

Equity unit trust funds flow and stock market returns: Evidence from Kenya

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Abstract

This study sought to evaluate the relationship between equity unit trust fund flows measured as purchases and sales and the Nairobi Securities Exchange (NSE) stock market return. The study employed Vector Autoregressive model and tested for Granger causality using monthly data for the period starting January 2010 to December 2017. The granger causality results showed that equity fund sales contain information that can explain stock market return and stock market return contain information that can explain equity fund purchases thus unidirectional causality. Impulse response results showed that equity fund purchases have a predominantly positive relationship with NSE stock market return and NSE stock market return have a positive relationship with equity fund purchases. This implies that an increase in stock market return will lead equity fund managers to purchase more securities and as the equity fund purchases increase, the demand for those stocks will increase causing the stock prices to increase and consequently increase stock market return. In contrast, equity fund sales are predominantly negatively related with stock market return and stock market return is also negatively related to equity funds sales. As the stock market return increase, the equity fund managers will decrease their sales. As the sales increase, the supply for those stocks will increase causing a decrease in prices and consequently a decrease in stock market return. Equity fund sales explain the variation in stock market return more than equity fund purchases while stock market return is a determinant of equity fund purchases and equity fund sales.

Keywords: Stock market return; Equity fund flows; Vector Autoregressive Model

JEL classification: G10, G20, G23

Introduction

Existing literature posit that unit trust funds flows are a significant determinant of the level of stock prices and consequently stock market return. Unit trusts also referred to as mutual funds have become a preferred means for investors to invest in. The worldwide open ended funds increased significantly over time. In the period starting 2010 to 2017, the number of funds increased by 24.18 percent from 86,310 funds in 2010 to 113,847 funds in 2017. The net assets held by these funds increased from \$29,033 billion in 2010 to \$49,294 billion in 2017, which is a 41 percent increase (International Investment Funds Association, 2018). Of these funds, 50 percent of the net assets were managed by America, while 36 percent were managed by Europe while the rest were managed by Asia Pacific and Africa specifically South Africa (IIFA, 2018). Despite this growth there is limited statistics on the unit trust industry in Africa except for South Africa. This is largely due to the fact that the unit trust industry is not well developed both in the number of funds and the net assets that they manage and there is therefore no formal platform for unit trust statistics in Africa.

Unit trusts in Kenya have significantly increased since their introduction in year 2001. In 2010, there were 11 registered unit trusts, which increased by 52 percent to 23 registered unit trusts in 2017 (Republic of Kenya (ROK), 2018). These unit trusts operate different funds based on the objectives of those funds, which includes equity funds, money market funds, fixed income funds and balanced funds. In Kenya, unit trust fund managers prefer investing in equities due to the positive relationship that exist between stocks invested and high performance on the unit trust returns (Maina, 2011).

Though an increase in these unit trusts in the world and in Kenya should lead to efficient capital markets, the nature of these open ended unit trusts which allows investors to redeem their investments at will and the use of professional fund managers to manage the unit trusts is a risk to financial stability. In fact as the funds grow in assets, they tend to become less efficient in their operations (Mbataru, 2012). According to the global financial stability report 2015, the behaviour of unit trusts especially in emerging markets largely Africa and Asia, is a key financial stability concern due to their role in causing systemic risk. On average, the contribution of emerging market equity funds flows to systemic risk is 4 percent, which is twice the risk of the advanced economies record of 2 percent (International Monetary Fund (IFM), 2015). In order to maintain financial stability, the financial sector regulators in Kenya rely on market forces. They believe that any measures to mitigate systemic risk should be at the minimum level required in order to be valuable, without interfering with the activities of the financial market (Republic of Kenya, 2012).

In addition to the impact equity fund flows may have on financial stability especially in Asia and Africa, various studies have been done in developed countries (see Oh and Parwada, 2007; Boyer and Zheng, 2008; Thonou and Tsekezos, 2008; Rakowski and Wang, 2009; Burucu and Contuk, 2011; Wang, 2012; Chang and Ke, 2014; Thenmozhi and Kumar, 2009 and Naik and Padhi, 2014;), with a few studies done in Africa specifically in South Africa (See Rudman, 2008; Anderson, 2009). A review of literature identified a gap in knowledge on this relationship in Kenya.

Moreover, trends in NSE 20 share index and equity fund flows over the study period showed a potential relationship between the variables and that understanding the relationship will help in taking measures that will curb potential systemic risk and maintain financial stability in the Kenyan stock market. In this context it was important to investigate; (i) Whether equity unit trust fund flows have a relationship with stock market return and the direction of that relationship (ii) whether the relationship is a positive or negative relationship (iii) investigate which variable explains the other variables the most. This was done through empirical analysis of equity fund flows as equity fund purchases and equity fund sales in order to determine whether the direction of the flows on the stock market had any significant difference in their impact.

The rest of the paper is structured as follows; The next section presents the relevant literature on the relationship between equity fund flows and stock market return. The third sections presents the methodology, empirical data and analysis, while results and discussion and conclusions are made in the fourth and fifth sections respectively.

