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Effect of Economic Policy Uncertainty on the Nigerian Stock Market

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Abstract

Nigeria has witnessed several uncertainty inducing events, especially in the period following the 2008-2009 Global Financial Crisis. Thus, this study investigated the effect of economic policy uncertainty on the Nigerian stock market over the quarterly period of 1997Q1 to 2019Q4. The study used the autoregressive distributed lag framework and found that: there is a stable long-run relationship between economic policy uncertainty and the all share index of the Nigerian Stock Exchange (NSE); and that economic policy uncertainty impacts significantly and adversely on the all share index of the NSE. Even when these findings were subjected to robustness checks using the NSE market capitalization, they remained consistent. Fluctuations in oil price and depreciations in the naira to U.S. dollar exchange rate were also found to impact adversely on the stock market. Overall, the study concludes that the Nigerian stock market requires a more certain and investment-friendly environment to thrive.

Key words: Economic Policy Uncertainty; Stock Market; ARDL Model; Nigeria

JEL Classification Codes: D80; G10; C22; N17

Introduction

The stock market is a market place where those who wish to buy or sell shares, stocks, government bonds, debentures and other approved securities can do so though only through members of the stock exchange (Anyanwu, 1993). In other words, the stock market can be described as a platform where long-term capital for financing new projects, and expanding and modernizing industrial/commercial concerns, are generated by the government and private sectors. Hence, the stock market is an economic institution that promotes efficiency in capital formation and allocation (Ohiomu & Enabulu, 2011).

The Nigerian Stock Exchange was established in 1960 as the Lagos Stock Exchange. In 1977, it became the Nigerian Stock Exchange (NSE), with branches in some major commercial cities in the country while Lagos became its head office (Olusegun, Oluwatoyin & Fagbeminiyi,

2011). The Nigerian stock market started operations with 19 securities listed for trading in 1961. In 2018, the NSE has over 169 companies listed on it with total market capitalization of over N13 trillion. To avoid breaches of market rules and other unfair manipulations, the Securities and Exchange Commission regulates the operations of the NSE. For many years, the NSE has been the bed rock for capital mobilization and investment in the Nigerian economy. Indeed, Anyanwu (1993) identified the functions of the NSE to include the following, among others: promoting appropriate machinery to facilitate further offerings of stocks and shares to the general public; promoting increased participation by the public in the private sector of the economy; providing the machinery for mobilizing private and public savings and making these available for productive investments through stocks and shares; providing opportunities for raising new capital; and providing opportunities for attracting foreign capital for the development of the Nigerian economy.

However, an important factor that may impact significantly on the performance of the Nigerian stock market is the issue of rising economic policy uncertainty. Following the 2007-2008 Global Financial Crisis (GFC), policymakers around the world have been concerned about the effects of economic policy uncertainty on the financial sectors of various economies. This concern is further reinforced by the findings of Baker, Bloom and Davis (2016) and Lo and Rogoff (2015), which indicate that economic policy uncertainty was responsible for the sluggish recovery of both advanced and developing economies after the crisis. Arouri, Rault and Teulon (2014) defined economic policy uncertainty as the risk of changes in prevailing policies that define the parameters or the process of decision making of economic agents like investors, households, and firms. Clearly, high economic policy uncertainty could delay decisions by economic agents on investment, spending and employment. This is because under the condition of economic policy uncertainty in which there is little or no knowledge regarding the future path of the economy, economic agents will naturally be cautious with their spending.

Bloom, Kose and Terrones (2013) identified several sources of economic policy uncertainty such as changes in economic and financial policies, economic crises and recessions, downturns in productivity, disasters caused by nature, wars and terrorism, sharp fall in commodity prices, divergent views regarding the prospects of growth, among others. In the last few decades, Nigeria has faced several uncertainty inducing events. While some of these events were domestic in nature, others were international. At the international level, some of the events that may have generated uncertainty, which in turn may have impacted on the NSE include: the 2007-2008 the Global Financial Crisis, the collapse in international oil price which started in

2013Q3, the trade tension between the United States and China, the Brexit vote, and the ongoing COVID-19 pandemic. The uncertainty generated by these events may have significantly reduced the inflow of foreign investments into the NSE. Domestically, there are several key events that have also fuelled uncertainty in Nigeria. These include: several military coups, the Civil War of 1967-1970, persistent exchange rate fluctuations and high inflation rates, unending episodes of bank failures, the continual issue insecurity of lives and property, tensions occasioned by various presidential elections, petrol subsidy removal crisis, the 2016 economic recession, the lack of continuity in development planning and implementation, and the recent #EndSars protest of October 2020. These events may have hindered the investment decisions of economic agents in Nigeria.

In spite of the fact that rising uncertainty may impact adversely on the NSE, empirical studies in Nigeria have scarcely focused on the impact of economic policy uncertainty on the Nigerian stock market. This leaves an important gap in the literature, which this study seeks to fill. Indeed, most of the studies in the literature have generally focused on the stock markets in other countries (examples are: Abdullah, 2020; Gilal, 2019; Bahmani-Oskooee & Saha, 2019; Riaz, Hongbing, Hashmi & Khan, 2018; Zalla, 2017; Arouri, Estay, Rault & Roubaud, 2016; Baker et al., 2016; Bhagat, Ghosh & Rangan, 2013). The few uncertainty studies in Nigeria did not specifically focus on the effects of economic policy uncertainty on the Nigerian stock market (Raulatu, Ugbem, Augustine & Paul, 2019; Ukwueze, Asogwa & Odo, 2018; CBN, 2015). This study will therefore contribute to the literature by investigating the effect of economic policy uncertainty on the Nigerian stock market. Thus, the broad objective of this study is to examine the effect of economic policy uncertainty on the Nigerian stock market. The specific objectives are: (i) to ascertain if there is a long-run relationship between economic policy uncertainty and the all share index of the NSE; and (ii) to establish the effect of economic policy uncertainty on the all share index of the NSE.

