

# Symmetric and Asymmetric effect of Investor Sentiment on Performance of Equity Market in Nairobi Securities Exchange, Kenya

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**Abstract:** The key aim of the study was determining the effect of investor sentiment on performance of equity market in Nairobi Securities Exchange, Kenya. Specifically the study determined the effect of investor sentiment on performance of equity market in Nairobi securities exchange, Kenya. The study was based on behavioral finance theories. The study was also based on positivism paradigm and explanatory research design. The study relied on monthly secondary data obtained from Central bank of Kenya, Nairobi Securities Exchange, Capital Markets Authority and Kenya National Bureau of Statistics between 2008 and 2018. The target population was all 67 listed firms in Nairobi securities exchange as captured by the Nairobi Securities Exchange All Share Index. The instruments of data collection were document review guides. The study used ARDL and NARDL models for data analysis. The findings of the study reported significant positive relationship between investor sentiment and performance of equity market. The study recommended that capital markets authority should monitor changes in investor sentiment in the market as it significantly affects equity market performance.

**Keywords:** Investor sentiment, contagion effects, systematic risk, macro risk factors, asymmetric effects, private sector credit, causality.

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## 1. INTRODUCTION

### 1.1 Background to the Study

A stock market or a securities exchange refers to a market where companies and governments can raise funds for their operations in both the short run and long run. A stock market comprises of a bond market and an equity market (Borowski, 2010). Companies use bonds or shares to generate funds for expansion (Kreinovich & Sriboonchitta, 2018). Equity markets are significant contributors to economic development in an economy. Equity markets provide avenues for firms to raise business capital, facilitate investment through savings mobilization, assist companies to grow, boost governance of corporations, expose small investors to available opportunities for investment and raise capital for the government (African Development Bank Group, 2018). Performance of equity market is measured by stock indices and market capitalization. Nairobi Securities Exchange is the only approved stock exchange in Kenya. (Capital Markets Authority, 2018b).

Performance of equity market is a requirement for a country's economic growth. Kenya's vision 2030 recognized the importance of financial services in achieving the targeted gross domestic product growth of ten percent per year by incorporating the equity market as a one of key pillars for economic growth (Capital Markets Authority, 2018a). The government, through the capital markets authority has developed a master plan for the period between 2014 to 2023 aimed at making Nairobi securities exchange the preferred investment destination in Africa (Government Of Kenya, 2018).

However, despite being in existence since 1954, the Nairobi securities exchange has remained constrained with low market capitalization and high concentration risks whereby a few large companies dominate trading. On Average, the top 5 companies; Safaricom, Equity bank, Cooperative bank, East African Breweries and Kenya Commercial Bank control 70% of market capitalization in the Kenyan exchange exposing the market to financial contagion effects (Ngugi, Maana, & Amanja, 2013;Wanja, 2017). The Equity market also suffers from low number of listings with the last initial public offer being in 2014. There have been only 10 initial public offers and 11 offers by introduction for the period 2006 to 2018. In addition, the NSE has experienced a drop in the key performance indices such as the NSE 20 and NASI between 2008 and 2018 (Capital Markets Authority, 2018a).

### **1.2 Theoretical literature review**

Kahneman and Tversky (1979) and Shefrin(2000) are the key proponents of herding behaviour bias. According to Baker and Puttonen (2017) herding tendencies occur when investors flock together under conditions of uncertainty due to social pressure to conform. Investors under the influence of herding behavior mimic the behavior of other investors in the market in purchase and sale of securities. Herding is caused by information availability in the market whereby different investors receive different information of varying type and quality. The differences in investor characteristics and information available leads investor groups to behave differently while exhibiting herding tendencies within the groups sharing similar information (Itzhak, 2018).

During herding, fundamental information is disregarded by individual investors in favor of what the masses are doing regarding underlying securities and specialist information. Similarly, common individual investment decisions across the market, tends to move the market in the same direction with investors seemingly making buying or selling decisions simultaneously (Nofsinger & Sias, 1999 ). Herding behavior results to negative effects in the stock market characterized by poor and incorrect decision-making by the general population due to correlated behavioral patterns across individuals in a market (Lehner & Harrison, 2014). Herding behavior bias is also responsible for reduction in market efficiency due to dissemination of information, increased destabilizing volatility in the market and contagion between markets (Itzhak, 2018).

Virigineni and Rao (2017) put in that mental and emotional factors are inseparable when investors are gathering investment information. Shefrin (2000) argues that investors tend to overestimate their capacity leading them into unsafe investments. Sulphey(2014) observes that herding behaviour is a frequent occurrence in stock markets despite its costly implications characterised by investors loosing their wealth by entering the market late after the investors who initiated the herding behaviour have left the market.

