Effect of foreign equity flows on stock market volatility in Kenya
Empirical evidence at Nairobi securities exchange

**Isaac L. Ochieng'[1], Tobias O. Olweny[1], Oluoch J. Oluoch[1]
and Gordon O. Ochere[1]**

Abstract

The study examined the effect of foreign equity flows on stock market volatility in Kenya. The effect of foreign equity purchases and sales turn-over and foreign equity purchases and sales volume on stock market volatility in Kenya were established. The moderating effect of foreign exchange rate on the effect of foreign equity flows on stock market volatility was also analysed in the study. The study was undertaken at the Nairobi Securities Exchange for a period of eight years from 2008 to 2015. Causal research design was used. The target population of the study were the monthly foreign equity flows, monthly NSE-20 share indices, monthly USD Bid-Ask FOREX. Time series secondary data was used in the study. The data was subjected to diagnostic tests such as linearity, multi-collinearity, normality, homoscedasticity tests and test for auto-correlation with E-views being the main statistical tool of analysis. The main model used in the study was the vector error correction model subsequent to undertaking stationarity, lag selection and cointegration tests. The study revealed that foreign equity flows does not statistically affect the current stock market volatility at the NSE prior to and after introduction of the moderating variable, USD FOREX mean and that the current stock market volatility at the bourse were caused by lagged values of the stock market volatility during the study period, further buttressing granger causality test results. Further results from Impulse Response Function indicate that it takes a shorter period of time for the effect of foreign equity flows shocks to dissipate in the stock market and that the proportion of shocks in the stock market volatility were attributed to the market volatility itself with a recommendation for

[1] Jomo Kenyatta University of Agriculture and Technology, Department of Economics, Accounting and Finance, Kenya

formulation and implementation of efficacious policies that would spur market integration thereby increasing foreign investor activities in the bourse.

1   Introduction

The nexus between foreign equity flows and stock market volatility is well articulated by a plethora of prevailing theoretical and empirical postulations. The base-broadening theory advanced by Merton (1987) and the price pressure hypothesis put forth by Harris and Gurel (1986) expound on the correlation between foreign equity flows and stock market volatility. The base-broadening hypothesis suggests that foreign equity flows causes emerging equity market prices to rise hence causing an increase in stock market volatility. The broadening of investor base leads to diversification of risk and ultimately risk sharing hence reduction in required risk premium. Besides, the influx of new investors can lower the perceived liquidity risk of stocks hence investors invest only in stocks in which they are informed (Merton, 1987). Empirical evidence of the base-broadening hypothesis is documented by (Bekaert, 2000).

The price pressure hypothesis contends that rise in prices due to foreign equity flows are as a consequence of market illiquidity in absorbing the extra demand and that the resulting price change tend to be reversed in subsequent trading periods but after increasing the stock market volatility. Thus, foreign equity flow induced price increases will would be reversed subsequently. Prices initially increase based on expectations and asymmetric information but due to learning process the prices revert to their original level. Warther (1995) find that there is a negative relation between returns and subsequent flows, this notion is inconsistent with the price pressure hypothesis. Pavabutr and Yan (2007) contend that foreign equity flows increase stock market volatility when they come in and decrease the stock bourse volatility when they leave subsequently making prices and by extension the stock market to be more volatile. Hence, monetary and non-monetary aspects of foreign flows have an impact on valuation due to the fact that information that foreign investors have is yet to be incorporated in prices. Farther, information asymmetry exists between foreign and domestic investors leading to aversion towards international investments (Law & Ngah, 2008).

Huang and Yang (2000) examine whether foreign investor participation increase, decreases or affects not the volatility of stock markets in ten developing countries. Their results show that stock index become more volatile in South Korea, Mexico and Turkey but less volatile in Argentina, Chile, Malaysia and the Philippines. There is no momentous pattern for the other markets including Taiwan, Thailand and Brazil. Law and Ngah (2008) also buttress the narrative on the fall in the

Malaysian stock market volatility after allowing for foreign investor participation in the stock market. The scholars in their seminal script, effect of equity market liberalization on volatility in Malaysian Stock market from 1985 to 2006 using the EGARCH model and find that the foreign equity flows have a negative effect on stock market volatility.

Pavabutr and Yan (2007), examine the effect of both predictable foreign equity flows and unpredictable equity flows in daily and weekly stock return volatility in Thailand stock market from 1995 to 2002. The upshot was found to be ambivalent. Whereas the unpredictable equity flows are found to have a significant impact on stock market volatility (both daily and weekly), the influence of the predictable foreign equity flows is however negligible and utterly insignificant. Nguyen and Bellalah (2008), conduct research on seven emerging markets including Argentina, Brazil, Chile, Colombia, Mexico, Malaysia and Thailand from January 1985 to January 2003. The researchers report an insignificant effect of foreign equity flows as a consequence of liberalisation on stock market volatility on average. However, according to Nguyen and Bellalah (2008), it is imperative to note that stock return volatility is lowered by two salient conditions: one, when participation of US investors becomes effective and important on emerging markets and two, when the size of the emerging market increases.

The statistical significant effect of foreign equity purchases turn-over, foreign equity sales-turn-over and the foreign equity purchases volume and foreign equity sales volume as proxies for foreign equity flows on the volatility of stock markets were considered in Japan by Cho, Kho and Stulz (1999) and by (Hamao & Mei, 2001) in Japan. The findings of the studies were that the foreign equity flows did not result in the increase of stock market volatility and instead there was an inverse relationship between foreign equity flows and stock market volatility. The lack of empirical support for the contention that foreign equity flows in and out of a stock market may cause excess market volatility as postulated by Borensztein and Gelos (2000) and Richards (2005) in these two stock markets was a notable conclusion. Despite the unidirectional and bidirectional effect of foreign equity flows on stock market volatility documented in empirical finance, Bellalah and Nguyen (2008) documented chequred findings in the study of foreign equity flows on stock market volatility as one of the findings was that foreign equity flows lacked the statistical significance in predicting current volatility in a stock market.

Bonser-Neal *et al.* (2002) contend that foreign traders who are alternately described as trend chasers are at information disadvantage compared to local investors and informed traders. This is consistent with the information asymmetry assertion of the price pressure hypothesis additionally, Pavabutr and Yan (2003) adduce evidence attesting to the fact that foreign equity flows are associated to reduction in risk premium which diminishes among stocks preferred by foreign investors and this phenomenon decreases over time. Bailey *et al.* (2007) study the Singapore and Thailand exchange and find that foreign investors, rather than locals have pre-announcement private information. However, Curcuru *et al.* (2011) use equity positions between the US and forty foreign countries, and finds that foreign

investors increase equity weights on a country's equity market before its strong performance.

Brennan and Cao (1997) assert that foreign equity flows which include the monetary and non-monetary aspects are extremely vital in an economy, the flows enable investors to diversify risk thereby reducing the risk premium in the market leading to stock market appreciation. Berkaert and Harvey (2000) argue that the equity flows from foreign investors raises firm valuation and ultimately reducing the cost of capital. Foreign equity flows also lead to economic growth as it ensures that capital flows where productivity is at its pinnacle (Bekaert *et al.*, 2011). The presence of large foreign investors can promote better monitoring, phenomenon coupled with the reduction in cost of capital can transform projects that had negative net present values before opening of stock markets to foreign investor participation to positive net present values after opening of stock markets to foreign equity investment thereby increasing physical investment (Aggarwal *et al.,* 2011). Bekaert *et al.* (2011) affirm that the flow of foreign equity flows in emerging in emerging markets tend to be skewed to favour enormous and well established indigenous companies. This scenario effectually results to the creation of a two-tier local market distinguished by relative foreign interest subsequently curtailing the pervasiveness of market liberalization. The issue of market segmentation as a result of opening the market to foreign investors has some implications on pricing and volatility of stock markets (Pavabutr & Yan, 2013).