What then is the problem necessitating this study? To answer this question, it must be re-emphasized that the Nigerian Stock Exchange (NSE) is expected to be the pillar for capital mobilization and investment in the Nigerian economy given its role in promoting the offerings of stocks and shares to prospective investors, promoting the participation of the private sector in the economy, mobilizing private and public savings for productive investments, providing opportunities for raising new capital, and attracting foreign investors into the economy. However, the performance of the NSE over the years has not been quite desirable. Indeed, the poor performance of the NSE may be attributed to various uncertainty shocks that may have

forced prospective investors to withhold their investment decisions. To see this, let us consider the plot of the all share index of the NSE from January 1997 to March 2020 as shown in Figure 1. We find that the index attained its highest value around February 2008, and crashed almost immediately due to the uncertainty occasioned by the 2007-2008 Global Financial Crisis. Since then, the index has not returned to this pre-crisis peak value.

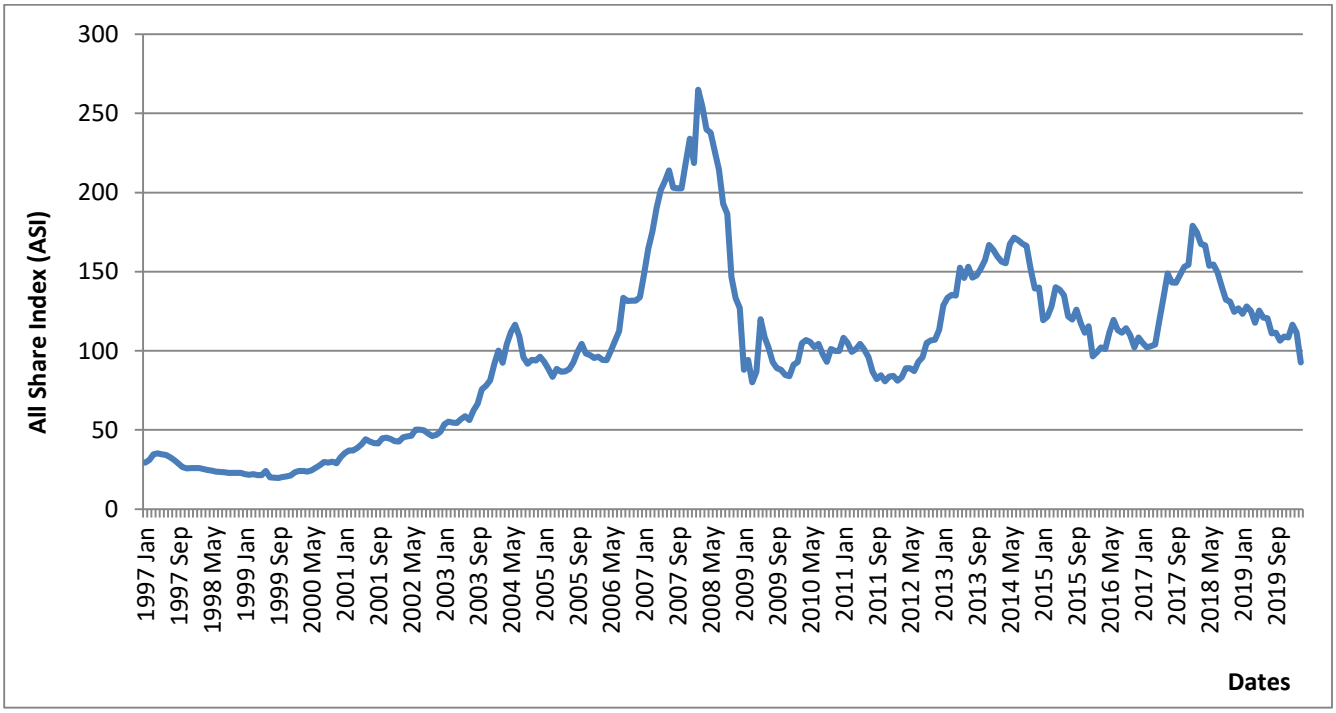

Figure 1: A Plot of the All Share Index (ASI) of the NSE, January 1997 – March 2020

Apart from the 2007-2008 Global Financial Crisis, the index has also reacted to other crises situations. Around February 2005, the index witnessed a dip in response to the uncertainty surrounding the 2004-2005 Banking Sector Consolidation exercise of the CBN. Around January 2012, the index witnessed a downturn due to the uncertainty created by the sudden removal of subsidy on petrol by the Federal Government. From January 2015, the index also witnessed somewhat prolonged downturn as a result of the uncertainties created by the 2015 general election and the collapse in international oil price. This downturn persisted until the economy went into a recession in 2016. From 2018Q2, the index has been on a downward trend till the end of the data in 2020Q1. In fact, the impact of the uncertainty generated by the ongoing Covid-19 pandemic is quite evident on the index.

The foregoing paragraphs indicate that there is a problem, which can be situated in the fact that rising uncertainty may be responsible for the less than desirable performance of the NSE. Thus, there is need for policymakers in Nigeria to empirically understand the effects of economic policy uncertainty on the Nigerian stock market. Indeed, such empirical evidence will also be of benefit to prospective investors and the general public as it will them to better appreciate how the decisions of economic agents impact on the market during uncertain times. It is the goal of this study to provide this empirical evidence.

Literature Review

Conceptual Review

The main concepts in this study are economic policy uncertainty and the stock market. Arouri et al. (2014) explained that economic policies are decisions making parameters, and that when economic policies are lacking or are not well defined, then uncertainty ensues, leading to delays in economic activities and decision making. Toma, Chitita and Sarpe (2012) also posited that economic policy uncertainty exists when there is either lack of or insufficient information needed to understand the future path of an economy. Under uncertainty condition, policymakers are unable to completely anticipate likely events that may happen, while economic agents have limited knowledge about current realities and possible future outcomes. Bloom et al (2013) explained that economic uncertainty arises when there is little or non-existence of knowledge regarding the future path of an economy. Kostka and Roye (2007) explained that economic policy uncertainty is a situation in which economic agents are unable to foreknow the monetary, fiscal, trade and regulatory policy outcomes. Under such conditions, economic agents are forced to withhold consumption and investment spending.