According to Leibowitz, Emrich and Bova (2009) institutional investors are not immune to herding behaviour either. They observe that most volatility in fund portfolios ranges between 10 to 11 percent on average regardless of the strategies, status and mission used by the funds. This phenomenon results from investors assuming that other investors have the correct idea (Peterson, 2011). Consequently, a large number of investors sharing the same beliefs even when the shared beliefs are erroneous can move the market in a certain direction with stock prices incorporating such behaviour. Herding behaviour causes prices to deviate from equilibrium and investors are forced to trade on inefficient prices (Lehner & Harrison, 2014).

Wilkinson and Klaes (2017) associate stock market booms and crashes to herding behaviour. They explain that professional fund managers managing large scale investments and responsible for their clients returns, exhibit herding behaviour in the sense that it would be better to be wrong in a crowd than be right individually. Such fund managers choose the safe strategy that makes investors happy by investing where other funds are investing. Herding behaviour bias links investor sentiment to performance of equity market. Based on arguments of herding behavior bias, the study determined the effect of investor sentiment on performance of equity market in NSE, Kenya. The study used trading volume as a proxy for investor sentiment as empirically used by Baker and Wurgler (2007).

### **1.3 Empirical Literature Review**

Anusakumar, Ali and Wooi (2017) examined the effect of investor sentiment measured by trading volume on equity market returns of emerging Asian markets. The findings indicated that equity specific sentiment positively affects equity returns. The findings also indicated country variations on the effects of market wide sentiments on stock returns. Anusakumar, Ali and Wooi (2017) study was conducted in Asian markets which are a developed nations with well-established equity markets and so the findings may not be applicable to the Kenyan market which suffers from low

capitalization and small number of listed firms. The current study also utilized ARDL and NARDL methodology to capture symmetric and asymmetric effects and incorporated moderation effect of institutional ownership. The current study also incorporated causality which was ignored by the Anusakumar, Ali and Wooi (2017).

Gizelis and Chowdhury (2016) evaluated whether investor sentiment proxied by closed end fund discount and European Commission compiled investor sentiment indicators influenced market returns in Athens stock exchange for the period between 1995-2014 using regression analysis. The findings of the study indicated that investor sentiment weakly explains equity returns. Gizelis and Chowdhury (2016) ignored moderation effects, which formed the subject matter of the current study. In addition, Gizelis and Chowdhury (2016) ignored foreign equity flows, domestic savings, private sector credit and inflation captured by the present study. Lastly, Gizelis and Chowdhury (2016) used regression analysis while the current study used ARDL and NARDL, which accommodates lags, symmetric and asymmetric effects.

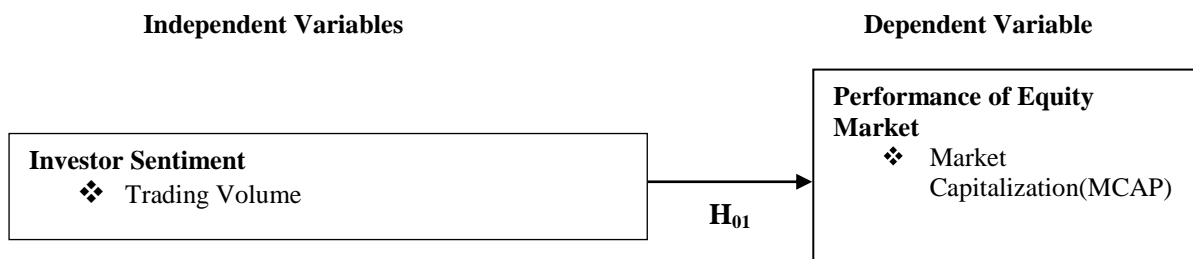
Kim and Park (2015) established the influence of individual investor sentiment on Korean stock market returns. The study concluded that equity returns were not affected by individual investor sentiment though individual investor contrarian trading behaviour influenced specific stock prices thus providing liquidity to the market implicitly while receiving compensation for the same in form of limited excess returns adjusted for the market. The study by Kim and Park (2015) was conducted in Korea, which is a developed nation with well-established equity markets and so the findings may not be applicable to the Kenyan market, which suffers from low capitalization and small number of listed firms hence the need to test the findings of Kim and Park (2015) locally. Kim and Park (2015) also ignored foreign equity flows, private sector, domestic savings, inflation and moderation effects captured by the present study. The present study also analysed long run effects, short run effects and causality relationships between the variables which was ignored by the previous study.

