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Efficiency of the Nigerian Capital Market; an Empirical Analysis

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Abstract
This study investigated the efficiency of the Nigerian capital market from 1986 to 2009 through the Random Walk Theory, the rate at which stock information is reflected in stock price and its impact on Nigeria's economic development. This was done because the capital market has been proven to be a hub and catalyst for economic development of a country. In order to accomplish the set out objectives of this study, three research hypotheses (H_{o1} - H_{o3}) were formulated which were tested via a number of analytical techniques. These are the ADF unit root test, the ARMA Test, the VAR-based granger causality test, the Cointegration analysis and the Vector Error Correction Test. Based on the results gotten, H_{o1} was rejected, H_{o2} was accepted and H_{o3} was rejected. The results revealed that there is still room for improvement of the efficiency level of the Nigerian Capital Market. This was due to the fact that the speed of adjustment of stock price to stock information was not very high and the market was also found to be inefficient within the period under review. The result also showed that a significant relationship exists between capital market performance and economic development. The study ended by recommending that there should be an increased level of public enlightenment on the gains of capital market, an increased level of regulation that would check the vice of all forms of market manipulations and an increased level of operators in the market by relaxing stringent entry requirements of companies. These would increase the efficiency level of the Nigerian capital market enabling it to have an improved impact on the development of the Nigerian economy.
Keywords: Efficiency, Random Walk Theory, ARMA Test, Vector error Correction

1. Introduction

It is a known fact that almost everything done by man involves the use of money or money surrogates. Indeed the world we live in today can hardly survive in the absence of money. Money enhances capital accumulation which in turn promotes economic growth. The capital market is actually created to make provisions for easier access to fund which is used for developmental and other purposes. In fact, for a nation to develop there is a dire need for that nation to have a functional and efficient capital market of which the stock exchange is the hub. According to Alile (as cited in Osinubi, n.d), "…the central objectives of stock exchanges world-wide remain the maintenance of the efficient market with attendant benefits of economic growth."

A capital market is constituted when a network of financial institutions interact to mobilize and allocate long term funds to productive investment. The long term funds are exchanged for financial assets issued by borrowers or traded by holders of previously issued assets. This implies that the capital market serves an important function of bringing together deficit and surplus units of an economy. Without this function the capital market is rendered useless as the opportunity for investment and production of goods and services for development is eliminated. The absence of this function also creates a gap where surplus units have idle funds and the deficit units are in search of funds for investment. The capital market thus provides services that are essential to a modern economy, mainly by contributing to capital formation through financial intermediation. It also promotes portfolio diversification which ensures that savers can maximize returns on their assets and reduce risk.(Olowe, 1999). The interaction between the surplus units and the deficit units actually determines the extent to which a nation develops. Basically, the Nigerian capital market is divided into 2 separable, but closely related segments. These are the primary and secondary markets.

The primary market is one where new securities are traded. It also provides the means for government and corporate bodies to raise fresh capital. The securities traded here could be shares, stocks and bonds. The secondary market, on the other hand, is one in which buyers and sellers trade on previously issued securities. Indeed the efficiency of the primary market rests on the efficiency of the secondary market. This follows from the fact that very few people will be willing to buy new securities if they do not have an assurance of being able to convert it to cash when they deem fit. The secondary market thus provides liquidity to investors. The ease of securities' conversion into cash is an important determinant of the efficiency of the secondary market and indeed the capital market in general. Therefore the secondary market facilitates the savings and investment process, and ultimately, the growth and economic development of a nation (Mbat 2001).

The efficiency of the Nigerian capital market has been studied by various researchers. These researchers provided various conclusions. Some researchers like Samuels and Yacout (1981) and Olowe (1999) concluded that the market is efficient while others like Akpan O.E. (1995) said it is not. However, this study ascertains the current state of the Nigerian Capital Market with respect to efficiency.

1.1 Statement of the Problem

The function of the capital market in the transformation of an economy cannot be overemphasized as the market forms the nucleus of a nation's growth process. The capital market plays a vital function in the mobilization of long term funds and the optimal allocation of resources for investment and productive purposes, aimed at stimulating industrial and economic development. Thus the ability of a nation to mobilize savings and transform such savings into investment depends on the kind of capital market in existence in that country.