Relevant literature

Various school of thoughts exist to explain the relationship between equity fund flows and stock market return. One school of thought argues that since unit trusts are managed by professional fund managers, they possess private information based on research and analysis and that should these fund managers use this information in their trading or follow a group with that information, the information will be reflected by the adjustments in the asset prices by either increasing or decreasing the stock prices and that consequently leads to an increase or decrease in stock market return (Lee, Shleifer and Thaler, 1991; Warther, 1995).

Another school of thought posits that although unit trusts are managed by professional fund managers, the trading actions of these unit trusts are not always based on information but a reaction on the market performance or simply following the crowd. The unit trust fund managers will either purchase stocks that performed well the previous period hoping that performance will continue (momentum/positive feedback traders) or purchase stocks that did not perform well in the last period assuming that the stock is undervalued and will soon revert to its fundamental value (contrarian/negative feedback traders) thus causing an increase or decrease in stock prices and consequently stock market return. Alternatively, the unit trust fund managers will simply follow the crowd (herd) or other investors thus leading stock prices away from their fundamental values (De Long, Shleifer, Summer and Waldman, 1990; Lakonishok, Shleifer and Vishny, 1992).

Contrary to the two school of thoughts that try to explain the relationship as being long term, Harris and Gurel (1986) and Shleifer (1986) argue that, where the stock market is not perfectly elastic, the relationship is temporary. For instance, equity fund purchases will lead to a temporary increase in stock prices from its fundamental values which causes an increase in stock market return. On the other hand, equity fund sales will lead stock prices to decrease below the fundamental value thus causing a decrease in market return. However, this temporary price pressure eventually subsides with the increase in demand and decrease in supply and the stock prices revert back to their fundamental value causing a positive or negative stock market return.

The relationship between fund flows and the stock market dates back to the work of Warther (1995), who analyzed the relationship between US stock fund flow, bond fund flow and precious metal funds to the stock market using time series monthly data for the period between January 1984 to June 1993. The study segregated the data into expected and unexpected flow and found that aggregated stock returns are highly correlated with concurrent expected flow. The study did not find any evidence of feedback trading by the funds. Since then various studies have been done to test this relationship and produced mixed results based on where they were done, variables used, methodology and the type of data.

Boyer and Zheng (2008) studied the relationship between aggregate stock market returns and investor cashflows for US funds at macro level. Using quarterly data for seven major groups, mutual funds, households, foreign investors, insurance companies, pension funds, closed ended funds and other institutions for the period 1952 to 2004. Using first order Vector Autoregressive model, they found evidence for positive feedback at quarterly frequency. Using monthly time series data for May 2005 to December 2011 and adopting autoregression model, Wang (2012) tested the relationship between stock mutual fund flow and stock market return in the Chinese market. As with Boyer and Zheng, (2008), the study found support for positive feedback since stock market return was significantly and positively related with the concurrent unexpected mutual fund flow. On the other hand, Oh and Parwada (2007), in their study on the relationship between mutual fund flows and stock market returns in Korea found that in aggregate mutual funds are negative feedback traders and that equity fund purchases do exert price pressure in the market. Using daily data for the period 1997 to 2003 and adopting Vector Autoregressive (VAR) model they found a positive relationship between fund flows measured as purchases and sales and the stock market returns.

In contrast to (Oh and Parwada, 2007; Boyer and Zheng, 2008; Wang, 2012) who found support for feedback trading hypothesis, Anderson (2009) found no support for positive feedback nor negative feedback in his study on the relationship between changes in holdings of unit trusts funds and returns in South Africa using quarterly Johannesburg Securities Exchange at sectoral level. The study used secondary time series data for the period between June 2002 and June 2009 and adopted Quasi experimental design.

On another note, (Rakowski and Wang, 2009; and Wang, 2012) found empirical evidence in support of Information Hypothesis. Using time series and cross sectional daily and monthly data for mutual funds in Korea, for the period between March 2000 to October 2006 and adopting Vector Autoregressive model, Rakowski and Wang (2009) found that there is a positive impact on fund return, information effect is long term and daily flows are mean reverting. These findings concurred with the findings of Wang, (2012) in his study on the Chinese market, who found support for information hypothesis and rejected the price pressure hypothesis.

Thonou and Tsekezos (2008), examined the non linear interaction between fund flow and stock market return in Greece. Using daily closing prices for the period between January 1988 to May 2005, and adopting a trivariate Vector autoregressive model, found that no long term relationship exist between fund flows and stock market return thus supported the fact that the relationship is primarily short term.

In detemining the direction (causality) of the relationship, Thonou and Tsekezos (2009) found a bidirectional non linear causality between market return and fund flow using daily data in Greece. Burucu and Contuk (2011) found no causality using quartely data in Turkey. Mishra (2011) using monthly data from India found that stock market return granger causes equity fund flow. The findings concurred with those of Oh and

Parwada (2007) who found uncausality flowing from market return to fund flows using daily data in Korea. In contrast, Wang (2012) using monthly data for China, found that it is mutual fund flows that can predict stock market return.

