Market Efficiency in the Nigerian and Ghanaian Stock Markets

by

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Abstract
In literature, there has not been a known comparative study published on Nigeria and Ghana stock markets. The study is considerably important to enable a fair comparison of the level of improvement on the Ghanaian and Nigerian Stock-Exchanges. We observed market responsiveness to information. We engaged Partial Autocorrelation in testing the independence of prices. We used One-sample Kolmogorov Smirnov to investigate recognizable trends in movement of prices. Price movements were found independent in these two markets. Results of the Partial Auto Correlation's test show independent movements of prices. However, Runs and Distribution patterns display prices movement, which is not completely random. Study shows that the two markets are similar in every respect as they both exhibit independence in stock movements, show non-randomness as well as the presence of observable trends within the period under study. We conclude that no one could really draw a line of difference between the two markets.

Keywords
efficient market; stock exchange; price movement; information-efficient

Introduction

Efficient market hypothesis holds that no investor is able to sustain reaping of abnormal profits when all investors are well informed of the existence of an accruable abnormal profit at a particular segment of the market. They would all rush into such investment to reap of the profit; thereby, they increase the demand for such an investment; and thereby force out the abnormal yield.

Even though the strong form efficient market holds to the believe that no investor can earn any excess returns, the hypothesis holds that efficiency can be at its strong, semi-strong, or its weak form. It is at its strong form when no one earns any excess profit no matter the form of analysis employed, but at its weak form when some fundamental analyses enable excess returns; even if on a very short term. This implies therefore that the hypothesis asserts that excess returns can be earned on the capital market when strategies based on historical share prices are used. It implies that the hypothesis does not subscribe to the fact that technical analysis techniques will be able to consistently produce excess returns. It avers that there are no patterns to assets' prices. That is, future price movements are random; they are determined by unexpected information.

Thus, it can be said that stock market efficiency basically concerns the nexus between prices of shares and information. In the words of Markowitz, as Akinsulire (2003) puts it, the efficiency of the market can be discussed or measured in categories. In the categories are the strong-form of efficiency, the semi-strong form, and the weak-form of efficiency as Fama (1970) defines it. At the weak form, prices are random. No historical price pattern could be studied and utilized to enable abnormal profits. Daily prices are independent of one another. Future earnings cannot be predicted accurately. There is no pre-assumption of potential price rallying. Hence, one could say that market efficiency is uncertain.

Study objectives

The central aim of the study is to find out degree of proficiency that exists in the Nigeria and Ghana stock markets. The specific objective is to investigate the extent to which the movement of stock prices in the two markets depends on previous stocks' prices movements; and compare the two. Equally, study set out to examine whether successive stocks' price movements in the two markets are random. That is, it set out to determine the extent to which there are observable patterns in the movements of prices in the two stock markets.

Research hypothesis

$H0_{1:}$ Movement of prices in the two markets are not independent.

$H0_{2:}$ Movement of in both markets are not random.

Empirical evidence

Ignited by Fama (1965)'s study of the American stock market, series of researchers have examined the efficiency of different markets, but with diverse results. For instance, Vitali and Mollah (2010) studied the random walk hypothesis on Egypt, Morocco, Kenya, Mauritius, South Africa, Tunisia and Nigeria from 1999 to 2009. Results obtained rejected the hypothesis. Only South Africa bourse proved market efficient; even at weak-form. The results suggest that prices of stocks do not fully reflect all historical info. Aga and Kocaman (2008) examined the efficiency of Istanbul stock market, with index-20, for a period of 20 years: 1986 – 2005. The analysis confirmed the existence of weak-form efficieny. That is a departure from Vitali and Mollah (2010).

Bhattacharya and Murherjee (2002) investigated the causal link between stock prices and financial market aggregates in India, using Granger causality tests. They found no causal link between stock prices and money supply, national income, nor interest rates. Moreover, they found a two-way causation between share prices and inflation. The study perceived Indian market tended towards efficiency.

Dragota et al (2009) appraised Romanian capital market. They used daily and weekly returns of 18 quoted firms. In addition, Dragota et al (2009) equally assessed daily and weekly market returns, using multiple variables ratio, and found that most of the stock prices were information efficient.

Vosvorda et al (1998) and Nwosa and Oseni (2011) could not find stock prices reflect random walk on Prague and Nigeria stock markets rerspectively. These are in tandem with the finding of Macskai and Molnar (1996). Macskai and Molnar (1996) utilised Ljung-Box Q Statistics to test the degree of efficiency on the Budapest stock exchange, and found traders making excessively high returns.