2 Literature Review

Foreign equity gross purchases are the total monetary values or the turn-over values of stocks purchased by foreign investors in a local stock market on a daily basis, monthly basis or annually with the possibility of analysing its short term, intermediate and long term effect on stock market volatility being postulated in both theoretical and empirical literature (Pavabutr, 2007). Wang (2009) examines the causal relationship between foreign ownership and stock market volatility in Indonesia using daily foreign holdings of Indonesian stocks from January 1996 to December, 2000. Using daily foreign equity aggregate purchases from Jakarta Stock Exchange, he finds that foreign investors prefer to hold stock with low historical volatility. Other findings indicate that foreign equity gross purchases are positively correlated with contemporaneous stock market volatility and that the level of stock market volatility increases with the level of foreign equity flows.

Hsu and Huang (2010) studied the effect of foreign equity gross purchases on stock market volatility in Taiwan after the Taiwan stock market was opened to foreign investment participants. Using daily data from 1995 to 2007 and employing a GJR-GARCH model, they find that the Taiwanese stock market become more stable after it fully opened. Lin, Lee and Chiu (2010) also used an auto-regressive jump intensity (ARJI) model to explore the stock market volatility in Taiwan subsequent to the opening of the Taiwanese stock exchange (TWSE) to

foreign investors. Using daily data from 1995 to 2005 they find that TWSE tended towards greater stability during the post financial liberalization period, hence foreign investor participation in the TWSE reported in-significant effect on the TWSE volatility.

Cheng, Huang and Chen (2011) applied an EGARCH model to determine the impact of removing foreign institutional quota on the stock market volatility using daily data from 2003 in Taiwan. They find that lifting foreign ownership quotas enhanced the value of Taiwanese listed electronics companies with a low overall effect on the volatility of TWSE. Dijk and Vagias (2010) examine the relationship subsisting between international flows and liquidity and market volatility. They estimate vector auto regressions with monthly U.S. equity portfolio flows and local stock market liquidity and volatility for 46 countries in six regions over 19895-2008. They find that foreign equity flows to developed Europe and Asia/Pacific are positively related to local market liquidity with the analysis lending little support to the view that foreign investors destabilize local markets through an adverse impact on liquidity and volatility.

Hsu (2013) analysed the influence of foreign portfolio investment on domestic stock markets volatility in Taiwan. He uses daily closing equity aggregate purchases of stocks listed on the TWSE from 2007 to 2011 and divided equities into foreign investor favoured and un-favoured stocks by foreign investors. The findings of the study revealed that market participants did not herd in the foreign investor favoured stock group but herded in the un-favoured group only in bear markets and that the foreign investor favoured group out-perfomed the other only during economic expansion. During recession, the foreign investor un-favoured group perfomed better. Foreign equity gross sales are the total monetary values or the turn-over values of stocks sold by foreign investors in a local stock market over a designated period of time (Nguyen and Le, 2013). The turn-over sales value of foreign equity flows is used as a proxy for foreign equity flows in the study of how flows affect other macro-economic variables in developed stock markets and in emerging stock markets such as stock market index volatility with the variable being also affected by other macro-economic variables in extant literature (Kodongo, 2011).

Muntasir (2015) evaluated how foreign equity investment impacted on exchange rate and composit stock index volatility in Indonesia. The objective of the study was to determine the effect of foreign equity gross sales on the volatility of the Jakarta stock index (JKSI) and the Rupia exchange rate. The uses the vector auto-regressive (VAR) model and the vector error correction model (VECM). The results show that foreign equity purchases directly affect the volatility of stock index while the foreign equity gross sales affect the volatility of stock index via exchange rate. Poshakwale, Sumil, Tapa and Chandra (2008) examines the influence of foreign equity aggregate sales on the volatility of the Indian equity markets. The long term relationship between foreign equity flows and the volatility of the stock index were examined using the vector autoregressive model (VAR) and vector error correction model (VECM) while short term relationship was

examined using Granger causality test. The study concludes that growing trading activities of foreign investors contain significant information in explaining the short term and the long term co-movements in Indian equity market with global equity market. Rajput and Namita (2012) empirically analysed causality and volatility spill over in Indian stock market as a results of foreign equity flows. The study period ranged from January 1992 to March, 2011. Upon testing for stationarity, Johansen co-integration analysis was used to confirm long run equilibrium relationship between foreign equity flows and stock market volatility with VECM being the main model of the study. The results of the study documented a positive contemporaneous relationship between foreign equity flows and stock market volatility with a bivariate volatility spill over.

Ozurumba (2012) in his study on the effect of foreign portfolio flows on volatility of Nigeria stock market find that foreign equity gross sales as part of the proxy variables for foreign equity flows has a positive and statistically significant effect on the fluctuations of the stock market index. This was after using linear regression analysis to capture the effect of foreign equity flows as well as inflation on the returns in the securities exchange and granger causality test to analyse the direction of causality between the variables. The study also exhibits a unidirectional causality that runs from stock market index fluctuations to foreign portfolio investments in the bourse. Nyang'oro (2013) considered the effect of foreign portfolio flows on stock market performance in in Kenya at the Nairobi Securities exchange. Using arbitrage pricing theory (APT), the study reveals that foreign portfolio flows push stock prices up as a consequence of foreign purchases hence an upward fluctuation in the stock market indices due to rising demand for local equities by foreign investors.

Foreign equity in-flows volume are the non-monetary values of foreign equity gross purchases; they are the foreign equity purchases without incorporating stock prices hence volume of foreign equity purchases (Nguyen and Le, 2013). The empirical effect of foreign equity in-flows volume on the volatility of the stock market has been considered in both emerging and developed markets with varied results being posited. Gupta (2011) investigates whether foreign equity in-flows volume affect or causes fluctuations in India stock market. Based on daily data from April, 2006 to February, 2011. ADF test confirmed data stationarity in the study, with OLS regression test showing that foreign equity in-flows volume influences the stock market index. Johri (2012) attempted to comprehend the dynamics of foreign investor participation in the Indian Stock market with regards to volatility. The study was conducted using daily data on BSE Sensex and foreign equity flows from January 2001 to December 2011. Using correlation analysis, foreign equity in-flows volume is found to significantly affect the volatility of the Indian capital market. The Pearson correlation values indicate that the Indian Stock index fluctuates with corresponding increases and decreases in the volume of foreign equity flows.

Ahmed (2015) assesses the effect of cross-border equity flows on stock market volatility in Qatar stock exchange. With the aim of the objective of looking into the

potential impact of foreign investor groups' trading activities on market volatility in comparison with those of Qatar's domestic investor counterparts, he uses daily data aggregated values of stock purchases and sales made separately by investor groups namely; foreign individual investors, foreign institutional investors, domestic individual investors and domestic institutional investors. The study uses the generalized method of moments estimation technique and finds that even though foreign buy and sell trades are not as large as those of their domestic counterparts, foreign institutional sales (purchases) tend to increase (reduce) market volatility. Like those of foreign institutions, the sell trades by foreign individuals have a positive impact on volatility. The findings further indicate that domestic institutional purchases are significantly negatively related with the volatility at the stock market, whereas the sell trades by the same category have no impact on volatility. Finally, surprises in foreign investor trading volumes turn out to be responsible for adding to stock market volatility.