Fayyazi and Maharlouei (2015) used OLS and granger causality to examine the relationship between investor sentiment proxied by investor sentiment index and stock market index in Tehran stock exchange from 2001 to 2014. The findings indicated a significant positive effect of investor sentiment on stock market performance in Tehran stock exchange, Iran. Fayyazi and Maharlouei (2015) used investor sentiment index as proxy for investor sentiment while the current study used trading volume as proxy for investor sentiment. Fayyazi and Maharlouei (2015) also ignored moderation effects and asymmetric effects which were captured by the current study using ARDL and NARDL models.

Li and Zhang (2008) used a unique data set to examine the effect of investor sentiment on stock market behaviour in China. The study found that investor sentiment had a positive effect on stock returns in China. Li and Zhang (2008) study was conducted in China which is a well-developed market with different economic, social and political structures hence the need to test the findings in the emerging market of Kenya. The current study also examined asymmetric effects and moderation effects which were ignored by Li and Zhang (2008). The current study also incorporated foreign equity flows, domestic savings, private sector credit and inflation as independent variables which were ignored by Li and Zhang (2008).

#### 1.4 Conceptual Framework

The conceptual framework assimilates investor sentiment ownership and performance of equity market.



**Figure 2.1: Conceptual Framework**

Source: Researcher, 2018

#### 1.5 Statement Of The Problem

Kenya's vision 2030 envisions the equity market as a source of financing for both corporate and government sectors aimed at achieving a 10 per cent average annual gross domestic product growth with 90 Percent market capitalization to Gross Domestic Product (Government of Kenya, 2007). The government of Kenya has instituted reforms on corporate

governance, conduct of business, introduction of real estate investment trusts, demutualization and introduction of growth enterprise segment to improve stock market efficiency and performance. However, Kenya’s equity market remains constrained with low market capitalization to gross domestic product, absence of new initial public offerings since 2014 and few listed stocks limiting liquidity. For instance, between the period 2015 to 2018, market capitalization to Gross Domestic product in Kenya stood at approximately 33 percent in 2015, 27 percent in 2016 and 31 percent in 2017 before dropping to 24 percent in 2018 against the targeted 90% market capitalization to GDP (Financial Sector Regulators, 2018). The market has high market concentration risks whereby the top 5 companies by market capitalization; Safaricom, East African Breweries, Equity Bank, Kenya Commercial Bank And Cooperative Bank control 70% the market value on average indicating their market dominance and exposing the equity market to financial contagion effects (Capital Markets Authority, 2018). Furthermore, performance of equity market indicators has declined significantly during the period under study. Investors lost an average of KES.20 billion in 2009, KES.299 billion in 2011, KES.262 billion in 2015 and KES.461 billion in 2018 in market capitalization losses (Capital Markets Authority, 2018b) equivalent to 20 percent of the country’s budget for the year 2018/2019. On average, the equity market has contributed less than one percent to economic growth against the government’s vision 2030 target of ten percent. (Ngugi, Maana, & Amanja, 2013). Consequently, the study determined the effect of investor sentiment on performance of equity market in Nairobi securities exchange, Kenya.

**1.6 Research Hypothesis**

Investor sentiment has no effect on performance of equity market in Nairobi securities exchange Kenya.

**2. RESEARCH DESIGN AND METHODOLOGY**

Positivism research paradigm forms the backbone of the study. Positivism paradigm views reality as real, external and independent and advocates for the use of scientific methods when dealing with observable and measurable facts (Sharma., 2010). The researcher maintains an objective stance. (Saunders, Lewis, & Thornhill, 2016). Existing financial theories were used to derive hypotheses for data collection, analysis and empirical testing to support or reject hypotheses. This was concurrence with Mogaka (2016).

**2.1 Model Specification**

The study adopted an ARDL model developed by Pesaran, Smith and Shin(2001) and applied by Odhiambo(2010), Ahmed and Ullah(2013) and Ho( 2017) to determine the effect of macro risk factors and investor sentiment on performance of equity market in NSE, Kenya. The model was selected because the variables were of mixed stationarity; Market capitalisation, domestic savings, private sector credit, inflation and investor sentiment were non stationary and had to be differenced to become stationary I(1). Foreign equity flows and institutional ownership were stationary at level. Guided by Meo(2018) and Shrestha & Bhatta (2018) (see figures 3.3a and 3.3b) the study adopted an ARDL model. Further, the model tested for cointegration and the presence of cointegration was followed by granger causality test as stipulated by Shrestha & Bhatta (2018).

The generalised ARDL (p,q) model is specified as follows.

$$Y_t = \gamma_0 + \sum_{i=1}^p \delta_i Y_{t-i} + \sum_{i=0}^q \beta_i X_{t-i} + \epsilon_{it} \dots\dots\dots (3.1)$$

Where  $Y_t$  is a vector and the variables in  $X_t$  are allowed to be integrated of order zero, I(0) or integrated of order one, I(1) or co integrated.  $\beta$  and  $\delta$  are coefficients while  $\gamma$  is a constant.  $i = 1 \dots k$  number of variables in the model; p, q represent optimal lag order.