Afego (2012) studied the Nigerian stock market, testing for random walk, using monthly index returns over 25 years (1984 - 2009). He conducted non-parametric runs. He found the market inefficient; even in the weak-form. This is contrary to the report of Ajao and Osayuwu (2012). Ajao and Osayuwu (2012) analysed efficiency of the market using all securities being traded on the stock exchange, and the month-end All Share Index of ten years (2001 - 2010). Serial Correlation technique was utilized to observe independence of price movements, the distributive pattern, and runs test for randomness. The duo found Nigeria stock market efficient; though it was at weak-form.

Olowe (1999) too analysed monthly data obtained from 59 randomly selected securities from 1981 to 1992 on the Nigerian stock exchange. Olowe (1999) found the market conformed with the weak-form efficiency. Nevertheless, Olowe doubted if the market could pass more stringent statistical tests. Apart from Olowe (1999), some other studies on the efficiency of the Nigerian stock market, Ekechi (2002), Inegbedion (2009), Aguebor et al (2010) and Rapuluchukwu (2010), averred that the Nigerian stock market is efficient in the weak-form.

Ekechi (2002), Aguebor (2010), and Inegbedion (2009) show that the Nigerian bourse was not efficient even in the weak-form. A cursory look on the reports show that all studies reporting that the Nigerian stock market is efficient in the weak-form used All Share index, while those reporting inefficiency used just samples of selected securities (Ajao and Osayuwu, 2012)

Research design

The data analysed for study were mostly sourced from internet. The publications of the Nigerian stock market, newspapers, publications of the Central Bank of Nigeria, the monthly All Share Index used were sourced from the CBNs Statistical Bulletins. The Ghana stock exchange composite index was sourced from Ghanaian stock exchange. The population of this study comprised the Nigerian and Ghanaian markets. Samples include monthly published all shares' indexes and the Ghana composite index. The NSE All-Shares Index and the Ghanaian Stock Exchange Composite Index depict the behaviours of ordinary shares that are quoted on the Exchanges. These provide a complete representation of the market. The market index indicate direction of the markets and capitulates the scope of their movements.

The Nigerian Stock Exchange's All-Shares' Index and the Ghana Stock Exchange's Composite Index are used as performance indicators for study. Two are the aggregations of shares' price gains and losses on trading. They constitute appropriate measures of stock price changes; required to determine market efficiency.

Model specification

$$ri = \frac{n\sum xy - \sum x \sum y}{\sqrt{[n\sum xi^2 - (\sum xi)^2][n\sum yi^2 - (\sum yi)^2]}}$$

$$Q = n\sum ri^2$$

Where:

Q	=	Box-pierce statistic
ri	=	serial correlation coefficient (the ith lag)
n	=	sample size (financial security)

The Box-pierce statistics follow chi-square distribution with 'm' degree of freedom; 'm' is the number of lags.

Test for randomness of prices

$$Z = \frac{R + 0.5 + R;}{SR}$$

Where:

R	=	number of runs (stock price changes)
R	=	(2N1N2/N1+N2) **+ 1 = me**an number of price changes
SR	=	2N1N1 (2N1N2 - N1 – N2) / (N1+N2) 2(N1+N2 - 1)

Where:

N1	=	number of positive price changes
N2	=	number of negative price changes
SR	=	standard deviation of the distribution (number of price changes)

Data analysis

We examined the unit root of data and obtained the following result. We used Augmented Dickey Fuller for the examination. We adjusted data for stationarity by integrating once, due to failure of Augmented Dickey Fuller stationarity test. It was after the adjustment that we conducted the analysis.

Table A. All Share Index (Nigeria). Month ends (2004-2014)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2004	22,712.9	24,797.40	22,896.40	25,793.00	27,730.80	28,887.40	27,061.10	23,774.30	22,739.70	23,354.80	23,270.50	23,844.50
2005	23,078.3	21,953.50	20,682	21,961.70	21,482.10	21,564.80	21,911.00	22,935.40	24,635.90	25,873.80	24,355.90	24,085.80
2006	23,679.4	23,843.00	23,336.60	23,301.20	24,745.70	26,316.10	27,880.50	33,096.40	32,554.60	32,643.70	32,632.50	33,189.30
2007	36,784.5	40,730.70	43,456.10	47,124.00	49,930.20	51,330.50	53,021.70	50,291.10	50,229.00	50,201.80	54,189.90	57,990.20
2008	54,189.92	65,652.38	63,016.56	59,440.91	58,929.02	55,949.00	53,110.91	47,789.20	46,216.13	36,325.86	33,025.75	31,450.78
2009	21,813.76	23,377.14	19,851.89	21,491.11	29,700.24	26,861.55	25,286.61	23,009.10	22,065.00	21,804.69	21,010.29	20,827.17
2010	22,594.90	22,985.00	25,966.25	26,435.20	26,183.21	25,384.14	25,844.20	24,268.20	23,050.60	25,042.20	24,764.70	24,770.52
2011	26,830.70	26,016.80	24,621.20	25,041.70	25,866.60	24,980.20	23,827.00	21,497.60	20,373.00	20,935.00	20,003.40	20,730.60

