EFFECT OF FOREIGN EXCHANGE RATES VOLATILITY ON SHARE PRICES OF LISTED FIRMS IN KENYA

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Abstract:

Since 1993 when the floating exchange rate regime was established in Kenya, the country has experienced tumultuous times regarding fluctuations in exchange rates. This continuous volatility has increased foreign exchange risk exposure which in turn has raised transaction costs of companies. Naturally, higher transaction costs results in lower profitability which subsequently affects the market prices of traded stocks. During the period 2008 to 2015, the Kenyan currency market experienced significant fluctuations in exchange rates – topping at the all-time high of Kshs 110 to the US dollar. This coincided with a period of depressed performance in the Nairobi Securities Exchange with regard to capitalization. This study sought to examine the effect of fluctuations in exchange rates on share prices of the listed companies in Kenya. Both the flow-oriented theory of exchange rates and efficient market hypothesis formed the theoretical foundation of the study. The study employed a longitudinal research design and a census of all the 61 listed companies was taken. The study utilized secondary data on the daily mean exchange rates between Kenyan shillings and United States Dollar and daily mean share prices for the 8 years period from January 2008 to December 2015.The relevant diagnostic tests for time series linear regression analysis were conducted to determine suitability of the collected data for the study. Regression analysis was performed to analyze the data. Both the F and t-tests were used at 5% significance level to test the significance of the overall model and coefficient of the independent variable respectively. The results of the study showed that exchange rates volatility had a significant adverse effect on the share prices. Based on this empirical finding, the study recommended that the managers of the Kenyan monetary system

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should adopt policies that promote stable exchange rate regime. Further, the study advocated for fast-tracking of the impending launch of the derivatives market in NSE to enable effective mitigation of the negative impact of exchange rates volatility in the economy.

Keywords: derivatives market, foreign exchange rates volatility, share prices

1. Background of the Study

After independence, Kenya operated a fixed exchange rate system pegged on US dollar (Ndung'u, Karingi, Geda and Were, 2001). This system was however replaced with a floating exchange rate regime in October 1993 in an effort to align exchange rates to the forces of the market and reduce the negative effects that exchange rate volatility had on the economy (CBK, 2013). This objective was however not realized as the Kenyan financial markets have continued to experience fluctuations in foreign exchange rates. From a micro perspective, foreign exchange rate volatility interferes with individual firms' financial performance; which may subsequently be transferred to the market prices of their traded stocks (Mumcu, 2005). In the context of this study, foreign exchange volatility means either the strengthening or weakening of a currency over a specified period of time (Kiptoo, 2007). Whereas a strengthening shilling dampens the exports by making them expensive, the imports becomes cheaper in the international market. On the other hand, a weakening shilling stimulates exports and makes imports expensive to finance (CBK, 2016). This implies that appreciation or depreciation of the shilling introduced by a floating exchange rate regime affects businesses either way depending on which side of foreign trade an entity is. It should however be noted that extreme exchange rate volatility increases operational costs of companies involved in international trade and creates uncertainty about their future returns (Benita and Lauterbach, 2004). Investors and stockbrokers normally use this returns to make strategic decisions on whether to buy, hold or sell firms' shares. Therefore, the behavior of the exchange rate is one of the key drivers influencing activities at the bourse.

Evidently, multinationals are more exposed to exchange rate risk than domestic-oriented firms. However, Farrell (2001) pointed out that even the domestic-oriented firms are also exposed to foreign currency risk through their input and output price linkages, their supply and demand chains, or competitors' prices; which could be influenced by currency movements. Shapiro and Atulya (2009), pointed out that firms may be exposed to exchange rate risk through transaction exposure; which is the risk that arises when the foreign-denominated transactions are executed at a rate that differs from that of the invoice date. The authors stated that transaction exposure impacts on the firms' cash flows directly. Besides the transaction exposure, Eiteman, Stonehill and Moffett (2001) observed that multinationals experience translation (accounting) exposure which derives from translating the values of foreign-denominated assets and liabilities into home currency at different exchange rates. Though not directly affecting the cash flows, the full effect of accounting exposure is felt on the firm's reported

profitability (Soleymani and Chua, 2014). Operating exposure measures the change in the present value of the firm resulting from any change in future operating cash flows of the firm caused by an unexpected change in exchange rates (Eiteman *et al.*, 2001).

