration tests showed that in the long-run exchange rate depreciation leads to increases in securities market prices in some of the countries, and in the short-run, exchange rate depreciations reduce securities market returns.

It is clear that literature links foreign exchange rates fluctuation with the performance of Securities markets. In Kenya Foreign Exchange market is active, a situation which is expected to remain the same due to globalization of the economy. For instance, the value of total exports from Kenya increased by 25.6% between 2007 and 2008 and that of imports to Kenya increased by 27.4% during the same period. Despite this situation, foreign exchange rates fluctuation and interest rates have hitherto not been considered as a factor influencing performance of Nairobi Securities exchange market. Moreover, literature reviewed has left theory building impoverished because of contradictory results as reviewed in: Pallegedara and Asankha (2012);Mishra (2004); Adjasi and Biekpe (2005); Tulin (2012);Zia and Zaid (2011); Kolawole and Olalekan (2010); Adjasi, Harvey and Agyapong (2008); and Amare and Mohsin (2000).

III.   METHODOLOGY

The study adopted a correlational case study design. The research attempted to determine the relationship between foreign exchange rates fluctuation and the performance of the Nairobi Securities Exchange Market

3.1 Modeling Performance Of The Nairobi Securities Exchange Market

Objective of the study sought to determine existence of relationship between foreign exchange rates fluctuation and performance of the Nairobi Securities Exchange market. Price index which was used as the indicator of market performance was therefore regressed on the three major currencies traded at the securities market. The relationship of price index and the foreign exchange rates was conceptualized to be of the form:

Price index = $\alpha_0 + \beta_1$ US dollar + β_2 British pound + β_3 Euro +$\acute{\epsilon}$…………………..(4.7)

Because multiple regression analysis was used to test the effects of foreign exchange rates fluctuation on performance of the Nairobi securities exchange market, the validity of the assumptions of multiple regression analysis in the case of time series data were first checked. The Durbin–Watson test was used to check for autocorrelation, Dickey–Fuller tests were used to test for non-stationarity, and Johansen's test was used to test for cointegration, Variance inflation factors (VIF) were used to test for multicollinearity and Breusch-Pagan test was used to test for heteroskedasticity.

3.2 Testing For Non-Stationarity
The time series trends indicated that all the variables used in the study had unit root in them and hence were non-stationary. Formal investigation for non-stationarity was therefore done through application of Augmented Dickey Fuller (ADF) test. The ADF tested the null hypothesis of unit root in the series. Upon performing the test, the test statistics were compared to the critical values. If the ADF statistics exceeded the critical value, the null hypothesis of unit root in the series was rejected. Otherwise it was accepted.
Table 3.1 reports the results of Augmented Dickey Fuller test of unit root. The test was applied at level as well as in the first difference.

Table 3.1: Results of Unit Root investigation (ADF Test)

Variable	ADF Test	Test Statistic	1% Critical value	5% Critical value
Euro	At Levels	-1.697450	-3.546099	-2.911730
	First Difference	-7.175227	-3.548208	-2.912631
Pound	At Levels	-1.991288	-3.546099	-2.911730
	First Difference	-7.430079	-3.548208	-2.912631
Us dollar	At Levels	-1.369108	-3.546099	-2.911730
	First Difference	-5.750587	-3.548208	-2.912631
Price Index	At Levels	-1.250266	-3.546099	-2.911730
	First Difference	-6.887881	-3.548208	-2.912631

Source: Research data, 2013

From Table 3.1, ADF statistics reported that all the variables under consideration contained unit root at level, as ADF statistics did not exceed 1% as well as 5% critical values i.e. they were all non stationary at level. They however became stationary in first difference.

3.3 Johansen's Test For Co Integration
Co-integration was used to determine the long run relationship between price index and foreign exchange rates. Johansen co integration technique was used and revealed results presented in Table 3.2.

Table 3.2: Results Of Johansen's Co Integration Test

Variable	Eigen Values	Trace Stat	5% Critical value
Euro	0.16815	12.7083	15.41
	0.0302	2.0302	3.76
Pound	0.18839	13.7776	15.41
	0.02840	1.6713	3.76
US Dollar	0.05269	4.6049	15.41
	0.02840	1.4656	3.76

Dependent Variable: Price Index
Source: Research data, 2013

Results indicated that the trace statistics (likelihood ratio) for the dollar, pound and Euro did not exceed the 5% critical value. This implies that there was no co-integrating relation between price index and exchange rates. Consequently, price indices and exchange rates do not move together in the long run. This is consistent with findings by Lee (1998) that short run linear causality exists between stock market and exchange rate but no long run relationships. Lack of co integration further supports views by Reilly (1997) that unexpected changes in the rate of inflation make it difficult for firms to plan, which inhibits growth and innovations. Beyond the impact of the domestic economy, differential inflation and interest rate influence the trade balance between countries and exchange rate of currencies. Besides, they support the findings by Mendelson *et al*, (1976), which indicated that events such as war, political upheavals within or outside a country, or international monetary devaluation produces changes in the business environment that lead to uncertainties and earnings expectations of investors therefore increasing the risk premium of investors.

