

TESTING FOR MULTIPLE BUBBLE EPISODES IN NIGERIAN STOCK EXCHANGE MARKET

¹Jamilu Iliyasu, ²Aliyu Rafindadi Sanusi, & ³Dahiru Suleiman

¹Department of Economics, Ahmadu Bello University, Business School, Zaria.

²Department of Economics, Ahmadu Bello University, Business School, Zaria.

³Department of Economics, Ahmadu Bello University, Business School, Zaria.

Correspondence author's e-mail: jamnashuha@gmail.com or jnashuka@yahoo.com

Abstract

This paper sets out to test for the existence of asset price bubbles in Nigerian Stock Exchange (NSE) to provide empirical evidence, within multiple bubble context, to the claim by the Monetary Policy Committee of Central Bank of Nigeria (CBN) in July 2017 of a “seeming bubble” as well as the Garba’s (2017) argument of “occurrence of three bubble episodes since 2006”. To achieve this objective, this paper employed monthly data on the All-Share Index of the Nigerian Stock Exchange (NSE-ASI) from 1985 to 2018 and the Consumer Price Index (CPI) from 1995 to 2018. The results obtained from the Generalised Supremum Augmented Dickey-Fuller (GSADF) and Backward Supremum Augmented Dickey-Fuller (BSADF) tests revealed evidence of the occurrence of two bubble episodes in nominal ASI and three episodes in real ASI. Comparing the empirically identified episodes from the BSADF tests suggests that only one out of the three posited by Garba (2017) was indeed an episode of a bubble. Further analyses revealed that, even within a multiple bubble context, the Monetary Policy Committee’s remark of “seeming bubble” was not supported empirically. Based on the above results, the primary conclusion of this paper is that the remark and two out of the three claims were not empirically supported. It is, therefore, recommended that CBN should imbibe the use of modern econometrics techniques of bubbles detection and monitoring on its NSE surveillance to avoid sending false alarm (signal) on price movement and to adequately conduct bubble diagnostic check on the NSE-ASI before communicating its views to the market.

Keywords: Nigerian Stock Exchange, Generalised Supremum Augmented Dickey-Fuller, Central Bank of Nigeria, All-Share Index, Asset Price Bubbles

JEL Classification: G12

Introduction

Stock markets are part of the financial system that facilitates channelling of savings into productive investments. It is an avenue of pricing securities, allocating resources to their most efficient use, allocating risks, and compensating investors based on the amount of risk taking. Thus, stock markets are crucial in promoting greater economic efficiency and economic growth (Mishkin, 2004). However, the concern is that, as these markets expand (size and activities) and become sophisticated, the vulnerability and fragility of the financial system increases making it more open to systemic risk. Bubbles are among the major by-products of such expansion of the financial markets. A bubble occurred when an asset (house or stock) is traded at a price that cannot be justified by its intrinsic value or expected income to be generated from the asset. The formation of a bubble and its subsequent burst often leads to a financial crisis. For example, the 2008 Global Financial Crisis (GFC) was triggered by the burst of the Real Estate bubble in the United States and later spread to other countries. This almost led to the breakdown of the global economy, causing loss of about \$5 trillion in Global Gross Domestic Product (GGDP) and over \$25 trillion in stock markets losses (Sornette, 2013).

In developing countries such as Nigeria, the effects of bubble burst and the subsequent outburst of a financial crisis is often very costly and protracted (Garba, Usman, & Sanusi, 2009), suggesting intervention costs may be higher with recovery becoming slow. For example, due to the crash of NSE in 2008 believed to be triggered by the bust of the real estate bubble in the US, the All Share Index (ASI) loss about 67.6 per cent of its value between March 2008 and 27th April, 2009 (Kighir, 2009) and Market Capitalisation fell from ₦13.64 trillion to ₦4.87 trillion losing about 61.5 per cent of its value. The ASI was 66,371.22 points a day to the correction and remains the all-time high. This suggests the devastating effects of a bubbles burst may last longer than the short-term gains from riding such bubbles. Motivated by the crash, several empirical studies on bubble in Nigeria detected and identified the domestic factors that might have contributed to the NSE price escalation (Agu & Chukwuma-Agu, 2010; Almudhaf, 2017). While these studies have helped to identify bubbles in NSE but the Monetary Policy Committee (MPC) of Central Bank of Nigeria (CBN) remark of “seeming bubbles” made on 24 and 25 July, 2017 together with Garba’s (2017) argument that NSE is in its third bubble regime since 2006, has not been captured in these studies. Interested by the remarks, Iliyasu and Saba (2019) search for a single bubble episode in NSE using Supremum Augmented Dickey-Fuller (SADF) test and find no empirical evidence of bubble occurrence between 2010 and 2017. The SADF test used by Iliyasu and Saba (2019) is particularly effective when there is a single-bubble episode in the sample data and its detection power deteriorates when there are multiples bubbles in the data, particularly if the duration of the first bubble is longer than the subsequent ones (Phillips, Shi, & Yu, 2015). The empirical question that remains to be addressed is whether these remarks/argument can be empirically substantiated with data within multiple bubbles context?

