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Article

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Research in Globalization

Provided in Cooperation with:

Elsevier

Suggested Citation: Ayeni, Emmanuel; Fanibuyan, Oluwaseyi (2022) : The dynamics of uncertainty, macroeconomic variables, and capital market performance: A case study of Nigeria, Research in Globalization, ISSN 2590-051X, Elsevier, Amsterdam, Vol. 5, pp. 1-8, <https://doi.org/10.1016/j.resglo.2022.100107>

This Version is available at:

<https://hdl.handle.net/10419/331035>

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The dynamics of uncertainty, macroeconomic variables, and capital market performance: A case study of Nigeria

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ARTICLE INFO

Keywords:

Uncertainty
Economy performance
All share index
Money supply
Gross domestic product

ABSTRACT

Economic uncertainty is gradually spreading across the globe due to government intervention and global development. Though it has been extensively shown in the literature that uncertainty impacts every economic sector, various economic agents also respond to uncertainty differently, particularly when faced with an unexpected shock. Thus, this study explores the interrelationship between uncertainty, macroeconomic variables, and capital market performance in Nigeria. Findings show that uncertainty has no impact on the macroeconomic performance of Nigeria. However, the prices of crude oil impact macroeconomic performance in the country as it has a positive and significant impact on the gross domestic product, all-share index, and money supply of the Nigerian economy. The economy is exposed to external uncertainty from crude oil exports which trigger domestic uncertainty leading to macroeconomic instability in Nigeria. The study thereby recommended that a framework be developed in the Nigerian economy to reduce the domestic economy from external shock because the internal shock was found to be insignificant.

Introduction

Uncertainty became a dominant discussion in economics due to many variations between the targeted and actual macroeconomic variables in the domestic and global economy. There is a link between uncertainty, macroeconomic variables, and share prices in every economy, as existing studies have shown (Ibrahim & Shah, 2012; Adarov, 2021; Popp & Zhang, 2016). Empirical evidence has shown that uncertainty can be caused by the business cycle (see Fernández-Villaverde and Guerrón-Quintana, 2020; Cho & Honorati, 2014; Anzuini et al., 2020; Gupta et al., 2018; Saijo, 2017). Other studies also revealed that commodities prices, such as crude oil and gas and other natural resources (see Joëts et al., 2017; Punzi, 2019; Shi & Shen, 2021), while some studies focus on the financial cycle and financial market, economic policy and other (see Aikman et al., 2015; Borio, 2013; Claessens et al., 2012; Drehmann & Juselius, 2012; Ha, 2020; Batabyal & Killins, 2021; Hasen, 2021; Luo & Zhang, 2020; Baum, 2006; Segal, 2019). Some studies conducted by Bloom (2009), Fernandez-Villaverde and Krueger (2011), Gourio (2012); and Christiano et al. (2014) argue that uncertainty shocks are a significant source of business cycle dynamics. However, there are two different views from the literature. The first view says fluctuations in uncertainty may be at least partially

endogenous. The distinction is crucial because if uncertainty is an equilibrium object coming from agents' actions, policy experiments that treat uncertainty as exogenous are subject to the Lucas critique. Second, some authors, Bachmann et al. (2013), Born and Pfeifer (2014); and Chugh (2016), also suggested that, given minor and transient fluctuations in measured volatility, changes in uncertainty have negligible effects.

Existing theories for investment under uncertainty believe that while in the period of irreversible condition or fixed costs, uncertainty over future returns reduces current investment, hiring, and consumption through an option value (Joëts et al., 2017). At the micro level, uncertainty will discourage a firm's willingness to expend funds on irreversible investment, and there is a corresponding sluggish response from households or consumers to expend their income and wages. There is a level of certainty that micro-level uncertainty will be transmitted to the macro level because uncertainty about the return to investment at a micro level may create cyclical fluctuations in aggregate investment at a macro level (Bernanke, 1983). For further illustration, it is essential to emphasize the micro and macro level impact on commodity markets. At the micro level, commodity markets in several sectors are confronted with high costs and should be impacted by uncertainty about investment returns. Similarly, at a macro level, as prices are related to both domestic

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<https://doi.org/10.1016/j.resglo.2022.100107>

Received 12 July 2022; Received in revised form 29 November 2022; Accepted 29 November 2022

Available online 1 December 2022

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and foreign markets, the uncertainty about macroeconomic aggregates should also affect commodity prices. In addition, the foreign market's influence is induced by the cost of inputs which is exogenously determined, and the degree of openness of the economy also influences the domestic market.