2012	20,875.80	20,123.50	20,562.50	22,045.70	22,066.40	21,599.60	23,061.40	23,750.80	26,011.60	26,430.90	26,494.40	28,078.80
2013	31853.18	33,075.14	33,536.25	38,485.56	41,474.40	42,482.48	42,097.49	41,532.31	36,585.08	37,622.74	38,920.85	41,329.19
2014	40,571.62	39,558.89	38,748.01	38,485.56	41,474.40	42,482.48	42,097.49	41,532.31	41,210.10	37,550.24	34,543.05	34,657.15

Source: CBN Statistical Bulletin 2014

Unit root test

Table B. Result of the unit root test

Augmented Dickey Fuller (ADF)					
Variables		Test Statistic	Probability	Status	Remark
ASI	1st Difference	-4.180128	0.0010	1(*1*)	Stationary
GSE-CI	1st Difference	-9.842816	0.0000	1(*1*)	Stationary

On the table above, the ADF test shows that both the **ASI and GSE-CI** are stationary at first difference. Thus, the 1st difference of the variables are used to perform the analysis to obtain normal results.

Test of hypotheses

We used Partial Autocorrelation to test for individuality of prices in the market. Equally, we used Ljung-Box and the Box-Pierce to test for the significance of autocorrelation coefficients. Based on the outcomes of the series of tests conducted we arrive at the following conclusions.

Hypothesis 1**:** The movement of prices in the market is not independent.

Test Statistics: (i) Partial Autocorrelation test (PACF)

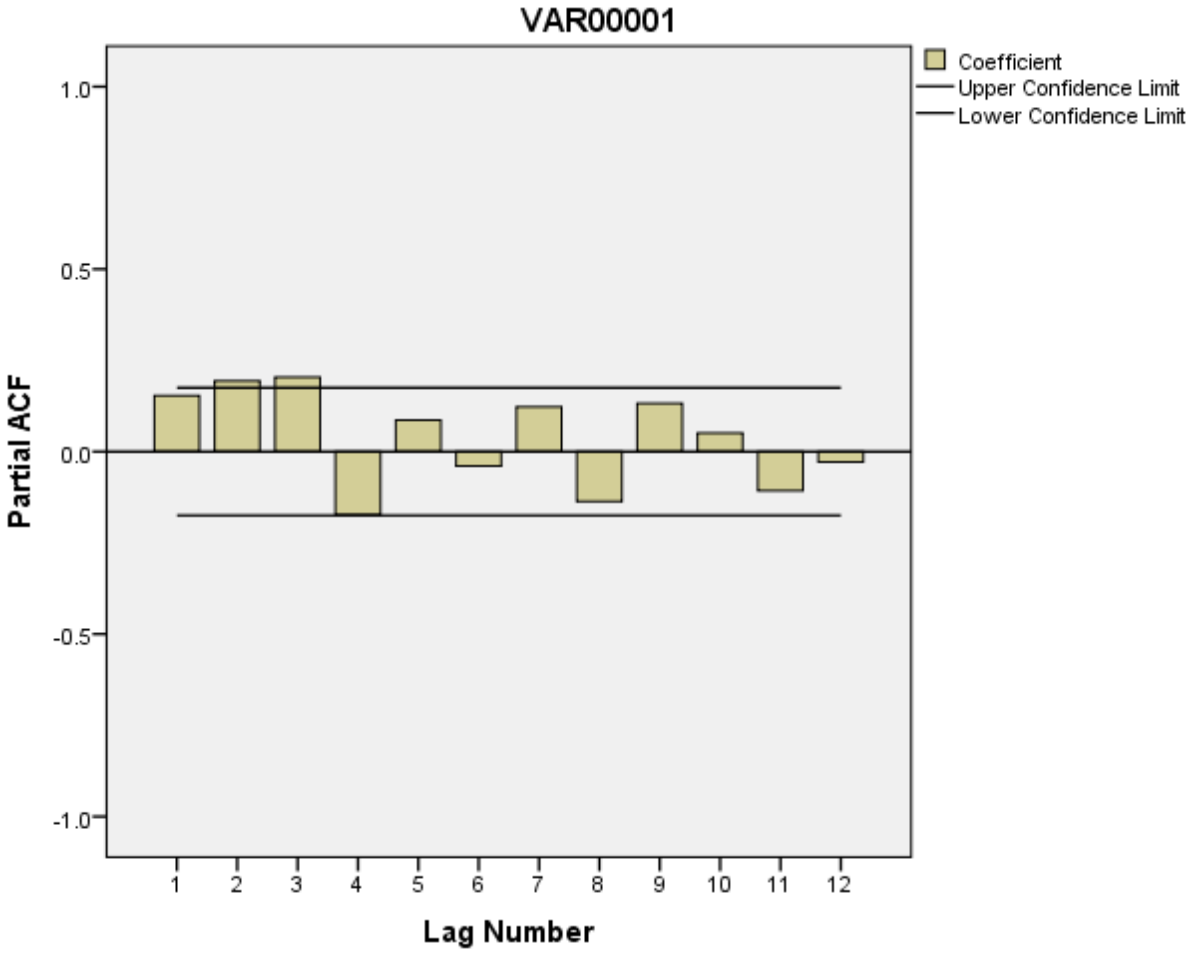
(ii) Autocorrelation test (ACF).

