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Effect of Herding Behavior on Stock Market Reaction in Kenya

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Abstract: **Herding is said to be present in a market where investors opt to imitate the trading practices of those they consider to be better informed, rather than acting upon their own beliefs and private information. Increase in security return dispersion as a function of the aggregate market return explains herding behaviour in a stock market. The main objective of the study was to determine the effect of herding behaviour on stock market reaction in Kenya. The target population was 67 listed companies at the Nairobi Securities Exchange. A sample of 48 listed companies was used for analysis. Secondary data extracted from his Nairobi Securities Exchange historical data of listed companies for the period 2004 to 2016 was used for analysis. The study adopted quantitative research design. The unit root results showed that all the variable were stationary. Panel data regression was used to analyse data. Unit root tests revealed the dependent and the dependent variable were both stationary at level. Hausman tests revealed that the random effect model revealed that the random effect was more appropriate that the fixed effect model. Panel data regression analysis model was used. Random effect model (EGLS) showed that herding behaviour had a positive statistically significant effect on stock market reaction. In conclusion, the null hypothesis was rejected for herding behaviour has significant effect of on stock market reactions in Kenya. The results revealed that herding behaviour has a positive significant effect on stock market reaction in Kenya.**

Keywords: **Herding, Stock Market Reaction, Behavioral Finance and Stock Market Efficiency.**

I. INTRODUCTION

Herding behaviour happens when individuals maintain an interest in what others are doing and, at times, follow them while overlooking their own analytical skills. Individual and institutional investors follow the lead of other investors or herd when they trade and helps in understanding the way information about securities is reflected in market prices. Herding is believed to be a human instinct and is always present in human decision-making processes; this is useful in explaining investor behaviour which cannot otherwise be understood by Efficient Market Hypothesis (EMH). Herding behaviour of investors represents a major cause of speculative bubbles and implies that investors are taking similar trading decisions which may lead to deviations of the stocks prices from their fundamental value. Herding behaviour is measured by examining the relationship between stock return dispersions and the corresponding equally weighted market return (Bikhchandani & Sharma, 2001); (Nofsinger & Sias, 1999); (Chang, Cheng & Khorana, 2000); (Banerjee, 1992); (Bikhchandi, Hirschleifer, & Welch, 1992); (Lao & Singh, 2011); (Filip, Pochea & Pece, 2015); (Tessaromatis & Thomas, 2009); (Henker, Henker & Mitsios, 2006); (Chiang & Zheng, 2010).

Problem Statement:

Nairobi Securities Exchange has witnessed cases of stock market reactions as a result of extreme price volatility which point to the possibility of underlying inefficiencies which impacts on the shareholder value. Such market reactions are as a result of irrational behavior leading to market inefficiencies. Herding can generate persistent deviations of asset prices from their fundamental values leading to asset price bubbles and sudden crashes. Traditional framework assumptions hold that the relationship is expected to be linear in that the dispersions are an increasing function of the market return. Markets

are said to be efficient when the asset prices reflect all available information based on investor rationality and limits to arbitrage (Lindhe, 2012). Herding is measured by examining the effect between stock return dispersions and the corresponding equally weighted market return. Under the assumption that the traditional framework, i.e. Efficient Market Hypothesis, holds the relationship is expected to be linear. This means that the dispersions are an increasing function of stock market return. This means that stock return dispersions will decrease or at least increase at a less-than-proportional rate with the market return (Christie & Huang, 1995). A challenge to Efficient Market Hypothesis is that individuals often overreact and underreact to news causing stock markets to react according to investor behavior in their investment decision making.

Mbaluka (2008) established the existence of behavioural effects on individual investment decision making process at the Nairobi Securities Exchange. Werah (2006) suggested that the behavior of investors at the Nairobi Securities Exchange is to some extent irrational regarding fundamental estimations because of anomalies such as herd behaviour, regret aversion, overconfidence and anchoring. Aduda and Muimi (2011) confirmed evidence of investor overreaction and under-reaction at the Nairobi Securities Exchange. Thirikwa and Olweny (2015) found that the magnitude of the impact of the market performance on the deviation of individual stock returns was also impacted by the market capitalization and the book-to-market value was relatively low. Previous studies have looked at the impact of investor behaviour biases on investment decisions, investor performance and stock market developments. An investor behavior model is needed to explain the observed pattern of returns that explains stock market reactions. The research will measure herding behaviour to determine predictability of abnormal returns in Kenya. The research gap therefore is to determine the effect of herding behavior on stock market reactions in Kenya.