A recent event in that line with uncertainty in the financial market was the global financial crisis of 2007 to 2008. The shock in the US economy started in the narrow financial market segment, which quickly spread to other segments leading to a downturn in the US national economy initially before the global spread of the event due to the increasing globalization and deepening macro-financial linkages and cross-border spillovers. Indeed, the overheating housing market in the US caused a subprime mortgage crisis in 2007, which further unraveled a chain of events leading to large-scale national banking and "shadow" banking sector meltdown and, ultimately, to cross-border financial contagion and the global economic recession. The overheating of the financial market and the formation of asset bubbles instigate the worst macroeconomic situation, which seems not to be unique to the previous crisis in the history of the world. There have been many devastating boom-bust in the world, such as the Dutch Tulip Mania of the 1630 s, the South Sea Bubble of 1720, the US Stock Market Crash of 1929, Japan's Real Estate and Equity Market Bubble of the late 1980 s, the Dot-Com Bubble of 2000, to name just a few prominent ones.

One of the proponents of the Efficient Market Hypothesis (EMH) says all publicly available information is already incorporated in stock prices while economic indicators will fail to impact the stock returns [Fama \(1970\)](#). Previous studies have been done to test the efficacy of the Efficient Market Hypothesis, and their findings show that macroeconomic variables have played an essential role in predicting the time series of stock returns. [Ross \(1976\)](#) developed Arbitrary Pricing Theory (APT) Framework to capture the effect of economic forces on stock returns. The APT modeled asset returns as a linear function of different risk factors, including macroeconomic variables, and the sensitivity of each factor was captured by the coefficient using the multivariate regression framework. Studies done using the model found a significant relationship between stock market returns, interest rate, real GDP, and money supply which questions the reliability of the existing theory [Chen et al. \(1986\)](#), [Taylor and Poon \(1991\)](#); [Hamao \(1988\)](#), [Martinez and Rubio \(1989\)](#), [Schwert \(1990\)](#) and [Ferson and Harvey \(1991\)](#).

[Liljebloom and Stenius \(1997\)](#) argued that since the value of stock prices depends on the economy's healthiness, macroeconomic uncertainty would affect stock return volatility, assuming consistent discount rates. Further studies on the relationship between stock return and macroeconomic condition show that uncertainty of macroeconomic fundamentals is the driver of stock market volatility (see [Fama, 1981, 1990](#); [Fama & French, 1989](#); [Chen et al., 1986](#)). According to [Adjasi \(2009\)](#), the primary significance of macroeconomic uncertainty plays a vital role in stock markets comprehension of results for risk management. He further concluded that information on macroeconomic fundamentals could help market traders and money market analysts better manage their portfolios. At the same time, policymakers are given a hedge in the proper management to develop appropriate policies that will further develop the stock market more effectively and efficiently by managing macroeconomic variables that impact the stock market.

This study examines the dynamics of uncertainty, macroeconomic variables, and stock prices in Nigeria. The Nigeria exchange commission was chosen for the study because the Nigerian economy is the biggest in Africa regarding nominal GDP. The study extends the existing literature by investigating the impact and interrelationship between uncertainty, macroeconomic variables, and stock prices in the Nigerian context, where little or no study has been conducted on the interrelationship among the variables of interest. As well known, Nigeria's economy is a developing country that earns over 90 % of its revenue from crude oil export, and most of the recent economic shocks have been linked to crude oil prices in the past. A study by [Obboh et al. \(2019\)](#) on uncertainties in global economic policy and Nigeria's export earnings

revealed that uncertainty in global economic policy hurts domestic earnings, confirming the country's sensitivity to external shocks. This study concluded that the domestic economy is prone to incessant shock due to overdependence on oil.