Research and Methodology

Data sources, description and construction

The equity fund variables; equity fund purchases and equity fund sales were collected from 17 unit trusts which had equity funds and/or balanced funds in daily units, for the period starting January 2010 to December 2017. However, the variables had very many gaps caused by the different transaction days among the unit trusts. It was thus imperative to convert all the study variables to monthly data. Daily equity fund flows were aggregated to get the monthly values while the NSE 20 share index closing values on each month were used as the monthly variables for NSE 20 share index.

In order to control for market and fund growth, following Oh and Parwada, (2007); Thermonzi and Kumar (2009) & Naik and Padhi, (2014), the variables equity fund purchases and equity fund sales flows were normalized through a rolling 90 day moving average of market capitalization before testing for stationarity. This was done by dividing the flow e.g. monthly equity fund purchases by the rolling monthly market cap.

Standardized purchases=Raw purchases/roll market cap

The normalization then produced standardized equity fund purchases and standardized equity fund sales. In order to rescale the data for ease of analysis, the equity fund flows were converted to their natural logarithms while the NSE 20 share index were converted to their natural logarithms where the monthly return $R_t = \ln$

$$\left(\frac{P_t}{P_{t-1}} \right) \quad (1)$$

Where:

P_t = NSE 20 share index for current month

P_{t-1} = NSE share index for the previous month

The raw data before normalization relates to the period starting January 2010 to December 2017 with 96 observations. After normalization, the study period reduced to 91 observations starting March 2010 to September 2017.

Model specification

Using equity fund data and NSE 20 share index, the study modeled the relationship based on Vector Autoregressive (VAR) model developed by Sims (1980) and following Oh and Parwada (2007) as follows:

$$\begin{bmatrix} R_t \\ F_t \end{bmatrix} = \begin{bmatrix} \alpha R \\ \alpha F \end{bmatrix} + \begin{bmatrix} \beta \lambda^{RR}(L) & \gamma \lambda^{RF}(L) \\ \delta \lambda^{FR}(L) & \theta \lambda^{FF}(L) \end{bmatrix} + \begin{bmatrix} \varepsilon_t^R \\ \varepsilon_t^F \end{bmatrix} \quad (2)$$

Where:

R is the NSE stock market return,

F is the equity fund flows.

$\lambda(L)$ are the distributed lag operators on lagged flow and returns.

Following Rakowski and Wang (2009), the relationship between equity fund flows and NSE stock market return is tested for information and price pressure hypothesis. If there exist a positive effect from past equity fund flows to future returns, then information hypothesis is supported, and where the effect persists, then it indicates a long term information effect. On the other hand, if the positive impact from past equity fund flows on future stock market return revert to the impact points, then there is a short term price pressure effect.

In order to test for positive and negative feedback, then the impact on stock market return is tested on equity fund flows. If equity fund flows are positively related to lagged returns, then positive feedback is present. On

the other hand, where equity fund flows are preceded by negative returns, then negative feedback exist (Rakowski & Wang, 2009).

In order to arrive at the optimal lag length for VAR, the study used sequential modified LR test statistic (LR), Final prediction error (FPE), Akaike Information Criterion (AIC), Schwartz information criterion (AIC) and Hannan-Quinn Information Criterion (HC). To make certain that the error term is not misspecified; the model chosen is the one that gives the lowest value of the information criterion (Enders 1995). The results of the lag selection are shown in Table 1.

Table 1: Lag selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-144.2685	NA	0.006689	3.506392	3.893207	3.541291
1	-113.0261	59.50927	0.003940*	2.976812*	3.324072*	3.116408*

*Indicates lag order selected by the criterion

The Final Prediction Criterion (FPE), Akaike Information Criterion (AIC), Schwartz information Criterion (SC) and Hannan-Quinn Information Criterion (HQ) were reported to have the lowest values at one lag. On the contrary, sequential modified LR information criterion (LR) had its lowest values at eleven lags. The optimal lag length is one that is selected by most information criterions. We consequently used one lag as the optimal lag length, as it had the highest frequency of selection using FPE, AIC, SC and HQ information criterions.

Stationarity tests

In order to run the data in a VAR model, the data needed to be stationary. Stationarity tests were performed using the Kwiatowski, Phillips, Schmidt and Shin (KPSS) (1992) model using Barlet Kenet estimation method and Newey- West Bandwith.

The test was based on the representation of y_t as

$$y_t = r_t + \delta_t + \varepsilon_t \quad \text{Where } r_t = r_{t-1} + u_t \quad (3)$$

$$\text{Null hypothesis } \mu_t \delta_\mu^2 = 0 \quad (\text{Stationary})$$

$$\text{Alternate hypothesis } u_t \delta_\mu^2 > 0 \quad (\text{Has unit root})$$

This test was preferred to other stationarity tests because it eliminates the potential low power against stationarity near root processes which are present in other unit root tests such as Augmented Dickey Fuller Test and Phillip-Perron (Kwiatowski, Phillips, Schmidt & Shin, 1992).

The null hypothesis in KPSS test is that the series is stationary against an alternative hypothesis that the series has a unit root (Kwiatowski, *et.al.*, 1992). If the KPSS Lagrange Multiplier (LM) statistic value is smaller than the critical value, the null hypothesis is not rejected thus the series is stationary. If the KPSS LM statistic value is greater than the critical values, the null hypothesis is rejected thus the series has a unit root.