In this paper, an attempt is made to address the above question by employing Generalised Supremum Augmented Dickey-Fuller (GSADF) test of Phillips, Shi, and Yu (2015), which has been acknowledged as most effective bubbles date-stamping strategy, particularly, when multiple bubbles are involved. This can help to identify bubbles and their causes so that timely action can be put in place. Thus, this paper contributes to the extant bubble literature at least in two ways. First, it contributes to the extant literature that centred on detecting bubbles in NSE (Chukwuma-Agu & Agu, 2009; Njiforti & Chidiogo, 2010; Almudhaf, 2017; Iliyasu, Sanusi, & Suleiman, 2019; Iliyasu & Saba, 2019). Finally, it joins a broader literature that centred on identifying and dating of bubbles in stock prices using formal statistical methods of Generalised Supremum Augmented Dickey-Fuller (GSADF) test of Phillips, Shi, and Yu (2013, 2015).

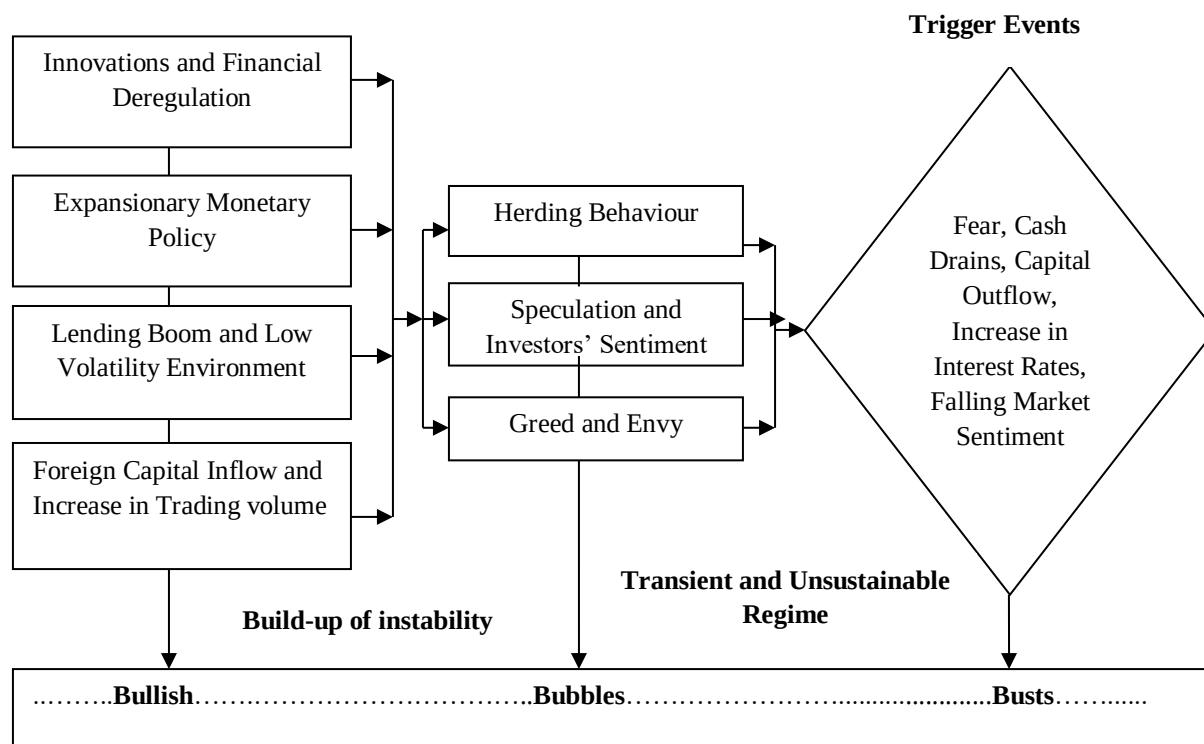
This paper is organised as follows; section two is concerned with the review of related literature on asset price bubble. Section three outlines the methodology, section four presents and discusses the empirical results, and section five concludes the paper.