The rest of the paper is organized as follow; the literature review is discussed in the next session, section 3 is the data and methodology, while section 4 and 5 is the discussion of results and conclusion.

Literature review

It is crucial to study uncertainty because of its impact on economic activities. Different economic agent reacts to uncertainty in different ways leading to fluctuations in economy from time to time. Despite numerous studies in recent years, the subject matter remains a dominant.

The study of [Shi and Shen \(2021\)](#) focused on natural gas prices and macroeconomic uncertainty. He identifies three markets and the three different gas pricing mechanisms: the U.S. market for hub pricing, the Japanese market for oil indexation, and the German market for transition between the two pricing regimes. In addition, the study investigated the dynamic causal effect of macroeconomic uncertainty shocks on formulating natural gas prices. The finding shows that macroeconomic uncertainty plays a vital role in determining variations in natural gas prices, thereby driving the business cycle fluctuations among countries considered in the study. Furthermore, a new market demand pattern was discovered called the "Asian Premium" phenomenon, which helps to show that the drivers of gas prices are different in the three markets of the natural gas trade. [Punzi \(2019\)](#) developed a model depicting the economy as a small open economy consisting of households and firms consuming energy for domestic consumption at the household level while firms use it as productivity input. Data were obtained for 10 countries in Asia between 2000 and 2016 while dynamic stochastic general equilibrium (DSGE) was adopted for the study. The study's findings revealed that the increase in the price of energy causes an economic slowdown due to a rise in the cost of consumers, and firms' energy price volatility shocks generate an increase in GDP in the short-run and a reversal in the long run. [Adarov \(2021\)](#) examines the dynamic interrelationship between business cycle, financial cycle, and macroeconomic imbalances, while a similar study was carried out by [Ibrahim and Shah \(2012\)](#) focused on a similar study for Malaysia.

[Adarov \(2021\)](#) studied 24 countries using the GMM and panel VAR framework; countries were grouped either as market-based or bank-based economies. His findings show that financial cycles play a significant role in shaping macroeconomic imbalances, with expansions inducing economic overheating and downward pressure on public debt to GDP ratios. Financial dis-equilibrium causes a more profound and faster response of business cycles in bank-based economies, while in market-based economies is more persistent but mild, with greater significance for current account and public debt dynamics. High-public debt countries reveal much more potent effects on fiscal stance and output gap trajectories, while a similar study by [Ibrahim and Shah \(2012\)](#) was country specific. The study identified Malaysia as a bank-based economy and concluded a long-term positive relationship between actual output, bank credits, and accurate stock prices. However, with slow adjustment of actual output in response to credit expansion or stock price increase and weak exogeneity of the latter two variables, both credits and stock prices can be persistently higher than their fundamental values. The situation can be detrimental since it heightens market uncertainty, thereby having a negative relationship with output in the long run, and based on dynamics analysis, it is likely to depress actual output, real credit, and real stock prices. [Batabyal and Killins \(2021\)](#) examined the effect of policy uncertainty on stock market return evidence from the Canadian economy. Findings show that both the short run and long run are asymmetric. In the long run, increased policy uncertainty motivates investors to take a 'risk-off' method to gravitate toward lower-risk investments, decreasing asset prices, whereas

decreased uncertainty prompts investors to take on portfolio risk for higher returns. [Bhuiyan and Chowdhury \(2020\)](#) examined macroeconomic variables and stock market indices while the scope is US and Canada. The study's findings show a stable relationship between macroeconomic variables and sectoral indices adopted in the study. In addition, the US money supply and the interest rate were found to form an explanation for the Canadian stock market. In the same vein, [Giovannoni and de Dios Tena \(2008\)](#) used different approach to examine the relationship between market concentration and monetary policy. In the study, market concentration was examined in relation to the uncertainty of the US economy at the point of carrying out the study. The study's findings show that investment and production in the country has effect on demand shock in the market which was not expected. In support of the study of [Giovannoni and de Dios Tena \(2008\)](#), the study of [Ibrahim and Shah \(2012\)](#) also gives an insight to the relationship between bank lending, microeconomic variables and financial uncertainty, which bring to account how microeconomic variables have been a major factor that is affected by uncertainty in the economy. The study's shows that there is relationship between stock price and uncertainty, by indicating a long run positive relations between real output and both real bank credits and real stock prices. However, with slow adjustment of real output in responses to credit expansion or stock price increase and weak exogeneity of the latter two variables, both credits and stock prices can be persistently higher than their fundamental values.