**2.2 Operationalization and Measurements of Study Variables**

**Table 1: Variable Operationalization and Measurement**

Variable Type	Variable	Operationalization	Measure	Direction Hypothesized
Dependent Variable	Performance Of Equity Market	❖ Market capitalization-Measures the market value of listed company for shares issued	❖ Shares outstanding * market price per share.	Positive
Independent Variables	Investor Sentiment	❖ Investor misevaluation of stock prices	❖ Trading Volume in millions	Positive

### 2.3 Data Sources

The researcher obtained Kenyatta university graduate school approval letter from the university, which was used to obtain a research permit from National Commission of Science and Innovation (NACOSTI) allowing the researcher conduct research in Nairobi, County. Monthly secondary data on market capitalization was obtained from the aggregated figures provided by the Capital Markets Authority and the Nairobi Securities Exchange. Monthly secondary data on investor sentiment was obtained from the Capital Market Authority’s website, reports and handbooks

### 2.4 Data Analysis and Presentation

Descriptive and inferential statistics were used to elaborate the data and facilitate deduction assisted by STATA 13. Diagnostic tests were conducted first to avoid violation of the classical linear regression model. Stationarity test for unit root was used to determine the analysis model for the data. If all variables were stationary, then OLS or VAR models was to be used. However, if not all are stationary or mixed then Johansen or ARDL model was to be used for analysis. In addition, in order to test for cointegration, the ARDL bounds test was conducted to determine the existence of a long run relationship between the macro risk factors, investor sentiment and performance of equity market.

Furthermore, the study decomposed the independent variables into positive and negative values in order to test for asymmetric effects or nonlinearity using Nonlinear Autoregressive Distributed Lag model (NARDL). The ARDL model was recommended by Pesaran, Smith and Shin (2001) and used by Shahbaz, Ahmed, & Ali, (2008) and Shahbaz, Rehman and Afza(2015). The NARDL model was adapted from Shin, Yu and Greenwood-Nimmo (2014). The study’s findings are presented in tables, graphs and figures.

## 3. RESULTS AND DISCUSSION

### 3.1 Descriptive statistics

**Table 2: Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
MC	132	1627139	616745.5	834170	2817360
IS	132	3692.598	2877.756	289	7666

#### Source: Study Data (2008-2018)

(KEY: MC; Market Capitalization, FEF; Foreign Equity flows, DS; Domestic Savings, PSC; Private Sector Credit, IF; Inflation, IS; investor Sentiment, IO; Institutional Ownership)

Table 2 shows that market capitalization has a mean value of KES. 1627139 million with a standard deviation of 616745.5 million indicating a high degree of variation evidenced by a maximum value of 2817360 million against a minimum value of 834170. Foreign equity flows measured by net foreign investor flows had an average value of KES.251.7576 million and maximum value of KES.9839 million and a minimum value of KES.-5799 million indicating that some months experienced a decline in foreign equity flows. The standard deviation of KES.2091.918 million indicates a large deviation of foreign equity flows from the mean.

Investor sentiment measured by trading volume registered a mean value of 3692.598 million and standard deviation of 2877.7256 million with a maximum value of 7666 million against a minimum value of 289 million indicating sharp fluctuations in investor sentiment during the period under study. Institutional ownership has mean value of 9204.514 million and a standard deviation of 1201.212 million with a maximum value of 11772.22 million and a minimum value of 5879.898 million. This means that the changes in institutional holdings fluctuated over the period under study.

### 3.2 Long Run ARDL Model Coefficients

After confirmation of Cointegration, ARDL with an error correction model (ARDL ECM) was conducted. The sign and magnitude of the coefficients of the error correction model indicate the long run coefficients. The magnitude is represented by the coefficient of the lagged error correction model, which indicates the speed of adjustment towards the long run equilibrium. The sign of the adjustment term should be negative and significant to show convergence in the long run (Akanni and Isah, 2018; Pesaran, 2018). The results of the ARDL ECM model coefficients are presented in table 4.10. The lag length selected was 2 based on the AIC criterion. The model was estimated under the joint null hypothesis that all the coefficients of the macro risk factors and investor sentiment were equivalent to zero.