According to Pavabutr and Yan (2007), Foreign equity out-flows volume are the non-monetary values of foreign equity gross sales; they are the foreign equity sales without incorporating stock prices hence volume of foreign equity sales. Gupta and Shaveta (2012) assesses the impact of foreign equity flows volume on the volatility of the Indian stock market. Monthly data on foreign equity out-flows volume and the stock market index were used in the study for a period of 2001-2002. Using correlation and regression techniques, it is found that foreign equity in-flows and out-flows volume are strongly associated with fluctuation of the Indian stock market index. Li, Nguyen, Pham and Wei (2011) constructs a firm-level measure of large foreign equity ownership volume and investigates its impact on the stock market volatility in 31 emerging equity markets including Venezuela, Turkey, Thailand and Turkey. They consider all firms in 31 emerging markets covered by the S&P/IFCG (Global) index and the S&P/IFCI (Investible-index) while using data from the S&P emerging markets database to calculate firm-level stock return volatility. The study documents a negative relationship between large foreign ownership volume and equity market volatility, even after controlling for potential indigeneity and the impact of major domestic shareholders suggesting a stabilizing role of large foreign ownership in emerging markets.

3 Data and Methodology

The study was anchored on the positivist research paradigm. Causal research design was instrumental in effectively determining the effect of foreign equity gross purchases, foreign equity gross sales, foreign equity in-flows volume and foreign equity out-flows volume on the volatility of stock market index before and after incorporating foreign exchange rate as a moderating variable. Secondary data was used in the study, Secondary data on stock market volatility-the dependent variable and also secondary data for each of the independent variables: monthly foreign equity gross purchases (FEGP), monthly foreign equity gross sales

(FEGS), monthly foreign equity in-flows volume (FEIV), monthly foreign equity out-flows volume (FEOV) were extracted from the Nairobi Security Exchange records for 8 years from May, 2008 to December, 2015. The monthly Foreign exchange rate (FER) data for the same period of 2008 to 2015 was extracted from the Central Bank of Kenya (CBK) foreign exchange rate reports. All the data was collated in a data collection sheet for further analysis. The collected data on the regressors were used to examine the causality and hence determine the variables that had statistical significance on the present values of the dependent variable, stock market volatility. The proxy measure for the dependent variable in the study was the NSE 20 share index upon determination of the natural log of the absolute standard deviation of the monthly NSE 20 share indices.

Model Specifications
First, a multi-variate ordinary least square (OLS) technique was applied in the study to ascertain the statistical significance of foreign equity gross purchases, foreign equity gross sales, foreign equity in-flows volume and foreign equity out-flows volume on stock market volatility. Consequently, the first model that was run in the study was:

SMV= f (FEGP + FEGS + FEIV + FEOV)
$$Y = \beta 0 + \beta_1.X_1 + \beta_2.X_2 + \beta_3.X_3 + \beta_4.X_4 + \mu \qquad (3.1)$$

Where:		
	Y	Stock Market Volatility
	β_0	Constant
	μ	Disturbance term
	X_1	Foreign Equity Gross Purchases
	X_2	Foreign Equity Gross Sales
	X_3	Foreign Equity In-flows Volume
	X_4	Foreign Equity Out-flows Volume

And β_1, β_2, β_3, β_4 are the beta coefficients of Foreign Equity Gross Purchases, Foreign Equity Gross Sales, Foreign Equity In-flows Volume and Foreign Equity Out-flows Volume respectively. Secondly, a moderating variable was introduced in the model, the moderating variable was the mean of the foreign exchange rate Bid and Ask. Subsequent to the moderation of foreign equity flows with foreign exchange rate and a desire to comprehend the effect of moderated foreign equity flows on stock market volatility, the second model that was run in the study was moderated foreign equity gross purchases with foreign exchange rate, moderated foreign equity gross sales with foreign exchange rate, moderated foreign equity in-flows volume with foreign exchange rate, moderated foreign equity out-flows volume with foreign exchange rate succinctly written as:

SMV = f (FEGP + FEGS + FEIV + FEOV + FOREX Rate)

$$Y = \beta 0 + \beta_1.X_1 + \beta_2.X_2 + \beta_3.X_3 + \beta_4.X_4 + \beta_5.Z_0 + \beta_6.Z^*.X_1 + \beta_7.Z^*.X_2 + \beta_8.Z^*.X_3 + \beta_9.Z^*.X_4 + \mu \qquad (3.2)$$

Where :
Y	Stock Market Volatility
β_0	Constant
μ	Stochastic variable
X_1	Foreign Equity Gross Purchases
X_2	Foreign Equity Gross Sales
X_3	Foreign Equity In-flows Volume
X_4	Foreign Equity Out-flows Volume
Z_0	Foreign Exchange Rate

And $\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$ and $\beta 5$ are the beta coefficients of Foreign Equity Gross Purchases, Foreign Equity Gross Sales, Foreign Equity In-flows Volume, Foreign Equity Out-flows Volume and Forex Exchange Rate respectively. β_6, β_7, β_8, β_9 are the beta coefficients of moderated Foreign Equity Gross Purchases, Foreign Equity Gross Sales, Foreign Equity In-flows Volume, Foreign Equity Out-flows Volume with foreign exchange rate. Running the two multiple-linear regression models above was informed by theoretical and literature postulation. Law and Ngah (2008) in a quest to grasp whether foreign portfolio flows cause high or low volatility in the Malaysian stock market run a regression model partially in the analysis.

All the above tests for the linear regression were undertaken in the study and they were found to be violated. These findings coupled with a negative adjusted R value for the model without foreign exchange rate as a moderating variable further buttressed the inability of linear regression to be used as the best model in the study of foreign equity flows on stock market volatility in Kenya and as a consequence the solution lied on using time series models such as vector autoregressive model (VAR) or the vector error correction model (VECM) as per theoretical and empirical postulations and ultimate diagnostic test results. The vector error correction model (VECM) was the main and the most efficacious model used in the study of foreign equity flows on stock market volatility in Kenya. VECM is a type of time series model with a chain of dynamic equations capable of determining the inter-relationships between various variables (Saunders, 2009). Consequently, to comprehend the effect of foreign equity gross purchases, foreign equity gross sales, foreign equity in-flows volume and foreign equity out-flows volume on stock market volatility before and after introducing a moderating variable which was foreign exchange rate, vector error correction model was used in the study.

The simplified version of the VECM model is defined as follows:

$FEF_{t,1} = \beta_{10} + \beta_{11} FEF_{t-1} + \beta_{12} FEF_{t-2} + \dots + \beta_{nn} FPF_{t-n} + SMV_{t,1} + \mu$ (3.3)

$SMV_{t,1} = \beta_{20} + \beta_{21} SMV_{t-1} + \beta_{22} SMV_{t-2} + \dots + \beta_{nn} SMV_{t-n} + FEF_{t,1} + \mu$ (3.4)

Concisely written as:

$$\begin{pmatrix} \textbf{Flows}_t \\ \textbf{SMV}_t \end{pmatrix} = \begin{pmatrix} \alpha_f \\ \alpha_r \end{pmatrix} + \sum_{k=0}^{n} \begin{pmatrix} \beta_{11,t-1} & \beta_{12,t-2} \\ \beta_{21,t-1} & \beta_{22,t-2} \end{pmatrix} + \begin{pmatrix} \textbf{SMV t} \\ \text{Flows}_t \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix}$$

Where $FEF_{t,1}$ is the current foreign equity flow and FEF_{t-1}, FEF_{t-2}, and FEF_{t-n} are lagged values of foreign equity flows and $SMV_{t,1}$ is the current market volatility in equation (**3.3**) whereas $SMV_{t,1}$ is the current stock market volatility and SMV_{t-1}, SMV_{t-2}, SMV_{t-n} are lagged values of stock market volatility and $FEF_{t,1}$ is the current foreign equity flow in equation (3.4). β_{11}, β_{12}, β_{nn}, β_{21}, β_{22}, and β_{nn} are beta coefficients and β_{10} and β_{20} are constant variables and μ is the white noise in both equations.