However, the Nigerian capital market, since inception, has experienced a lot of problems (e.g. paucity of tradable shares and the global financial crises) which have hindered its operational capabilities. More so, the extent of efficiency or inefficiency of the this market is yet to be convincingly determined as previous studies in this regard employ methods that have been shown to have certain weaknesses. It is against this background that this study ascertained whether the efficiency level of the Nigerian capital market is strong enough to lead to Nigeria's economic growth and development. Furthermore, there has been a debate concerning whether prices of securities follow a random or non-random walk. This study also ascertained which is more applicable in Nigeria's context.

1.2 Objectives of the Study

This study has the following objectives;

- To determine whether investors use historical data as a tool for predicting future security prices.
- To determine the speed of adjustment of stock price to stock information.
- To determine the relationship between stock market performance and economic growth of Nigeria.

1.3 Research Questions

In order to achieve the objectives of this study, the following research questions are treated;

- To what extent do investors depend on historical data on stocks to influence their decision to buy?
- To what extent is the level of speed at which stock information is reflected in stock price?
- To what extent does the Nigerian Capital Market impact on the development of the Nigerian economy?

1.4 Research Hypotheses

In order to provide a framework for analyzing the efficiency of the Nigerian Capital market the following hypotheses are formulated;

H_{o1} Stock prices do not follow a trend, over the years in the Nigerian Stock market

H_{o2} The speed of adjustment of the stock price to stock information is not high.

H_{o3} There is no significant relationship between the performance of the Nigerian capital market and economic development.

1.5 Significance of the Study

The significance of this study would be most felt in 3 perspectives. Firstly, it would aid investors to manage their portfolio better, via proper investment analysis. Secondly, it would aid the capital market regulators and other economic policy makers in formulating appropriate policies that will facilitate growth and development. Lastly, it would add to the existing body of literature for students and other researchers.

2 Theoretical Framework and Literature Review

2.1 Theoretical Framework

2.1.1 Fundamental Analysis

This theory of securities analyses implies that, at any point in time, an individual security has an intrinsic value. This intrinsic value is determined via a careful analysis of the company that owns the stock, the industry in which the company finds itself and the economy in general. A difference in the intrinsic and market value of the stock creates a room for profit making. The extent of this difference and the speed of correction of this difference indicate the level of efficiency of the capital market (Mapsofworld, n.d.).

2.1.2 Technical Theory

This assumes that price trends and patterns exist in the trading of stocks (Snavely, n.d.). These patterns can be

utilized to make gains if one can recognize them quickly enough. This model implies that all information pertaining to a stock is already reflected in the stock price. Thus there is really no need for a fundamental analysis i.e. it is not necessary to determine the intrinsic value of a stock.

2.1.3 Random Walk Theory

This states that stock prices follow no predictable pattern, implying that future prices have no relationship with historical prices of the same stock. According to Mbat (2001), the random walk theory insinuates a statistically independent relationship between future prices of stock and their past prices.

2.1.4 Capital Asset Pricing Model (CAPM)

This model is one used in the pricing of securities. The CAPM asserts that only systematic risk, which cannot be eliminated, is priced by rational investors. CAPM is used to evaluate the rate of return of an asset if it is to be included to a portfolio that is already well diversified portfolio.

2.1.5 Efficient Market Hypothesis (EMH)

This states that markets make instant adjustments to stock price fluctuations. These changes in stock price occur due to the emergence of new information pertaining to that particular stock. The EMH occurs when the active market participants all have access to relevant information, utilizing this information to compete rationally in order to maximize profit on their buy and sell decisions. This eventually leads to the situation where the actual price of a security is a good estimate of the intrinsic value of that security. This implies that no stock is overvalued or undervalued and as such there is no possibility of making gains by outperforming the market. It is therefore evident that the EMH supports the random walk theory. If information is not utilized by all concerned, the theory breaks down as opportunities emerge for one or more market participants to make hay while the sun is still shining. This phenomenon is called information arbitrage. The EMH is further divided into the weak form, the semi strong form and the strong form depending on the kind of information that is reflected in the existing price of securities

The weak form of EMH implies that prices of assets always fully reflect all historical, publicly available information. Thus, future prices cannot be ascertained by simply analyzing data on past prices. Thus it totally kicks against technical analysis, but lends credence to fundamental analysis as it implies that one can outperform the market if one undertakes research into the financial statements of the company under scrutiny. A capital market is therefore weak form efficient if there is no discernable pattern that can be identified in its stock prices over time. Therefore, no amount of chart reading is likely to out-perform the buy and hold strategy (Olowe, 1999).