Review of Related Literature on Asset Price Bubbles

The term bubble was first in used finance in the 1720s to describe the inflated stock price South Sea Company in Britain. The collapse of the soaring stock price of the South Sea company led to the Bubble Act of 1720, which limited the creation of new business ventures and limited joint-stock companies to prevent future bubbles. The Act was later repealed in 1825, allowing people to invest in a new corporation, which after fifteen years in the mid of 1840s, the Railway Mania emerged (Porrás, 2016). In modern finance, the persistent occurrence of assets price bubbles spurs

the interest of both policymakers and academia to understand the mechanism that generates them. To this effect, several definitions of a bubble were offered. For example, Garber (2000) defined a bubble as that “part of asset price movement that is unexplainable based on fundamentals” where “fundamentals are collections of variables that drive asset prices”. Similarly, Kindleberger and Aliber (2005:01) explained that “a bubble involves a non-sustainable pattern of price changes or cash flows”; and to Ivana and Luboš (2011:34) a bubble is an “explosive and asymmetric deviation of the market price of an asset from its fundamental value, with the possibility of a sudden and significant reverse correction”. However, this paper following Phillips, Wu, and Yu (2011) defines a bubble as “explosive autoregressive behaviour” of the price of assets.

Bubbles are often caused by innovations (financial or technological), expansionary monetary policy, lending boom, foreign capital inflow, financial deregulation, increase in trading volumes, and low volatility environment. These causal factors often lead to the emergence of bullish behaviour in the market as indicated by the first loop in fig.1. As the bullish trend continues to grow, a bubble may emerge as a result of herding among investors, speculation, greediness and envy. The phase between the bullish trend and the growth of the bubble is an unstable regime on which instability developed (i.e the middle loop). As the bubble gets matured, the market may be in an unsustainable and transient regime and the waiting time for the inevitable (crash or burst) to occur. The burst or crash might be triggered by events such as fear among investors that the upward trend in the price is not sustainable, cash drain, increase in interest rates through contractionary monetary policy, falling market sentiment (pessimistic expectations), and increase in volatility (i.e the outer loop).



Source: Authors' Conception

Fig. 1: A Conceptual Mechanism of Bubble Boom and Burst

According to Gurkaynak (2006), the household's optimization problem can be used to derive the basic asset pricing relationship assuming no-arbitrage and rational expectation (E_t), where E_t is the market's expectation conditional on information known at time t . Assuming household has initial endowment (y_t), consumes (c_t) with expected utility $U(c_t)$, discounts future consumption by β , p_t is the after-dividend price of a storable asset (x_t), and d_t is the payoff received from an asset (x_t), and x_{t+1} is the desired next period level of a storable asset. In this paper the focus is on stock prices, thus p_t is assumed to be a stock price and d_t dividend. Then, following Gurkaynak (2006) the optimisation problem is given by the objective function equation (1) and the subjective equation (2) below;

$$\text{Max}_{\{c_t, x_{t+1}\}_{i=0}^{\infty}} E_t \left[\sum_{i=0}^{\infty} \beta^i U(c_{t+i}) \right] \quad (1)$$

$$\text{Subject to: } c_{t+i} + p_{t+i} x_{t+i+1} \leq y_{t+i} + (p_{t+i} + d_{t+i}) x_{t+i} \quad (2)$$

$$c_{t+i} = y_{t+i} + (p_{t+i} + d_{t+i}) x_{t+i} - p_{t+i} x_{t+i+1} \quad (2a)$$

The optimization problem's first-order condition is

$$E_t[U'(c_t)p_t] = E_t[\beta U'(c_{t+1})(p_{t+1} + d_{t+1})] \quad (3)$$

For asset pricing purposes, it is often implicitly or explicitly assumed that utility function is linear, which implies constant marginal utility and risk neutrality (Gurkaynak, 2006). In this case, equation (3) simplifies to;

$$E_t(p_t) = \beta E_t(p_{t+1} + d_{t+1})$$

$$p_t = \frac{1}{(1+r_t)} E_t(p_{t+1} + d_{t+1}) \quad (3a)$$

Where: $\beta = \frac{1}{(1+r_t)}$, r_t is the required rate of return at time t and E_t is the expectation of p_t

formulated at time t . The stock price (p_t) at time t is observable to the investor, so $E_t(p_t) = p_t$.