VECM attempts to predict where the values of the dependent variable can be explained by other variables other than the lagged values of the dependent variable. VECM was used to ascertain whether lagged values of foreign portfolio flows were able to predict present values of stock market volatility over and above stock market volatility lagged values.

Diagnostic Tests

To test for linearity and multi-collinearity, pear-wise coefficient of correlation (rho) was used. Normality test was carried out using the Jarque-Bera test. To establish whether the variance of the error terms of the independent and the dependent variables were constant (homoscedasticity) or not (heteroscedasticity) White's test of heteroscedasticity was used. Heteroscedasticity is caused by omission of important variables in the model, measurement errors and averaging of data (Saunders, 2009). Since the test's p-value was less than 0.05, it was clear that the variances of the error terms were not constant. To test for auto-correlation, that is the errors in different observations are to be unrelated, Breusch-Godfrey Lagrangian test was used together with Durbin Watson test. These tests were undertaken before introducing foreign exchange rate as a moderating variable in the study and after introducing foreign exchange rate in the model for further analysis.

From all the aforesaid tests, there was incontrovertible evidence that linear regression was not the most efficacious model in determining the effect of foreign equity flows on stock market volatility before and after introducing foreign exchange rate as a moderating variable since all the assumptions of linear regression analysis were violated in case of the model before introducing the moderating variable while in the case of the model with foreign exchange rate as a moderating variable most of the assumptions were violated. The first test that was undertaken in the time series data was stationarity test or unit root test. In this

study Augmented Dickey-Fuller Test (ADF) was used to test for stationarity. The null hypothesis in the test was that there was unit root in the series. Johansen Co-Integration Tests was performed to determine the subsistence of long term correlation between the dependent and the independent variable as per the postulations of (Lutkepohl, 2007).

While running a time series model, lag lengths were determined in the study. Lag lengths were arrived at using four different techniques; one, Final prediction error (FP), two, Akaike information criterion (AIC), three, Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQI) (Lutkepohl, 2007). The lag length was arrived at by the majority of the techniques. For the model without moderation, the lag length was one since majority of the lag selection techniques produced one while for the model with foreign exchange rate as a moderating variable the lag length was four as produced by the majority of the techniques of lag selection.

Granger Causality tests was the fourth test undertaken under time series analysis. The purpose of the test was to figure out the causal correlation (in Granger sense) between variables. Impulse Response Function (IRF) test was undertaken to determine how the dependent variable; stock market volatility reacted to shocks from foreign equity gross purchases, foreign equity gross sales, foreign equity in-flows volume and foreign equity out-flows volume before incorporating foreign exchange rate in the study as a moderating variable and after incorporating it in the study. The test empirically tells the period of time it takes for the effect of foreign equity flows to be felt and ultimately dissipate in the stock market. Variance decomposition was able to tell the out of foreign equity gross purchases, foreign equity gross sales, foreign equity in-flows volume, foreign equity out-flows volume and lagged stock market volatility, the variable with the most statistical significance in predicting the present stock market volatility.

4 Empirical Results

Table 4.1: Descriptive Statistics

	SMV	ADSMV	FEGP	FEGS	FEIV	FEOV	FOREX	FER
Mean	6.07	623.59	0.50	0.37	0.53	0.39	84.72	4.43
Median	6.51	672.73	0.55	0.37	0.55	0.42	84.95	4.44
Maximum	7.44	1711.02	0.85	0.77	0.85	0.76	105.27	4.66
Minimum	1.68	5.37	0.07	0.08	0.10	0.05	61.90	4.13
Std. Dev.	1.12	385.60	0.18	0.17	0.18	0.16	8.37	0.10
Skewness	-1.78	0.18	-0.63	0.37	-0.48	0.00	0.12	-0.29
Kurtosis	6.35	2.38	2.66	2.33	2.42	2.23	3.60	3.94
Jarque-Bera	91.66	2.00	6.50	3.78	4.86	2.26	1.60	4.67
Probability	0.00	0.37	0.04	0.15	0.09	0.32	0.45	0.10

Sum		558.19	57370.40	46.34	34.20	48.51	36.09	7794.29	407.97
Sum Sq. Dev.		114.67	13530452.00	2.85	2.53	2.83	2.45	6381.76	0.91
Observations	92	92	92	92	92	92	92	92	

The following section presents descriptive analysis of the data collected based on the whole sample. Results in Table 4.1, has measures of central tendency such as mean and median, measures of diversion such as minimum, maximum, standard deviation and measures of distribution such as skewness, kurtosis and Jarque Berra. Results of the study revealed that mean stock market return volatility was 6.07 units, with a minimum of 1.68 units and a maximum of 7.44 units. There was minimal volatility of stock return as accounted for by standard deviation of 1.12 units. Stock market volatility was not normally distributed since Jarque Berra had a coefficient of 91.66 and p value of 0.00 units. Further, skewness coefficients revealed that the stock market volatility was skewed to the negative side (Skewness coefficient = -1.78) and kurtosis coefficient was not normally distributed, since its coefficient was greater than 3 at a coefficient of 6.35 units. High kurtosis coefficient indicated traces of auto-regressive cointegration (ARCH) effects in the series, which can only be modelled through time series analysis.

These findings were in support of Uyaebo, Atoi and Usman (2015) who demonstrated that stock market return volatility in Nigeria was not normally distributed though it was positively skewed. Similarly, the findings cemented Angko (2013) who found wider variations in stock market returns in Ghana securities exchange and was positively skewed. These results are in support of random walk hypothesis which stipulates that stock market returns responds to both positive and negative news and could explain its volatility. Stock Market Volatility at the NSE is negatively skewed thus an indication that the level of information asymmetry is more and high amongst foreign investors, hence a need to bridge information gap for purposes of minimizing high degree of negative speculation. Generally, the output from descriptive statistics intuitively had chequered implications with regard to data being normally distributed and non-normal distribution of data, stock market volatility and foreign equity gross purchases were not normally distributed implying that foreign equity investors experienced information asymmetry challenges at different points. It is imperative for policy makers to a bridge the information gap for purposes of spurring stock market growth, the results farther implied that the probability of large losses and large gains was greater than expected if returns matched a normal curve hence high market return volatility.