The stock market is a public market that exists for issuing, buying, and selling of stocks that are traded on a stock exchange or over-the-counter (Ohiomu & Enabulu, 2011; Anyanwu, 1993). Stocks, which are also known as equities, represent part ownership of a company, and the stock market is a place where investors can buy and sell ownership of such assets. Clearly, an efficiently functioning stock market is important in every economy as it helps companies to easily raise capital from the public rather than incurring debt and paying interest charges on the debt. It also enables the investors (i.e. those who purchase stocks) to benefit from the profits of publicly-traded companies. The overall performance of the stock market is usually tracked and measured through various stock market indices. In the NSE, the main indices for tracking performance are the all share index and the market capitalization. While the all share index

represents the change in the average value of all the shares prices of all companies on the NSE, market capitalization refers to the aggregate valuation of a listed company based on its current share price and the total number of outstanding stocks. The market capitalization is usually computed as the product of the current market price of the company's share and the total outstanding shares of the company (Anyanwu, 1993)

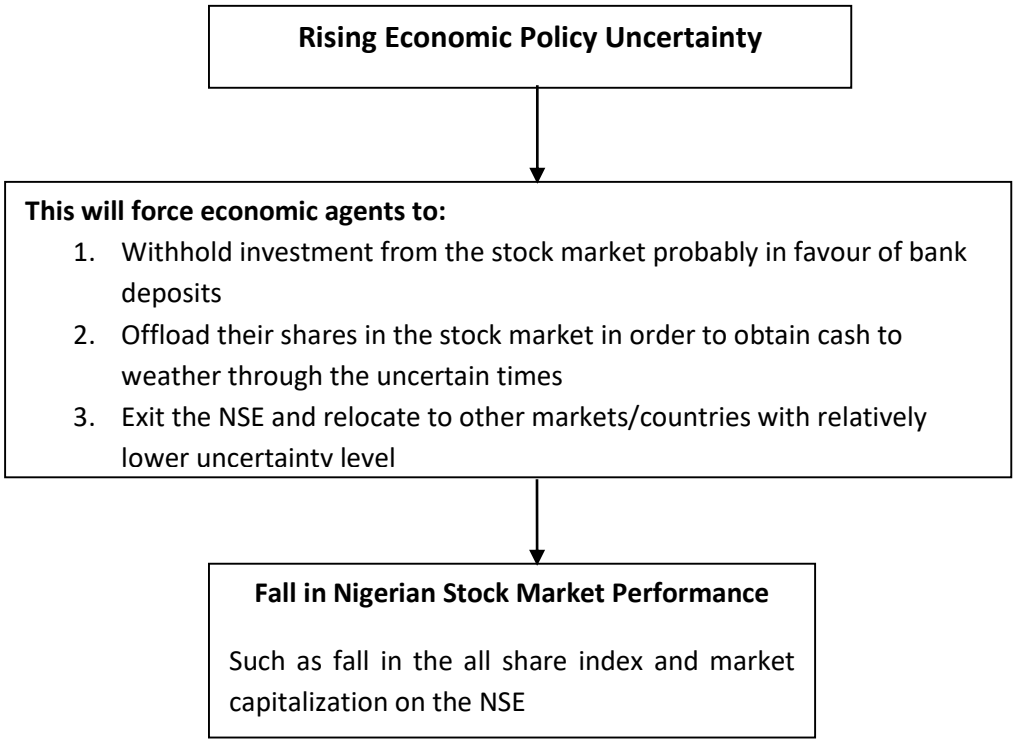

Figure 2: Conceptual Framework

The conceptual framework in Figure 2 indicates that rising economic policy uncertainty can adversely impact on the performance of the Nigerian stock market. It shows that high uncertainty conditions can induce economic agents to withhold investments from the stock market probably in favour of bank deposits, sell off the shares in the stock market in order to obtain cash (which are considered more liquid) to enable them weather through the uncertain times, and to exit the market altogether and move their investments to other markets or countries with relatively lower uncertainty levels. The implication is that the Nigerian stock market will then witness poor performance due to fall in its benchmark indices, such as the all share index and the overall market capitalization.

Theoretical Review

In what follows, some stock market theories and uncertainty theories are reviewed.

Stock Market Theories

Several theories have been advanced by different scholars in attempt to explain the fluctuations in the stock market. Here, we consider the following theories: the Efficient Capital Market Theory, the Modern Portfolio Theory and the Liquidity Preference Theory.

a. The Efficient Capital Market Theory

The finance literature provides three main theories for explaining the performance of stock market performance: classical, behavioral, and the efficient capital market. The classical theory explains that market behavior can be analyzed in terms of the intersection of demand and supply schedules and the stability of this intersection at equilibrium. Consequently, changes in stock prices arise from shifts in either the demand or the supply schedule, or both. The behavioral theory tries to explain and predict observable decision making. The theory represents decision makers by a set of decision processes which act on, as well as react to, information already available or which may be procured from the environment (Clarkson, 1964). The efficient capital market theory is the most prominent theory for explaining stock behavior. The theory uses statistical time series models to explain stock price movements. According to Fama (1970), an efficient capital market is one in which prices always fully reflect available information. This theory, also known as the Random Walk Theory, is the proposition that current stock prices fully reflect available information about the value of the firm, and there is no way to earn excess profits, (more than the market overall), by using this information.

b. The Modern Portfolio Theory

Markowitz (1952) explained that rather than use one-dimensional investment criteria such as the Net Present Value (NPV) criterion, investors should consider expected returns and risk, defined as the standard deviation of the return distribution. The theorist posits that investors should build their portfolios on the basis of expected returns (desirable) and returns variance (undesirable), in order to maximize the former and minimize the latter, by diversifying assets with reduced covariance. The theorist rejected the idea that investors should base their portfolios solely on the greatest expected return, because adopting this criterion may lead to two assets with similar returns being allocated to the investment portfolio with no analysis of

their contribution to its risk. He also explained that a portfolio with the maximum expected return is not necessarily that with the least risk; and that although diversification allows reduction of portfolio risk, it does not lead to complete extinction of the risk present in an investment portfolio.

c. Liquidity Preference Theory

Tobin (1958) argued that investors choose situations that fall between a state of total liquidity and a point of total investment in high-risk assets. In his work, Tobin (1958) noted that investors prefer liquidity, due to two aspects: one concerns individual inelasticity towards the expected interest rate, and the other, uncertainty as to the future of interest rates. Thus, investors would generally prefer not to lose their capital due to market risk or asset price fluctuations. Tobin (1958) also explained that investors make their decisions by combining a risk-free asset with the portfolio located at the efficient frontier advanced by Markowitz (1952). This proposition led to the Separation Theorem, which states that the two investment decisions made by investors are independent and separate. These decisions include: determining the most efficient risky asset portfolio; and defining the proportion of resources to be allocated to risk-free assets and risky assets. Thus, the difference between an investor with higher risk tolerance and one with lower risk tolerance is the proportion of risk-free assets in his or her portfolio.