1.1 Statement of the Problem

Stock prices represent the capital appreciation returns expected from a given security. Hence, variables that cause stock prices to change such as foreign exchange rate, inter-bank lending rate and inflation are of great importance to investors and the economy at large (Elly & Oriwo, 2013). The stock market plays a vital role of intermediation between borrowers and lenders hence uncertainty in the market impacts negatively to the economy (Kirui *et al.*, 2014). For the period 2008 to 2015, foreign exchange in Kenya experienced significant volatilities which exposed operating firms to huge systematic risk.

Exposure to forex risk negatively influences companies' profitability – which could cause the stock prices to similarly decline in tandem. Such a phenomenon may not only result in loss of investors' wealth but also erodes confidence in the capital markets (Monther & Kaothar, 2010). In addition, falling stock prices can hamper a firms' ability to raise additional capital in the capital market. Given the significance of this interaction between the currency market and stock markets, Chkili, Aloui and Nguyen (2012) flagged out the need to undertake a study on this subject in developing countries as majority of similar studies have been domiciled within the developed economies. Notably, studies carried out by Kirui, Wawire and Onono (2014); Kisaka and Mwasaru (2012) and, Aroni (2011) centered on the effect of foreign exchange volatility on economic development and did not address the effect on stock prices. The purpose of this study, therefore, was to bridge this empirical gap with regard to the listed firms in Kenya.

At the firm level, the findings of this study will enable business managers appreciate how the behavior of exchange rates affects stock prices of the firms they manage. By so doing, they will obtain crucial insights on how to take advantage of foreign exchange rate volatility in making appropriate strategic decisions. The study findings will also guide policy formulators and market regulators in developing policies that cushions the firms and the economy at large from the vagaries of extreme forex rate volatilities. The study will also enrich the scholarly frontier by bridging the identified research gap and set forth a basis for further research in the subject area. Finally, the study will assist the investors to effectively plan for their portfolio holdings.

2. Literature Review

2.1 Theoretical Review

This study adopted both the flow-oriented theory and efficient market hypothesis as they were deemed relevant in explaining the relationship of the study variables. The flow-oriented theory attributed to Dornbusch and Fisher (1980) postulates that stock prices are affected by exchange rates. The theorists contended that favorable changes in

exchange rates triggers the international competitiveness of the economy which is subsequently transferred to the individual firms through increased sales. This increased company profits eventually have a positive influence on stock prices and vice versa. This position was supported by studies that found that an appreciation of the currency caused the goods and services to be dearer on the international market; thereby causing their exports to decline. This led to low company's' sales volume and a decline in reported profits. This ultimately translated into reduction in stock prices (Umoru and Asekome, 2013; Olugbenga, 2012; Kisaka and Mwasaru, 2012; Choi and Papaioannou, 2009).

Efficient market hypothesis (EMH) is a stock market theory that is credited to Fama (1991). This hypothesis states that at any given time and in a perfect market, security prices fully reflect all available information. The theory holds the view that in an efficient market, new information is processed and evaluated as it arrives and prices instantaneously adjust to news and correct levels. Proponents of this theory contends that since capital markets are efficient and current prices reflect all information, attempts to outperform the market are essentially a game of chance rather than one of skill. The weak-form hypothesis states that future securities' prices are random and not influenced by past events. Advocates of weak form efficiency believe that all past information is reflected in stock prices and therefore one cannot predict stock prices by relying on historical data. Semi-strong form efficiency implies that all public information is incorporated into a stock's current market price, meaning neither fundamental nor technical analysis can be used to achieve superior gains. Hence, this class of EMH suggests that only information not publicly available can benefit investors seeking to earn abnormal returns on investments. The strong form efficiency version of market efficiency on the other hand assumes that current stock prices fully reflect all information in the market whether public, private, and inside information. This means that advice provided by many financial analysts is useless since neither technical nor fundamental analysis can accurately predict stock prices. This theory is relevant to the study since it helps to understand the relationship between expected stock prices and exchange rate fluctuations since the emerging new information of currency appreciation or depreciation will be incorporated into the stock prices rapidly.