Regression Analysis on Effect of Foreign Equity Flows on Stock Market Volatility (Model without moderation)

Linearity Assumption for Regression Model without Moderation

Table 4.2: Correlation Analysis on the Effect of Foreign Equity Flows on Stock Market Volatility

	SMV	FEGP	FEGS	FEIV	FEOV	FER
SMV	1					
FEGP	-0.156	1				
	0.137	-----				
FEGS	-0.019	0.429	1			
	0.858	0.000	-----			
FEIV	-0.187	0.887	0.249	1		
	0.075	0.000	0.017	-----		
FEOV	-0.030	0.498	0.858	0.388	1	
	0.773	0.000	0.000	0.000	-----	
FER	-0.114	0.678	0.690	0.541	0.635	1
	0.280	0.000	0.000	0.000	0.000	-----

To ascertain whether there was linear relationship between the dependent variable and the independent variable, correlation coefficient was used. From table 4.2 there was no significant relationship between stock market volatility and foreign equity gross purchases, foreign equity gross sales, foreign equity in-flows volume, foreign equity out-flows volume and foreign exchange rate since the p-value for the variables had coefficients of 0.137, 0.858, 0.075, 0.773 and 0.280 units respectively which were greater than 0.05 hence there was no linearity in the data. These findings were in violation of the assumption of linearity in regression analysis. and FERV (-0.114 units). These findings of weak inverse correlation and non-linearity were also documented by Pavabutr and Yan (2007) in their analysis of the impact of foreign portfolio flows on emerging market volatility in Thailand that subsequently precipitated the choice of error correction model in the study.

Multi-Collinearity Assumption for Regression Model without Moderation
Multicollinearity was measured using pearwise correlation, if correlation coefficient between two independent variables is greater than 0.7 units then there is Multicollinearity between the two independent variables. Generally, from table 4.2 results, there was multi-collinearity between the independent variables: FEGP, FEGS, FEIV, FEOV. If there is multi-collinearity between two independent variables, then the two variables cannot be regressed together. This problem can be addressed by dropping one of the variables that are highly correlated in the study and subsequently undertaking a model re-specification or applying any of the error correction models in the analysis (Skinner, 2007). The significant relationship; multi-collinearity results between the independent variables in the study were also documented by other researchers in their studies such as Franzel (2009) and Sanvicente (2014) in Brazil that precipitated their use of simultaneous equation

tests to undertake a study on the relationship between stock market and foreign portfolio flows.

Test for Normality Assumption for Regression Model without Moderation
The third test that was undertaken in the study to determine whether regression analysis would be used in the study was the normality test. Saunders *et al*. (2009) contend that for regression analysis to be undertaken, the data must be symmetric about the mean. To ascertain whether, stock market volatility and foreign equity flows followed a normal probability distribution, histograms, skewness, kurtosis and Jarque Bera test were employed in the analysis.
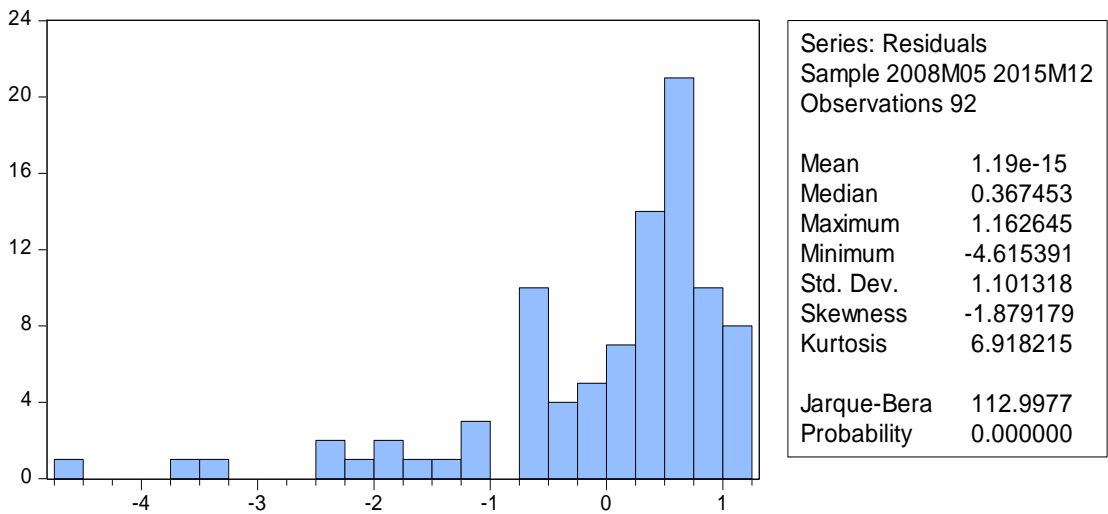

Figure 4.1 Normality Assumption for Regression Model without Moderation

From figure 4.1, Jarque Bera coefficient was 112.9977 with a p-value of 0.000. Since the p-value of Jarque Bera was less than 0.05, the data was not normally distributed. Further, the kurtosis coefficient was 6.9182 which was beyond a range of negative 3 and positive 3 and therefore the data was not normally distributed. The data was further, skewed to the negative as skewness coefficient was -1.8791 units. These results proved that regression analysis was not appropriate since the error term was not normally distributed. These finding corroborates those of Kodongo (2013), who reported that financial data are seldom distributed normally.

Test for the Randomness of Error Term (model without moderation)
The fourth test to be undertaken before regression analysis can be applied in the study is randomness of error term test. Basically, the error term is expected to be randomly distributed for each of the variables; both the dependent variable and the independent variables for regression model to be used in any analysis. With an error term that is randomly distributed the data lacks an identifiable pattern (Kim & Wei, 2002).
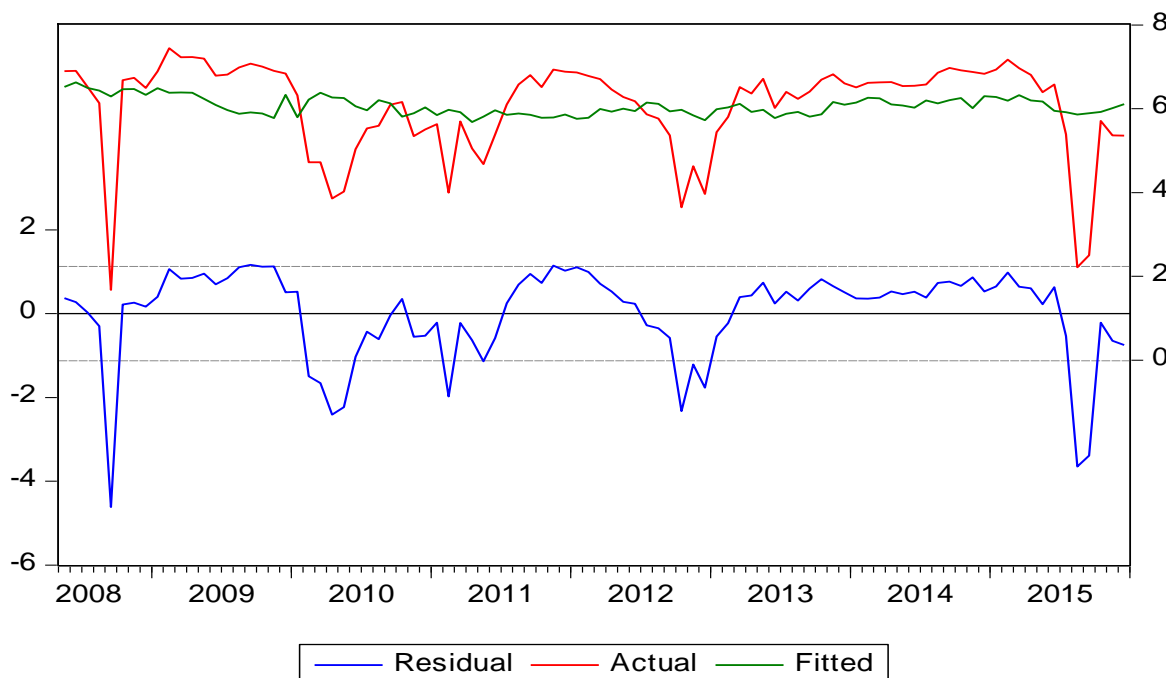
Figure 4.2 Randomness of Error Term Assumption for Regression Model without Moderation

From figure 4.2, stock market volatility and foreign equity flows data had an identifiable pattern and so the error term of the variables were not randomly distributed a phenomenon which violates the randomness of error term assumption of regression model and therefore, regression analysis could not be used in the examining the effect of foreign equity flows on stock market volatility. This finding corroborated those of Linnan and Neal (2002) who documented non-random distribution of error term in the data used in his study of foreign portfolio flows on market performance using general error correction model in lieu of regression analysis.