Table 3: Long Run ARDL model coefficients

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ardl LNMC_d1 LNFEF LNDS_d1 LNPSC_d1 LNIF_d1 LNIS_d1,lags(1,2,2,2,2,2) ec
ARDL(1,2,2,2,2,2) regression
Sample:      April 2008 - September 2016, but with gapsNumber of obs=      40
              R-squared          =      0.9843
              Adj R-squared      =      0.9734
Log likelihood = 117.78811          Root MSE          =      0.0168
    
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	D.LNMC_d1	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
<b>ADJ</b>						
	LNMC_d1					
	L1.	-1.435157	.1098073	-13.07	0.000	-1.66231 -1.208003
<b>LR</b>						
	LNFEF	-.006104	.0027125	-2.25	0.034	-.0117152 -.0004927
	LNDS_d1	-.1672053	.0506439	-3.30	0.003	-.2719703 -.0624404
	LNPSC_d1	1.203043	.4022386	2.99	0.007	.3709492 2.035137
	LNIF_d1	-.133085	.0265239	-5.02	0.000	-.1879538 -.0782163
	LNIS_d1	.3707643	.0264472	14.02	0.000	.316054 .4254745
<b>SR</b>						
	LNFEF					
	D1.	.0019414	.0039483	0.49	0.628	-.0062264 .0101091
	LD.	-.0070077	.0033415	-2.10	0.047	-.01392 -.0000953
	LNDS_d1					
	D1.	-.020608	.0611192	-0.34	0.739	-.1470428 .1058268
	LD.	-.0733619	.0315285	-2.33	0.029	-.1385836 -.0081402
	LNPSC_d1					
	D1.	-1.255573	.4714329	-2.66	0.014	-2.230807 -.2803403
	LD.	-.7159472	.3443536	-2.08	0.049	-1.428297 -.0035975
	LNIF_d1					
	D1.	.1639376	.0355487	4.61	0.000	.0903996 .2374757
	LD.	.1443805	.0320917	4.50	0.000	.0779937 .2107674
	LNIS_d1					
	D1.	-.2390522	.0338593	-7.06	0.000	-.3090954 -.169009
	LD.	-.0449417	.0085839	-5.24	0.000	-.062699 -.0271845
	_cons	.0206705	.0256	0.81	0.428	-.0322871 .0736281

Source: Study data (2008-2018)

From table 4.10 the coefficient of the lagged ECM adjustment term is negative and significant at 5 percent significance level with a value of -1.435157 with a P value of 0.000 indicating that in the short run, performance of equity market tend to adjust to long run equilibrium given disturbances resulting from changes in macro risk factors and investor sentiment. The adjustment term -1.435157 indicates that 100 percent of the disequilibrium in performance of equity market from the previous period shock will converge back to the long run equilibrium in the current period.

The findings in Table 4.10 also indicate that in the long run, investor sentiment had coefficient of 0.3707643 and P value of 0.000 which was less than 0.05 leading to the rejection of the null hypothesis at 5 percent significance level and leading to the conclusion that investor sentiment had a significant positive effect on market capitalisation. The findings were in agreement with Huang, Yang, Yang and Sheng (2014), Ahmed and Ullah(2013), Anusakumar, Ali, and Wooi (2017), Fayyazi and Maharlouei (2015, Uygur and Tas (2014), Oprea and Brad (2014), Rahman, Shien and Sadique (2013), Li and Zhang (2008) who found that investor sentiment positively affects performance of equity market. On the other hand, the findings were in disagreement with Yoshinagal and Junior (2012); Naik and Padhi (2014) and Grigaliuniene and Cibulskiene (2010) who found that investor sentiment negatively affects stock returns and performance of equity market. The findings were also in disagreement with Kim and Park (2015), Paudel and Laux (2010) and Cuong and Ishaq (2015) who found that Investor sentiment had no effect on performance of equity markets.

The findings also supported behavioral finance theories by Baker and Wurgler (2007); Shiller (1992) and Shefrin (1999) who argued that investor sentiment affects the performance of equity markets. The findings were in support of herding bias and prospect theory since investor sentiment had a significant positive effect on performance of equity market in NSE, Kenya. The findings on investor sentiment support herding bias and prospect theory in Nairobi securities exchange whereby investors concentrate their trading on a few blue chip stocks because the blue chip stocks offer intrinsic insurance against regret and losses due to their well established performance and dividend paying history.

### 3.3 Nonlinear ARDL Model For Asymmetric Effects

The nonlinear Autoregressive distributed lag model (NARDL) simultaneously evaluates asymmetric short run and long run effects. The results from the bounds test indicated the presence of cointegration indicating that long run relationship exists between macro risk factors and investor sentiment and performance of equity market in NSE, Kenya. The study used Nonlinear ARDL to test for asymmetry in the long run relationship between the dependent and independent variables.

Asymmetric effects are present if the effects of positive and negative shocks in the independent variables are not of same magnitude on the dependent variable (Rocher, 2017). Table 4.12 presents the NARDL regression and the asymmetry statistics comprising of coefficients of decomposed long run positive values and long run negative values of the macro risk factors and investor sentiment. The asymmetry statistics also present the long run asymmetry statistics and short run asymmetry statistics in the same model. The model was estimated under the null hypothesis of no asymmetry.