Lag	Partial Autocorrelation	Std. error
1	.153	.087
2	.194	.087
3	.204	.087

Table C Result of Partial Autocorrelations

4	-.173	.087
5	.086	.087
6	-.040	.087
7	.123	.087
8	-.136	.087
9	.132	.087
10	.051	.087
11	-.107	.087
12	-.029	.087

Fig 1: Partial Autocorrelation 2 Standard Error Test



As seen in Fig.1, lags 2 and 3 of these 12 lags violate the two standard error limits; lag 4 is only just within. All the remaining 9 lags fall inside the range. Thus, a significant percentage of the 12 lags (above 75%) are within the two standard errors limit. Hence, we accept the null hypothesis. We conclude at 95% confidence level that movement of prices in the stock market is independent.

Table D. Autocorrelations

Lag	Autocorrelation	Std. error[a]	Box-Ljung Statistic

			Value	Df	Sig.[b]	Remark
1	.153	.086	3.154	1	.0.76	Not significant
2	.213	.086	9.255	2	.0.10	Significant
3	.248	.086	17.623	3	.001	Significant
4	-.086	.085	18.254	4	.001	Significant
5	.136	.085	20.819	5	.001	Significant
6	-.004	.085	20.821	6	.002	Significant
7	.084	.084	21.821	7	.003	Significant
8	-.035	.084	21.999	8	.005	Significant
9	.079	.084	22.893	9	.006	Significant
10	112	.083	24.709	10	.006	Significant
11	-.108	.083	26.416	11	.006	Significant
12	.064	.083	27.018	12	.008	Significant

The Box-Ljung statistics as contained in the Autocorrelation test show that only the 1st lag is not significant. Results of the Box-Pierce Q statistics show that the overall significance of the test is poor; the tabulated value of the Box-pierce Q is higher than the calculated value. Hence, we accept null hypothesis. Therefore, it is reasonable to conclude that at 95% confidence level, the changes in prices of stocks traded on the floor of the Stock Exchange are independent. This result is consistent with that of the partial autocorrelation test.

$Q = n\sum r_i^2$ where n is the sample size

What informs the use of this statistics is that high sample autocorrelations lead to large values of Q. If the calculated value of Q exceeds the appropriate value in a χ^2 table, we reject the null hypothesis. This implies the acceptance of the alternative hypothesis; that at the minimum, one autocorrelation is not zero.

Table E: Box-pierce statistics

0.153^2	0.023409
0.213^2	0.045369
0.248^2	0.061504
-0.086^2	-0.007396
0.136^2	0.018496
-0.004^2	-0.000016

0.084^2	0.007056
-0.035^2	-0.001225
0.079^2	0.006241
0.112^2	0.012544
-0.108^2	-0.011664
0.064^2	0.004096
	$^{\Sigma}$=0.158414

Q = 0.158414 × 132

Q = 20.911

Box-pierce statistic$\sim\chi^2_{\propto,\,m}$

$\propto$ = 0.05

Bp$\sim\chi^2_{0.05}$, 12 = 21.026

Bp > $\chi^2_{\propto}$, m

Hence, we admit null hypothesis; since Q > Bp

This implies that changes in prices of stocks are dependent. Hence, investors can predict future price movement from past stock prices. Hence, the Nigerian stock market lacks efficiency; even at the weak-form.

Test for randomness

Hypothesis 2**:** The movement of prices not random.