Table 2: Stationarity test

Variables	KPSS LM statistic	critical value @5%	Inference
Stdpurchases	0.249528	0.463000	Stationary
Stdsales	0.243512	0.463000	Stationary
Nse20	0.172137	0.463000	Stationary

The standardized equity fund purchases variable was stationary since its LM statistic value was 0.249528 which was less than the critical value of 0.463000 at 5%. This implies that the series was stationary and thus the null hypothesis was accepted against the alternate hypothesis. The standardized equity fund sales variable was stationary given that the LM statistic value of 0.243512 was smaller than the critical value of 0.463000 at 5% hence the series was integrated of order I (0). The null hypothesis for NSE 20 Share Index at its natural logarithm was not rejected because its LM statistic value was 0.172137 which was smaller than the critical value of 0.463000 at 5%. The series was thus stationary and integrated of order I (0).

Dynamic (causality) relationship

In order to test whether the equity fund variables granger causes the stock market return, granger causality test was used on each of the variables; equity fund purchases and equity fund sales individually. According to Granger (1969), granger causality means that one variable precedes the other and the information content of that variable can predict the other variable and not the effect and result of one variable to the other.

The null hypothesis that equity fund flows on lagged values of stock market return are zero in the equation of stock market return on equity fund flows were tested against the alternate hypothesis that the equity fund flows on lagged flows of stock market return are not zero in the equation of stock market return on equity fund flows. The null hypothesis was rejected if the F-statistic value was greater than the p-value.

Impulse responses and variance decomposition

Due to the difficulty in interpreting the VAR estimation results, the impulse responses were constructed. The impulse responses trace out the responsiveness of the dependent variables in the VAR to shocks to the error term and the effects over time are noted (Brooks, 2019). The impulse responses helped to examine how long and to what degree a shock to a given equation has on all of the variables. On the other hand, variance decomposition was used as an alternative to the impulse response construction; it decomposes variation in an endogenous variable into the component shocks to the endogenous variable in the VAR.

Results and discussion

The characteristics of the data in terms of the mean, maximum value, minimum value, standard deviation, skewness and kurtosis for equity fund purchases, equity fund sales, and NSE 20 share index are shown in table 3.

Table 3: Data description

Variables	Mean	Maximum	Minimum	Std deviation	skewness	Kurtosis
Equity fund Purchases	99,612,350	721,065,067.78	0.00000000	116,000,000	2.321212	10.98030
Equity fund Sales	127,253,566.58	896,025,426.20	0.00000000	142,000,000	2.987997	14.95839
NSE 20 share Index	4152.18	5491.370	2794.27	662.00	0.035805	1.859363

Equity fund purchases were captured to measure equity inflows to the market and the unit of measurement was Kenya shillings. Equity fund purchases had an average value of Kshs 99 million; with a maximum of Kshs 721 millions in March 2010 as a result of the vibrant equity market (Republic of Kenya, 2011). This was indicated by a 40 per cent increase in market capitalization in 2010 which also made NSE the second best performing bourse in Africa (Republic of Kenya, 2011). The minimum value of Kshs 0.00 was as a result of reduced market liquidity experienced in 2017 (Republic of Kenya, 2018). The standard deviation of the variable purchases was Kshs 116 million. These could be explained by the fluctuating stock market performance, which lead the fund managers to purchase in large volumes during impressive performance and purchase in low volume during market downturns where they purchased other securities like the money markets (Republic of Kenya, 2017). The skewness and kurtosis were away from the standard value of 0 and 3 respectively indicating lack of symmetric distribution.

Equity fund sales were captured to measure equity outflows from the stock market by the unit trusts and the unit of measurement was Kenya shillings. The variable equity fund sales had an average value of Kshs 127 millions with a maximum value of Kshs 896 millions in mid 2014. This was boosted by the implementation of the automated trading system and an increased market liquidity which made sales easy for the unit trusts (Republic of Kenya, 2015). The Equity fund sales variable had a minimum value of Kshs 0.00 in Dec 2015, October 2016 and July 2017. During these periods, equity turnover was high, mainly due to large sales by foreign investors, thus decreasing the prices of stocks and consequently causing fund managers to hold their investments at zero sales (Republic of Kenya, 2017). The standard deviation of the equity fund sales variable was Kshs 142 million. This was explained by the fluctuations experienced in the high sales volume in 2014 and no sales in Dec 2015, October 2016 and July 2017. The values for skewness and Kurtosis at 2.99 and 14.96 respectively showed there was asymmetry in the variable (Republic of Kenya, 2018).

The NSE 20 Share Index was used to capture the Kenyan stock market return and the unit of measurement was index points. The variable NSE 20 share index had an average of 4152.18 index points with a maximum index point of 5491.37 and a minimum of 2794.27 index points. The maximum index point of 5491.37 was due to a favorable financial market in February 2015 (Republic of Kenya, 2016). The minimum of 2794.27 in January 2017 was due to the banks stock shocks caused by the capping of their interest rates, which led to the reduction in their stock prices (Republic of Kenya, 2018). The index had a standard deviation of 662.00 point implying that the stock market performance fluctuated over the study period. The values for skewness and Kurtosis were at 0.04 and 1.86 respectively which showed that Nse 20 share index has a symmetric distribution.