2.2 Empirical Literature

Inci and Lee (2014) examined the relationship between stock returns and exchange rate changes in seven advanced economies: France, Germany, Switzerland, the UK, the US, Canada, and Japan using annual data over a period from 1984 to 2009. The results showed that both exchange rate and stock prices influence each other simultaneously. These findings differed from those of a similar study conducted by Caporale, Hunter and Ali (2014) in six advanced economies namely: US, UK, Canada, Japan, the Euro Zone, and Switzerland. They reported mixed associations in different countries. Both studies were however in agreement that the Canadian economy embraces flow-oriented model, where exchange rates causes stock prices. Further, both studies were in consonance with regard to the Euro zone that there is bidirectional relationship between
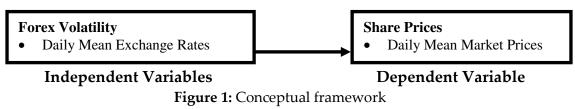
the variables. The contradicting results provide room for introducing additional variables in further studies and the need to establish the behavior of the Kenyan economy.

Tsagkanos and Siriopoulos (2013) carried out a study to determine the long-run relationship between stock prices and exchange rate within the European Union and the USA using both daily and monthly observations. The study applied structural nonparametric cointegration regression model; which revealed a negative unidirectional relation running from the stock prices to exchange rates in both countries. These results were in agreement with those from a study by Caporale *et al.* (2014). These findings were in agreement with those of a study performed by Chkili and Nguyen (2014) among the BRICS countries (Brazil, Russia, India, China and South Africa) that found stock prices to have a strong influence on exchange rates. However, the findings were at variance with those by Mlambo (2013) who found a very weak relationship between currency volatility and the stock market in the South African context.

On the Nigerian economy, Umoru and Asekome (2013) investigated the effect of stock prices on exchange rate variability. The study revealed that whenever there is a change in the exchange rate, stock prices react in tandem. They further established that in Nigeria, there is a bidirectional Granger-causality between stock prices and exchange rate. They therefore recommended a study to be carried on the effect of exchange rates on stock prices in the context of an emerging economy. The findings of this study were in agreement with those of a study carried out by Bhunia (2012) and Agrawal (2010) both of which found existence of negative causality from stock market indices to exchange rate in India. However, these study findings were at variance with those of a study conducted by Hussain and Bashir (2013) whose results indicate that there is no causal relationship between exchange rate and stock returns volatility in India. These differences for Indian economy might be due to different tools used in the analysis of their data.

As can be deciphered from the empirical review, the results are largely mixed which imply that the nature of the relationship between variables can be influenced either by the model used, the timeframe, and the economic conditions of each country. This justifies the current study in examining the effect of foreign exchange rate volatility on share prices in Kenya for the period 2008 - 2015.

2.3 Conceptualization

Figure 1: Conceptual framework

3. Research Methodology

3.1 Research Design
This study employed a longitudinal research design. This research design is considered suitable as it involves collecting numerical data on the same variable over a lengthy period of time. This has the overall benefit of providing a more incisive understanding of the variables behavior which helps the researcher to make informed conclusions (Saunders *et al.,* 2009 & Robson 2002).

3.2 Study Population
The target population for this study comprised of all the listed companies as at 31st December 2015. In total, there were 61 listed companies at the NSE categorized into ten broad economic sectors namely: Agricultural (7), Automobiles and Accessories (4), Banking (10), Commercial and Services (9), Construction and Allied (5), Energy and Petroleum (5), Insurance (6), Investment (4), Manufacturing and Allied (9), and Telecommunication and Technology (2). The study therefore took a census of all the listed firms.

3.3 Data collection
Secondary data of time series nature covering the 8 years period was collected and utilized for the study. The data relating to the daily mean exchange rates between Kenya shillings to the US dollar were obtained from the Central Bank of Kenya database which is published on the CBK's website. Similarly, the data for daily market capitalization and daily number of shares traded by all the listed companies were obtained from the NSE's handbooks. These figures were used to compute the daily average stock prices by dividing total daily market capitalization with the daily total number of traded shares.

3.4 Data Analysis & Empirical Model
Excel program was used to edit and organize the data before analyzing it using Stata version 13 software. Both descriptive and inferential statistics were used to analyze the data. Descriptive statistics such as mean, maximum value, minimum value, the standard deviation was determined and tabulated. On the other hand, inferential statistical analysis involved estimating the specified OLS regression model and using the F and t tests at 95% confidence level to determine the significance of the estimators obtained. The following regression model was estimated by the study:

$$SP_t = \beta_0 + \beta_1 DMR_t + \varepsilon_t$$

Where:
SP = Share prices;
DMR = Daily mean exchange rates;
β_0 = Constant term;

β_1 = Coefficient of the independent variable;
εt = Constant variance error term.