A similar study by [Segal \(2019\)](#), gives account of the tale of two volatilities: sectoral uncertainty, growth and asset prices which literally tells about the stock market of the United States. This study's finds that the volatility that comes from the sectoral uncertainty drops the macroeconomic growth rate as well as that of the stock price. The relationship between the variables determines the level of uncertainty in the country and negatively impact the market at large.

Empirical studies done by [Punzi \(2019\)](#) and [Shi and Shen \(2021\)](#) show that agricultural and natural resources significantly drive uncertainty. In the same vein, a similar study was done by [Joëts et al. \(2017\)](#) and gives an overview of the commodity market. The study laid emphasis on the macroeconomic uncertainty shock in the market and adopted the structural threshold vector autoregressive (TVAR) model to examine the effect of macroeconomic uncertainty shock on commodity price return under uncertainty. The study examined mainly 19 raw materials (energy, precious metal, agriculture and industry) in the commodity markets where each commodity responds to uncertainty differently ranging from short run to long run. The finding shows that agricultural and industrial markets are susceptible to the variability and level of macroeconomic uncertainty. At the same time, the impact on precious metals is more parsimonious given their well-identified safe-haven role in the time of economic turmoil.

[Adjasi \(2009\)](#) focus on Ghana's macroeconomic uncertainty and conditional stock price volatility. The result of the study shows that the volatility of the stock prices is caused by the higher volatility in cocoa prices and interest rate, while oil prices, gold prices, and money supply reduces the volatility of stock prices. This study examines the interrelationship between uncertainty, microeconomic variable and the capital market in Nigeria.

Data and methodology

Studies have shown to date that proxy has been used to capture uncertainty. The most used measures are the implied or realized volatility of stock market returns, the cross-sectional dispersion of firm profits, stock returns, or productivity, and the cross-sectional dispersion of survey-based forecasts. However, [Jurado et al. \(2015\)](#) believe that the proxy for uncertainty should be questionable, and those measures could be misspecification with the theoretical perspective of uncertainty. In reality, stock market volatility, cross-sectional dispersion in stock returns, and firms' profits are dynamic over time due to numerous factors such as risk aversion, the leverage effect, and heterogeneity between

firms- even if there is no significant change in uncertainty. In other words, predictable fluctuations can be erroneously attributed to uncertainty, putting forward the importance of distinguishing between uncertainty in a series and its conditional volatility ([Joëts et al., 2017](#)).

In this view, this study adopted the data from the Federal Reserve Bank computed using the frequency of the same word in the quarterly Economist Intelligence Unit Country reports. Data for uncertainty was collected from [fred.stlouisfed.org](#), which was all quarterly data, while macroeconomic variables were gross domestic product and money supply. Studies by ([Ibrahim & Shah, 2012](#); [Adarov, 2021](#)) used gross domestic product while ([Bhuiyan et al., 2019](#); [Adjasi, 2009](#)) used money supply and interest rate to capture macroeconomic variables. Due to the nature and structure of the Nigerian economy, empirical studies have shown that crude oil prices have been a significant cause of economic uncertainty in the country ([Obboh et al., 2019](#); [Ozili, 2021](#)). Other variables include crude oil price, and all share indexes adopted from the Nigeria stock exchange commission. All share index was adopted in the study as a proxy to measure capital market performance due to data availability for the period considered in the study. The study period is from 1981 to 2021 due to long time dependent of the Nigeria economy on oil revenue. This will help to strength the result findings in the study.