Table F Runs test

	VAR00001
Test value	31568.9164
Cases< Test value	80
Cases>= Test value	52
Total Cases	132
Number of runs	4
Z	-10.988
Asymp.Sig.(2-tailed)	.000

As shown in Table F the calculated value of the Z-statistic is -10.988 with an associated asymptotic significance (2-tailed probability of 0.000). Therefore, the null hypothesis is accepted at 1% level. Thus, at 99% confidence level, we conclude that the stock price movement in the stock market is not random.

Although the results from this study contradict few previous studies already done on the Nigerian Stock Exchange, which have employed the Runs test, they are consistent with many others like Appiah-Kusi and Menyah (2003), Smith (2008), Emenike (2008), and Mollah and Vitali (2011). Given that African Stock Markets, including the Nigerian stock exchange, are bothered by problems of thin trading, lack of market transparency and poor regulatory standards (Mlambo and Biekpe, 2005). Therefore, the results reported in this study are not inconsistent with expectations.

Distribution patterns

The normal curve in Fig. 2 shows that the distribution Patterns is asymmetrical, since the shape of the curve to the left of the line of symmetry is conspicuously different from the shape to the right of the line of symmetry. The implication is that the distribution pattern of the Stock price movement is not Random. This is consistent with the result of the Runs test earlier carried out.

Test for observable trend

Hypothesis 3: There is no observable trend in the movement of stock prices in the Nigerian stock market. This test was carried out using the one-sample Kolmogorov smirnov test.

Table G. Result of the One-Sample Kolmogorov Smirnov test

N		132
Normal Parameters[a,b]	Mean	31568.9164
	Std. Deviation	11177.58123
Most Extreme Differences	Absolute	.217
	Positive	.217
	Negative	-.147
Kolmogorov-smirnov Z		2.497
Asymp.Sig.(2-tailed)		.000

One-sample Kolmogorov-Smirnov test

As shown in Table G, Kolmogorov-Smirnov calculated value of the Kolmogorov-Smirnov Z is 2.496 with an associated asymptotic significance (2-tailed probability of 0.000). as a result of this, the null hypothesis is rejected. The implication is that we conclude at the 99% confidence level that there is an observable trend in the pattern of price movement in the market.

Discussion of findings relative to Nigerian Stock Exchange

The results of the autocorrelation and partial autocorrelation tests indicate that the movement of stock prices in the Nigerian stock market is independent. This implies it is impossible for investors to use previous stock price movements to predict potential prices or use today's stock price movement to predict future prices. Contrarily, the results of the runs test and distribution patterns of price changes show that price movement is not random; thus signalling that the Nigerian stock market is not efficient, even in the weak form. In other words, it is possible for investors to beat the market; that is, make gains on the basis of privileged information. Although this result is inconsistent with those of Olowe (1999) and Rapuluchukwu (2010); it is consistent with the findings of Ekechi (2002) and Inegbedion (2009).

Test of hypotheses for the Ghana stock market

The same tests that was carried out for the Nigerian bourse was also carried out for the Ghana Stock Market. The aim is to promote fair comparison of the two markets.

Table H. Data presentation [Ghanaian Composite Index (GSE-CI)] Months end (2004-2014)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2004	3,798.06	4,633.14	4,633.14	6,543.95	6,853.00	7,045.40	7,125.05	7,316.31	6,997.79	6,932.90	6,747.41	6,798.60
2005	6,889.44	6,737.21	6,453.84	6,108.19	6,050.03	5,862.74	5,019.66	4,836.56	4,880.06	4,903.68	4,801.89	4,778.07
2006	4,702.60	4,739.60	4,773.28	4,791.74	4,855.26	4,851.32	4,903.19	4,932.18	4,963.00	4,993.93	5,013.71	5,026.80
2007	5,032.95	5,065.75	5,113.15	5,162.19	5,247.18	5,318.29	5,368.71	5,587.94	5,675.91	5,837.58	6,381.27	6,595.63
2008	6,718.48	7,011.03	7,851.54	9,344.69	9,812.26	10,349.68	10,655.21	10,812.91	10,921.46	10,781.02	10,573.43	10,431.64
2009	10,220.99	9,836.84	9,247.17	8,822.91	7,496.02	5,423.03	5,230.49	5,900.41	6,292.14	5,378.72	5,386.48	5,572.34
2010	5,625.42	5,541.15	6,014.34	6,518.88	7,172.08	6,591.10	6,394.02	6,821.80	6,835.71	6,886.31	7,101.23	7,369.21
2011	1,057.14	1,051.83	1,071.50	1,100.38	1,162.78	1,188.91	1,170.85	1,145.12	1,098.38	1,007.86	987.26	969.03
2012	974.53	1,016.47	1,046.88	1,056.10	1,022.95	1,045.48	1,027.78	1,025.90	1,047.72	1,116.27	1,133.47	1,199.72