4. Results and Discussions

4.1 Descriptive Statistical Analysis
Descriptive statistics are used to describe the basic features of the data and to simplify large amounts of data in a clear and understandable way.

Table 4.1: Summary statistics

Variables	Mean	Std. Dev.	Max	Min	Count
Daily mean exchange rates	85.35	4.83	115.42	73.36	2064
Daily mean share prices	25.72	15.21	72.98	6.40	2064

Table 4.1 indicate that there were 2064 observations for each variable during the entire period of the study. The average of the daily mean exchange rates of Kenya shillings to USD was 85.35 with a standard deviation of 4.83. This indicate a significantly high volatility which is confirmed by the high difference between minimum and maximum values of 73.36 and 115.42. The implication is that the economy experienced high volatility of exchange rates during the period under review.

Concerning the share prices, it is evident from Table 4.1 that the average of the daily mean prices was Kshs 25.72 with a standard deviation of 15.21. This also indicates a high fluctuation in prices in the capital market. The minimum share price was Kshs 6.40 while the maximum share price achieved was Kshs 72.98. The implication of this finding is that the high volatility in the forex market may have been transferred to the stock market.

4.2 Regression Data Diagnostic Tests
To determine the suitability of the time series data for statistical analysis, various tests were carried out. The tests that aimed at establishing if the time series data fulfilled the cardinal requirements of classical linear regression analysis included: normality test, serial autocorrelation test, model specification test, and stationarity tests. The results of the tests are laid out as follows:

4.2.1 Normality Distribution Test
This study used the Jarque-Berra (J-B) normality test at 5% significance level under the null hypothesis that the error term is normally distributed. The results of Jarque-Berra normality test provided a J-B statistic of 1.57234 and a P-value of 0.4235. Since the P-value is greater than 0.05, the specified null could not be rejected, and the study concluded that the residuals obtained from the data were normal.

4.2.2 Serial Correlation Test
The study applied Breusch-Godfrey serial correlation test to establish whether the error terms were serially correlated; under the null hypothesis that there is no serial

correlation. The results of the test showed an F-statistic of 0.22857 at 2 and 58 degrees of freedom. The F-statistic value had a corresponding p-value of 0.8527 indicating that the null hypothesis of no first order autocorrelation could not be rejected at 5% significance level. The result therefore concluded that the data did not exhibit the problem of first-order autocorrelation.

4.2.3 Stationarity Tests

According to Dickey and Fuller (1979), testing for stationarity is the first step of time series model building. This is because time series data typically contains a unit root which implies that both the mean and variance are not constant. The effect is to provide spurious or meaningless regression results due to the presence of trend in the data series. This study adopted the Kwiatkowski Phillips Schmidt-Shin (KPSS) test for existence of unit root. This criterion was chosen on account of its superior testing power (Gujarati, 2003). The results of the KPSS tests were summarized in Table 4.2 below:

Table 4.2: KPSS Unit Root Test Results

Variables	Intercept Only	Lag Length	Intercept & Trend	Lag Length	Status
Daily mean exchange rates	0.635473 (0.0000)	6	0.284585 (0.000312)	6	Stationary
Daily mean share prices	0.205944 (0.0000)	6	0.083575 (0.043237)	6	Stationary

H0: The time series is stationary

The KPSS results in Table 4.2 indicate that all variables were stationary at either intercept only or with both trend and intercept, implying that all the variables were integrated of order *I (0).*

4.3 Regression Analysis

Prior to estimating the specified regression model, the study performed the granger-causality test on the two variables to ascertain the direction of the relationship between variables. In doing so, the pair-wise granger-causality test criterion was used at 5% significance level and the respective null hypotheses. The results are presented in Table 4.3 below:

Table 4.3: Pairwise Granger Causality Test Results

Null Hypothesis	Observations	F-statistic	Probability
Exchange Rate Volatility does not Granger Cause Share Prices	2064	1.72548	0.0324
Share Prices does not Granger Cause Exchange Rate Volatility	2064	1.38901	0.3856

The Pairwise Granger-Causality results in Table 4.3 indicate that the computed P-value between exchange rate volatility and stock prices is 0.0324 which is less than 5 percent. This means that there exists granger- causality at 5 percent significant level. Further, the

results indicate that causality relationship running from stock prices to exchange rate volatility could not be established because the computed P-value of 0.3856 exceeds the significance level of 0.05. Based on these findings, the study drew the conclusion that there exists a unidirectional relationship that runs from exchange rate volatility to share prices. This finding corroborates the results by Kisaka and Mwasaru (2012) and Ouma and Muriu, (2014). However, they contradict the empirical findings by Chirchir (2014) who established a bi-directional relationship.