The following are the steps that our study takes. Using the Augmented Dickey-Fuller (ADF) approach, we first check the stationarity of each series. Then, to identify the lag length used in the cointegration tests, the study moves forward with Bayesian Vector Regression (VAR) model. Based on the qualities of the data and current literature, we chose an empirical method ([Mukherjee & Naka, 1995](#); [Nasseh & Strauss, 2000](#); [Greene, 2012](#)). The study further adopted variance decomposition, which shows the proportion of the forecast error variance of the variable that can be attributed to its innovations and that of other variables. It highlights which of the shocks in the variables intrigues a more significant response on the endogenous variables. It is used to reasonably forecast variables in the model over a specified period. The studies finally use impulse response analysis to show the response of variables to one-standard-deviation shock and other variables in the model over a particular period. The impulse response function checks how long any endogenous variables respond to a one-time component shock in the other variables.

Unit root test

Macroeconomic variables typically have trending behavior, meaning that the series' mean is nonstationary. A series is not stationary if there is a unit root in the series. Therefore, unless cointegration tests are done where all the series need to be integrated in the same order, utilizing nonstationary time series in a regression framework may result in erroneous regression and fruitless economic and statistical inference. All-time series variables must be integrated into order 1 for the study's purposes. In this work, a unit root has been tested using the Augmented Dickey-Fuller (ADF) test. The ADF test's null hypothesis incorporates a unit root with a constant and a time trend due to the nature of the variables in this study. The ADF test is predicted to be implemented using the following regression, which represents a random walk with drift and temporal trend:

$$\Delta Y_t = \alpha + \delta t + \theta Y_t - 1 + \sum \lambda i P_i = 1 \Delta Y_t - i + \epsilon_t \quad (1)$$

Where Δ is the difference operator, Y is the variable, P is the number of lags, ϵ is the error term, δt is the time trend, and P is the number of lags. The Akaike Information Criteria determines how many lags there will be (AIC). The ADF critical values and the t -statistic of θ are compared to see if the series includes a unit root.

Vector Auto Regression (VAR) model

Multiple time series linear interdependencies are attempted to be

Table 1
Summary Statistics.

	Descriptive statistics			
	Mean	Std. dev.	Skewness	Kurtosis
UI	0.255699	0.186358	0.729769	2.778183
GDP	34244.08	49671.79	1.191863	2.980070
MS	7130.975	9580.806	1.040856	2.507549
COP	42.66317	29.21269	0.978937	2.781955
ASI	15590.84	15286.81	0.562373	2.115978

Table 2
Unit Root Test.

	At Level		First Difference	
	ADF	PP	ADF	PP
UI	-2.936942**	-2.644302**	—	—
GDP	—	—	-6.252447***	-5.610453***
MS	—	—	-3.425353***	-2.938987**
COP	—	—	-3.415588***	-3.610453***
ASI	—	—	-3.110453***	-3.510453***

Note: ***, and ** represent 1% and 5% level of significance.

captured using vector autoregression (VAR) models. These models, which support several dynamic variables, are expansions of univariate Auto-Regressive (AR) models. While dependent and independent variables interact simultaneously in a traditional regression framework, in VAR models, each variable evolves based on the lagged values of both itself and other variables in the model. The VAR model of the study is as follows:

$$\Delta UI_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta UI_{t-i} + \sum_{i=1}^p \beta_{2i} \Delta LASI_{t-i} + \sum_{i=1}^p \beta_{3i} \Delta LCOP_{t-i} + \sum_{i=1}^p \beta_{4i} \Delta LGDP_{t-i} + \sum_{i=1}^p \beta_{5i} \Delta LMS_{t-i} + \varepsilon_t \quad (2)$$

$$\Delta LASI_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta UI_{t-i} + \sum_{i=1}^p \beta_{2i} \Delta LASI_{t-i} + \sum_{i=1}^p \beta_{3i} \Delta LCOP_{t-i} + \sum_{i=1}^p \beta_{4i} \Delta LGDP_{t-i} + \sum_{i=1}^p \beta_{5i} \Delta LMS_{t-i} + \varepsilon_t \quad (3)$$

Table 3
Vector Auto Regressive (VAR) Models.