The semi-strong form holds that a capital market is efficient, when the prices of stocks reflect, all publicly available information. "All publicly available information" implies both historical and current information whether financial or non-financial as long as it concerns the stock in question. Therefore the prices of stock undergo a rapid transformation in order to accommodate any new information that becomes publicly available. The assertion is that one should not be able to profit from something everyone else knows. Semi strong efficiency is in opposition to both fundamental and technical analysis.

The strong form of the EMH states that the current price of a stock fully reflects all existing information (both public and private) about that stock. Olowe (1999) stressed that, in a strongly efficient market, no individual can out-perform the market from any information available to him or her. This remains true even if that person is the only one with access to the information. Pandey (1999) equally observed that in this form of efficiency, the security prices reflect all published and unpublished information. This implies that even the member of a company's top management staff, who is privileged to have insider information, cannot use such information to out-perform the market. In the same vein, the research team of a company cannot gain abnormally if they invest in the company's shares immediately after making a discovery that is bound to be of immense benefit to the company.

Of all the theories mentioned, this paper is primarily anchored on the efficient market hypothesis with emphasis on the random walk theory.

2.2 Literature Review

The emphasis here is on the weak- form version of the EMH. Over the years, a number of empirical studies of the Weak-Form efficiency have been performed on the Nigerian Stock Exchange (NSE). These studies offered mixed evidence. For instance, the works of Olowe (1999) and Okpara (2010) provide evidence to support Weak-Form Efficiency. In contrast, Akpan O.E. (1995) found the Nigerian Stock Market to be weak-form

inefficient. He used time series data of stock market price indices covering the period 1989-1992. The research conducted by Appiah-kusi and Menya (2003) resulted in evidence that rejected the weak-form efficiency in some countries under scrutiny. Rahman and Hossain (2006) concluded that stock market efficiency changes overtime, thereby indicating that the contrasting evidence in a stock market may occur as a result of changing efficiency.

Now it is pertinent to note that most of the earlier studies that supported the weak-form efficiency studied individual price series of shares whereas the studies that rejected the weak-form studied stock indices. There are 2 plausible reasons that can be given for this occurrence:

1) The studies on the individual price series were not good representative samples of the entire market
2) Over time, the efficiency of the Nigerian Stock Exchange changes.

If the former is the case then the solution is to ensure that samples collected are true representatives of the market. However, if the latter is the case, then some anomalies are identified:

1) Is it possible for the NSE to be efficient during the period when trading was done via call-over trading system only for it to become inefficient in this era of the advanced technological input of the automated trading system?
2) Is it possible for the NSE to be efficient during the era of manual transfer of ownership of shares only for it to be efficient in the era of T+3 days?

The works of Suzuki and Yasuda (2006) provide evidence that improvement in trading system, market capitalization and other things lead to increased liquidity and efficiency levels. Therefore since the NSE has shown considerable improvements in these factors, it only follows that it should be weak –form efficient. The reason for this anomaly can be due on the techniques utilized by the previous researchers (runs test, correlation analysis etc). Gupta & Basu (2007) identified several weaknesses in these techniques. This study fills this gap by utilizing a different approach in the data analysis. This was done using cointegration analysis with error correction mechanism. Even though Okpara (2010), Riman, Esor and Eyo (2008) are all evidence that this method of analysis has been previously used, the difference is the fact that this study incorporated the Auto Regressive Moving Average test and also utilized a large number of variables(quarterly data from 1986 to 2009) for the purpose of reliability.

3. Research Methodology

This study is on the efficiency of the Nigerian stock exchange. It utilizes the causal research design to empirically analyze this. The data used for this study are extracted from secondary sources like annual reports of Central Bank of Nigeria. The analytical methods used for this study are the augmented dickey fuller (ADF) unit root test, the auto regressive moving average (ARMA) test, the VAR-based granger causality test, the co-integration analysis and the vector error correction model.