Theories of Uncertainty

The theories of uncertainty presented here include: the theory of real options channel; the theory of precautionary savings channel; and the theory of risk-premia.

a. Theory of Real Options Channel

This theory dates back to Bernanke (1983) and Brennan and Schwartz (1985). The concept behind the real option theory is that firms have sequences of real options on possible investments to embark upon. Real options channel has to do with the value of option related to investments that are not reversible. Specifically, when investment is completely or partly irreversible, once such investment has been embarked on, the investor must face a high cost if he must disembark from the investment. If the economic agent chooses to delay the investment, he forfeits the short-term earnings from the investment, and in the next period he will have the option to either delay the investment or not. Since the economic agent is not capable of foreseeing what returns may accrue from the investment, he will wait in order to obtain new appropriate information that could likely aid him in making better decision about the

investment. Hence, uncertainty causes firms to be cautious regarding their actions when employing and investing in projects for which the costs of adjustment always make such investment to be costly to reverse.

b. Theory of Precautionary Savings Channel

According to Carroll and Kimball (2016), precautionary saving is the extra saving that emanates as a result of information a household have about future uncertainty. A household attains extra saving either by reducing consumption or increasing work hour in order to hedge against uncertainty. Thus, the response of present expenditure to future risk based on the prevailing circumstance is precautionary saving. In a situation of decreasing risk aversion, a rise in uncertainty regarding upcoming income flow causes a rise in savings (Leland, 1968). When economic agents are confronted with uncertainty, they consume less and supply more work so as insure themselves against upcoming negative occurrences. Carroll and Samwick (1998) showed that precautionary saving is caused by high uncertainty regarding distribution of income of the household in the future. Moore (2016) demonstrated that household saving ratio rose due to economic uncertainty and reduced consumption growth for durable goods. In sum, a rise in investment and decrease in consumption of households could be caused by the precautionary savings channel.

c. Theory of Risk-premia

Rising risk premia is a medium through which uncertainty decreases growth in an economy (Bloom, 2014). According to the theorist, compensation for taking a high risk is the wish of an investor, and as uncertainty increases, financing cost must also increase. Just like risk premia, uncertainty raises the cost of financing debt by increasing the default probability. Because banks are mainly concerned about debtors repaying, a mean preserving spread deteriorates their loans returns; and due to the increase in default risk, banks will charge higher rates of interest. This action is capable of reducing the overall growth of an economy (Arellano, Bai & Kehoe, 2010).

Empirical Review

Several studies have investigated the effect of economic policy uncertainty on various stock markets across the globe. Gilal (2019) examined the effects of USA economic policy uncertainty on Indonesian stock market returns using the ordinary least square (OLS) method.

The study used monthly data for the period January 2000 to December 2017. The study found a steady positive conditional correlation between stock market returns of Indonesian and USA economic policy uncertainty. Interestingly, the findings further indicate a negative value of conditional correlation in a sub-sample estimation, suggesting an inverse relationship between stock market returns of Indonesian and USA economic policy uncertainty. Baker et al. (2016) investigated the effects of policy uncertainty on firm-level stock price volatility implied by equity options, firm-level investment rates and employment growth rates and on aggregate investment, output and employment using newspaper coverage frequency in the United States and eleven other advanced economies. The study established that greater volatility in stock price, employment in policy-sensitive sectors (such as health care, defense, finance, construction and infrastructure) and reduced investment were related to policy uncertainty.

Another study by Bahmani-Oskooee and Saha (2019) investigated the asymmetric effects of policy uncertainty on stock prices in USA, Canada, UK, Korea and Japan using the nonlinear autoregressive distributed lag (NARDL) model. The study used monthly stock prices data for the period of January 1985 to October 2018. The findings indicate that there is short-run asymmetric effect of policy uncertainty on the stock prices of USA, Canada, UK and Korea, while all the five markets witnessed significant long-run impacts of uncertainty. The findings further indicate that increasing policy uncertainty adversely impacts on stock prices in Japan, Canada, and UK, while decreasing policy uncertainty boosts stock market returns. The study also found that rising policy uncertainty has adverse impacts on stock returns in USA, Canada, UK, Korea and Japan in the short-run.

In Ireland, Zalla (2017) developed an economic policy uncertainty index to examine the effects of policy uncertainty on the stock exchange, interest rate, industrial production and employment. The study used vector autoregressive (VAR) model and macroeconomic data spanning from 1985 to 2016. The study found that economic policy uncertainty innovation impacted negatively on macroeconomic and financial variables such as industrial production and stock market indices. Arbatli, Davis, Ito and Miake (2017) found that economic policy uncertainty increased during elections and key leadership transitions in Japan. The study also found that the Asian Financial Crisis, the Global Financial Crisis, the USA debt downgrade of 2011, the Brexit referendum, and the recent pronouncement of Japan on consumption tax increased uncertainty in the country. The study also found that rising economic policy uncertainty innovations caused decline in employment, investment and output performance in Japan.

Arouri et al. (2016) examined the impact of economic policy uncertainty on USA stock markets using the ordinary least square regression (OLS) method. The study employed monthly data for the period 1900 to 2014. The study found that a rise in policy uncertainty decreases stock returns significantly and the effect is robust and persistent in the period of severe volatility. In same vein, Gulen & Ion (2016) used the economic policy index developed by Baker, Bloom, Davis and Sammon (2021) to examine the effect policy uncertainty on USA corporate investment. The findings indicate that economic policy uncertainty depressed USA corporate investment by encouraging precautionary delay as a result of irreversible investment.