Relationship between equity fund flows and stock market return

The VAR model was run to each equation of stationary data using one lag as selected by the lag length criterion. The analysis produced two types of regressions; standard regression statistics for each equation using their residuals and regression statistics for the VAR system as shown in table 4

Table 4: VAR estimates

	NSE 20 index	share Equity purchases	fund Equity sales	fund
NSE 20 share index (-1)	-0.025675 (0.10332) [-0.248497]	7.684418 (2.88513) [2.66345]	-3.476338 (2.48691) [-1.39785]	
Equity fund purchases(-1)	0.005370 (0.00307) [1.74672]	0.487593 (0.08585) [5.67965]	-0.014716 (0.07400) [-0.19886]	
Equity fund sales (-1)	-0.009197 (0.00366) [-2.51415]	-0.077301 ((0.10215) [-0.75677]	0.368886 (0.08805) [4.18963]	
C	0.072603 (0.08557) [0.84845]	10.42593 (2.38942) [4.36338]	11.75062 (2.05962) [4.18963]	
R- Squared	0.098572	0.356937	0.213842	
Adj.R-Squared	0.068855	0.335737	0.187925	
Sum sq. resids	0.179559	140.0024	104.0219	
S.E equation	0.04420	1.240358	1.069157	
Log likelihood	163.0795	-153.2188	-139.1086	
Akaike SC	-3.349043	3.309870	3.012812	
Schwarz SC	-3.241511	3.417402	3.120343	
Mean dependent	0.000424	17.63481	18.17695	
S.D dependent	0.046033	1.521868	1.186439	
Determinant resid covariance (dof adj.)		0.003370		

Determinant resid covariance	0.002962
Log likelihood	-127.8513
Akaike Information Criterion	2.944237
Schwarz information criterion	3.266832
No of coefficients	12

Table 4 shows the VAR results for 95 observations after adjustment. The values in () are the standard errors while the values in [] are the t-statistics.

The VAR results are conversely not interpreted as they give very little theoretical information about the relationships between variables (Brooks, 2014). They are used to develop impulse response functions and forecast error variance decompositions that explain the relationships in the variables.

After the VAR equation was estimated, several VAR diagnostic tests were carried out. The tests were crucial for purposes of determining the appropriateness of the generated VAR model and to avoid spurious estimation results. The results show that, the VAR model was stable since all the roots of the characteristic polynomial were within the circle. If VAR was not stable, certain results such as impulse response standard errors would not be valid (Brooks, 2014). The residual serial correlation was absent at lag 1 and the Wald test for 1 lag chi-square was greater for all variables at 5% significance. This implies that it was justified to use one lag in the model. The VAR model residuals are multivariate normal since the joint Jarque Bera Test was 66.207 with a p-value of 0.0000.

Direction of the relationship (Dynamic/causality relationship)

The null hypothesis that equity fund purchases do not granger cause stock market return was not rejected since the P- value of 0.0957 was greater than 0.05 significant level. On the contrary, we reject the null hypothesis that stock market return does not granger cause equity fund purchases at 1% level of significance. This suggests that the stock market return has information that can be used to predict equity fund purchases but equity fund purchases cannot predict stock market return thus a unidirectional causality.

Table 5: Granger causality test

Null hypothesis	F statistic	Lags	Probability	Inference
Equity fund purchases does not granger cause stock market return	2.83431	1	0.0957	No Causality
Stock market return does not granger cause equity fund purchases	8.83447	1	0.0038**	Causality
Equity fund sales does not granger cause stock market return	6.13147	1	0.0151*	Causality
Stock market return does not granger cause equity fund sales	2.17306	1	0.1439	No Causality

**Indicates rejection at 1% level of significance

*Indicates rejection at 5% level of significance

The null hypothesis that equity fund sales do not granger cause stock market return was rejected at 5% significant level since its probability value of 0.0151 was less than 0.05. However, we failed to reject the null hypothesis that stock market return does not granger cause equity fund sales at 5% significance level since its p-value was 0.1439 which is greater than 0.05. This implies that equity fund sales have information that can predict the stock market return but the stock market return does not have information that can predict equity fund sales thus a unidirectional causality.

In general, the findings show that the performance of stock market return impacts on the equity fund purchases decisions in Kenya while equity fund sales decisions impacts on the stock market return. These results concur with the results of Oh and Parwada (2007) who also found that stock market returns can predict equity fund purchases but differ in that stock market return in Kenya do not predict equity fund sales but equity fund sales can predict the stock market return. The findings also differ with the results of Burucu and Contuk (2014) who found no causality between investment funds flow and earnings of markets in Turkey

and Naik and Padhi (2014) who found bidirectional causality between institutional fund flows that included mutual funds and the stock market return in India.

Impulse response analysis

From the VAR equations estimated, the coefficients were used in the derivation of impulse responses. The impulse response helps to determine whether a variable has a positive or negative effect or shock on the other variable and how long the effect will take to work through the system.