Again, for simplicity, it is assumed that the expected return that the marginal rational trader requires to hold the stock is constant over time, $E_t(r_{t+1}) = r$. Then, equation (3a) becomes;

$$p_t = \frac{1}{(1+r)} E_t(p_{t+1} + d_{t+1}) = \frac{E_t(d_{t+1})}{(1+r)} + \frac{E_t(p_{t+1})}{(1+r)} \quad (4)$$

Solving equation (4) forward N times and using the repeated substitution method (see, Karl, 2005), one obtains the present value model using the following formula;

$$y_t = a \sum_{k=0}^{N-1} b^k E_t(x_{t+k}) + b^N E_t(y_{t+N}) \quad (4a)$$

Substituting equation (4) into equation (4a) as in Karl (2005), the present value model becomes;

$$p_t = \sum_{k=0}^{N-1} \left(\frac{1}{1+r} \right)^{k+1} E_t(d_{t+k}) + \left(\frac{1}{1+r} \right)^N E_t(p_{t+N}) \quad (4b)$$

Which says the current price is the sum the discounted expected future dividends payments and future expected price. This means that the equilibrium price (p_t) is given by the expected discounted value of the future dividend stream paid from $t+1$ to N plus the expected discounted value of the price at time N (Brunnermeier & Martin, 2013). However, from the perspective of

Efficient Market Hypothesis, in an efficient market competition among many intelligent investors leads to a situation, where at any point in time, the actual price of individual securities already reflects the effects of both current and future expected information (Fama, 1965). Thus, in an efficient market, at any point in time, the actual price of a security is a good approximation of its intrinsic or fundamental value (Fama, 1965). To derive the intrinsic or fundamental value of given stock we impose transversality condition on equation (4b). Transversality condition says as

$N \rightarrow \infty$, the value of $\left(\frac{1}{1+r}\right)^N$ converges to zero, so will the value of p_N . That is

$\lim_{N \rightarrow \infty} \left(\frac{1}{1+r}\right)^N E_t(p_{t+N}) = 0$. This yield;

$$p_t = \sum_{k=0}^{N-1} \left(\frac{1}{1+r}\right)^{k+1} E_t(d_{t+k}) \quad (5)$$

If let F_t = the fundamental component, then equation (5) becomes;

$$p_t = F_t \quad (5a)$$

$$F_t = \sum_{k=0}^{N-1} \left(\frac{1}{1+r}\right)^{k+1} E_t(d_{t+k})$$

Both equation (5) and (5a), signify dividend is the main driver of stock prices called the fundamental value (F_t). However, without imposing the transversality condition, equation (5a) is one of many possible prices that solve equation (4b). Thus, equation (5a) is a specific solution of equation (4b) which is consistent with the Efficient Market Hypothesis. However, the general solution of equation (4b) becomes:

$$P_t = F_t + B_t \quad (6a)$$

Equation (6a) says an asset price P_t consists of a market fundamental (F_t) and a bubble component (B_t). The bubble component (B_t) is a sub-martingale process (Diba & Grossman, 1988) such that:

$$E_t(B_{t+1}) = \frac{1}{\rho} B_t \text{ With } \frac{1}{\rho} > 1 \quad (6b)$$

Where ρ is the discount factor and is represented as: $\rho = \frac{1}{1+r}$. Therefore the expected bubble component becomes:

$$E_t(B_{t+1}) = (1+r)B_t \quad (6c)$$

Equation (6c) shows that the bubble process is explosive, with an autoregressive coefficient $(1/\rho) > 1$. Thus, the appearance of explosive behaviour in the observed price of an asset when the dividend series is $I(0)$ or $I(1)$ provides empirical evidence of the presence of bubbles in the data. Modern bubble detection methodologies such as SADF and GSADF tests use the intuition from equation (6b and 6c) to search for the occurrence of bubbles in the price by expressing price (P_t) in first-order Autoregressive (AR) form. Then, examine the AR coefficient for an explosion for sub-periods (sub-samples), if the AR coefficient is greater than one, the price series is explosive.

On the empirical viewpoint, researchers on asset price bubbles are often interested in the question of whether changes in asset price are consistent with changes in economic fundamentals

(macroeconomic developments). Bubbles are assumed to occur when large changes in asset prices cannot be justified by changes in economic fundamentals. For example, in United States' stock markets, empirical evidence of bubbles occurrences has been produced by researchers (Phillips, Wu, & Yu, 2011; Phillips, Shi, & Yu, 2015; Fulop & Yu, 2017). Similarly, in real estate markets evidence of the bubbles occurrences has been established by Kivedal (2012) and Nneji, Brooks, & Ward (2013) in the United States; and in Hong Kong by Yiu, Yu and Jin (2013). In contrast, Caspi (2015) did not find any evidence of bubbles occurrence in Israel. However, bubbles also occurred in the International Commodity Markets for commodities such as oil and iron ore on which researchers such as Caspi, Katzke and Gupta (2014) in oil price and Etienne (2016) in iron ore established evidence that is consistent with bubbles episodes.