3.1 Model Specification

The model used to analyse the first hypothesis is;

$$1) \qquad \Delta \text{ Log } ASI_t = \alpha_0 + e_t + \sum_{i=1}^{p} \beta_i \Delta \text{ Log } ASI_{t-i} + \sum_{i=1}^{p} \varphi_i e_{t-i}$$

Where α_0 is a constant, β_i and φ_i are coefficients, t is the current time period, t-i = i^{th} lagged time period and e_t is white noise error term. Decision rule: If the probability of the F-Statistic is less than 0.05, the overall model is statistically significant and the null hypothesis is rejected, otherwise, it is accepted. In order to test the second hypothesis, the model used is;

$$\Delta \text{ Log } ASI_t = \alpha_0 + \alpha_1 \Delta \text{ Log } TBR_t + \alpha_2 \Delta \text{ Log } EAR_t + \alpha_3 \Delta \text{ Log } EX_t + \sum_{k=1}^{p} \beta_i \Delta \text{ Log } TBR_{t-k} + \sum_{k=1}^{q} \mu_i \Delta \text{ Log } EAR_{t-k} + \sum_{k=1}^{r} \varphi_i \Delta \text{ Log } EX_{t-k} + e_t$$

where, α_0 is Constant, α_1 to α_3, β_i, μ_i and φ_i are model parameters, Δ Log is the first difference of logarithm, ASI is All Share Price Index , TBR is Treasury bill rate, EAR is Expected earnings, EX is Exchange rate, e_t is Stochastic error term.

Decision rule: If the calculated speed of adjustment ratio is higher than 0.75, the null hypothesis (the speed of adjustment of stock price to stock information is not high) is rejected otherwise it is

accepted (Frimpong, 2010).
Now, in order to test the third hypothesis the model is;

Δ Log GDP = $\beta_0 + \beta_1 \Delta$ Log MCAP+ $\beta_2 \Delta$ Log NUM L + $\beta_3 \Delta$ Log NUM C + $\beta_4 \Delta$ Log ASI+ ECT+e_t

Where β_0 to β_4 are model parameters, Δ Log is the first difference of logarithm, GDP Gross Domestic Product, MCAP is Market Capitalization, NUM L is Number of Listed Securities, NUM C is Number of Listed Companies, ASI is All-Share index, ECT is error correction term and e_T is Stochastic error term
Decision rule: If the results from the five models show that most of the error correction terms are significant and negatively signed the null hypothesis is rejected, otherwise it is accepted. A t-statistic value higher than 2 indicates significance.

4. Data Analysis

The data used for this study are all presented in table 1 and are analyzed using e-views 7 statistical software. Initially, the ADF test was performed on all the variables to test for stationarity. The result is shown in table 2.For the first hypothesis, using dlog ASI (in order to account for unit root) as the dependent variable, the appropriate order of ARMA terms (after a process of identification) was taken to be ARMA (2, 3). The overall model is significant as shown by the value of the F-statistic, implying that ASI indeed followed an ARMA process. Thus the null hypothesis is rejected here. For the second hypothesis, taking a cue from Frimpong (2010), the study regressed the All Share Index on contemporaneous and lagged returns of all the other information assumed to affect stock price. If the sum of the coefficients on all contemporaneous independent variables is "Z" and the sum of the coefficients on all lagged independent variables is "W" then the speed of adjustment ratio "S" is given as: S = W/Z. The result of the regression was shown in the table 4. From the result;
W = -0.09816 + 0.050302 + (-0.413854) = -0.46171
Z = 0.042893 + (-0.061253) + 0.790013 = 0.771653
Solving for S= W/Z,
S = -0.46171 / 0.771653 = -0.59834
The negative sign simply implied that the effect of the adjustment reduced the disequilibrium rather than exploding it. Thus the speed of adjustment of stock price to stock information was about 59.83 percent. This was an average value implying that it was not high. Therefore the null hypothesis was accepted here. For the third hypothesis, the VAR based granger causality test was performed. The results show that the independent variables in the model actually granger caused the dependent variable GDP. Next the Johansen's cointegration test was employed. Based on the results of both the eigenvalue and trace figures it was evident that the number of cointegrating equations were 2. The existence of a cointegrating equation implies that an equilibrium relationship existed among the co integrating variables and that no matter the fluctuation in the short run, these variables had a tendency to return to this equilibrium path in the long run. Next the vector error correction is employed in order to determine how much of the errors generated in each period were corrected in subsequent periods within the framework of this model. The result of this test showed that all the five models captured fitted the observed data pretty well as indicated by their adjusted R-squared values. The error correction estimates (cointeq1 and cointeq2) showed that, of the five models, three had the expected negative sign. The equations representing NUML, NUMC and MCAP fell in this category. That representing GDP showed that only one error correction estimate was negatively signed. However the positive error correction estimate in this equation was not significant. This implied that a significant error correction was taking place here. Thus the null of the third hypothesis was rejected.