Homoscedasticity Assumption for Regression Model without Moderation

Table 4.3: White Test for Heteroscedasticity (Model without moderation)

F-statistic	2.868	Prob. F(14,77)	0.002
Obs*R-squared	31.529	Prob. Chi-Square(14)	0.005
Scaled explained SS	83.432	Prob. Chi-Square(14)	0.000

From table 4.3, the p-value was less than 0.05; p-value = 0.002 units and therefore there was heteroscedasticity. With heteroscedasticity exhibited in the data, regression analysis was not the best model to be used in the study. If

heteroscedasticity exists; that is unequal variances, then it may be impossible to carry out a study using a regression model (Anderson, 2003).

Breusch-Godfrey Serial Correlation Lagrangian Multiplier Test (Model without moderation)
The sixth test for regression analysis is the assumption of no auto-correlation (no serial correlation), in regression analysis, the errors in different observations are not supposed to be related (Saunders et al., 2009). Serial correlation was tested using the Breusch-Godfrey serial correlation test in the study.

Table 4.4 Breusch-Godfrey Serial Correlation Lagrangian Multiplier Test (model without moderation)

F-statistic	47.263	Prob. F(1,86)	0.000
Obs*R-squared	32.629	Prob. Chi-Square(1)	0.000

Table 4.4, documented serial correlation test results which revealed presence of serial correlation since the p-value was less than 0.05. With this outcome of the test, the errors in the stock market volatility values and the errors in unmoderated foreign equity gross purchases, foreign equity gross sales, foreign equity in-flows volume and foreign equity out-flows volume were the same which was a violation of regression analysis principles. The outcome essentially meant that a regression model could not be used in the analysis. Generally, all the six regression analysis tests undertaken in did not justify the use of a regression model however a model was still fitted for further analysis and tests.

Regression Results for model without moderating variable
From table 4.5, the goodness of fit test (ANOVA) for the regression model proved that the model could not fit in the analysis of the effect of foreign equity flows on stock market volatility since the p-value for F-statistic was greater than 0.05 meaning that the model had an insignificant explanatory power of the independent variables on the dependent variable hence spurious regression was evident further, the adjusted R was negative; -0.01 units which was a clear testament that the model could not fit in the study. Consequently, in a quest to comprehend the effect of foreign equity flows on stock market volatility without a moderating variable of foreign exchange rate, regression analysis could not be applied.

Table 4.5: Regression Analysis on Effect of Foreign Equity Flows on Stock Market Volatility

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FEGP	0.17	1.63	0.11	0.92
FEGS	-0.32	1.48	-0.21	0.83

FEIV	-1.48	1.57	-0.95	0.35
FEOV	0.59	1.50	0.40	0.69
C	6.65	0.42	15.99	0.00
R-squared	0.04	Mean dependent variable		6.07
Adjusted R-squared	-0.01	S.D. dependent variable		1.12
S.E. of regression	1.13	Akaike info criterion		3.13
Sum squared residuals	110.37	Schwarz criterion		3.27
Log likelihood	-138.92	Hannan-Quinn criterion.		3.18
F-statistic	**0.85**	Durbin-Watson stat		0.81
Prob(F-statistic)	0.50			

4.4 Regression Analysis on Moderating Effect of Foreign Exchange Rate on the Effect Foreign Equity Flows on Stock Market Volatility

Table 4.6 Regression Analysis on Moderating Effect of Foreign Exchange Rate on Foreign

Equity Flows on Stock Market Volatility

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FEGP	368.822	68.250	5.404	0.000
FEGS	70.678	60.273	1.173	0.244
FEIV	-231.019	64.738	-3.569	0.001
FEOV	-154.112	71.289	-2.162	0.034
FERV	4.360	3.061	1.424	0.158
FEGP_FER	-82.926	15.373	-5.394	0.000
FEGS_FER	-15.992	13.632	-1.173	0.244
FEIV_FER	51.230	14.586	3.512	0.001
FEOV_FER	35.310	16.205	2.179	0.032
C	-12.348	13.298	-0.929	0.356
R-squared	**0.357**	Mean dependent variable	6.067	
Adjusted R-squared	**0.286**	S.D. dependent variable	1.123	
S.E. of regression	0.948	Akaike info criterion	2.834	
Sum squared residuals	73.737	Schwarz criterion	3.108	
Log likelihood	-120.363	Hannan-Quinn criterion.	2.945	
F-statistic	5.058	Durbin-Watson stat	1.167	
Prob (F-statistic)	**0.000**			

Time Series Analysis
To empirically model the nexus subsisting between unmoderated foreign equity flows and moderated foreign equity flows on stock market volatility, time series analysis was employed. This is because all the assumptions of linear regression model were violated in the case of un-moderated independent variables and in the case of moderated variables most assumptions were violated thereby resulting to spurious regression for the moderated variables hence the shift to time series analysis. Time series tests included; stationarity tests, lag selection tests, cointegration tests,

Stationarity Test for Model without Moderation
Augmented Dickey Fuller (ADF) test was used in the study to test for stationarity. Augmented Dickey Fuller Test (ADF), was undertaken to examine whether the dependent variable; stock market volatility data and the independent variables were stationary. From table 4.5 the only stationary variables at level was the stock market volatility; SMV and FEOV

Table 4.7: Unit Root Test (Level)

Variable		ADF Test at levels		
		T statistic	Critical Value at 5%	P value
SMV	Constant	-4.7	-2.89	0.00
	Constant and Trend	-4.67	-3.45	0.00
FEGP	Constant	-2.72	-2.89	0.08
	Constant and Trend	-4.22	-3.45	0.01
FEGS	Constant	-1.91	-2.89	0.33
	Constant and Trend	-6.66	-3.45	0.0
FEIV	Constant	-3.16	-2.89	0.03
	Constant and Trend	-3.06	-3.45	0.12
FEOV	Constant	-2.98	-2.89	0.04
	Constant and Trend	-4.71	-3.45	0
FER	Constant	-2.32	-2.89	0.17
	Constant and Trend	-3.56	-3.45	0.04

Table 4.8: Unit Root Test (First Difference)

Variable		ADF Test at levels		
		T statistic	Critical Value at 5%	P value
FEGP	Constant	-13.58	-2.89	0.00
	Constant and Trend	-13.55	-3.45	0.00
FEGS	Constant	-10.6	-2.89	0.00
	Constant and Trend	-10.54	-3.45	0.00
FEIV	Constant	-14.16	-2.89	0.00

	Constant and Trend	-14.17	-3.45		0.00
FER	Constant	-6.63	-2.89		0.00
	Constant and Trend	-6.61	-3.45		0.00

From table 4.8 all the variables had no unit root; stationary, upon differencing.

