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Testing Of Consistent Trends in Stock Performance In The Nairobi Securities Exchange

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Consistent stock performance contradicts random adjustment of stock prices in efficient markets and is thus anomalous despite the potential of generating significant profits for investors. This research set out to test the existence of consistent stock performance in the NSE during the years 2001 to 2010 and to examine whether consistent stock performance is associated with efficiency of NSE. Balanced monthly closing average stock price data was employed for 32 sample stocks drawn using purposive sampling technique from a population of 56 stocks listed in the NSE during the study period. In order to identify consistent stock performance, frequency tests were employed. In order to test association between consistent stock performance and efficiency of NSE 3 tests were employed including: t-test to test the significance of abnormal returns of consistent stock performance. Runs serial correlation test was employed to test serial correlation of stock returns. Spearman rank correlation was also employed to test volatility of stock prices with time. The results indicated weak presence of consistent stock performance in the NSE and that abnormal returns of consistently performing stocks were insignificant. There was also zero serial correlation of stock returns and stock prices of consistently performing stocks exhibited low volatility with time. The overall results indicate that NSE may be weak form efficient. This research contributes to new knowledge by combining the alternative definitions of consistent stock performance to minimize on the inherent weaknesses of each definition(cross sectional and longitudinal) which have in the past been studied independently.

Key Words: Consistent stock performance, serial correlation, volatility, abnormal returns, stock market efficiency.

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Introduction

Consistent stock performance is defined as repeated ranking of stocks at the top or bottom in a stock market ranking periodically (Alwathainani, 2011). This definition is cross sectional based as it compares the performance of a stock relative to the performance of other stocks in a stock market ranking. This research, criticizes the above definition for failing to specify a threshold of measuring outstanding performance which implies that a stock that ranks consistently at the top of a ranking may do so but marginally when compared to the performance of other stocks.

Alternatively, consistent stock performance is defined as repeated occurrence of positive or negative stock returns for two thirds of a study period. This definition is time series or longitudinal based as it compares the performance of stocks only periodically. It is criticized for being vulnerable to influences of bullish or bearish market movements and manipulative forces (Alwathainani, 2011). This research combined both the alternative definitions as an innovation for the purpose of yielding common consistent stock performance that hasboth cross sectional and time series features and thus minimizing on the inherent weaknesses possessed by each alternative definition.

Consistent stock performance implies that stocks are less volatile perhaps due to reduced news and thus generate patterns that provide reliable signals of the underlying value of stocks (Watkins, 2003). The release of news directly influences stock price movement and hence volatility of the stockprices (Stefan, 2009). Stock markets that are efficient have high but not excessively high stock price volatility that relates to the continued release of information (news) which affects the listed stock prices (Watkins, 2003).Consistent positive returns relate to sustained low discounting rates while consistent negative returns relate to sustained high discounting rates (Watkins, 2003). Consistently performing stocksexhibit positive serial correlation so that stock returns of a certain sign in a period are followed by returns of the same sign in the next period (Watkins, 2003). In efficient stock markets, there should be zero serial correlation unless there is an anomaly in the market (Fama, 1991).Consistent stock performance is also associated with significant abnormal returns whichare difference between actual stock returns and normal returns which are determined by asset pricing models. Abnormal returns can occur occasionally,but are not expected not to occurconsistently instockmarkets that are efficientlike NSE (Magnusson and Wydick, 2005; Mlambo and Biekpe, 2007)unless there is an anomaly yet to be exploited by the market participants (Fama, 1998).

Consistent stock performance is alsoassociated with information diffusion theory which postulates that stock market investors underreact to stock news due to delay in receiving the news and delay in synthesizing newsupon arrival (Grinblatt and Moscowitz, 2004). The slow diffusion of information amongst investors may arise from high information and transaction costs. These costs cause delay in investor reaction to stock price movement and hence under reaction anomaly. The delayed investor reaction to

news in stock markets is usually caused by interference by noise traders who move stock prices away from their fundamental value based on wrong or insufficient information (Cuthbertson, 2005). Such irrational investors may buy stocks at a basis below or above the current pricesand then experience capital gains or capital losses which appear to be persistent and may not be immediately undone by the effects of arbitrageurs or rational investors(Grinblattand Moscowitz, 2004). The consistent stock price patterns may thus cause irrational investors to believe that there is meaning in the patterns and this may cause them to invest in the consistentpositively performing stocksand divest from consistent negatively performing stocks and behavior thus extending the trend of rising or falling stock prices respectively (Watkins, 2003). The occurrence of consistent stock performance occurs in efficient markets like the NSE contradicts efficient market hypothesis (Fama, 1991).