5.0 Conclusions /recommendation

Based on the theory of choice, it is known that decision makers seek the best option out of available alternatives in order to attain optimal benefits. In a similar manner, the availability of information plays a pivotal role for investors to make optimal decisions on the choice of securities in the stock market. This however is theoretical. In the real world it is extremely unlikely for full efficiency to exist. However it is possible to attain a level of efficiency which is as close as possible to full efficiency. This is possible if a sufficient number of market participants have equal access to relevant information, and make maximum use of this information to guide their buy and sell decisions. In order for this to happen it is recommended that there should be an increased level of public enlightenment on the gains of the capital market. Furthermore, an increased level of regulation for policing and enforcement of punitive actions against all forms of market manipulation is appropriate. Lastly, in order to increase the number of participants, there should be a relaxation of entry requirements in the Nigerian capital market.

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Table 1: Data presentation

QTR	ASI	GDP (N'm)	MCAP (N'm)	NUMC	EAR	EX	TBR (%)	NUML
87-Q1	164.93	24,996.00	7,160	93	153.63	3.76	10	185.61
87-Q2	169.27	26,452.00	7,510	95	159.97	4.04	10	185.27
87-Q3	193.77	26,417.00	7,860	98	165.62	4.03	12.67	185.05
87-Q4	179.7	27,358.00	8,200	100	175.99	4.24	13.25	185
88-Q1	192.57	32,233.00	8,570	101	180.91	4.25	11.75	185.27
88-Q2	201.77	34,961.00	8,970	102	188.68	4.17	11.75	185.83
88-Q3	217.73	35,330.00	9,430	102	191.34	4.64	11.75	186.72
88-Q4	231.17	36,562.00	10,000	102	204.02	5.09	11.75	188
89-Q1	249.2	53,255.00	10,700	103	216.89	7.34	12.25	189.78
89-Q2	257.93	54,338.00	11,400	105	232.7	7.48	12.25	192.03
89-Q3	276.7	53,794.00	12,100	107	246.1	7.25	12.25	194.76
89-Q4	311.63	55,410.00	12,800	111	261.28	7.51	16.38	198
90-Q1	349.43	65,930.00	13,500	115	282.09	7.9	16.65	201.83
90-Q2	387.23	67,104.00	14,200	121	312.59	7.94	17.5	206.24
90-Q3	459.07	66,261.00	15,000	126	349.43	7.96	17.5	211.28
90-Q4	498.9	68,256.00	16,300	131	398.58	8.35	17.5	217
91-Q1	562.23	76,449.00	17,900	135	448.4	9.43	14.5	222.87
91-Q2	641.93	78,244.00	19,800	138	506.73	9.47	14.5	228.89
91-Q3	712.47	77,318.00	21,600	140	567.69	10.9	14.5	234.47
91-Q4	769.83	80,128.00	23,100	142	638.88	9.87	14.5	239