General Objective:

To determine the effect of herding behaviour on stock market reaction in Kenya

Research Hypotheses:

H_0: Herding behaviour has no significant effect on stock market reaction in Kenya

II. LITERATURE REVIEW

Theoretical Literature:

A very early reference of herding theory was the classic paper by Grossman and Stiglitz (1976) showed that uninformed traders in a market context could become informed through the price in such a way that private information was aggregated correctly and efficiently. Bikhchandani, Hirshleifer and Welch (1992) explained that an informational cascade appears when investor made optimal choice by imitating the behavior of preceding investors without relying on his personal information. Froot, Schaferstein and Stein (1992) considered how investors imitate each other and this drives volatility. Christie and Huang (1995) explained the existence of investor herds was one frequently used explanation for the volatility of stock returns. Lux (1995) formalized herd behavior or mutual mimetic contagion in speculative markets. The author explained both excess volatility and mean reversion with the type of noise trading or infection model.

Wermers (1999) found that herding levels are somewhat higher among stocks that have large positive or negative returns in prior quarters. Swarm theory observed in non-human societies is a related concept and is being explored as it occurs in human society, (Bikhchandani, and Sharma, 2001). Sias (2004) supplied measures to detect investor herding based on transaction data and provided insights which investor groups and asset types are particularly prone to herding. Caparrelli, D'Arcangelis and Cassuto (2004) explained that in the security market, herding investors base their investment decisions on the masses' decisions of buying or selling stocks. Hey and Morone (2004) analyzed a model of herd behavior in a market context. Avramov, Chordia and Goyal (2006) findings suggested that the violation of the efficient market hypothesis due to short-term reversals is not so egregious after all. Tan, Chiang, Mason and Nelling (2008) explain that herding effect in financial market was identified as tendency of investors' behaviors to follow the others' actions. Chiang and Zheng (2010) explain that herding in financial markets was of interest to both economists and practitioners.

Boortz, Jurkatis, Kremer, & Nautz, (2013) results show that herding intensity increases with information risk. In contrast, herding measures estimated for the financial crisis period cannot be explained by the herd model. This suggests that the correlation of trades observed during the crisis is mainly due to the common reaction of investors to new public information and should not be misinterpreted as herd behavior. Cipriani and Guarino (2014) noted that herding theory and

the corresponding empirical literature are disconnected. While herd models rarely provide empirically testable hypotheses, empirical works do not rigorously tie their proposed measurement approaches to the theoretical concept of herding

Empirical Literature:

Blasco, Corredor and Ferreruela (2012) tested the link between investor herd behaviour and market volatility, arguing that irrational investors destabilize prices. The results show evidence of the asymmetric effect of herding on volatility during extreme market movements, something that is in line with the different psychological implications of extreme up and down market movements. Thirikwa and Olweny (2015) result showed that the magnitude of the impact of the market performance on the deviation on individual stock returns. Vieira and Pereira (2015) findings have an important empirical implication, since it suggested that different herding measures lead to different conclusions about the existence of investor herd behavior. Lee and Lee (2015) findings confirmed that bubble and burst of prices were more likely to emerge when heterogeneous expectations about prices were combined with herding behavior among agents, so that agents in the same group shared the similar expectations about the price changes. Fu (2010) indicated that turnover rate influence herding. Low turnover is lacking sufficient information leading to more tendencies to herd market return.

Lux (1995) objective was to formalize herd behavior or mutual mimetic contagion in speculative markets and showed the speed of change in trading volume indicates the emergence of a bubble explained by the emergence a self-organizing process of infection among traders leading to equilibrium prices which deviate from fundamental values. Lindhe (2012) used Hwang and Salmon (2001) methodology which uses Cross Sectional Standard Deviation to analyze data. Significant evidence of local market-wide herding was found in Finland during both up and down going market days. The author found evidence of local market-wide herding was found in Denmark, Norway or Sweden.