**Table 4: NARDL Model Test for Asymmetric Effects**

Asymmetry statistics:							
Exog. var.	Long-run effect [+]			Long-run effect [-]			
	coef.	F-stat	P>F	coef.	F-stat	P>F	
LNFEF	-0.000	13.72	0.006	0.000	23.49	0.001	
LNDS_d1	0.001	7.141	0.028	0.000	-	-	
LNPSD_d1	0.007	10.42	0.012	-0.005	1.698	0.229	
LNIF_d1	0.000	.05348	0.823	-0.000	.07477	0.791	
LNIS	-0.000	2.779	0.134	-0.002	292.5	0.000	
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	Long-run asymmetry			Short-run asymmetry			
	F-stat	P>F		F-stat	P>F		
LNFEF	21.97	0.002		3.639	0.093		
LNDS_d1	7.141	0.028		336.8	0.000		
LNPSD_d1	1.34	0.280		15.86	0.004		
LNIF_d1	.04014	0.846		1.526	0.252		
LNIS	275.1	0.000		28732	0.000		

Note: Long-run effect [-] refers to a permanent change in exog. var. by -1

Cointegration test statistics: t\_BDM = -1080.4716  
F\_PSS = 990576.8133

Model diagnostics	stat.	p-value
Portmanteau test up to lag 18 (chi2)	21.46	0.2570
Breusch/Pagan heteroskedasticity test (chi2)	.002212	0.9625
Ramsey RESET test (F)	-	-
Jarque-Bera test on normality (chi2)	1.265	0.5312

The study determined the asymmetric effect of investor sentiment on performance of equity market. To achieve this, the study employed wald tests for asymmetry. The tests were conducted under the null hypothesis of no asymmetry. Table 4.12 presents the asymmetry statistics, which are explained below.

The upper part of asymmetry statistics in Table 4. decomposes the investor sentiment into positive and negative values and presents their long run effects on performance of equity market. Positive investor sentiment has a coefficient of -0.000 with p value 0.134, which is statistically insignificant since it is greater than 0.05 at 5% significance level, while negative investor sentiment has a coefficient of -0.002 with p value 0.000 which is statistically significant since it is less than 0.05 at 5% significance level indicating that only negative investor sentiment has an effect on performance of equity market.

The lower part of asymmetry statistics in Table 4. summarizes long run asymmetry and short run asymmetry for investor sentiment. From the long run asymmetry statistics, investor sentiment has F statistic of 275.1 and p value of 0.000. The F statistics is less than 0.05 leading to the rejection of the null hypothesis of no asymmetry. These results imply that in the long run, increase and decline in investor sentiment have effects of different magnitude on performance of equity market. This was in accordance with (Akanni & Isah, 2018; Pesaran, Smith, & Shin, 2001; Naik & Padhi, 2014). According to the nonlinear ARDL model, when long run relationship exists, it is asymmetrical in nature (Shin, Yu, & Greenwood-Nimmo, 2014).

The lower part of asymmetry statistics in Table 4.12 also summarizes short run asymmetry. In the short run, investor sentiment have F statistic values of 28732 and P values of 0.000 leading to the rejection of the null hypothesis of no asymmetry in the short run. The asymmetric effects imply that the performance of the equity market does not react linearly in the short run to positive and negative shocks in investor sentiment.

### 3.4 Granger Causality Analysis

The existence of Cointegration proved the existence of granger causality at least in one direction. Granger causality test (1987) was carried out to establish the direction of the causal link between investor sentiment and performance of equity market in NSE, Kenya. The null hypothesis was that granger investor sentiment do not granger cause performance of equity market in NSE, Kenya. The results for granger causality are presented in table 5.