92-Q1	814.6	133,927.00	24,500	144	708.08	12.5	17.25	242.36
92-Q2	858.43	133,261.00	25,800	146	765.63	18.5	17.31	244.92
92-Q3	957	130,710.00	27,900	149	814.29	18.8	18.75	247.52
92-Q4	1,094.03	134,716.00	31,200	153	876.68	19.5	21	251
93-Q1	1,121.27	166,746.00	35,600	158	969.82	22.3	23	255.87
93-Q2	1,173.90	171,233.00	40,600	164	1,057.43	22.1	25	261.58
93-Q3	1,197.87	170,640.00	45,000	170	1,129.73	21.9	26	267.25
93-Q4	1,423.07	175,251.00	47,500	174	1,164.34	21.9	28	272
94-Q1	1,724.80	211,794.00	49,200	176	1,264.94	21.9	12.5	274.73
94-Q2	1,880.07	225,286.00	50,900	177	1,448.58	21.9	12.5	276.06
94-Q3	1,932.13	227,716.00	55,600	177	1,675.98	21.9	12.5	276.35
94-Q4	2,115.90	235,066.00	66,300	177	1,845.67	21.9	12.5	276
95-Q1	2,405.40	475,135.00	86,200	178	1,976.03	21.9	12.5	275.88
95-Q2	3,157.60	482,977.00	113,000	179	2,151.14	21.9	12.5	275.69
95-Q3	4,612.33	481,117.00	145,000	180	2,559.63	21.9	12.5	275.67
95-Q4	5,085.13	493,982.00	180,000	181	3,391.78	21.9	12.5	276
96-Q1	5,193.90	670,620.00	212,000	182	4,285.02	21.9	12.5	276.49
96-Q2	5,638.40	675,142.00	242,000	182	4,963.79	21.9	12.5	277.01
96-Q3	6,187.43	670,697.00	268,000	183	5,305.81	21.9	12	277.03
96-Q4	6,800.83	686,260.00	286,000	183	5,673.24	21.9	12	276
97-Q1	7,843.00	686,351.00	294,000	183	6,208.89	21.9	12	273.7
97-Q2	8,593.80	700,532.00	295,000	183	6,943.76	21.9	12	270.49
97-Q3	7,653.87	699,923.00	290,000	182	7,745.88	21.9	12	267.03
97-Q4	6,463.70	715,166.00	282,000	182	8,030.22	21.9	12	264
98-Q1	6,386.77	647,960.00	276,000	182	7,570.46	21.9	12	262.49
98-Q2	6,013.30	678,289.00	270,000	183	6,834.78	21.9	12	262.02
98-Q3	5,770.13	685,016.00	266,000	184	6,287.92	21.9	12.25	262.54
98-Q4	5,677.30	697,166.00	263,000	186	6,056.73	21.9	13	264
99-Q1	5,442.50	777,024.00	264,000	188	5,820.24	86.3	18	265.6
99-Q2	5,536.43	799,246.00	270,000	191	5,629.98	93.3	19	267.42
99-Q3	4,933.80	801,411.00	281,000	194	5,552.08	94.9	19	268.78
99-Q4	5,144.03	816,334.00	300,000	196	5,304.24	96.3	17	269
00-Q1	5,891.60	1,165,093.00	329,000	197	5,204.76	99.9	17	267.75
00-Q2	6,151.63	1,144,268.00	367,000	197	5,323.14	101	16	265.47
00-Q3	7,197.90	1,124,620.00	415,000	196	5,729.09	104	15	262.96
00-Q4	7,563.57	1,148,136.00	472,000	195	6,413.71	104	13	261
01-Q1	9,044.83	1,164,239.00	530,000	195	6,971.03	111	16.5	260.37
01-Q2	10,227.57	1,182,576.00	587,000	194	7,935.43	113	17	260.53
01-Q3	10,393.20	1,181,000.00	635,000	194	8,945.32	112	19.5	260.92
01-Q4	11,074.70	1,197,271.00	662,000	194	9,888.53	112	20.5	261
02-Q1	10,815.43	1,625,546.00	677,000	194	10,565.16	115	22.4	260.32
02-Q2	11,775.50	1,735,603.00	684,000	194	10,761.11	117	20.7	259.27
02-Q3	12,199.23	1,792,349.00	706,000	194	11,221.88	125	16.5	258.33