2013	**1,270.72**	**1,482.26**	**1,733.47**	**1,800.66**	**1,884.26**	**1,880.26**	**1,936.29**	**1,989.55**	**2,030.96**	**2,099.88**	**2,123.75**	**2,145.20**
2014	**2,255.52**	**2,420.91**	**2,386.34**	**2,255.27**	**2,319.12**	**2,373.38**	**2,300.35**	**2,200.18**	**2,239.68**	**2,249.33**	**2,266.92**	**2,261.02**

Source: Annual Reports Ghana

Table I. Results of the partial Autocorrelation

Lag	Partial Autocorrelation	Std. error
1	.145	.087
2	.012	.087
3	.042	.087
4	.073	.087
5	-.024	.087
6	.022	.087
7	.062	.087
8	-.068	.087
9	-.062	.087
10	-.117	.087
11	-.051	.087
12	-.032	.087

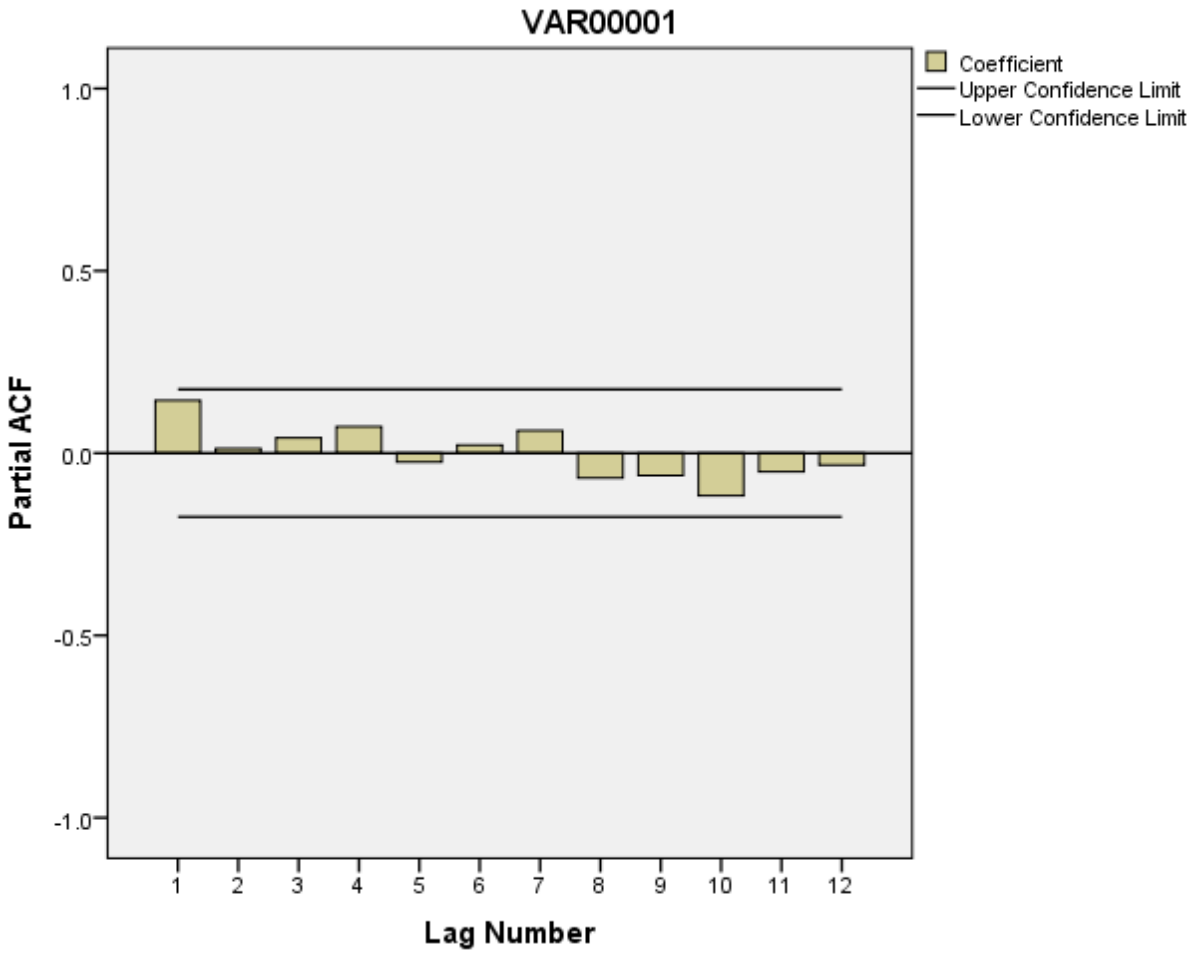


Fig 3: Partial Autocorrelation 2 Standard Error Test

Result in Fig 3 shows that out of the 12lags, none of them violate the two standard error limits, but are all within the range. The implication of this is that the degree of independence of the stock price movement is maximal. Hence, we accept null hypothesis. We therefore conclude that at the 95% confidence level the movement of prices in the Ghana Stock Exchange is independent.

Table J. Result of the Auto correlation test

Lag	Autocorrelation	Std. Error[a]	Box-Ljung statistic			
			Value	Df	Sig.[b]	Remark
1	.145	.086	2.804	1	.094	Not significant
2	-.033	.086	2.951	2	.224	Not significant
3	.048	.086	3.261	3	.353	Not significant
4	.084	.085	4.234	4	.375	Not significant
5	.000	.085	4.234	5	.516	Not significant
6	.022	.085	4.303	6	.636	Not significant

7	.072	.084	5.026	7	.657	Not significant
8	-.042	.084	5.270	8	.728	Not significant
9	-.073	.084	6.038	9	.736	Not significant
10	-.125	.083	8.295	10	.600	Not significant
11	-.077	.083	9.147	11	.608	Not significant
12	-.065	.083	9.774	12	.636	Not significant