Similarly, Riaz et al. (2018) used autoregressive distributed lag model (ARDL) bounds approach to ascertain the relationship between economic policy uncertainty and other macroeconomic variables in the USA. The findings showed that stock returns of the transportation sector were affected negatively by domestic and international economic policy uncertainty. Bhagat et al. (2013) examined the effects of economic policy uncertainty on the Indian economy using quantile regression and macroeconomic variables for the period 2003 to 2012. The study found a strong negative correlation between economic policy uncertainty and Bombay Stock Exchange index. The study also found that economic policy uncertainty is negatively related to fixed investment and gross domestic product. According to the study, if uncertainty in economic activity were to decrease to what India experienced in 2005, gross domestic product growth and fixed investment growth would increase by 0.56% and 1.36% respectively.

Abdullah (2020) evaluated the effects of United States economy policy uncertainty on stock market returns of some Gulf countries (United Arab Emirate, Saudi Arabia, Qatar, Bahrain, Oman and Kuwait) using vector autoregressive (VAR) model. The study found that United States economy policy uncertainty respond negatively to stock market returns of United Arab Emirate, Qatar, Saudi Arabia, Kuwait, Oman and Bahrain. Rehman and Apergis (2019) investigated the sensitivity of economic policy uncertainty to investor sentiment in Asia and European markets using a quantile regression method. The data covered the period of 1995 and 2015. The findings indicate that economic policy uncertainty impacts negatively impacted on investors' sentiment. The full sample results also showed that economic policy uncertainty was mainly driven by oil price volatility, suggesting that economic policy uncertainty is highly sensitive to international oil prices.

In Nigeria, CBN (2015) investigated the impact of macroeconomic uncertainty on monetary policy based on the generalized autoregressive conditional heteroskedasticity (GARCH) framework. The study used quarterly data that covered the period of 2000Q1 to 2015Q1. The study found that monetary policy effectiveness in Nigeria is not significantly undermined by macroeconomic uncertainty. For example, inflation uncertainty causes no harm to output growth performance, while shocks in oil price and exchange rate uncertainty impacted significantly on output instantly but does not persist for long. Ukwueze et al. (2018) examined the impact policy uncertainty on enterprise sector in Nigeria using a multinomial logistic regression model. The study found that medium and large enterprises are negatively impacted on by policy uncertainty, labour regulation, licensing and permits, and political instability. Raulatu et al. (2019) investigated the effect of global economic policy uncertainty on Nigeria's export earnings using the autoregressive distributed lag (ARDL) and the generalized autoregressive conditional heteroskedasticity (GARCH) model. The data covered the period of 1997 to 2016. The study reported that Nigeria's export earnings are adversely affected by global economic policy uncertainty.

Clearly, the foregoing empirical review indicates that studies focusing on the effect of economic policy uncertainty on the stock market have generally been conducted in other countries outside Nigeria. There is, therefore, the need for policy makers in Nigeria to obtain empirical evidence on the effect of economic policy uncertainty on the Nigerian stock market. It is the goal of this study to provide this empirical evidence.

Methodology

Analytical Framework

This paper adopted the autoregressive distributed lag (ARDL) modeling framework of Pesaran, Shin and Smith (2001) based on its ability to produce consistent estimates even in small samples. The paper subjected the model to various diagnostic checks in order to ensure that the underlying assumptions of the framework are duly satisfied. These checks include: normality test, autocorrelation test, heteroskedasticity test, and model specification test. However, prior to the estimation of the model, the variables were subjected to pre-estimation tests in order to avoid spurious regression. The pre-estimation tests include the Augmented Dickey-Fuller (ADF) unit root test and the Pesaran *et al*. (2001) bounds cointegration test.

The Data

The data for this study consists of quarterly observations from 1997Q1 to 2019Q4 on the variables listed in Table 1. All the variables were logged prior to estimation. This is to ensure that the estimated parameters are interpreted in percentage terms.

Table 1: Variable descriptions and sources of data

Variable	Description	Source of data
ASI	All share index	CBN (2020)
MSS	Broad money supply, M2 (N'Billion)	CBN (2020)
EPU	Economic policy uncertainty index	Davis (2016)
EXCH	Official naira to dollar exchange rate	CBN (2020)
MCAP	NSE market capitalization	CBN (2020)
POB	Brent spot price FOB (USD per barrel)	Energy & Information Administration (2020)
RGDP	Real GDP per capita (Constant 2010 USD)	World Bank (2020)

Table 2 reports the descriptive statistics of the variables based on the log transformation of the data. The mean, maximum and minimum values for all the variables indicate that none of the values is too high or too low to be considered an outlier. The standard deviations indicate that all the variables actually witnessed some variations. In sum, there are 92 observations, which are considered large enough to achieve a robust estimation.

Table 2: Descriptive statistics of the variables

	ASI	EPU	EXCH	MCAP	MSS	POB	RGDP
Mean	4.4108	4.6803	4.8738	8.0247	8.5344	3.8848	7.5831
Median	4.6015	4.6698	4.8920	8.6868	9.0438	4.0210	7.6360
Maximum	5.5054	5.6139	5.7267	9.6473	10.2798	4.7991	7.8555
Minimum	2.9914	4.0086	3.0858	5.4613	6.0159	2.4147	7.2069
Std. Dev.	0.6669	0.3906	0.6486	1.4150	1.3553	0.6435	0.2267
Skewness	-0.7175	0.3111	-1.4938	-0.6057	-0.4255	-0.4793	-0.4879
Kurtosis	2.4268	2.4050	5.6080	1.8022	1.7936	2.2733	1.7397
Jarque-Bera	9.1524	2.8410	60.2866	11.1246	8.3544	5.5472	9.7384
Probability	0.0103	0.2416	0.0000	0.0038	0.0153	0.0624	0.0077
Observations	92	92	92	92	92	92	92

Model Specification

Following Riaz *et al*. (2018), the long-run model for this study is econometrically specified as follows:

$$ASI_t = \alpha_0 + \sum_{j=1}^{p} \alpha_j ASI_{t-j} + \sum_{j=0}^{q} \beta_j EPU_{t-j} + \sum_{j=0}^{q} \gamma_j RGDP_{t-j} + \sum_{j=0}^{q} \theta_j EXCH_{t-j} + \sum_{j=0}^{q} \lambda_j MSS_{t-j} + \sum_{j=0}^{q} \pi_j POB_{t-j} + \varepsilon_t \quad (1)$$

where: the variables are as defined in Table 1, j is the lag length to be selected by Akaike Information Criteria based on the general-to-specific modeling procedure starting with a maximum lag length of 4 since our data is quarterly, and ε_t is the stochastic error term expected to be normally, identically and independently distributed with zero mean and constant variance. The economic or *a priori* expectations are that β_j, θ_j, and π_j will be negative, while α_j, γ_j and λ_j will be positive.