Impulse responses for stationary VAR should die out to zero. Using the VAR estimates, the impulse responses of the variables were tested using 12 periods since the data was in monthly form. The impulse response did not change with the increase in the number of periods. This means that one standard shock on a variable takes less than twelve months for the effects to take place after which they diminish. The months were plotted on the horizontal axis, while the natural logarithms were plotted on the vertical axis.

The impact of one standard deviation shock on NSE stock market return to equity fund purchases is shown in figure 1

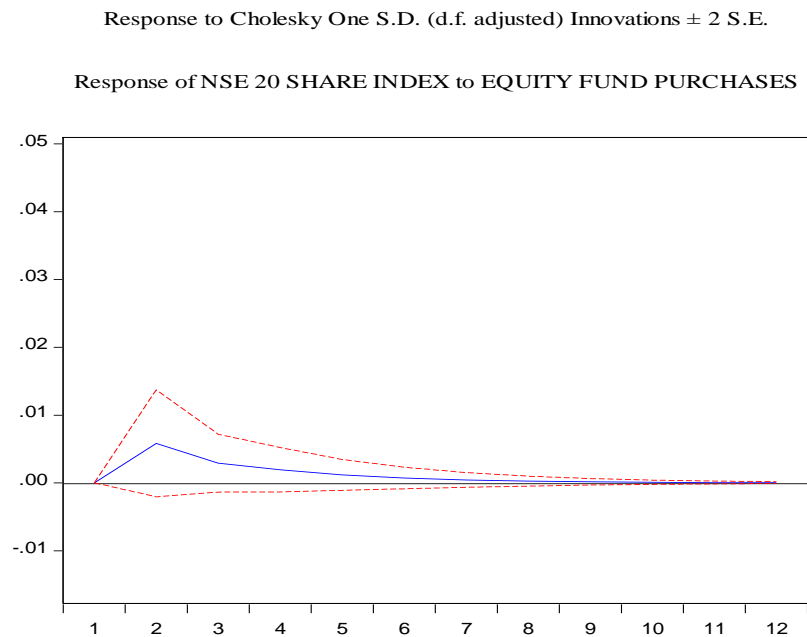


Figure 1: Effect of NSE stock market return to equity fund purchases

The response of one standard deviation shock on NSE stock market return to equity fund purchases resulted in a predominantly positive trend. The impact of NSE shock to fund purchases increases for one month then declines from the second month fizzling on the eighth month. This implied that an increase in stock market return would initially lead to an increase in equity fund purchases for a period of one month. From the second month an increase in stock market return would lead to an increase in equity fund purchases but reducing in quantity as the time increases.

This phenomenon is attributed to equity fund managers being momentum traders who trade on stocks that performed well in the recent past depicted by the increased stock market return. This will consequently lead to an increased demand for the stocks whose price increase will cause the increase in market return and reduced supply signified by the increase in equity fund purchases but in a decreasing trend. NSE stock market return can therefore be said to be positively related with equity fund purchases. These results concur with the findings of Oh and Parwada (2007) who found a positive correlation between stock market returns and purchases in Korea using daily data, and differ with Naik and Padhi (2014) who found that stock market returns have a negative association with equity fund purchases using daily data. The study findings support the positive feedback hypothesis that states that a shock to security returns leads to a change in equity fund purchases which in turn leads to a further change in security returns (Thermonzi & Kumar, 2007).

The impact of one standard deviation shock on equity fund purchases to the NSE stock market return is shown in figure 2

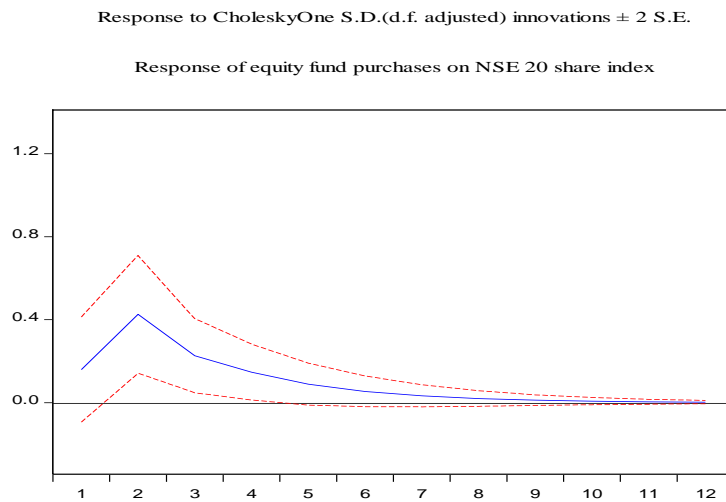


Figure 2: Effects of equity fund purchases to NSE stock market return

The response of one standard deviation innovation of equity fund purchases on NSE stock market return is predominantly positive. The effects start off on a stable and increasing path in the first month and start declining from the second month and fizzles out by the twelfth month. The effects are therefore felt in a span of twelve months.