In Africa, capital account liberalization and financial markets reforms attracted a substantial inflow of foreign portfolio into the continent in the early decade of the 21st Century. The inflows were also attracted by positive returns associated with the African stock markets, which induced international investors looking for diversification opportunities (Almudhaf, 2017). However, the negative impact of the 2008/2009 Global Financial Crisis on the African stock markets and economies, prompted researchers to test some of the markets for bubbles. For example, in South Africa, Zhoua and Sornette (2009) applying the Log-Periodic Power Law Method on monthly and Balciar, Gupta, Jooste and Wohar (2016) Regime-Switching Model, produced evidence of the occurrence of bubbles in monthly of Johannesburg Stock Exchange (JSE) Indices. In Nigeria, similar results were obtained for Nigerian Stock Exchange using cointegration technique (Njiforti & Chidiogo, 2010; Agu & Chukwuma-Agu, 2010), GSADF test (Almudhaf, 2017), and evidence of bubbles contagion by Iliyasu, Sanusi, and Suleiman (2019) using Greenaway-McGreevy & Phillips (2016) Model of Bubble of Contagion. On the other hand, Iliyasu and Saba (2019) apply SADF test on monthly NSE-ASI for a single bubble episode and find no evidence of its occurrence from January 2010 to December 2017.

In summary, reviewed literature demonstrates that substantial empirical evidence of bubbles occurrences in NSE was established. However, the use of the Cointegration test by Njiforti and Chidiogo (2010), Agu and Chukwuma-Agu (2010) indicate the presence of bubbles in the sample data but does not reveal the origination and termination dates of such bubbles. Almudhaf (2017) stamps the dates using data up to 2008, which Iliyasu and Saba (2019) complement to 2017, while Iliyasu, Sanusi, and Suleiman (2019) focus on bubbles contagion before 2008. In this paper, the objective is to test for multiple bubbles episodes in the NSE to capture within multiple bubbles context, the Monetary Policy Committee (MPC) of Central Bank of Nigeria (CBN) remark of "seeming bubbles" made on 24 and 25 July, 2017 as well as Garba's (2017) argument of three bubbles occurrences since 2006.

Method and Data

This paper follows the lead of Phillips, Shi, and Yu (2015) by applying GSADF test to date-stamp multiple bubbles episodes in the NSE from 1985 to 2018 to discover more episodes. The GSADF test is found to be the most effective bubbles detect test, particularly, when there is multiple bubble occurrence within a sample (Brunnermeie, Simon, & Schnabel, 2018). The test associates the emergence of a bubble with the appearance of an explosion in the first-order autoregressive coefficients of the price series. Greenaway-McGreevy and Phillips (2016) specified the simple first-order Autoregression, AR(1), as follows;

$$\Delta y_t = \alpha + \beta y_{t-1} + \varepsilon_t, \quad t=1, \dots, T \quad (7)$$

Following Phillips, Shi, and Yu (2015), equation (1) is then expressed in rolling form as:

$$\Delta y_t = \hat{\alpha}_{r_1, r_2} + \hat{\beta}_{r_1, r_2} y_{t-1} + \sum_{i=1}^k \hat{\gamma}_{i, r_2, r_1} \Delta y_{t-i} + \hat{\varepsilon}_t \quad (8)$$

Where y_t is the NSE-ASI, α is the intercept, κ is the maximum number of lags, γ_i for $i=1 \dots \kappa$ are the differenced lags coefficients, ε_t is the error term, r_1^{th} is the start of the rolling window as a fraction of the total sample, r_2^{th} is the end of r_1^{th} sample, where $r_2=r_1+r_w$ and $r_w>0$ is the (fractional) window size of the regression. To detect bubble occurrence, equation (8) is estimated using the GSADF test and date-stamping the bubbles involves comparing the sequence critical values generated through Monte Carlo simulation with Backward Supremum Augmented Dickey-Fuller (BSADF) statistics. The null hypothesis at each sub-sample is of a Unit root against the alternative of a mildly explosive autoregressive coefficient, which is stated formally as:

$$H_0 : \beta = 0$$

$$H_1 : \beta > 0$$

To determine whether CBN Monetary Policy Committee's remark of "seeming bubble" made on 24 and 25 July, 2017 as well as Garba's (2017) for the occurrence of three bubble episodes in NSE since 2006 is supported by empirical evidence within multiple episodes, the testing procedure was carried out in three stages. First, GSADF test was applied to NSE-ASI (both real and nominal) to ascertain the occurrence of bubbles from 1985 to 2018 in NSE. Second, a Backward Sup Augmented Dickey-Fuller (BSADF) test was performed to date-stamp the origination and termination of the bubbles. Finally, the estimated occurrence dates of the bubbles are then compared with the remark/argument to determine their empirical contents.