**Table 5: Granger Causality Wald Tests Results**

Granger causality Wald tests					
Equation	Excluded	chi2	df	Prob >	chi2
LNMC_d1	LNFEF	4.3646	2	0.113	
LNMC_d1	LNDS_d1	2.7761	2	0.250	
LNMC_d1	LNPSD_d1	1.2796	2	0.527	
LNMC_d1	LNIF_d1	21.176	2	0.000	
LNMC_d1	LNIS_d1	3.547	2	0.170	
LNMC_d1	ALL	23.174	10	0.010	
LNFEF	LNMC_d1	.37938	2	0.827	
LNFEF	LNDS_d1	1.3722	2	0.504	
LNFEF	LNPSD_d1	7.4231	2	0.024	
LNFEF	LNIF_d1	3.6709	2	0.160	
LNFEF	LNIS_d1	5.5864	2	0.061	
LNFEF	ALL	16.654	10	0.082	
LNDS_d1	LNMC_d1	1.366	2	0.505	
LNDS_d1	LNFEF	5.1648	2	0.076	
LNDS_d1	LNPSD_d1	1.3221	2	0.516	
LNDS_d1	LNIF_d1	12.282	2	0.002	
LNDS_d1	LNIS_d1	2.2555	2	0.324	
LNDS_d1	ALL	13.839	10	0.180	
LNPSD_d1	LNMC_d1	1.4472	2	0.485	
LNPSD_d1	LNFEF	3.209	2	0.201	
LNPSD_d1	LNDS_d1	.53027	2	0.767	
LNPSD_d1	LNIF_d1	6.2072	2	0.045	
LNPSD_d1	LNIS_d1	1.3719	2	0.504	
LNPSD_d1	ALL	10.575	10	0.392	
LNIF_d1	LNMC_d1	3.7232	2	0.155	
LNIF_d1	LNFEF	1.3798	2	0.502	
LNIF_d1	LNDS_d1	1.4866	2	0.476	
LNIF_d1	LNPSD_d1	2.4624	2	0.292	
LNIF_d1	LNIS_d1	6.6224	2	0.036	
LNIF_d1	ALL	22.974	10	0.011	
LNIS_d1	LNMC_d1	4.1418	2	0.126	
LNIS_d1	LNFEF	1.0311	2	0.597	
LNIS_d1	LNDS_d1	1.9885	2	0.370	
LNIS_d1	LNPSD_d1	.18383	2	0.912	
LNIS_d1	LNIF_d1	10.738	2	0.005	
LNIS_d1	ALL	13.464	10	0.199	

Source: Study data (2008-2018)



Granger causality wald test was conducted for all the equations. From table 4. 5, First equation for market capitalization indicates that inflation granger causes market capitalization with a P value of 0.000 for the coefficient of inflation, which was less than 0.05 leading to rejection of null hypothesis of no granger causality. The joint chi statistic for the first equation for market capitalization is 23.174 with a P value of 0.010 which is less than 0.05 meaning that the null hypothesis that foreign equity flows, domestic savings, private sector credit, inflation and investor sentiment do not granger cause market capitalization is rejected.

Lastly, the sixth equation for investor sentiment indicates that inflation granger causes investor sentiment with a P value of 0.005 for the coefficient of inflation, which is less than 0.05 leading to the rejection of the null hypothesis of no granger causality. The joint chi statistic is 13.464 with P value of 0.199 which is greater than 0.05 meaning that the null hypothesis that market capitalization, foreign equity flows, Domestic savings, private sector credit and inflation do not granger cause investor sentiment cannot be rejected. The findings were in agreement with Gachanja and Kosimbei, 2018; Makoni and Marozva, 2018; Bayar, 2016; Sapian and Auzairy, 2015; Ramzan, 2016; Faisal, Muhammad, and Tursoy, 2017; Dengke, 2015 and in disagreement with De and Chakraborty (2015)

#### **4. CONCLUSIONS AND RECOMMENDATIONS**

The study determined the effect of investor sentiment and performance of equity market in NSE, Kenya. Equity market capitalization was selected as proxy for performance of equity market. The study was based on positivism research paradigm, which views reality as real, external and independent. Consequently, explanatory research design was selected to clarify the relationship between the variables under study. The study relied on monthly time series data between 2008 and 2018. Data on investor sentiment and market capitalization was used. The sources of data for the study included KNBS, CBK, NSE, CMA and World Bank. ARDL and NARDL models were used for analysis.

The objective of the study was to determine the effect of investor's sentiment on performance of equity market in NSE, Kenya. Trading volume was used as a proxy for investor sentiment. ARDL model was used for analysis. The findings indicate that investor sentiment had a positive significant effect on market capitalization.

The study also tested for asymmetry in the long run relationship between macro risk factors, investor sentiment and performance of equity market in NSE, Kenya using NARDL. The results of NARDL indicate the existence of long run asymmetric effects for investor sentiment. Investor sentiment had F statistic of 275.1 with P value 0.000. The asymmetric effects imply that the performance of the equity market does not react equally in the long term to positive and negative shocks in foreign equity flows, domestic savings and investor's sentiment in the long run. Short run asymmetric effects were also reported for domestic savings, private sector credit and investor sentiment. Domestic savings had an F statistic of 336.8 with p value 0.000, private sector credit had F statistic of 15.86 with p value 0.004 and investor sentiment had F statistic of 28732 with p value of 0.000. The short term asymmetric effects imply that the performance of the equity market does not react equally in the short run to positive and negative shocks in domestic savings, private sector credit and investor sentiment.