Equity fund purchases are predominantly the initiative of the equity fund managers who act based on the performance of the stock market return. An increase in stock market return will lead to an increase in equity fund purchases. Since equity fund managers are assumed to be informed investors, an increase in their purchases will be seen as a signal to other investors to buy stock. As the demand for the stocks increases, it exerts a temporary price pressure by increasing the prices of the stocks above the equilibrium which is visible by the sharp increase between the second and the third month. The price pressure then subsides and the stock prices revert back to their fundamental values causing a positive and reducing NSE stock market return. This implies that equity fund purchases have an indirect impact on the stock market return. The findings support the price pressure theory which suggests that an increase in equity fund purchases would stimulate a greater demand by individuals to hold stocks and thus cause share prices to increase consequently increasing stock market return (Thermonzi & Kumar, 2007).

The impact of one standard deviation shock on equity fund sales to stock market return is shown in figure 3.

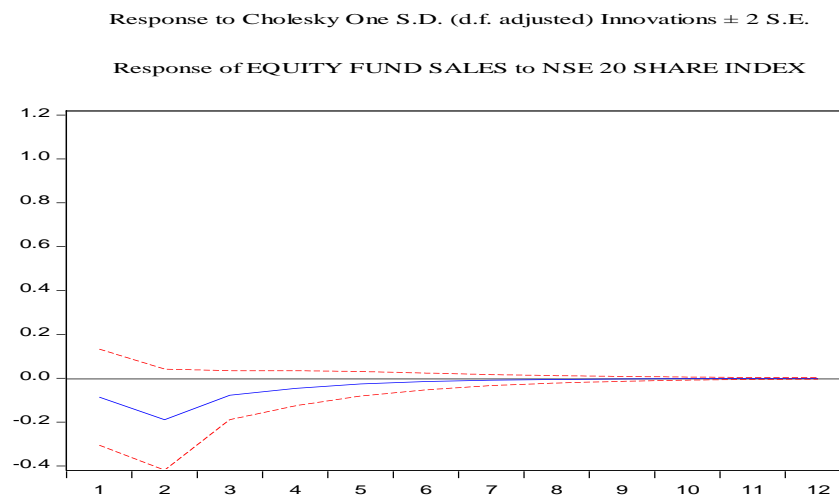


Figure 3: Effects of equity fund sales to NSE stock market return

The impact of one standard deviation shock on equity fund sales to NSE stock market return resulted in a stable path predominantly on the negative horizon. The effects are felt for one month and then declines from the second month fizzling on the tenth month. This implied that an increase in equity fund sales would lead to a decrease in NSE stock market return and this effect lasted for a period of ten months after which the effects would fizzle out.

Due to the nature of open ended equity funds to allow unit holders to redeem their investment at will, equity fund sales are not based on fund managers' investment information but on the reaction of the unit holders especially if other traders are pulling out of the market. Should all equity holders decide to redeem their investments from the equity funds, the fund managers will be forced to liquidate their investments irrespective of the value of the investment. This will cause an increase in the supply of the stocks thus reducing the stock prices and consequently reducing NSE stock market return. These findings concurs with Thonou and Tsekezos (2009) who found that in the Greece market, outflows of cash are translated into stock sales from the fund portfolio causing a drop in stock prices and consequently stock market return.

The impact of one standard deviation shock on stock market return to equity fund sales is shown in figure 4

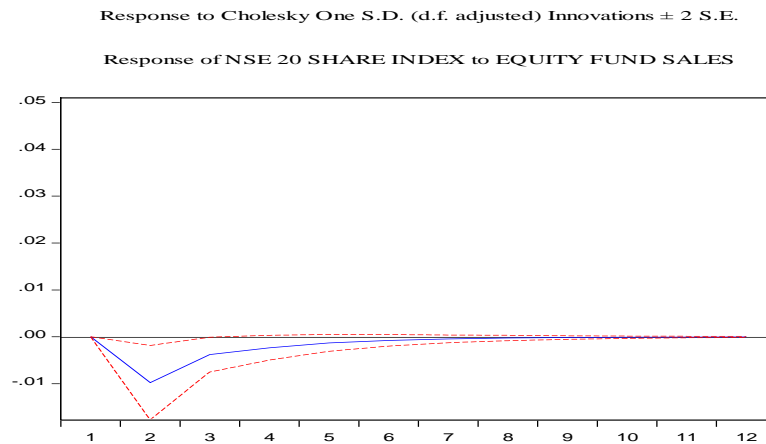


Figure 4: Effects of NSE Stock market return to equity fund sales

The response of one standard deviation shock of NSE stock market return on equity fund sales was predominantly negative. The impact of NSE stock market return shock to equity fund sales decreases for one month then increases from the second month fizzling on the ninth month.

Generally, equity fund sales are mostly initiated by the unit holders who redeem their investments forcing the equity fund managers to sell their portfolios. This implies that in Kenya equity fund sales decisions are made irrespective of the stock market return performance thus the stock market return cannot be used to predict equity fund sales. However, should a large group of unit holders redeem their investment; they will increase the supply of the stocks and reduce the prices of these stocks and consequently the stock market return. The aftermath will be that the unit holders will reduce their redemptions and consequently the equity fund sales in order to avoid losses. These effects will last for nine months after which they will sizzle out. These findings differ with the findings of Oh and Parwada (2007: Thermonzi and Kumar, 2007); Naik and Padhi ,2014) who found a positive association on the stock market return with mutual fund sales using daily data.