3.4 Testing For Multicollinearity

Multicollinearity was examined by regressing each of the independent variables against all other independent variables. Table 3.3 presents the R-squared statistic and the variance inflation factor (VIF) for each equation.

Table 3.3: Multicollinearity Results for the Independent and Moderator Variables

Variable	Auxiliary R^2	VIF
Average Deposit Rate	0.142	1.166
Euro	0.082	1.089
Pound	0.396	1.656
US dollar	0.346	1.642
	0.181	1.222

Source: Research data, 2013

Based on the very small values of the R^2 and the VIF for all the variables, the data was found to have no issues of multicollinearity.

3.5 Testing For Autocorrelation

The Durbin-Watson statistics were used to test for the presence of autocorrelation. Consequently, the null hypothesis that there was no autocorrelation was tested. A value of the Durbin–Watson statistic close to 2 was adjudged to indicate lack of serial correlation. Each variable was regressed against all the other variables in order to determine the Durbin–Watson statistic for each variable. Table 3.4 reveals that with the exception of the US dollar, all the other variables had no cases of autocorrelation.

Table 3.4: Results of Autocorrelation Test

Variable	Durbin-Watson Stat.	Conclusion
Average Lending Rate	2.084	No autocorrelation
Average Deposit Rate	2.060	No autocorrelation
Euro	2.055	No autocorrelation
Pound	1.942	No autocorrelation
US dollar	1.067	Some positive autocorrelation

Source: Research data, 2013

Autocorrelation in the US dollar was considered to be minimal and thus the variable was retained but with this as a limitation in mind.

3.6 Testing For Heteroskedasticity

Data was also checked for constant variance in the error term. The null hypothesis for this test for each variable was that the variance was constant. A significant heteroskedasticity chi-square value would then indicate evidence of heteroskedasticity. Results are presented in Table 3.5.

Table 3.5: Results of the Heteroskedasticity Test

Variable	Chi2(1)	Prob >Chi2
Average Lending Rate	0.07	0.7910
Average Deposit Rate	0.01	0.9151
Euro	13.71	0.0002
Pound	0.81	0.3691
US dollar	0.11	0.7438
Price Index	0.23	0.6330

Source: Research data, 2013

Results presented in Table 3.5 reveal that the chi2 (1) statistics for pound, US dollar and price index were not significant. This implies that these variables had no heteroskedasticity. The chi2 (1) statistic for the Euro was found to be significant indicating presence of heteroskedasticity. Once again, the variable was retained under this limitation.

3.7 Results Of Regression Equation

To establish the relationship between performance of the Nairobi Securities Exchange market and foreign exchange rate fluctuation, multiple regression analysis was conducted. Unit root investigation earlier indicated that the variables used in the study contained unit root at level and were integrated of order 1. The variables were also found not to be co integrated, and had no major issues of autocorrelation, multicollinearity and heteroskedasticity. Regression was therefore run at the first differenced. As shown from the ANOVA table presented in Table 4.8, the F-test was highly significant ($F_{0.01; 5, 54}=18.031$, $p<0.01$). This indicates that the

hypothesized multiple regression model was statistically adequate. Thus, the observed R^2 was significantly different from zero and the multiple regression equation was a better predictor of price index.

Table 3.6: ANOVA Results of the Suitability of the Proposed Multiple Regression Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5858.394	5	1852.798	18.031	.000[a]
	Residual	8670.102	54	154.002		
	Total	14528.496	59			

Predictors: (Constant), Euro, US Dollar, Pound
Dependent Variable: Price index
Source: Research data, 2013

Results presented in Table 3.7 which displays the model summary show that the three major currencies used for foreign exchange rates fluctuation and interest rates together explained 73.7% of the variance in price index (Adj. R^2=.737). In addition, the Durbin-Watson statistic of 2.476 suggests that the residuals of the three foreign exchange currencies and interest rates were uncorrelated.