Table K. Box-Pierce statistic

0.145^2	0.021025
-0.033^2	-0.001089
0.048^2	0.002304
$s0.084^2$	0.007056
0.000^2	0
0.022^2	0.000484
0.072^2	0.005184
-0.042^2	-0.001764
-0.073^2	-0.005329
-0.125^2	-0.015625
-0.077^2	-0.005929
-0.065^2	-0.004225
	$\sum$ =0.002092

Q=0.002092× 132

Q=0.2761

Box-pierce statistic~$\chi^2_{\propto,\,m}$

$\propto = 0.05$

Bp~$\chi^2_{0.05}$, 12=21.026

Bp> $\chi^2_{\propto}$, m

The Box-Ljung statistics from the Autocorrelation test shows that all the lags are not significant. Results of the Box-Pierce Q statistic shows that the overall significance of the Autocorrelation test is poor since the calculated value of the Box-pierce Q is less than the

tabulated value. Hence, we reject the null hypothesis. In other words, it is reasonable to conclude that at 95% confidence level, the changes in prices of stocks traded in Ghanaian Stock market are independent.

Table L. Runs test

	VAR00001
Test value	4721.8402
Cases< Test value	51
Cases>= Test value	81
Total Cases	132
Number of runs	5
Z	-10.801
Asymp.Sig.(2-tailed)	.000

Table 4.12 shows the calculated value of the Z-statistic is -10.801 with an associated asymptotic significance (2-tailed probability of 0.000). Consequently, the null hypothesis that the stock price changes are random is rejected at the 1% level. Thus, at the 99% confidence level, the stock price movement in the Ghanaian market is not random. This result is consistent with Magnusson and Wydick (2002). They made use of Partial Autocorrelation and runs test for randomness for a number of African markets. They find evidence of significant correlations in stock returns for Ghana, Nigeria and Zimbabwe, thus suggesting that these markets are not efficient, even at weak form.