Variance decomposition

The VAR equation for equity fund purchases, equity fund sales and stock market return were decomposed to determine how much of the impulses were due to its own shock and how much is due to shocks to other variables.

The results of the variance decomposition of stock market return are shown in Table 6.

Table 6: Variance decomposition of stock market return

Variables	1 st month	3 rd month	6 th month	9 th month	12 th month
Stock market return	100.00	92.88382	92.32539	92.30159	92.30049
Equity fund purchases	0.0000	1.986929	2.231205	2.243409	2.243993
Equity fund sales	0.0000	5.129247	5.443401	5.455000	5.455516

In the first month the stock market return is explained by its own shock at 100 percent. This implies that equity fund purchases and equity fund sales did not contribute to the stock market return in the first month. The variations of own shock on stock market return reduced to 92.88 percent in the third month while that of equity fund purchases increased to 5.12 per cent and equity fund sales increased to 1.99 percent respectively. In the sixth month the stock market return variation to own shock reduced further to 92.32

percent. In the ninth month, the variance decomposition reduced to 90.30 percent and continued to reduce as the number of periods increased. By the 12th month the variations due to stock market return own shock was at 92.30 percent. This implies that stock market return is strongly endogenous while equity fund sales is weakly endogenous and equity fund purchases exhibit strong exogeneity.

Since the study sought to evaluate the relationship between stock market return and equity fund flows measured as equity fund purchases and equity fund sales, the forecast error variance decompositions for the equity fund purchases and equity fund sales were also determined.

The variations brought about by equity fund purchases we also analyzed in table 7

Table 7: Variance decomposition of equity fund purchases

Variable	1 st	3 rd	6 th	9 th	12 th
Stock market return	1.653159	11.39962	12.26883	12.30981	12.31175
Equity fund purchases	98.34684	87.36723	85.80222	85.51505	85.50976
Equity fund sales	0.00000	1.233154	2.004812	2.175143	2.178488

The variations in equity fund purchases in the first month were mainly due to its own shocks at 98.34 percent and the rest were explained by stock market return. In the third month it reduced its variation to 87.36% while the effects of stock market return and equity fund sales increased. By the 12th month, it had decreased to 85.50 percent, while the effects of stock market return and equity fund sales had increased to 12.31 percent and 2.18 percent respectively. The findings show that equity fund purchases are strongly endogenous, while stock market return is weakly endogenous and equity fund sales strongly exogenous.

The results for the variance decomposition on equity fund sales are shown in table 8

Table 8: Variance decomposition of equity fund sales

Variable	1 st	3 rd	6 th	9 th	12 th
Stock market return	0.650116	3.573933	3.755661	3.762532	3.762838
Equity fund purchases	0.615085	0.567715	0.639595	0.646552	0.646928
Equity fund sales	98.73480	95.85835	95.60474	95.59092	95.59023

The results show that equity funds sales shocks are predominantly explained by variations in its own shocks at 98.73 percent during the first month while the rest is explained more by stock market return than equity fund purchases. In the third month, the variation reduced to 95.85 percent while the effects of stock market return increased more than in equity fund purchases. By the twelfth month, the variations on equity fund sales to own shock had reduced to 95.59 percent while the effects of stock market return increased over time and notably more than equity fund purchases did.

This implies that equity fund sales are strongly endogenous while stock market return and equity fund purchases are weakly endogenous and strongly exogenous respectively. This phenomenon may be explained by the actions of the fund managers to adopt herding trading strategy or the reactions of the unit holders to redeem their investment at anytime without necessarily being a reaction of the NSE stock market performance.

The results of the variance decomposition shows that for all variables, stock market return, equity fund purchases and equity fund sales are mostly explained by their own series as suggested by Brooks, (2014). Apart from their own series, stock market return is also explained by equity fund sales more than it is explained by equity fund purchases, while equity fund purchases and equity fund sales are explained by stock market return.

Conclusion

The study sought to evaluate the relationship that exists between equity unit trust fund flows measured as purchases and sales and the NSE stock market return. Granger causality tests showed that there exists a unidirectional causality from stock market return to equity fund purchases and from equity fund sales to stock

market return. Impulse responses on one standard shock on the variables revealed that equity fund purchases had a predominantly positive relationship while equity fund sales had a negative relationship to the stock market return and the effects of the shocks lasted for less than twelve months. This was attributed mainly to the nature of the unit trust. The study found evidence for positive feedback and price pressure in the Kenyan stock market. In addition to already existing knowledge, the Kenyan market showed a negative relationship between stock market return and equity fund sales, which differed with the existing literature (see Oh and Parwada,2007; Thermonzi and Kumar,2007; and Naik and Pahdi,2014). From the research, it was noted that using a high frequency data like daily data would give sharper inferences unlike monthly data, this is because the effects were concentrated to a short term periods that were less than three years. Besides, a comparison study on a yearly basis would add more value to the results. The direction of the flows is important since the findings differed for purchases and for sales. In general, equity fund flows showed a significant relationship with NSE stock market return and therefore their contribution to the stock market return should not be overlooked in market activity policies.

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