	UI	LASI	LCOP	LGDP	LMS
UI(-1)	0.064913 (0.08755)	0.088791 (0.15266)	-0.012715 (0.16150)	0.280809 (0.22369)	0.011066 (0.06723)
UI(-2)	0.010647 (0.04821)	0.030457 (0.08393)	0.002058 (0.08879)	0.049085 (0.12298)	0.000220 (0.03696)
LASI(-1)	-0.032427 (0.03004)	0.797269 (0.05308)	0.133905 (0.05585)	0.107978 (0.07734)	0.101232 (0.02325)
LASI(-2)	-0.000473 (0.02551)	0.138973 (0.04523)	0.030713 (0.04742)	0.012426 (0.06567)	0.021431 (0.01974)
LCOP(-1)	0.000440 (0.03696)	0.081135 (0.06496)	0.439889 (0.06912)	0.266759 (0.07521)	0.002110 (0.02861)
LCOP(-2)	0.006781 (0.02434)	0.005942 (0.04278)	0.098611 (0.04566)	0.093787 (0.04269)	-0.006752 (0.01884)
LGDP(-1)	0.026373 (0.02812)	0.041145 (0.04940)	0.085916 (0.05229)	0.378998 (0.07282)	0.024378 (0.02176)
LGDP(-2)	0.005135 (0.01770)	0.003384 (0.03110)	0.009505 (0.03290)	0.076127 (0.04597)	-0.003325 (0.01370)
LMS(-1)	0.040656 (0.06387)	0.082720 (0.11225)	-0.078413 (0.11873)	0.342940 (0.16448)	0.710544 (0.04982)
LMS(-2)	-0.006493 (0.05506)	-0.092356 (0.09674)	-0.004161 (0.10235)	0.000655 (0.14175)	0.147663 (0.04300)
R-squared	0.448585	0.975214	0.795438	0.971968	0.998028
Adj. R-squared	0.277457	0.967521	0.731953	0.963268	0.997416

$$\Delta LCOP_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta UI_{t-i} + \sum_{i=1}^p \beta_{2i} \Delta LASI_{t-i} + \sum_{i=1}^p \beta_{3i} \Delta LCOP_{t-i} + \sum_{i=1}^p \beta_{4i} \Delta LGDP_{t-i} + \sum_{i=1}^p \beta_{5i} \Delta LMS_{t-i} + \varepsilon_t \quad (4)$$

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta UI_{t-i} + \sum_{i=1}^p \beta_{2i} \Delta LASI_{t-i} + \sum_{i=1}^p \beta_{3i} \Delta LCOP_{t-i} + \sum_{i=1}^p \beta_{4i} \Delta LGDP_{t-i} + \sum_{i=1}^p \beta_{5i} \Delta LMS_{t-i} + \varepsilon_t \quad (5)$$

$$\Delta LMS_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta UI_{t-i} + \sum_{i=1}^p \beta_{2i} \Delta LASI_{t-i} + \sum_{i=1}^p \beta_{3i} \Delta LCOP_{t-i} + \sum_{i=1}^p \beta_{4i} \Delta LGDP_{t-i} + \sum_{i=1}^p \beta_{5i} \Delta LMS_{t-i} + \varepsilon_t \quad (6)$$

Where UI is uncertainty index, GDP is gross domestic product; MS is money supply, COP is crude oil price, and ASI is the all-share index. All the variables are in natural logarithmic form except UI. 'P' denotes the number of lagged differences and ε_t is the error term.

Data results and interpretations

Preliminary results

Table 1 above presents the descriptive statistics of the study. The uncertainty index has a mean of 0.255. The standard deviation of the uncertainty index is 0.186, indicating that it has been constant over the years. GDP has a mean of ₦34244.08 billion, the money supply has ₦7130.975 billion, and crude oil price is \$42.66 and all share index has ₦15590.84 billion as the mean also. The standard deviation for GDP, MS, and ASI is exceptionally high, indicating that the figure had not been stable over the year in the study, while COP is relatively low, which shows that the variation in prices of crude oil cannot be compared to those of GDP, MS, and ASI.