Good econometric work should also capture the short-run dynamics. Accordingly, the error correction modeling specification for Equation (1), which captures the short-run effects of the regressors, is as follows:

$$\Delta ASI_t = \alpha_0 + \sum_{j=1}^{p} \alpha_j \Delta ASI_{t-j} + \sum_{j=0}^{q} \beta_j \Delta EPU_{t-j} + \sum_{j=0}^{q} \gamma_j \Delta RGDP_{t-j} + \sum_{j=0}^{q} \theta_j \Delta EXCH_{t-j} + \sum_{j=0}^{q} \lambda_j \Delta MSS_{t-j} + \sum_{j=0}^{q} \pi_j \Delta POB_{t-j} + \eta ECM_{t-1} + \varepsilon_t \quad (2)$$

where: ECM_{t-1} is the first lag of the residual from the estimation of Equation (1), and its coefficient is expected to be statistically significant with a negative sign.

As a robustness check, Equations (1) and (2) will be re-estimated using the NSE market capitalization (MCAP) as the dependent variable.

Empirical Results and Discussions

We started the empirical analysis by examining the time series properties of the data. The ADF unit root results in Table 3 for all the variables indicate that all the variables are integrated of order one, I(1). In other words, all the variables were non-stationary at levels, but only became stationary after first differencing. This means that without testing for cointegration, we run the risk of fitting a spurious regression. Hence, we conducted the bounds cointegration test following Pesaran *et al*. (2001).

Table 3: ADF Unit Root Test Results

Variable	ADF Stat at Level	5% Critical Value	ADF Stat at 1st Diff	5% Critical Value	Order of Integration
ASI	-1.70609	-3.46052	-6.30570	-3.46052	I(1)
EPU	-3.40301	-3.45995	-10.81499	-3.46052	I(1)
EXCH	-2.78179	-3.45995	-9.10013	-3.46052	I(1)
POB	-1.44411	-3.45995	-7.50377	-3.46052	I(1)
MCAP	-1.31014	-3.46052	-6.54110	-3.46052	I(1)
MSS	-0.41849	-3.45995	-10.77941	-3.46052	I(1)
RGDP	-1.13477	-3.46291	-5.43912	-3.46291	I(1)

The results of the bounds cointegration test are shown in Table 4. The results indicate that the F-statistic value of 5.1276 is greater than both the lower and the upper critical value bounds at the 5% level. This means that the variables are cointegrated. In other words, the variables have a stable long-run relationship between them. Thus, the long-run model for this study cannot be called spurious. This finding clearly achieves the first specific objective of this study which seeks to ascertain if there is a long-run relationship between economic policy uncertainty and the all share index of the NSE. Hence, we must reject the first null hypothesis which posits that there is no significant long-run relationship between economic policy uncertainty and the all share index of the NSE.

Table 4: Results of the Bounds Cointegration Test

Test Statistic	Value	k
F-statistic	5.127608	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Note: The bounds test for the robustness estimation is shown in Appendix 1.

The results of the long-run model in this study are shown in Table 5 following the specification in Equation (1). The Breusch-Godfrey test autocorrelation and the Breusch-Pagan-Godfrey test for heteroskedasticity indicate that the model is free from both problems. The Durbin-Watson

statistic of 2.00 further reinforces the absence of residual serial correlation in the model. This is not surprising given the dynamic nature of the model. The p-value of the Jarque-Bera statistic indicate that the residual is normally distributed as expected. The p-value of the F-statistic also indicates that the model as a whole is statistically significant even at the 1% level. The F-statistic of the Ramsey RESET test has a p-value of 0.4814, which is not statistically significant at the 5% level. This indicates that the model is well specified. Overall, the model in Table 5 is seen to be adequate to inform inference. In what follows, we discuss the estimated coefficients of the model.

We find that the first lag of all share index (ASI) impacts significantly and positively on the current values, while the impacts of the second and third lags are muted. Cumulatively, we find that initial all share index impacts positively on the current values. We find that the current level of economic policy uncertainty (EPU) impacts significantly and negatively on all share index even at 1% level. The results further indicate that the impact of the first lag of EPU is not significant at 5% level, but cumulatively, the impact of EPU is seen to be negative. This means that rising uncertainty impacts significantly and adversely on the stock market's all share index. This is in line with economic expectation because during periods of rising uncertainty, market participants are expected to be cautious and/or postpone further activities in the market. This finding is consistent with some recent studies in the literature, such as Bahmani-Oskooee and Saha (2019), Gilal (2019), Zalla (2017), Arouri et al. (2016), and Riaz et al. (2018). This finding clearly achieves the second specific objective of this study, which seeks to establish the impact of economic policy uncertainty on the all share index of the NSE. In fact, this finding means that we must reject the second null hypothesis which posits that economic policy uncertainty does not impact significantly on the all share index of the NSE.

Table 5: Long-run Regression Results, ARDL (4, 1, 4, 3, 0, 3) (Dependent Variable = ASI)

Variable	Coefficient	Standard Error	t-Statistic	P-value
ASI(-1)	1.0985	0.0983	11.1742	0.0000
ASI(-2)	-0.1671	0.1535	-1.0891	0.2800
ASI(-3)	0.0990	0.1447	0.6838	0.4964
ASI(-4)	-0.2211	0.0863	-2.5625	0.0126
EPU	-0.1803	0.0622	-2.8974	0.0051
EPU(-1)	0.1047	0.0616	1.7007	0.0936
MSS	0.4903	0.1757	2.7907	0.0068
MSS(-1)	-0.2801	0.2028	-1.3815	0.1717
MSS(-2)	0.1520	0.2030	0.7490	0.4565
MSS(-3)	0.2358	0.2026	1.1642	0.2485
MSS(-4)	-0.5866	0.1854	-3.1643	0.0023
EXCH	-0.1428	0.0699	-2.0444	0.0448
EXCH(-1)	0.0130	0.0900	0.1440	0.8859
EXCH(-2)	-0.0547	0.0890	-0.6143	0.5411
EXCH(-3)	0.2113	0.0652	3.2412	0.0019
RGDP	0.5817	0.3790	1.5349	0.1295
POB	0.2705	0.0741	3.6504	0.0005
POB(-1)	-0.2682	0.1168	-2.2953	0.0249
POB(-2)	-0.2531	0.1108	-2.2854	0.0255
POB(-3)	0.2037	0.0713	2.8586	0.0057
Constant	-3.3193	2.5080	-1.3235	0.1902