Lastly, the study sought to establish the direction of causal link between, investor sentiment and performance of equity market in NSE, Kenya. The study found investor sentiment granger causes inflation and inflation granger causes investor sentiment. In addition, granger causality tests indicated that jointly, foreign equity flows, domestic savings, private sector credit, and inflation and investor sentiment granger cause market capitalization; Jointly, market capitalization, foreign equity flows, private sector credit, inflation and investor sentiment do not granger cause domestic savings; Jointly, market capitalization, foreign equity flows, domestic savings, inflation and investor sentiment do not granger cause private sector credit; Jointly, market capitalization, foreign equity flows, Domestic savings, private sector credit and investor sentiment granger causes inflation and Jointly, market capitalization, foreign equity flows, Domestic savings, private sector credit and inflation do not granger causes investor sentiment.

The study concluded that private sector credit measured by gross credit to private sector had significant positive effect on performance of equity market as measured by market capitalization in both short run and long run. This was evidence that financial institutions needed to inject more credit to firms for expansion in order to increase their profitability and positively influence their equity market performance. The study identified investor sentiment as a crucial factor influencing performance of equity market. This study recommends that the CMA and CBK incorporate investor irrationality in policy making since behavioral aspects of the investors influence investment decisions.

## REFERENCES

- [1] African Development Bank Group. (2018). East Africa economic outlook 2018. African Development Bank Group.
- [2] Akanni, L. O., & Isah, K. O. (2018). Exchange Rate Movements on Sectoral Stock Prices of Nigerian Firms: Is there Evidence of Asymmetry? -. Centre for Econometric and Allied Research, University of Ibadan Working Papers Series , CWPS 0046.
- [3] Borowski, A. (2010). Financial Management. Munich: Grin Verlag Publishing.
- [4] Capital Markets Authority. (2018b). capital markets quarterly statistical bulletin,Q4 2018. capital markets statistical bulletin .
- [5] Capital Markets Authority. (2018a). Study on low uptake of capital maerkets products in kenya:Research Paper. Nairobi: Capital Markets Authority.
- [6] Finacial Sector Regulators . (2018). The Kenya Financial Sector Stability Report 2018. Nairobi: Financial sector regulators;Capital markets Authority,central bank,insurance regulatory authority,retirements benefit authority and SASSRA.
- [7] Government of Kenya. (2007). Kenyas Vision 2030 Popular Edition. Nairobi: Government of Kenya.
- [8] Government Of Kenya. (2018). Kenya-Vision-2030-Sector-Progress-Project-Updates-June 2018. Vision 2030 .
- [9] Itzhak, V. (2018). Lecture Notes In Behavioral Finance. Singapore: World Scientific.
- [10] Kreinovich, V., & Sriboonchitta, S. (2018). Structural Changes and their Econometric Modeling. Springer.
- [11] Lehner, O. M., & Harrison, R. (2014). ACRN Proceedings in Finance and Risk Series '13: Proceedings of the 13th ... Cambridge: ACRN publishing house.
- [12] Naik, P. K., & Padhi, P. (2014). Investor Sentiment, Stock Market Returns and Volatility: Evidence from National Stock Exchange India. International Journal of Management Practice Forthcoming,Research gate .
- [13] Ngugi, R. W., Maana, D., & Amanja, I. (2013). Capital Market, Financial Deepening and Economic Growth in Kenya. Kenya Institute for Public Policy Research and Analysis (KIPPRA) Discussion Paper, Nairobi .
- [14] Nofsinger, J., & Sias, R. (1999 ). Herding and feedback trading by institutional and individual investors. . Journal of Finance , 2263-2295.
- [15] Pesaran, M. H., Smith, R. J., & Shin, Y. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. Journal of Applied Econometrics , Vol. 16, No. 3, , 289-326.
- [16] Peterson, R. L. (2011). Inside the Investor's Brain: The Power of Mind Over Money. New Jersey: Wiley Publishers.
- [17] Rocher, C. L. (2017). Linear and Non linear relationships between interest rate changes and stock returns: international evidence. Universidad Complutense de madrid , 1-40.
- [18] Saunders, M., Lewis, P., & Thornhill, A. (2016). Research Methods for Business Students. England: Pearson.
- [19] Sharma., B. (2010). Postpositivism. In: Mills AJ, Durepos G, Wiebe E (eds) Encyclopedia of case study research., pp 701–703. Los Angeles: Sage.
- [20] Shin, Y., Yu, B., & Greenwood-Nimmo, M. (2014). (2014). Modelling Asymmetric Cointegration and Dynamic Multipliers in a Nonlinear ARDL Framework. In W. Horrace, & R. Sickles (Eds.), The Festschrift in Honor of Peter Schmidt. Econometric Methods and Applications .