Spyrou (2013) used Lakonishok, Shleifer and Vishny (1992) methodology to determine how herd behavior was measured in empirical studies. The findings were more than two decades of empirical and theoretical research had provided a significant insight on investor herding behavior. Serra and Lobão (2002) used the measure of herding developed by Lakonishok et al. (1992) methodology to assess if Portuguese mutual funds exhibit herding and to what extent. The herding effect seemed to affect, as likely, purchases and sales of stocks. There seemed to be a stronger tendency to herd among medium-cap funds rather than very large or very small funds, and among funds with less stock. Messis and Zepranis (2014) used Hwang and Salmon (2004) to analyze investor daily, weekly and monthly data of securities traded at the Athen Stock Exchange. The results confirm a linear effect of herding on all volatility measures considered. Stocks exhibiting higher levels of herding or adverse herding will also present higher volatility, and from this point of view, herding can be regarded as an additional risk factor. Hachicha (2010) findings showed that the herd phenomenon consisted of three essential components: stationary herding which signals the existence of the phenomenon whatever the market conditions, intentional herding relative to the anticipations of the investors concerning the totality of assets, and the third component highlights that the current herding depends on the previous one which is the feedback herding.

III. RESEARCH METHODOLOGY

Quantitative research design therefore is useful in the study where cross-sectional and time series data analysis is required (Gujarati, 2003). The target population for this study comprised of 67 listed companies in Kenya trading in equity stocks in the period 2004 to 2016 at the Nairobi Securities Exchange. All the 67 listed companies were used as the population for this study in order to determine how the investor behavior has an effect of stock market reactions in Kenya. The sample for this study was 48 listed companies in Kenya from 2004 to 2016 because these were the companies that had traded for less than 3 years during this period of study. Sampling frame involves identifying samples from which to infer about the population. The dependent variable is the Stock Market Reactions and herding behavior variable as the explanatory variables. Nairobi Securities Exchange historical data on stock returns for the 13 year period 2004 to 2016.

Measurement of Study Variables:

Stock Market Reaction:

Stock market reaction was measured using abnormal returns. Excess return or abnormal return AR_{it} are computed as the difference between the stock return and the market portfolio return to get market adjusted return. Market adjusted returns was measured as follows:

Abnormal return = Observed return – Expected market return

$$AR_{i,t} = R_{i,t} - R_{m,t}$$

Where for the monthly period t, market return constant R_{mt} is subtracted from $R_{it.}$ $R_{mt\ is}$ the equal-weighted return of the entire 20 share index. There is no risk adjustment except for movements of the market as a whole and the adjustment is identical for all stocks (De Bondt & Thaler, 1985); (Boussaidi, 2017).

Investor Herd Behaviour:

Investor herd behavior was measured using return dispersions using Cross Sectional Absolute Deviations (CSAD) method (Thirikwa & Olweny, 2015). CSAD is expressed as

$$CSAD_{it} = |r_{it} - r_{mt}|$$

CSAD is the measure of dispersion, where N is the number of firms in the aggregate market portfolio, r_{it} is the observed stock return on firm i and for year t, and r_{mt} is the cross-sectional average return on year, t. This means that the dispersions will decrease or at least increase at a less-than-proportional rate with the market return. Herding exists when there is a small difference between the returns of individual stock and the market index.

IV. RESULTS AND DISCUSSIONS

Unit Root Test:

Table I: Unit root test

Panel unit root test: Summary ;Series: market Reactions; Sample: 2004 2016;Exogenous variables: Individual effects, individual linear trends; Automatic selection of maximum lags; Automatic lag length selection based on SIC: 0 to 1;Newey-West automatic bandwidth selection and Bartlett kernel				
			Cross-	
Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-23.7412	0.0000	48	
Breitung t-stat	-3.52203	0.0002	48	
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.62687	0.0000	48	462
ADF - Fisher Chi-square	265.142	0.0000	48	462
PP - Fisher Chi-square	353.634	0.0000	48	476
			Cross-	
Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-19.9873	0.0000	48	466
Breitung t-stat	-3.39570	0.0003	48	420
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.23248	0.0000	48	466
ADF - Fisher Chi-square	234.818	0.0000	48	466
PP - Fisher Chi-square	368.667	0.0000	48	476

The results from the unit root test for all the cross-sections in the variables stock market reaction and investor herd behavior in table 1 above shows that all the cross sections were stationary. The first part of each section for each variable presents the common unit root tests developed by Levin, Lin and Chu (2002) and the one developed by Breitung t-stat. The test shows that considered simultaneously all the cross-section were stationary for all the variables. In other words, they do not have the unit root problem since the null hypothesis of unit root is rejected as depicted by the significant p-value of 0.0000.