Notes: Adjusted R-squared = 0.9838; F-statistic = 265.99; Prob(F-stat) = 0.0000***; DW Stat = 2.00; Jarque-Bera statistic = 0.5705; Prob(Jarque-Bera) = 0.7518; Breusch-Godfrey serial correlation Prob(Chi-square) = 0.9605; Breusch-Pagan-Godfrey Prob(Chi-square) = 0.2573; P-value of Ramsey RESET test F-statistic = 0.4814. Here, ** and *** denote significance at 5% and 1%, respectively.

The results in Table 5 further indicate that the cumulative impact of money supply (MSS) is positive and significant at the 5% level. This shows that money supply impacts positively and significantly on the all share index of the NSE. The current level of exchange rate impacts negatively and significantly on the all share index. This is consistent with economic expectation. However, the cumulative impact of changes in exchange rate is positive. As expected, real per capita GDP growth impacts positively on the all share index, though this impact is not statistically significant. Interestingly, the results further indicate that the effect of changes in oil price on the all share index is cumulatively negative and significant at the 5% level. This finding is interesting because as an oil-rich economy, developments in the international oil prices have far reaching implications for the Nigerian economy. Here, the empirical evidence indicates that fluctuations in oil price impacts adversely on the Nigerian stock market.

At this point, the findings of this study can be summarized as follows: (i) there is a stable long-run relationship between economic policy uncertainty and the all share index of the NSE; (ii) economic policy uncertainty impacts significantly and adversely on the all share index of the NSE; and (iii) changes in oil price and current exchange rate impact negatively on the all share index, while the impacts of money supply growth and real GDP per capita growth are positive. What remains to be seen is whether these findings will be robust to the short-run results as well as the robustness estimation results of Equation (2). In what follows, we consider the results of the error correction model in Equation (2), which captures the short-run dynamics.

To understand the short-run effect of economic policy uncertainty on the stock market in Nigeria, we estimated the error correction model (ECM) in Equation (2), which used the residual of the model in Table 5 as the ECM term. The results of the error correction model are shown in Table 6. We find that in the short-run: (i) the cumulative effect of economic policy uncertainty on the all share index of the NSE is also significant and negative; (ii) previous levels all share index cumulatively impact positively and significantly on the stock market; (iii) the cumulative effect of changes in oil price and exchange rate is negative, while that of money supply is positive; and (iv) the role of real GDP per capita growth is muted in the short-run. These findings are generally consistent with the earlier findings in the preceding paragraph. The error correction term is well behaved because it has a negative value and it is statistically significant at the 5% level. In what follows, we subject these findings to robustness checks by re-estimating the models in Equations (1) and (2) using the NSE market capitalization as the dependent variable.

Table 6: Error Correction Model, ARDL (4, 2, 4, 3, 0, 3) (Dependent Variable = D(ASI))

Variable	Coefficient	Standard Error	t-Statistic	P-value
D(ASI(-1))	1.1162	0.1850	6.0326	0.0000
D(ASI(-2))	-0.1747	0.1059	-1.6496	0.1039
D(ASI(-3))	0.0924	0.0952	0.9708	0.3353
D(ASI(-4))	-0.2308	0.0841	-2.7442	0.0079
D(EPU)	-0.1941	0.0590	-3.2890	0.0016
D(EPU(-1))	0.0999	0.0632	1.5804	0.1189
D(EPU(-2))	-0.0713	0.0583	-1.2228	0.2259
D(MSS)	0.4089	0.1718	2.3792	0.0203
D(MSS(-1))	-0.2543	0.1630	-1.5600	0.1237
D(MSS(-2))	0.2158	0.1527	1.4135	0.1624
D(MSS(-3))	0.2964	0.1587	1.8677	0.0664
D(MSS(-4))	-0.4730	0.2029	-2.3317	0.0229
D(EXCH)	-0.1409	0.0653	-2.1599	0.0345
D(EXCH(-1))	-0.0100	0.0678	-0.1471	0.8835
D(EXCH(-2))	-0.0864	0.0694	-1.2451	0.2177
D(EXCH(-3))	0.1650	0.0683	2.4168	0.0185
D(RGDP)	-0.2780	1.1803	-0.2355	0.8145
D(POB)	0.3122	0.0742	4.2079	0.0001
D(POB(-1))	-0.2668	0.0986	-2.7065	0.0087
D(POB(-2))	-0.2623	0.0747	-3.5108	0.0008
D(POB(-3))	0.2156	0.0778	2.7713	0.0073
ECM1(-1)	-1.0411	0.2238	-4.6517	0.0000
Constant	-0.0011	0.0180	-0.0628	0.9501

Notes: Adjusted R-squared = 0.5421; F-statistic = 5.6288; Prob(F-stat) = 0.0000***; DW Stat = 2.07. *** denotes significance at 1%.

Robustness Check with Market Capitalization as the Dependent Variable

To ensure that the results obtained in this study are not just a happenstance, we subjected the models to robustness checks by re-estimating equation (1) with NSE market capitalization (MCAP) as the dependent variable while the independent variables remained unchanged. The results of these robustness estimations are shown in Table 7 for the long-run model of Equation (1) and Table 8 for the error correction model of Equation (2) which accounts for the short-run dynamics. Interestingly, the overall patterns in our earlier results remained qualitatively unchanged. In fact, the results in Tables 7 and 8 indicate that both in the long-run and short-run, rising uncertainty and depreciation in the naira to U.S. dollar exchange rate impacts significantly and adversely on the NSE market capitalization, while the impact of money supply growth remained positive. The impact of real GDP per capita growth remained muted

in all cases. The only difference between our earlier results and the robustness results is that in the latter case, the effect of oil price changes is positive.