To achieve the said objective, this paper employed monthly data spanning 1985 to 2018 on the All-Share Index and Consumer Price Index (CPI) from 1995 to 2018 both obtained from Central Bank of Nigeria Statistical Bulletin. It also obtained annual data on Dividend Yield (DY) from 1985 to 2018 on from Securities and Exchange Commission (SEC) Statistical Bulletins. The DY was decomposed into monthly due to its non-availability in monthly frequency using the following formula;

$$DY_{\text{monthly}} = DY_{\text{annual}} \times \frac{W_i}{12} \quad (9)$$

Where; w is the weight attached to each month (i) of the year with i (January=1, February=2, ..., December=12).

Empirical Results and Discussion

This section presents the empirical results. It starts with the analysis of NSE-ASI trend and its statistical properties in nominal and real terms. It then presents the results of the evidence of the occurrence of exuberance.

Movement of NSE All-Share Index from 1985 to 2018

Fig. 2 displays the trajectory of NSE-ASI from 1985 to 2018 in normal and logarithmic form.

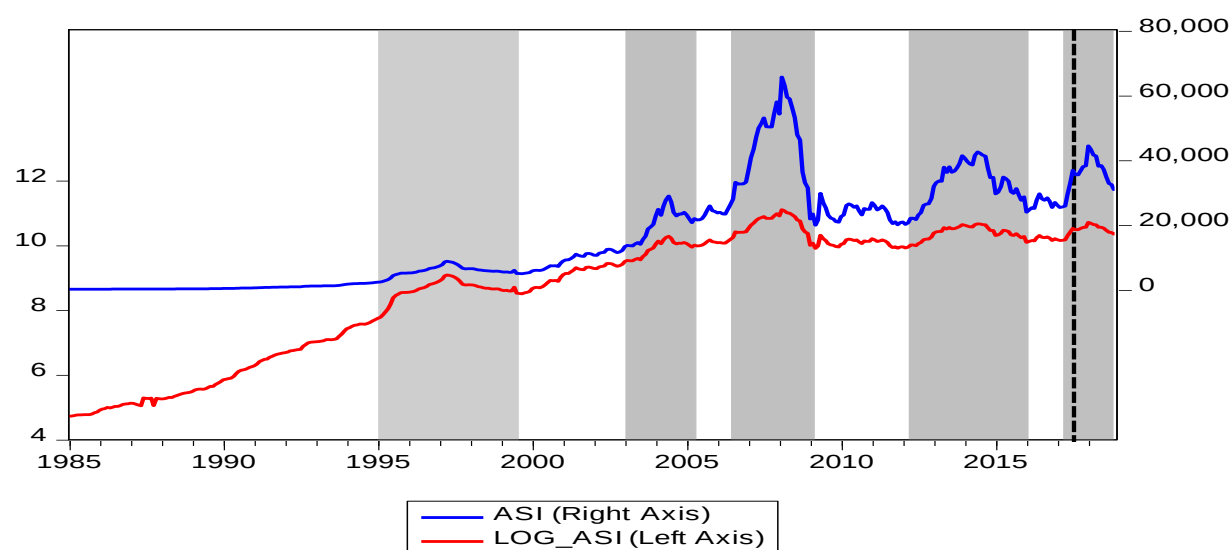


Fig. 2: Trend of NSE Stock Price (NSE- ASI) and its Logarithm from 1985 to 2018

Source: Researchers' Calculation

As observed in Fig.2, both in normal and logarithmic form, NSE-ASI grew steadily from 1985 to 2008 and dropped drastically following the global financial crisis in 2008/2009. Further visual inspection of fig. 2 indicated about five cycles that could be related to boom-and-bust (shown by the grey region). The episodes started from December 1994 to September 1999, December 2002 to June 2005, May 2006 to February 2009, April 2012 to January 2016, and from January 2017 to October 2018. Within these cycles are the Monetary Policy Committee's remark (the dotted vertical line) and Garba's (2017) argument for the occurrence of three bubbles episodes since 2006. These suggest that the observed evolution of NSE All-Share Index (ASI) displayed in fig. 1, might have experienced multiple bubbles episodes and the index needs to be diagnosed against the occurrence of multiple bubble episodes.

Statistical Properties of Nominal and Real ASI Returns in the NSE

Table 1 shows the descriptive statistics and test of Arch Effect results for the Nominal (1985-2018) and Real ASI (1995-2017).

Table 1: Results of Statistical Properties of Nominal and Real ASI Returns in the NSE (1985-2018)

Statistic	Real Return (%)	Nominal Return (%)
Mean	-0.01	1.39
Maximum	30.52	32.35
Minimum	-37.13	-36.59
Std. Dev.	6.75	6.16
Skewness	-0.44	-0.45
Kurtosis	7.58	9.59
Jarque-Bera	247.99	749.42
Probability	0.00	0.00

Source 1: Researchers' Calculation using Eviews 10.