In order to avoid a spurious result, it is essential to test for stationarity in the variables. This process is conventional to time series. To this end, the result is presented in Table 2. It is discovered that UI is stationary at levels while MS, COP, GDP, and ASI are stationary at the first difference using the ADF and PP tests. UI is stable at levels, the null hypothesis of unit root is accepted, while MS, COP, GDP, and ASI are not

mean reverting at levels, and its standard deviation is constant at levels.

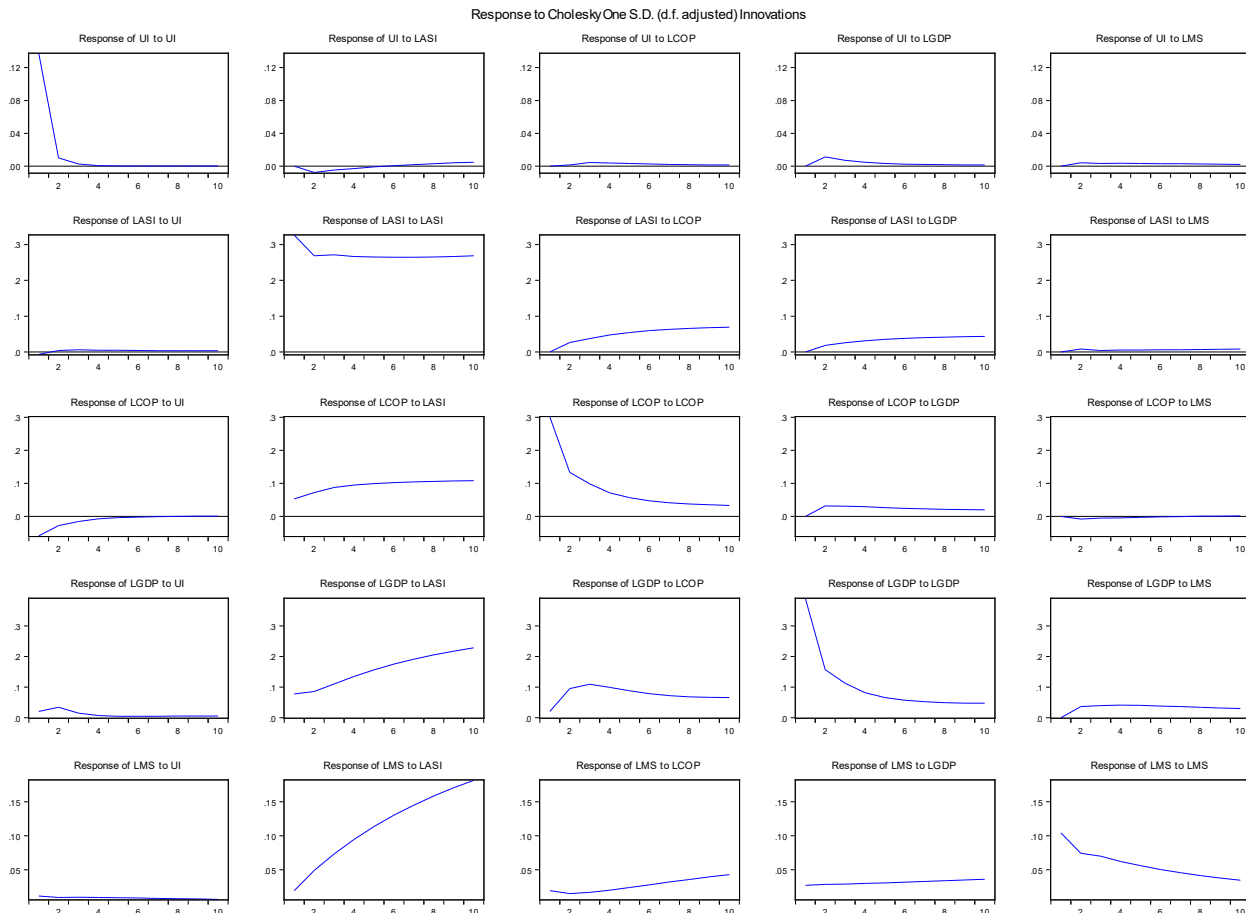
Table 3 above shows that crude oil price and gross domestic product positively impact the uncertainty index while all share indexes hurt the uncertainty index. Money supply has an insignificant impact on the uncertainty index. This means that price of crude oil drives uncertainty in the Nigerian economy. Findings indicated that an increase in GDP of the Nigerian economy contributes to the rise in the uncertainty in the economy, while a rise in all share indexes indicating capital market performance reduces the uncertainty in the Nigerian economy. This is justifiable because macroeconomic factors play an important role in determining the prices of financial assets in the capital market. Crude oil price and GDP has a positive and significant impact on all share index, while uncertainty index and money supply has an insignificant impact on all share index. This supports the Nigerian economy's mono-structure and shows that the country's primary source of income is still crude oil. As the prices of crude oil influence the business cycle of either economic boom or recession, it directly affects the performance of the Nigeria capital market.