Efficient Stock Markets

Efficient market hypothesis was developed by Eugene Fama, (1965) and is closely linked to the theory of randomness of stock prices that was developed by Louis Bachelier, (1900). Finance theory assumes that stock markets have a large number of rational profit maximizing investors who are actively competing to outdo the each other in predicting the future stock prices. The intense competition causes new information to be instantaneously reflected in stock prices and thus hinders any participant from possessing superior and profitable information (Cuthbertson, 2005). An efficient market is one in which all known information is instantaneously reflected in stock prices which causes stock prices to occur in a random manner and instead of occurring in a predictable fashion (Fama, 1991). The random occurrence of stock prices is influenced by the randomness in the occurrence of new information which can be in the form of news, announcements, expectations, opinions, stories, and even lack of news (Stefan, 2009).

Random occurrence of stock prices prevents any trends or patterns in prices from occurring and also prevents market participant from possessing superior information that can aid in out-performing the market (Fama, 1991). Random walk is characterized by stock price series where future stock prices are independent of those of current and past periods which makes the occurrence of stock prices to be unpredictable(Fama, 1991). The logic behind random walk is that if the flow of information is unimpeded it should instantaneously be reflected in stock prices and hence future price changes will only reflect future news and not the current or past news (Malkiel, 2003). News by definition is unpredictable and random hence in markets that are efficient, the average stock is fairly priced (Pearce, 1987). This implication is that weak form efficient markets like NSE are expected to exhibit zero abnormal returns (Larson and Madura, 2003) also zero serial correlation of stock returns (Cuthbertson, 2005) and high but not excess stock price volatility (Watkins, 2003).

Methods

In the study period between years 2001 to 2010, the NSE had 56 listed companies that formed its population. The current research employed balanced panel data

consisting of monthly closing stock price data for the decade of years 2001 to 2010 that was expected to have 120 months for the 32 companies that constitute the sample selected using purposive sampling method. The closing average stock price data was chosen in the current research as it represented the most current valuation of firms before trading continues in the following day.

The study sample focused on company stocks that were actively and continuously traded in the NSE for at least 80% of the study period out of 120 months from January 2001 to December 2010. The 80% threshold, according to Cronbach' alpha rates as good (Gliem and Gliem, 2003). Inactively traded stocks are affected by the problem of thin or infrequent trading and were omitted from the research which is consistent with the case deletion solution to thin or infrequent trading problem (Scheffer, 2002). Companies on suspension from trading in the NSE during the study period or the companies listed for less than 80% of the study period were also omitted from the study to avoid disruption when studying the consistent stock performance.

This research employed the logarithmic returns which are estimated as follows (Copeland, 2005):

$$L_nR_t = L_n (P_t / P_{t-1}) - 1 \quad (1)$$

Where: L_n = natural logarithm

L_nR_t = stock log return for current period

P_t = closing price for the current day

P_{t-1}= closing price if the previous day

The market model is employed in this research for estimation of normal returns which are then compared with actual returns for derivation of abnormal stock returns. The market model is as follows (Mac Kinlay, 1997):

$$E (R_{it}) = \alpha_i + \beta_i R_{mt} + \varepsilon_t \quad (2)$$

Where $E (R_{it})$= Normal Return

α_i= Constant term

β_i= coefficient or beta

R_{mt}= Market return

ε_t= error term

The statistical significance of abnormal returns from common consistent winners was to be tested by employing student t-test which was computed as follows (Sweeney, 2006):

$$\text{tstatistics} = \bar{x} - \mu / S.E \quad (3)$$

Where: μ = test value = 0

S.E = standard error = $\sigma / \sqrt{n}$

In this research, serial correlation of stock returns is measured using the following model (Napper, 2008):

Serial correlation (t_1, t_{-1}) = covariance (t_1, t_{-1}) / $\sigma t_1 \sigma t_{-1}$ (4)