The lower section presents three other test of stationarity in panel data setting. These are Im, Pesaran and Shin (2003), ADF - Fisher Chi-square Maddala, and Wu (1999), PP - Fisher Chi-square (Choi, (2001). These tests assume there is a unit root process on individual cross sections. As depicted by the p-values which are very statistically significant, the null hypothesis of non-stationarity was rejected. The interpretation was that all the variables were found to be stationary in the two cases of test. In conclusion, the test of stationarity is important because it help to identify the order of integration of a variable and avoid spurious regression. In this case all the variables were found to be integrated of order zero (0).

Hausman Test:

Table 2 below presents the results on the Hausman test that is used to test the existence of a difference between a fixed effect and random effect model. Hausman (1978) originally proposed a test statistic for endogeneity based upon a direct comparison of coefficient values.

Table II: Hausman Test

Correlated Random Effects - Hausman Test; Equation: Untitled; Test period random effects				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random		0.862210	1	0.3531
Period random effects test comparisons:				
Variable	Fixed	Random	Var (Diff.)	Prob.
Investor behavior	0.162436	0.155659	0.000053	0.3531

Table 2 presents the results on Hausman test. The test starts by estimating the random effect model. The test also estimates the fixed effect model. The last step entails the subtraction of the random effect estimated from the fixed effect estimates. If the difference is statistically significant, then the fixed effect model is adopted. On the other hand, if there is no difference literature suggests the adoption of the random effect model which assumes that the unobservable effect is not correlated with the explanatory variables. From table 2 the chi-square value of 0.862210 is statistically insignificant and shows that there is no difference in the two models. This led to the conclusion that the random effect model was not mis-specified and thus was chosen as the preferred model.

Random effect model

Table III: Random effect model

Dependent Variable: market Reactions; Method: Panel EGLS (Period random effects);Sample: 2004 to 2016; Total panel (unbalanced) observations: 529; Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Investor herd Behavior	0.155659	0.036295	4.288663	0.0000
C	-0.923608	0.340534	-2.712231	0.0069
R-squared	0.033668	Mean dependent var		0.157327
Adjusted R-squared	0.031834	S.D. dependent var		3.100043
S.E. of regression	3.050187	Sum squared resid		4903.019
F-statistic	18.36101	Durbin-Watson stat		1.968783
Prob(F-statistic)	0.000022			

From the regression results in table 3 above the long run coefficient of investor herding behavior was found to be 0.155659. This value shows that holding other variables in the model constant, an increase the herding behavior by one unit causes stock market reaction to increase by a value of 0.155659 percent. The positive effect shows that there is a positive relationship between investor herd behavior and stock market reaction.

The coefficient was also found to be statistically significant with a t-statistic value of 4.288663. The p-value was found to be 0.0000. The interpretation was that in Kenya, herding behavior has a statistically significant effect on stock market

reaction. The findings indicate that investor herd behavior has a significant effect on stock market reactions in Kenya. Thirikwa and Olweny (2015) found a significant positive relationship between the deviation in earning of a security and the squared market returns evidence that herding exists in the Nairobi Stock E. Vieira and Pereira (2015) results were inconsistent with our findings as results did not show any evidence in favors of herd formation during periods of significant change in market returns. Linde (2012) result shows a negative and statistically significant value of coefficient in finish market which was inconsistent with the results in this study.

V. CONCLUSION

The study concludes that herding behavior has a positive significant effect on stock market reaction in Kenya. The investors and stock brokers should be keen on the herding behavior variable in the stock market. Herding behavior could cause stock prices to move from its fundamental values causing an abnormal return that leads to stock market reaction resulting to variations in returns. The investors and stock brokers should be keen on herding behavior in the market. In this research, it has been revealed that herding has a statistically significant positive effect on stock market reaction.

Area for Further research:

This research was not able to identify conclusively all the possible variables with explanation power on stocks pricing in Kenya. This was evident from the random effect model that showed that the model was able to explain approximately 3.3668 % on the variation of the stock market reaction. It is therefore in this light that the future researchers are encouraged to consider other investor behavior biases that are deemed to cause stock market reaction which would increase the predictive capability of the model.

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