DISTRIBUION PATTERNS

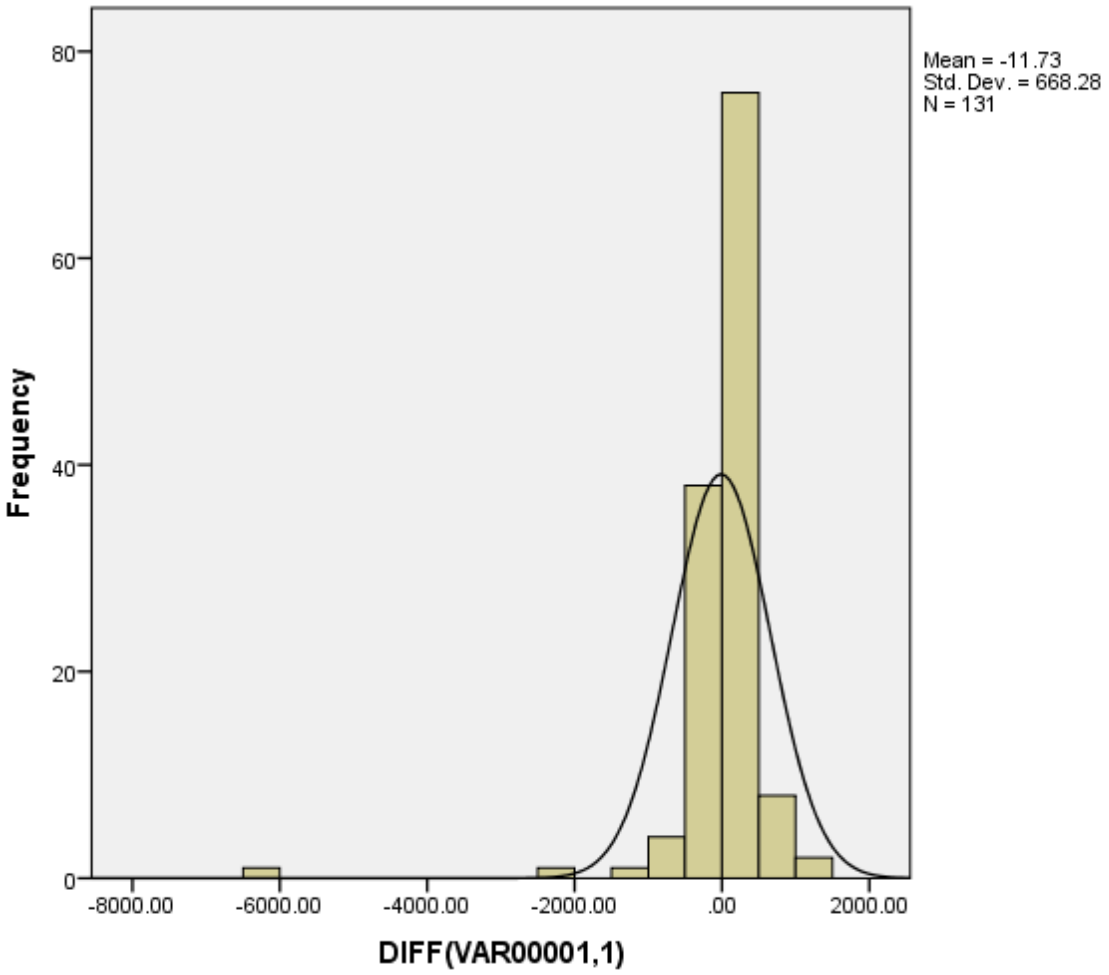


Fig 4: Distribution pattern

The normal curve in the above shows the distribution pattern is asymmetrical. This implies that the distribution pattern of the stock price movement is not random. This is consistent with the result of the Runs test earlier conducted.

Table M. Result of the One-sample Kolmogorov Smirnov test

N		132
Normal Parameters[a,b]	Mean	4721.8402
	Std. Deviation	2801.68066
Most Extreme Differences	Absolute	.158
	Positive	.158
	Negative	-.118
Kolmogorov-smirnov Z		1.814
Asymp.Sig.(2-tailed)		.003

One-sample Kolmogorov-Smirnov test

The table above shows the calculated value of the Kolmogorov-Smirnov Z is 1.814; with an associated asymptotic significant (2-tailed probability of 0.003). Therefore, we reject the null hypothesis that there exists no observable consistent trend in the pattern of price movement. This implies, at the 99% confidence level, that there is an observable consistent trend in the Ghanaian market.

Discussion of findings for the Ghana stock market

The Ghanaian market just like the Nigerian bourse shows that the movements of prices are not independent. This means that it is possible for investors to use previous stock price movements to predict subsequent day's stock prices or use today's stock price movements to predict future prices. Furthermore, the results of the runs test and distribution patterns of the stock price changes show that the price movements are not random. This suggests that the Ghana stock market is not efficient in the weak form. That is, new information is not always diffused promptly. Therefore, it is possible for investors to make gains on the basis of privileged information. This result is consistent with Magnusson and Wydick (2002), Frimpong et al (2008), Ayentimi et al (2013) and Osei (2002).

Lastly, the one sample Kolmogorov Smirnov test for availability of trend in the pattern of stock price changes in the Ghana stock market revealed that there is a trend in the pattern of stock price movements. This means that there are short durations of bullish runs and short durations of price movements. However, even within these periods, the investors were not in a vantage position to predict stock prices with absolute certainty since the changes in the stock prices are independent. The results obtained from both the Nigerian and the Ghanaian stock markets show that they are the same in every respect as they both exhibit independence in price movements, exhibited non-randomness as well as the presence of observable trends in the movement of prices within the period under study. This shows that one could not really draw a line of difference between the two markets.

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