Where: covariance (t_1, t_{-1}) = $\sum (R_t - ER_t) (R_{t-1} - ER_{t-1})$ (5)

t = current period

t_{-1} = previous period

σ= standard deviation

E = Expected

R = Returns

In case the series of stock returns is serially correlated, runs test clearly

indicates whether the series is positively or negatively serially correlated. Negative serial correlation implies reversal anomaly and is evidenced by numerous and short runs in a series. Positive serial correlation implies momentum and consistent stock returns and is evidenced by few but long runs. When Zero serial correlation implies randomness and indicates that a stock market is efficient (Adolph, 2007). The null hypothesis of zero serial correlation is tested by employing the Z test for the purpose of rejecting or not rejecting the null hypothesis after generating Z-statistics and p-values as follows (Adolph, 2007):

$$Z = [\,|\text{actual runs} - \text{expected runs}| - 0.5] / \delta \quad (6)$$

Where: $\delta = \sqrt{2n_1n_2(2n_1n_2-N) / N^2(N-1)}$ (7)

n_1 = no. of positive returns in the series

n_2 = no. of negative returns in the series

N = total no. of returns in the series

In this research stock return volatility or heteroscedasticity was measured using the Spearman's rank correlation coefficient which is modeled follows (Gujarati, 2006):

$$Rs = 1 - 6(\sum di^2) / n(n^2 - 1) \quad (8)$$

Where Rs = Spearman's rank correlation coefficient

di = difference between 2 ranks of independent variable (market return) and residuals (abnormal returns)

n = number of months

Results And Discussions

The study established thatthere are 12 stocks ranked consistently among the top 40% of 32 stocks during the study sample as per Table 1. These results appeared to support the occurrence of consistent stock trends in the NSE as per the cross sectional definition by Alwathainani, (2011). This is an anomaly as the NSE is weak form efficient(Magnusson and Wydick, 2005; Mlambo and Biekpe, 2007). However as per the cross sectional definitionof consistent stock performanceby Alwathainani, (2011) the degree of repeated stock performance is unspecified. This implies thateven marginal consistent stock performance is acceptable yet in many fields of study the threshold of acceptable or good performance is specified. In many fields 50% is considered as an acceptable pass rate (Saunders *et* al., 2009).

A further analysis of the results revealed that only 3 stocks consistently ranked at the top of the 32 sample stocks for at least 50% of the study period. The other 9 out of 12stocks had consistent top ranking but for less than 50% of the study period. This implies that the NSE may be weak form efficient (Magnusson and Wydick, 2005; Mlambo and Biekpe, 2007)and thus hinders trends and patterns from occurring.

Table 1: Descriptive Statistics on Consistent Top Ranked Stocks as per the Cross Sectional Definition

S/N	Consistently Top Ranked Stocks	Rate of Repeated Top Ranking
1	CO.17	**0.53**
2	CO.9	**0.52**
3	CO.28	**0.50**
4	CO.10	0.48
5	CO.22	0.48
6	CO.32	0.47
7	CO.6	0.46
8	CO.14	0.45
9	CO.21	0.45
10	CO.5	0.44
11	CO.16	0.43
12	CO.1	0.42

The research also established that no stock out of the sample of 32 stocks met the strict threshold of consistent or repeated positive or negative stock returns for 2/3rds of the study period as per the longitudinal definition (Watkins, 2003). The weak presence of consistent positive stock returns implies that the NSE may be weak form efficient and thus hinders trends and patterns from occurring(Magnusson and Wydick, 2005; Mlambo and Biekpe, 2007). The strict threshold requirement was thus relaxed until 12 consistently performing stocks with positive returns appeared as per Table 2 for comparison with results of consistent stock performance as per the cross sectional definition as per Table 2.

Table 2: Descriptive Statistics on Consistent Positive Stock Returns

S/N	Consistent Positive Stock Returns	Rate of Repeated Positive Returns
1	CO.5	57.6
2	CO.7	56.8
3	CO.28	56.8
4	CO.11	55.9
5	CO.16	55.9
6	CO.17	55.1
7	CO.22	55.1
8	CO.9	54.2
9	CO.13	54.2
10	CO.19	54.2
11	CO.6	53.4
12	CO.12	53.4

A joint analysis of both cross sectional and longitudinal definitions of the consistent stock performance in the NSE, yielded results that showed that no stock exhibited repeated performance for 2/3rds of the study period and at the same time ranked at the top of other stocks in the sample.These results also imply that the NSE may be weak form efficient and thus prevents trends or patterns from occurring (Magnusson and Wydick, 2005; Mlambo and Biekpe, 2007).