4.3.1 Effect of Exchange Rate Volatility on Share Prices

The study sought to determine the effect of exchange rate volatility on share prices. In doing so, the specified regression model was estimated at 5% confidence level. The results are laid out in Table 4.4 below:

Table 4.4: Regression Results

Variable	Coefficient	Standard error	t-value	P-value
Intercept term	642.2074	132.5781	4.843995	0.0000
Daily mean exchange rates	-7.95415	1.72494	-4.67660	0.0000
Adjusted R-Square	0.21402			
F-statistic	23.83264			0.0000

The results provided an adjusted R-square value of 0.21402, which shows that the daily mean exchange rates explain approximately 21.4% of the variations in share prices during the period of the study; while other factors not included in the model explained the rest of the variations. Further, the F-statistic of the model was 23.83264 with a corresponding p-value of 0.0000; which indicate that the overall model was significant in explaining the relationship between the study variables at 5% level. Finally, the coefficient of the daily mean exchange rates was -7.95415 with a corresponding p-value of 0.0000. This indicated that the effect of exchange rates volatility on share prices was negative and statistically significant at 5% level. The implication of the finding was that as the exchange rates volatility increased, the share prices declined significantly during the period of the study. The empirical findings of the study support the flow-oriented theory of exchange rate attributed to Dornbusch and Fisher (1980), which postulates that exchange rates influence share prices. Further, the results are in consonance with the empirical findings by the study conducted by Umoru and Asekome (2013) but differed from the findings by Tsagkanos and Siriopoulos (2013) who found that stock prices lead exchange rates.

5. Conclusions and Recommendations

From these empirical results, it can be concluded that an increase in exchange rate volatility will lead to a fall in market share prices with the attendant decline in market capitalization. Since rational investors aim at maximizing returns, a decline in share prices will erode the investors' wealth. This could result in diversion of investment funds to economies with stable exchange rates and lower perceived market risk.

Consequently, the demand for shares of the firms listed in the NSE declines leading to further reduction in market capitalization. Therefore, stability in exchange rates in the economy is an important driver of the stock prices.

Based on these empirical findings, the study recommends that the regulators of the Kenyan monetary system such as Central Bank and the Capital Markets Authority should develop and implement macroeconomic management strategies that fosters stable exchange rate regime. This will have a positive ripple effect in promoting growth of the stock market and consequently preserve investors' wealth. Further, the stock market regulator (CMA) should fast-track the impending launch of the derivatives market in NSE. This will enable both institutional and individual investors to effectively mitigate the negative impact of exchange rates volatility in the economy.

References

Agrawal, G. (2010). A study of exchange rates movement and stock market volatility. *International Journal of Business and Management*, 5(12).

Aroni, J. M. (2011). Factors influencing stock prices for firms listed in the Nairobi stock exchange. *International Journal of Business and Social Science*, 2(20).

Benita, G. & Lauterbach, B. (2004). Policy factors and exchange rate volatility: *International Research Journal of Finance and Economics*, 7(8), 7-23.

Bhunia, A. (2012). A causal relationship between stock indices and exchange rates-empirical evidence from India. *Research Journal of Finance and Accounting*, 3(1), 47-54.

Caporale, M. G. Hunter, J. & Ali, M. F. (2014). On the linkages between stock prices and exchange rates: Evidence from the banking crisis of 2007-2010. *International Review of Financial Analysis*, 33, 87-103.

CBK (2016). *The exchange rate and the performance of the Kenya Shilling*. Retrieved from: https://www.centralbank.go.ke/wp-content/uploads/2016/09/Response-Performance-of-the-Shilling

CBK. (2013). *History of Kenyan currency*. Retrieved from http://www.centralbank.go.ke/index.php/history-of-kenyan-currency

Chirchir, D. (2014). Share prices-exchange rates nexus: Evidence from Kenya. Research *Journal of Finance and Accounting*, 5(21).