The results in Table 1 show that from 1995 to 2018, the real monthly return averaged -0.01 per cent, while from 1985 to 2018 the nominal monthly return averaged 1.39 per cent. The results

further show that the returns fluctuate above or below the monthly average by 6.75 per cent and 6.16 per cent in real and nominal terms. There is also evidence of extreme market events most of which lie below the average returns indicating the dominance of losses over gains. This evidence is established by the presence of fat tails and negative skewness. The Jarque-Bera statistic and its associated *p-value* show the distributions of both returns are not normal.

Detecting the Occurrence of Exuberance in the NSE

The results from the estimation of equation (8) for the Real and Nominal All-Share Index (ASI) and All-Share Index Dividend Yield (ASIDY) in NSE are shown in Table 2.

Table 2: Results of Occurrence of Exuberance in the NSE

Variable	GSADF Statistic	P-Value*	Critical Values		
			90%	95%	99%
ASI	12.86920	0.0000	2.014510	2.263398	2.930071
ASIDY	1.651226	0.2260	2.014510	2.263398	2.930071
RASI	2.904743	0.0080	1.890127	2.095073	2.700651
RASIDY	1.927571	0.0900	1.890127	2.095073	2.700651

*Right-tailed test

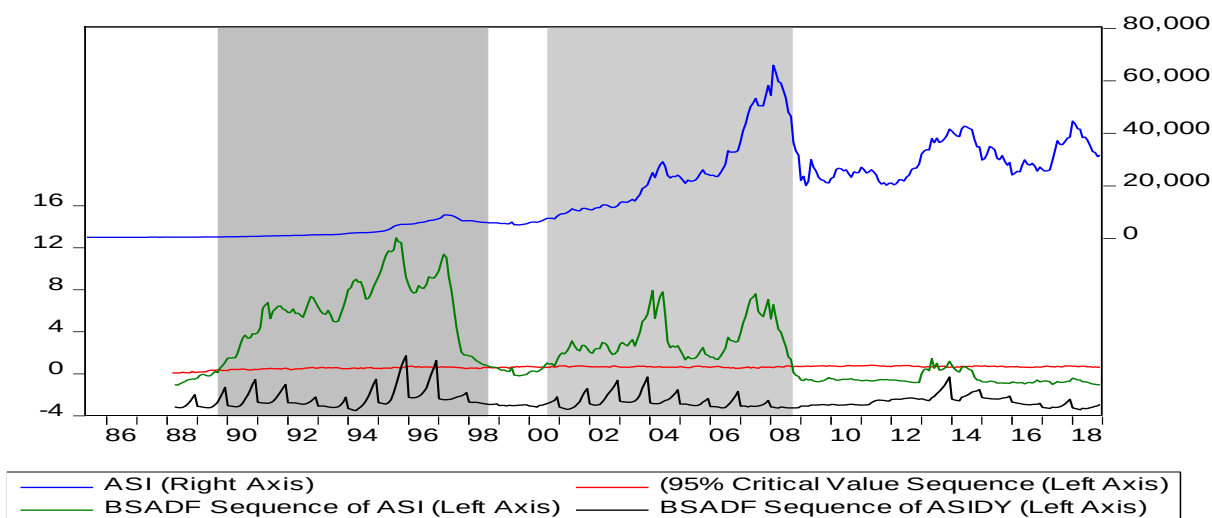
**Critical values are based on a Monte Carlo simulation with 1,000 (run with Eviews 10)

Source 2: Researchers' Computation, 2019.

The results show that the All-Share Index (ASI) is explosive in both Real (RASI) and nominal (ASI) terms, while the dividend yield is not explosive in the real (RASIDY) and nominal (ASIDY) terms. This reveals evidence of the occurrence bubbles (exuberance) within the sample period, which is established by the statistical significance of the GSADF statistic at 0.05 and led to the rejection of the null hypothesis of a Unit root in favour of the alternative of an explosion. This can be interpreted as suggesting the boom-bust cycles observed in fig. 2 might be associated with bubble episodes. Thereby, providing empirical support for the result obtained from the Cointegration test by Njiforti and Chidiogo (2010) and Agu and Chukwuma-Agu (2010). But it does not tell when the bubbles occurred and hence, the remarks cannot empirically be substantiated.