The threshold requiring repeated positive stock returns for at least 2/3rds of the research period as per the longitudinal definition wasthen lowered to at least 50% (Saunders *et* al., 2009). The study established that out of 32 stocks in the sample there are 6 consistent best performers as per both definitions as per Table 3. This implies that the probability of identifying a consistent best performing stock in the NSE is only 6/32 or0.1875 of the study period. For investors who are risk averse, the low probability of making money is risky especially if there are other investments that can offer similar return but with a lower risk.

Table 3: Descriptive Statistics of Combination of Cross Sectional and Longitudinal Definitions of Consistent Stock Performance

S/N	Consistent best performing stocks
1	CO.17
2	CO.9
3	CO.28
4	CO.22
5	CO.5
6	CO.16

After abnormal returns from the 6 consistent best performing stocks were tested for significance from zero as postulated by the efficient market hypothesis (Fama, 1991), the results revealed that the abnormal stock returns were not significantly different from zero. All the 6 consistent best performers had p-values that were above 0.05 level of confidence at 95% level of significance as per Table 4. These results implied that the NSE may be weak form efficient and does not allow for significant abnormal returns to be generated by investors(Magnusson and Wydick, 2005; Mlambo and Biekpe, 2007; Watkins, 2003).

Table 4: Results of Significance of Abnormal Returns

One-Sample Test						
Consistent best performers	Test Value = 0					
	T	df	**Sig. (2-tailed)**	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
CO.17	-0.34	117.00	**0.73**	0.00	-0.02	0.02
CO.9	-0.09	117.00	**0.93**	0.00	-0.02	0.02
CO.28	-0.57	117.00	**0.57**	-0.01	-0.06	0.03
CO.22	-0.22	117.00	**0.83**	0.00	-0.04	0.03
CO.5	-0.16	117.00	**0.87**	0.00	-0.03	0.03
CO.16	-0.37	117.00	**0.71**	0.00	-0.02	0.01

After testing serial correlation using runs test for the 6 consistent best performing stocks in the NSE, the test results showed that all the6 consistent best performing stocks had p-values greater than 5% level of confidence when tested at 95% level of significance as per Table 5. This implied zero serial correlation of stock returns which is a characteristic of efficient stock markets like NSE (Magnusson and Wydick, 2005; Mlambo and Biekpe, 2007; Watkins, 2003).

Table 5: Runs Test of Serial Correlation of Stock Returns

Consistent best performers	Total Cases	Number of Runs	Z statistics	**P-value (2-tailed)**
CO.17	118	66	1.113	**0.266**
CO.9	118	63	0.558	**0.577**
CO.28	118	64	0.861	**0.389**
CO.22	118	60	0.013	**0.990**
CO.5	118	62	0.373	**0.709**
CO.16	118	58	-0.370	**0.712**

Test on volatility of stock returns of the 6 consistent best performing stocks yielded results that revealed that the 6 consistent best performers exhibited low volatility with time as evidenced by a high p-values of 0.338, 0.979, 0.885, 0.614, 0.691 and 0.226 for CO.17, CO.9. CO.28, CO.22, CO.5 and CO.18 respectively. The p-values were all above the 0.05 level of confidence which implied that the consistent best performing stocks did not exhibit high volatilitywith time and hence randomness of stock price occurrencewhich is expected for stocks listed in efficient stock markets (Fama, 1991). The implication of these results was that there was an anomaly regarding the efficiency of NSE with regard to volatility of stock returns.

Table 8: Spearman's Rank Volatility Test

Consistent Best Performers	**P-Value (2-tailed)**	**Correlation Coefficient**	**Number of Observations**
CO.17	**0.338**	0.089	118
CO.9	**0.979**	-0.002	118
CO.28	**0.885**	-0.013	118
CO.22	**0.614**	0.047	118
CO.5	**0.691**	0.037	118
CO.16	**0.226**	-0.103	118

Conclusion

The overall results of the research reveal that there is weak presence of consistent stock performance in the NSE, perhaps due to weak form efficiency status of the bourse (Magnusson and Wydick, 2005; Mlambo and Biekpe, 2007). In this research, innovation arose fromthe combination of the alternative definitions of consistent stock performance (cross sectional and longitudinal) which have in the past been studied independently.

Implication on Policy and Practice

Stock market investors should not waste time searching for consistent stock performance anomaly in the NSE as it is not present and any abnormal returns from such trends or patterns are not consistent but are generated by chance. Investors are also advised to trust market prices as the NSE may be weak form efficient and thus invest long term. NSE regulators should educate the public on investment strategies that can be yield sustainable profits.

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