Lag Selection Criterion for Model without Moderation

Table 4.9: Lag Selection Criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	302.5881	NA	3.45e-11	-7.06162	-6.88799	-6.99182
1	516.9184	392.9390	4.96e-13*	-11.30758*	-10.09217*	-10.81900*
2	548.8095	53.91124*	5.54e-13	-11.2098	-8.95256	-10.3024
3	574.8398	40.28497	7.26e-13	-10.9724	-7.67341	-9.64622
4	602.8052	39.28469	9.36e-13	-10.7811	-6.44033	-9.03613
5	630.2971	34.69211	1.28e-12	-10.5785	-5.19598	-8.41477
6	675.6008	50.69698	1.21e-12	-10.8	-4.37572	-8.2175
7	712.2341	35.76113	1.54e-12	-10.8151	-3.34902	-7.8138
8	764.0238	43.15810	1.53e-12	-11.191	-2.68319	-7.77096

 * indicates lag order selected by the criterion

 LR: sequential modified LR test statistic (each test at 5% level)

 FPE: Final prediction error

 AIC: Akaike information criterion

 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

Cointegration for Model without Moderation
Cointegration tests are applied to determine if there exists a long term relationship between variables; long term relationship between stock market volatility the dependent variable and foreign equity flows before moderation.

Table 4.10: Johansens Cointegration for Model without Moderation

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.499	138.833	95.754	0.000
At most 1 *	0.261	77.323	69.819	0.011
At most 2 *	0.234	50.433	47.856	0.028
At most 3	0.158	26.725	29.797	0.109
At most 4	0.108	11.406	15.495	0.188

| At most 5 | 0.014 | 1.276 | 3.841 | 0.259 |

Trace test indicates 3 cointegrating eqn.(s) at the 0.05 level

 * denotes rejection of the hypothesis at the 0.05 level

 **MacKinnon-Haug-Michelis (1999) p-values

From table 4.10 the time series variables were cointegrated 3 times; at most 2, this occurrence meant that the series was in three pairs or in patterns of three hence the evidence of a long term relationship. Consequently, the best model to use in the study was Vector Error Correction Model (VECM)

Vector Error Correction Model Results

Table 4.11: Vector Error Correction Model (model without Moderation)

	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C(1)	-0.06	0.03	-2.04	0.04
C(2)	-1.53	1.59	-0.96	0.34
C(3)	-0.24	0.10	-2.35	0.02
C(4)	2.71	1.78	1.53	0.13
C(5)	0.37	1.36	0.27	0.79
C(6)	-2.85	1.62	-1.76	0.08
C(7)	-1.05	1.32	-0.80	0.43
C(8)	-0.02	0.10	-0.18	0.86
	R Squared	0.15	Mean of dependent variable	-0.02
	Adjusted R squared	0.07	S.D. dependent variable	1.00
	S.E. of Regression	0.97	Sum Squared residuals	77.00
	Durbin-Watson	2.03		

D(SMV)=C(1)*(SMV(-1)+46.7*FEGS(-1)+9.19*FEIV(-1)-58.31*FEOV(-1)-5.41)+C(2)*(FEGP(-1)-0.59*FEGS(-1)-0.90*(FEIV)+0.18*FEOV(-1)+0.12)+C(3)*D(SMV(-1))+C(4)*D(FEGP(-1))+C(5)*D(FEGS(-1))+C(6)*D(FEIV(-1))+C(7)*D(FEOV(-1))+C(8)

VECM results (without moderation) on effect of lagged values of stock market volatility on current stock market volatility
Table 4.11; main model devoid of moderating variable; foreign exchange rate, revealed that 15%; R-Squared 0.15, of variations in current stock market volatility (SMV) was accounted for by lagged Stock Market Volatility (SMV)/C (3), Foreign Equity Gross Purchases (FEGP)/C (4), Foreign Equity Gross Sales (FEGS)/C (5), Foreign Equity In-flows Volume (FEIV)/ C (6) and Foreign Equity Out-flows Volume (FEOV)/ C (7). Moreover, the estimation results indicated that an increase in lagged stock market volatility (SMV) resulted in a decrease of the current Stock Market Volatility (SMV) by 0.24 units (-0.24). This phenomenon meant that there

was a negative relationship between lagged Stock Market Volatility (SMV) and present Stock Market Volatility (SMV). Further, the negative effect was significant as p-value was less than 0.05, (p-value = 0.02). The statistically significant negative relationship between lagged values of stock market volatility and current stock market volatility signified current stock market volatility data was correlated with previous stock market volatility data hence volatility clustering, suggesting that large fluctuations in volatility are always followed by large fluctuations and small fluctuations by small ones (Kumar & Tamimi, 2012). All the other proxies' variables for foreign equity flows were insignificant in explaining volatility levels at the Nairobi Securities Exchange.

Table 4.12: Vector Error Correction Model with Foreign Exchange Rate Moderation

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.08	0.05	-1.51	0.13
C(2)	-376.97	85.37	-4.42	0.00
C(3)	166.10	70.56	2.35	0.02
C(4)	330.92	64.20	5.15	0.00
C(5)	-0.36	0.11	-3.36	0.00
C(6)	175.36	88.16	1.99	0.05
C(7)	-25.28	65.86	-0.38	0.70
C(8)	-118.56	85.88	-1.38	0.17
C(9)	-27.73	65.63	-0.42	0.67
C(10)	6.07	7.56	0.80	0.42
C(11)	-38.73	19.85	-1.95	0.05
C(12)	5.91	14.94	0.40	0.69
C(13)	25.78	19.43	1.33	0.18
C(14)	6.16	14.89	0.41	0.68
C(15)	-0.05	0.09	-0.56	0.58
	R Squared	0.44	Mean of dependent variable	-0.02
	Adjusted R squared	0.33	S.D. dependent variable	1.00
	S.E. of Regression	0.82	Sum Squared residuals	50.48
	Durbin-Watson	1.93		

D(SMV)=C(1)*(SMV(-1)-237.44*FEOV(-1)+56.54*FERV(-1)+26.97*FEGP_FER(-1)-48.04*FEGS-FER(-1)-29.65*FEIV_FER(-1)+88.28*FEOV_FER(-1)-229.19)+C(2)*(FEGP(-1)-0.926*FEOV(-1)+0.17*FER(-1)-0.18*FEGP_FER(-1)-0.09*FEGS_FER(-1)-0.05*FEIV_FER(-1)+0.28*FEOV_FER(-1)-0.08*FER(-1)-0.713)+C(3)*(FEGS(-1)-1.13*FEOV(-1)-0.08*FER(-1)-0.02*FEGP_FER(-1)-0.18*FEGS_FER(-1)+0.02*FEIV_FER(-1)+0.22*FEOV_FER(-1)+0.33)+C(4)*(FEIV(-1)-0.61*FEOV(-1)+0.28*FER(-1)+0.06*FEGP_FER(-1)-0.14*FEGS_FER(-1)-0.3*FEIV_FER(-1)+0.24*FEOV_FER(-1)-1.16)+C(5)*D(SMV(-1))+C(6)*D(FEGP(-1)+C(7)*D(FEGS(-1))+C(8)*D(FEIV(-1))+C(9)*D(FEOV(-1))+C(10)*D(FERV(-1))+C(11)*D(FEGP_FER(-1))+C(12)*D(FEGS_FER(-1))+C(13)*D(FEIV_FER(-1))+C(12)*D(FEOV_FER(-1))+C(15)

Table 4.12 revealed the Vector Error Correction Model (VECM) estimated equation for the model with foreign exchange rate as a moderating variable, (main model of the study with the moderating variable). From the results posited, 44% (R Squared = 0.44) of variations in the current Stock Market Volatility (SMV) were explicated for by lagged Foreign Exchange Rate (FERV)/ C (10), lagged Foreign Equity Gross Purchases (FEGP_FERV)/ C (11), lagged Foreign Equity Gross Sales (FEGS_FERV)/ C (12), lagged Foreign Equity In-flows Volume (FEIV_FERV)/ C (13) and lagged Foreign Equity Out-flows Volume (FEOV_FERV)/ C (14). Moreover, it was observed from the estimation results that lagged Stock Market Volatility (SMV) had an inverse relationship with current stock market volatility as there was a decrease in the current Stock Market Volatility (SMV) at the Nairobi Securities Exchange by 0.36 units (-0.36) during the period of study, the inverse relationship was a significant one too, this striking outcome meant that the bourse volatility in the previous months were continually and permanently higher relative to the subsequent months farther endorsing the price pressure theory of foreign equity flows. All the four independent variables lacked the statistical significance in explaining the volatility levels at the Nairobi Securities Exchange.