Table 3.7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.871[a]	.759	.737	90.95702	2.476

Predictors: (Constant), Euro, US Dollar, Pound
Dependent Variable: Price index
Source: Research data, 2013

Table 3.8 presents results of the regression analysis in which price index was regressed on the three major currencies and interest rates. These major currencies were US dollar pound and the Euro while the interest rates were the lending rates and deposit rates.

Table 3.8: Results of the Regression of Price Index on Foreign Exchange Currencies and Interest Rates.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	10382.825	2857.624		3.633	.001	4653.634	16112.016
	US Dollar	-41.285	14.174	-.261	-2.913	.005	-69.703	-12.867
	Pound	27.216	10.912	.233	2.494	.016	5.339	49.092
	Euro	14.425	12.693	-.124	1.136	.261	-11.022	39.872
	Lending Rate	-123.216	191.450	-.081	-.644	.523	-507.050	260.617
	Deposit Rate	-1369.493	327.067	-.532	-4.187	.000	-2025.222	-713.764

a. Dependent Variable: Price Index
Source: Research data, 2013

Table 3.8 indicates that the US dollar (ß₁ = -0.261, p<0.05) was negative and significant predictors of price index, the Euro (ß₃=-0.124, p>0.05) was negative and not significant predictor and the pound (ß₂= 0.233, p<0.05) was positive and significant predictor of price index. On the contrary, the pound (ß₂ = 0.387, p<0.05), was found to be a positive and significant predictor of price index.

Besides, the value of R^2 indicates the prediction power of the proposed model. Consequently, 73.7% of the variance in price index was accounted for by the three exchange rates used. Furthermore, the regression equation showed that a unit standard deviation increase in the exchange rate for US dollar was likely to decrease the standard deviation of the price index by 0.261. Similarly, a unit standard deviation increase in the exchange rate for the Pound was likely to result in a 0.233 increase in the standard deviation of the price index; also, a unit standard deviation increase in the exchange rate for the Euro was likely to lead to 0.124 standard deviations decrease in price index.

IV. DISCUSSION AND CONCLUSION

These findings indicated that increase in exchange rates of the US dollar and the Euro tended to lead to decrease in the price index and are consistent with findings reported in several other studies (Ajayi & Mongoue (1996); Granger, Huang and Yang (2000); Hsing, 2004).

According to Ajayi and Mongoue (1996) an increase in stock prices causes the currency to depreciate. These authors found that currency depreciation led to a decline in stock prices in the short run, which was supported by the findings in the present study. The authors attributed the observed negative relationship to the

fact that exchange rate depreciation tended to lead to higher inflation in the future, making investors to remain skeptical about future performance of companies.

The findings further concur with the studies by Granger, Huang and Yang (2000). In a study on whether currency depreciation led to lower stock prices or whether declining stock prices led to depreciating currencies, these authors found out that stock prices react ambiguously to exchange rate. They noted that depreciation could either raise or lower the value of a company, depending on whether the company mainly imports or exports.

The finding that the pound positively predicted price index though contradictory to several studies was however consistent with findings by Hsing (2004), which indicated that the exchange rate increase (depreciation) does cause a slight drop in output (stock prices) over the first two months and strengthened with time. The negative relationship found between foreign exchange rates for the dollar and the Euro further lends support to findings by more recent studies, Adjasi, Harvey and Agyapong (2008); Kolawole and Olalekan (2010); Tulin (2012).

In a study on the relationship between stock markets and foreign exchange markets, Adjasi *et al* (2008) established that there was a negative relationship between exchange rate volatility and stock market returns. Kolawole and Olalekan (2010) in their study focusing on the effects of exchange rate volatility on the Nigeria stock markets also found the exchange rate volatility exerted a strong negative impact on the Nigeria stock markets. In addition, Tulin (2012) in exploring the relationship between changes in foreign exchange rates and the main composite index at Istanbul stock exchange, first found out as was the case in this study that the variables in the estimation framework were non-stationary at the initial level and only achieved stationarity at the first difference level.

The findings indicated that as the dollar, euro and lending and deposit rates continuously showed decline, the performance of the market continuously portrayed a rising trend. This could be due to first, the Kenya shillings gaining strength against the dollar and euro thereby attracting more domestic investors, secondly, declining lending rates attracting investors due to low cost of borrowing and finally declining deposit rates could have made investors opt for securities investment as opposed to savings.

The study concluded that both the US dollar and the Euro were negative and significant predictors of price index, while the British Pound was a positive and significant predictor of price index. Furthermore, an R^2 of 76.2% implies that equivalent percentage of the variance in price index was accounted for by the three exchange rates used in the modeled relationship.

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