Table 7: Long-run Regression Results, ARDL (4, 0, 4, 3, 0, 3) (Dependent Variable = MCAP)

Variable	Coefficient	Standard Error	t-Statistic	P-value
MCAP(-1)	0.9864	0.1045	9.4351	0.0000
MCAP(-2)	-0.1293	0.1532	-0.8439	0.4017
MCAP(-3)	0.1162	0.1474	0.7882	0.4333
MCAP(-4)	-0.2250	0.0952	-2.3644	0.0209
EPU	-0.1605	0.0581	-2.7621	0.0074
MSS	0.5601	0.1965	2.8507	0.0058
MSS(-1)	-0.3401	0.2254	-1.5086	0.1360
MSS(-2)	0.1894	0.2317	0.8176	0.4165
MSS(-3)	0.4703	0.2316	2.0311	0.0462
MSS(-4)	-0.5789	0.2073	-2.7928	0.0068
EXCH	-0.1677	0.0795	-2.1078	0.0387
EXCH(-1)	-0.0484	0.1019	-0.4751	0.6362
EXCH(-2)	-0.0237	0.1019	-0.2326	0.8168
EXCH(-3)	0.1732	0.0745	2.3247	0.0231
RGDP	0.0656	0.4191	0.1565	0.8761
POB	0.3410	0.0828	4.1169	0.0001
POB(-1)	-0.2989	0.1262	-2.3689	0.0207
POB(-2)	-0.2067	0.1180	-1.7524	0.0842
POB(-3)	0.1669	0.0793	2.1043	0.0391
Constant	-0.0024	2.7791	-0.0009	0.9993

Notes: Adjusted R-squared = 0.9953; F-statistic = 962.6735; Prob(F-stat) = 0.0000***; DW Stat = 2.01; Jarque-Bera statistic = 01.3378; Prob(Jarque-Bera) = 0.5122; Breusch-Godfrey serial correlation Prob(Chi-square) = 0.7064; Breusch-Pagan-Godfrey Prob(Chi-square) = 0.4117; P-value of Ramsey RESET test F-statistic = 0.2661. Here, ** and *** denote significance at 5% and 1%, respectively.

Table 8: Error Correction Model, ARDL (4, 0, 3, 3, 0, 3) (Dependent Variable = D(MCAP))

Variable	Coefficient	Standard Error	t-Statistic	P-value
D(MCAP(-1))	0.8565	0.1679	5.1005	0.0000
D(MCAP(-2))	-0.0730	0.1012	-0.7208	0.4735
D(MCAP(-3))	0.1361	0.0967	1.4071	0.1640
D(MCAP(-4))	-0.2647	0.0868	-3.0509	0.0033
D(EPU)	-0.2083	0.0670	-3.1088	0.0028
D(MSS)	0.3303	0.1719	1.9214	0.0589
D(MSS(-1))	-0.2813	0.1765	-1.5941	0.1156
D(MSS(-2))	0.2475	0.1722	1.4372	0.1553
D(MSS(-3))	0.6071	0.1779	3.4133	0.0011
D(EXCH)	-0.2024	0.0736	-2.7495	0.0077
D(EXCH(-1))	-0.0920	0.0732	-1.2567	0.2132
D(EXCH(-2))	-0.1083	0.0722	-1.4988	0.1386
D(EXCH(-3))	0.1239	0.0750	1.6504	0.1035
D(RGDP)	-1.7032	1.1961	-1.4240	0.1591
D(POB)	0.4027	0.0836	4.8173	0.0000
D(POB(-1))	-0.1589	0.0962	-1.6514	0.1033
D(POB(-2))	-0.2106	0.0796	-2.6436	0.0102
D(POB(-3))	0.1167	0.0787	1.4826	0.1429
ECM2(-1)	-0.9482	0.2149	-4.4116	0.0000
Constant	-0.0103	0.0202	-0.5108	0.6111

Notes: Adjusted R-squared = 0.4939; F-statistic = 5.4174; Prob(F-stat) = 0.0000***; DW Stat = 2.05. *** denotes significance at 1%.

Conclusion and Recommendations

This study investigated the effect of economic policy uncertainty on the Nigerian stock market over the quarterly period of 1997Q1 to 2019Q4. Specifically, the study sought to: (i) determine if there is a long-run relationship between economic policy uncertainty and the all share index of the NSE; and (ii) establish the effect of economic policy uncertainty on the all share index of the NSE. The study used the ARDL methodology and found that: (i) there is a stable long-run relationship between economic policy uncertainty and the all share index of the NSE; (ii) the effect of economic policy uncertainty on the all share index of the NSE is significant and adverse; (iii) changes in oil price and depreciation in the naira to U.S. dollar exchange rate have significant and negative effects on the all share index, while the cumulative effect of money supply growth remained positive; and (iv) the role of real GDP per capita growth remained insignificant throughout.

Based on the above findings, the paper makes the following recommendations. First, policy makers in Nigeria should ensure that economic agents, including prospective investors, are not

left in doubt as to what the policy direction of the government is at any point in time. This is because the uncertainty arising from such doubts could adversely affect the stock market. Second, the Nigerian government should strengthen its efforts towards reducing or eliminating some persistent uncertainty inducing issues in the economy, such as terrorism, farmers/herders clashes, ethnic and religious tensions, political tensions, and so on. Again, this is because the uncertainty arising from these issues could hamper the performance of the Nigerian stock market. Regulatory agencies like the Securities and Exchange Commission, the Central Bank of Nigeria, the Nigeria Deposit Insurance Corporation, among others, should ensure that their regulatory policies are not shrouded in doubt, especially the exchange rate policies of the Central Bank of Nigeria, since the uncertainty that could arise from such doubtful situation can impede the performance of the Nigerian stock market. Overall, the paper concludes that the Nigerian stock market requires a more stable and investment-friendly environment to thrive.

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Appendix 1: Bounds Cointegration Results for the Robustness Estimation using Market Capitalization as Dependent Variable

Test Statistic	Value	k
F-statistic	4.288568	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Source: Authors