5 Conclusion

Generally, VECM estimated results revealed that foreign equity flows had no effect on Stock Market Volatility (SMV) in Kenya during the period of study. Specifically, foreign equity gross purchases (FEGP), and foreign equity gross sales (FEGS), foreign equity in-flows volume (FEIV) and foreign equity out-flows volume (FEOV) had no statistical significance in predicting the current volatility at the stock market. Further, moderated foreign equity gross purchases with foreign exchange rate, (FEGP-FER), moderated foreign equity gross sales with foreign exchange rate, (FEGS-FER), moderated foreign equity in-flows volume with foreign exchange rate, (FEIV-FER), and moderated foreign equity out-flows volume with foreign exchange rate, (FEOV-FER) all had no statistical significance in predicting the stock market volatility at the Nairobi Securities Exchange. From VECM estimate results, the only variable that had the statistical significance in predicting the current stock market volatility at the Nairobi Securities Exchange were the lagged values of stock market volatility before and after introducing foreign exchange rate as a moderating variable in the study. The study recommends that policies of increasing market integration should be embraced to increase foreign investor participation in the stock market besides adopting efficacious cross-border listing rules.

References

[1] R. Aggarwal, I. Erel, F. Miguel, and P. Matos,mDoes Governance Travel Around the World? Evidence from Institutional Investors. *Journal of Financial Economics*, (2011) 154-181.

[2] G. Bekaert, and C. Harvey. Foreign Speculators and Emerging Equity Markets. *Journal of Finance*, (2000) 295-350.

[3] C. Bonser-Neil, S. Jones, D. Linnan, and R. Neil, Herding, Feedback Trading and Foreign Investors. *Pacific Basin Finance journal*, (2002) 103-127.

[4] E. Borenzstein, and R.G. Gelos, The Behaviour of Emerging Market Mutual Funds. *IMF Working Paper*, (2000) 00/198.

[5] T. Brennan, and H. Cao, International Portfolio Investment Flows. *Journal of Finance*, (1997) 1851-1880.

[6] C. Cheng, A. Y. Huang, and C. C. Chen, The Effect of Abolishing a Foreign Institutional Investment Quota in Taiwan. *Journal of Emerging Markets Finance and Trade Volume 47*, (2011) 1-12.

[7] E. Curcuru, C. Thomas, F. Warnock, and J. Wongswan, US. International Equity Investment and Past and Prospective Returns. *American Economic Review*, (2011) 3440-55.

[8] M. Dijk, and D. Vagias, International Capital Flows and Liquidity. *International Journal of Finance*, (2011) 1 -60.

[9] A. Franzel, R. Meurer, C. Goncalves, and S. Seabra, Determinants of Foreign Portfolio Flows. *Journal of Financial and Quantitative Analysis*, (2009) 301-328.

[10] A. Gupta, and J. Shaveta, Impact of Foreign investment on Stock market. *Journal of effective Management*, (2012) 1-11.

[11] Y. Hamao, and J. Mei, Living with the enemy: An analysis of foreign investment in the Japanese equity market. *Journal of International Money and Finance*, (2001) 715-35.

[12] L. Harris, and E. Gurel, Price and volume effects associated with changes in the S&P 500 List: New evidence for the existence of price pressures. *Journal of finance*, (1986) 815-829.

[13] C. P Hsu, and C. Huang, How Foreign Portfolio Investment Affect Stock Markets in the Host Country. *The 2010 Proceedings of the Northeast Business and Economics association*, (2010) 298-302.

[14] B. Huang, and C. W Yang, The Impact of Financial Liberalization on stock price. Volatility in Emerging Markets. *Journal of Comparative Economics*, (2000) 321-339.

[15] A. Johri, A study of foreign Investment Pattern on Context to Indian Stock Market and Its impact on Stock market Returns. *International Journal of Research in Management*, (2012) 139-157.

[16] C. Kodongo, Foreign Exchange Risk and the Flow of International Portfolio Capital: Evidence from Africa's Capital Markets. *Journal of International Finance*, (2011) 1-250.

[17]   S. Liu, The impact of index rebalancing and their implications. Some new evidence from Japan. *International Financial Markets, institutions & Money*, (2006) 246-269.

[18]   C. Merton, A Simple Model of Capital Market Equilibrium with Incomplete Information. *Journal of Finance*, (1987) 483-510.

[19]   A. Muntasir, Portfolio Investment and Its Impact on Exchange rate and Composit Stock Index Volatility in Indonesia. *Journal of International Finance*, (2015) 1-22.

[20]   D. Nguyen, and M. Bellalah, Stock market Liberalization, Structural breaks and dynamic changes in emerging market volatility. *Review of Accounting and Finance*, (2008) 396-411.

[21]   L. Nguyen, and N. Le, Impact of Foreign Portfolio Flows on Stock Market Volatility-Evidence from Vietnam. *Journal of Emerging Issues in Economics, Finance and Banking*, (2013) 872-887.

[22]   O. Nyangoro, Foreign Portfolio Flows and Stock market Performance. *CSAE Conference Paper*, (2013) 1-33.

[23]   B.A. Ozurumba, Impact of Stock market Returns on Foreign portfolio Investment in Nigeria. *Journal of Economics and Management*, (2012) 10-19.

[24]   P. Pavabutr and H. Yan, Impact of Foreign Portfolio Flows on Emerging Market Volatility. *Australian Journal of Management*, (2007) 345-368.

[25]   P. Pavabutr, and H. Yan, Differential Impact of Foreign portfolio Flows on Emerging Market Returns: Evidence from Thailand. *Journal of International Finance*, (2013) 44-86.

[26]   K. Rajput, and M. Namita, Foreign Investment Flows and its Impact on Stock Market: A study on Lead-Lag volatility Spill-over. *Asian Journal of Finance and Accounting*, (2012) 18-38.

[27]   A. Richards, The Trading Behaviour and price Impact of Foreign Investors in Asian Emerging Equity Markets. *Journal of Financial and Quantitative Analysis Volume 40*, (2005) 1-27.

[28]   A. Sanvicente, The Foreign capital Flows and Behaviour of Stock Prices at BM & BOVESPA. *BAR-Brazilian Administration Review*, (2014) 86-106.

[29]   M. P. Saunders, R*esearch methods for Business Students 5th Edition.* Essex: Prentice Hall Financial Times.(2009) 190-210

[30]   R. Stulz, International portfolio Flows and security Markets . *Working Paper*, (1995) 257-93.

[31]   F. Usman, and S. Uyaebo, (2015). Application of Asymmetric GARCH Models. *Journal of Applied Statistics*, (2015) 134-160.

[32]   V. Warther, Aggregate Mutual Fund Flow and Security Returns. *Journal of Financial Economics*, (1995) 209-235.