02-Q4	11,737.30	1,758,883.00	765,000	195	11,596.72	127	13.8	258
03-Q1	13,499.57	2,039,516.00	877,000	196	11,904.01	127	15.2	258.82
03-Q2	14,046.60	2,127,693.00	1,030,000	197	12,478.70	128	15.9	260.45
03-Q3	15,296.17	2,171,579.00	1,190,000	199	13,094.49	128	14.5	262.61
03-Q4	19,397.23	2,148,243.00	1,360,000	200	14,280.78	135	14.5	265
04-Q1	23,468.90	2,631,256.00	1,510,000	201	16,246.67	135	14.13	267.34
04-Q2	27,470.40	2,592,273.00	1,670,000	203	19,387.43	133	14.25	269.82
04-Q3	24,525.37	2,985,542.00	1,860,000	204	23,445.51	133	14.25	272.64
04-Q4	23,489.93	3,201,996.00	2,110,000	207	25,154.89	133	14.6	276
05-Q1	21,904.73	3,169,613.00	2,380,000	210	25,161.90	133	12.5	279.47
05-Q2	21,669.53	3,399,352.00	2,660,000	212	23,306.68	133	5.03	282.95
05-Q3	23,160.77	3,924,775.00	2,860,000	214	22,354.73	132	2.15	285.7
05-Q4	24,771.83	4,078,499.00	2,900,000	214	22,245.01	131	10.83	287
06-Q1	23,619.67	3,986,280.00	2,990,000	212	23,200.71	130	9.6	287.05
06-Q2	24,787.67	4,426,084.00	3,180,000	208	23,850.76	128	11.2	286.31
06-Q3	20,145.00	4,986,489.00	3,780,000	204	24,393.06	128	6.9	286.16
06-Q4	32,821.83	5,165,742.00	5,120,000	202	22,850.78	128	7.5	288
07-Q1	40,323.77	4,740,807.00	7,110,000	203	25,918.17	128	6.9	292.51
07-Q2	49,461.57	4,853,839.00	9,550,000	205	31,096.87	128	6.6	298.76
07-Q3	51,180.60	5,524,364.00	11,800,000	209	40,869.06	127	7.1	305.14
07-Q4	54,127.30	5,538,295.00	13,300,000	212	46,988.64	121	7.1	310
08-Q1	59,952.95	5,535,964.00	13,400,000	213	51,589.82	118	9.3	310.96
08-Q2	58,106.30	5,720,249.00	12,500,000	214	55,086.95	118	9.6	309.18
08-Q3	49,038.73	6,461,895.00	11,100,000	214	57,395.52	118	9.4	305.06
08-Q4	33,600.83	6,578,221.00	9,560,000	213	55,699.33	121	7.7	299
09-Q1	21,680.93	5,404,850.00	8,630,000	213	46,915.29	147	6	292.1
09-Q2	26,017.63	5,880,233.00	7,950,000	212	34,773.50	148	6.1	284.04
09-Q3	23,453.57	6,682,026.00	7,450,000	212	27,099.80	151	5.7	275.21
09-Q4	21,214.10	6,745,561.00	7,030,000	212	23,717.38	150	6	266

Source: CBN Statistical bulletin (Various issues)

Table 2: Summary of ADF test

Variables	Critical Values						T Calc.		P Values	
	Level	1st Diff	Level	5% Diff	Level	10% Diff	Level	1st Diff	Level	1st Diff
		1%								
ASI	-3.51	-3.50	-2.90	-2.89	-2.59	-2.58	3.38	-6.54	1.00	0.00
TBR	-3.50	-3.50	-2.89	-2.89	-2.58	-2.58	-2.50	-10.77	0.12	0.00
EAR	-3.51	-3.51	-2.89	-2.90	-2.58	-2.59	-2.29	-4.29	0.08	0.00
EX	-3.50	-3.50	-2.89	-2.89	-2.58	-2.58	-0.18	-8.44	0.94	0.00
GDP	-3.51	-3.50	-2.90	-2.89	-2.58	-2.58	-0.33	-3.75	0.92	0.01
MCAP	-3.51	-3.51	-2.90	-2.90	-2.59	-2.58	1.82	-3.30	1.00	0.02
NUML	-3.51	-3.51	-2.90	-2.90	-2.59	-2.59	-2.49	-8.48	0.12	0.00
NUMC	-4.08	-4.08	-3.47	-3.47	-3.16	-3.16	-3.12	-3.92	0.09	0.01

Source: Compiled by Author using Eviews 7

Table 3. ARMA Estimation

Dependent variable	AdjustedR-Squared	Akaike info criterion	S.E. of regression	Sum of resid^2
dlogASI	0.275644	-1.484630	0.110356	0.986446

Source: Eviews 7

Table 4. Ordinary last squares regression

dependent variable = Dlog ASI	Independent variable (IV)	Coefficient of IV	Standard error (SE) of IV	T-Statistic of IV	Probability of IV
	Dlog TBR	0.042893	0.050627	0.847230	0.3993
	DLOG(TBR(-1))	-0.098160	0.050847	-1.930493	0.0569
SE of regression = 0.120405	DLOG(EX)	-0.061253	0.082124	-0.745850	0.4578
	DLOG(EX(-1))	0.050302	0.082203	0.611922	0.5422
	DLOG(EAR)	0.790013	0.246118	3.209889	0.0019
Akaike info criterion = -1.322101					
Durbin Watson = 1.792380	DLOG(EAR(-1))	-0.413854	0.249522	-1.658587	0.1009

Source: Eviews 7

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