Date-Stamping the Occurrence of Exuberance in the Nigerian Stock Exchange (NSE)

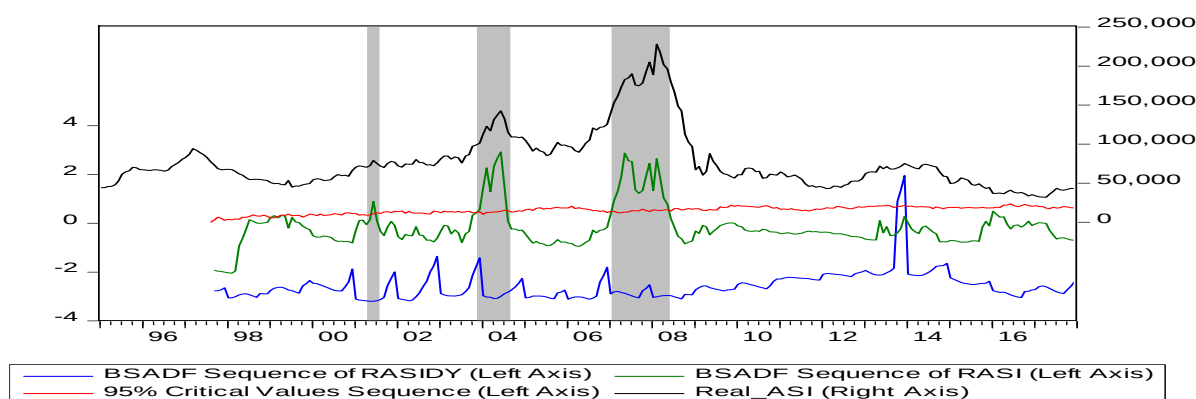
Figures 3 and 4 show the Backward Supremum Augmented Dickey-Fuller (BSADF) test for the origination and termination dates of the NSE bubbles. The ASI in nominal term experienced two bubbles episodes from September 1989 to August 1998 and from August 2000 to September 2008 (as indicated by the grey region in fig. 3). The origination date is indicated when the BSADF statistic crosses the 95 per cent critical value from below and termination from above.



Source 3: Researchers' Computation, 2019.

Fig. 3: Backwards SADF (BSADF) Test Results for Nominal ASI in NSE (1985-2018)

Fig. 3 shows that for the Real All-Share Index (RASIDY), three episodes of exuberance were found. The first episode occurred between April 2001 and July 2001, November 2003 and July 2004, and between January 2007 and May 2008. The results also revealed that there was only one bubble episode in NSE after 2006, suggesting that only one out of the three arguments of bubbles occurrence by Garba (2017) was empirically substantiated.



Source 4: Researchers' Computation using, 2019

Fig. 4: Backwards SADF (BSADF) Test Results for Real ASI in NSE (1995-2018).

There is no evidence of bubbles occurrence on the date to which the Monetary Policy Committee's remark of "seeming bubbles", suggesting that the remark is not supported by data. This finding is also consistent with Iliyasu and Saba (2019) who find no empirical evidence of bubble occurrence from January 2010 to December 2017 in the NSE. This finding implies that since the occurrence dates of the bubbles have been identified, then, the causal factors can be identified. This because the severity of the crash 2008 suggested the need to improve our understanding of bubbles generating mechanism to ascertain the extent of systemic risks, they exposed our financial system.

Conclusion

Bubble bust often causes a financial crisis, damages conventional channels of monetary policy, heightened intervention costs, and a slow recovery of output. This earned them a special position in the surveillance strategies of Central Banks in both developed and developing economies. On its financial surveillance on NSE, the Monetary Policy Committee (MPC) of Central Bank of Nigeria (CBN) described the evolution of NSE stock prices from March 31, 2017, to July 21, 2017, as “seeming bubble” after observing a 33.33 per cent growth. Also, a Monetary Policy Committee (MPC) member CBN, Garba in 2017 argued that NSE is in its third bubble regime since 2006. Motivated by the remark and argument, this paper, tested for multiple bubbles episodes in the NSE to provide empirical validation to this remark/argument within multiple bubbles context. The results obtained using GSADF and BSADF tests revealed two and three bubble episodes in nominal and Real All-Share Index (IASI). One out of the three arguments of Garba is empirically supported and there is no evidence of bubbles occurrence of bubble from March 31, 2017, to July 21, 2017, to period the Monetary Policy Committee (MPC) remarked. Based on the above results, the primary conclusion of this paper is that the remark and the two out of the three claims were not empirically supported. The implication of the above results is that CBN on its financial surveillance strategies can conduct an empirical assessment on the most recent financial data for bubbles to guide policy actions/guidelines. It is, therefore, recommended that CBN should imbibe the use of modern econometrics techniques of bubbles detection and monitoring on its NSE surveillance to avoid sending false alarm (signal) on price movement and to adequately conduct bubble diagnostic check on the NSE-ASI before communicating its views to the market.

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