Chkili, W., Aloui, C., & Nguyen, D. (2012). Asymmetric effects and long memory in dynamic volatility relationships between stock returns and exchange rates. *Journal of International Financial Markets, Institutions and Money*, 22(4), 738-757.

Choi, J. J. & Papaioannou, M.G. (2009). *Credit, Currency, or Derivatives: Instruments of Global Financial Stability*. Emerald Group Publishing, U.K.

Dickey, D. A. & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of American Statistical Association*, 74(366), 427-437.

Dornbusch, R. & Fischer, S. (1980). Exchange rates and the current account: *American Economic Review*, 70, (5), 960-971.

Eiteman, D. K. Stonehill, A.I. & Moffett, M.H. (2001). *Multinational business finance*, 9th ed., Addison Wesley Longman: New York, NY.

Elly, O. D., & Oriwo, A. E. (2013). The Relationship between macro-economic variables and stock market performance in Kenya. *DBA Africa Management Review*, 3(1).

Fama, E. F. (1991). Efficient capital markets. *The Journal of Finance*, 46(5), 1575-1617.

Farrell, G. N. (2001). Capital controls and the volatility of South African exchange rates. *South African Reserve Bank Occasional Paper*, No.15.

Gujarati, D. N. (2003). *Basic econometrics*. 4th ed. New York: McGraw-Hill Inc.

Hussain, M, & Bashir, U. (2013). Dynamic linkages of exchange rate and stock return volatility evidence from Pakistan, India and China (PIC). *Journal of International Review of Management and Business Research*, 2(2).

Inci, A. C. & Lee, B. (2014). Dynamic relations between stock returns and exchange rate changes. *European Financial Management*, 20, 71-106.

Kiptoo, C (2007). Real exchange rate volatility and misalignment in Kenya, 1993-2003: Assessment of its impact on International Trade, and investments. Unpublished PhD Thesis, University of Nairobi.

Kirui, E. Wawire, N.H.W, & Onono, P. O. (2014). Macroeconomic variables, volatility and stock market returns: A case of Nairobi Securities Exchange, Kenya. *International Journal of Economics and Finance*, 6(8), 214.

Kisaka, S. E. & Mwasaru, A. (2012). The causal relationship between exchange rates and stock prices in Kenya. *Research Journal of Finance and Accounting*, 3(7), 121-130.

Kothari, C. R. 2009. *Research methodology – methods and techniques*. New Delhi: Wiley eastern Limited.

Mlambo, C. (2013). *Effects of exchange rate volatility on the stock market: a case study of South Africa.* Master Dissertation, University of Fort Hare

Monther, C. & Kaothar, G. (2010). Macroeconomic and institutional determinants of stock market development. *The International Journal of Banking and Finance*, 7 (1), 139-140.

Mumcu, F. (2005). *The effects of changes in foreign exchange rates on ISE-100 index*. Retrieved from: https://pdfs.semanticscholar.org/c532/407a72b6c1d7240bf0f0ba384648faca0fa2.pdf

Ndung'u, N. S., Karingi, N. S., Geda, A., & Were, M. (2001). Kenya's exchange rate movement in a liberalized environment: An empirical analysis. *KIPPRA Discussion Paper* No. 10.

Olugbenga, A. A. (2012). Exchange rate volatility and stock market behaviour: The Nigerian Experience. *European Journal of Business and Management*, 4(5), 31-39.

Ouma, W. N. & Muriu, P. (2014). The impact of macroeconomic variables on stock market returns in Kenya. *International Journal of Business and Commerce*, 3(11).

Saunders, M., Thornhill, A. & Lewis, P. (2009). *Research methods for business Students*. 5th ed. Italy: Prentice Hall.

Shapiro, A. C. & Atulya, S. (2009). *Multinational financial management*. 6th ed. United States: John Wiley & Sons, Inc.

Soleymani, A. & Chua S. Y. (2014). Effect of exchange rate volatility on industry trade flows between Malaysia and China. *The Journal of International Trade & Economic Development. An International and Comparative Review,* 23(5).

Tsagkanos, A. & Siriopoulos, C. (2013). A long-run relationship between stock price index and exchange rate: a structural nonparametric cointegrating regression approach. *Journal of International Financial Markets, Institutions and Money,* 25, 106–118.

Umoru, D. & Asekome, O. M. (2013). Stock prices and exchange rate variability in Nigeria econometric analysis of the evidence. *European Scientific Journal*, 9(25).