Also, the uncertainty index, money supply, and all-share index were found to have a positive and insignificant impact on GDP, but the price of crude oil was found to have a positive and significant impact on the GDP. This clearly shows the interrelationship between economic performances and proceeds from crude oil. Finally, the uncertainty index, all-share index, crude oil price, and GDP all have a positive and significant impact on the money supply in the Nigerian economy. This is expected as the total money supply in an economy is linked to economic activities (GDP), and the main driver of the GDP is the crude oil price (COP). In addition, the capital market is expected to positively impact the money supply because long-term capital is raised in the market by investors for investment purposes, which further drives the economy. Furthermore, the uncertainty index also influences the money supply, which helps explain the macroeconomic variables' impact.

The study's findings differ from the results of Ibrahim and Shah (2012) as they indicated that uncertainty harms the output of Malaysia's economy, while in Nigeria, uncertainty was found to have a positive impact on output but remains insignificant. Furthermore, uncertainty was found not to have a significant impact on GDP, all share index, and crude oil price while only impacting the total money supply to the Nigerian economy. The results further indicated that crude oil price has continued to determine the macroeconomic performance of the Nigerian economy as money supply, GDP, and all-share index were found to have a positive and significant impact on macroeconomic conditions rather than uncertainty.

Also, the empirical results of Adjasi (2009) indicated that uncertainty in oil prices and money supply reduces the stock prices while a cross study of Sánchez-Gabarré (2020) of Spain and Brazil revealed that in Spain uncertainty in economic policy and stock market volatility affect share prices negatively both in the short and long run while in Brazil, global uncertainty in capital market drive stock prices both in the short and long run. In Nigeria, crude oil price and GDP has a positive and significant impact on all share index, while uncertainty index and money supply has an insignificant impact on all share indexes. This shows the uniqueness of the Nigeria capital market as majorly driven by crude oil price and the performance of the economy majorly.

The findings of Oboh et al. (2019) indicated that global economic policy uncertainty on Nigeria's export earnings is affirmative to vulnerabilities of Nigeria's external shocks. This justifies the result of the study, which indicated that the uncertainty index does not impact the macroeconomic performance of the Nigerian economy but price of crude oil is major determinant (see Ikue and Amabuike, 2021; Abubakar & Ahmad, 2016). The Nigerian economy has a generally stable uncertainty index, but it is nonetheless vulnerable to global uncertainty, affecting its receipts from crude oil sales and directly reflecting the country's macroeconomic health.



The graph represents the impulse response function for the study. It can be deduced that uncertainty shock response is relatively stable in the long-run while with some sense of fluctuation in the short run.

Conclusion

This study was carried out to determine the interrelationship between the Nigerian economy's uncertainty, macroeconomic, and capital market performances. This study result indicates that uncertainty has no impact on macroeconomic performances, but global economic policy uncertainty determines the level of shock that the economy is exposed to. The crude oil price was found to have determined the macroeconomic performance of the country, while uncertainty only impacted the money supply.

The study thereby recommended that the domestic economy should be diversified to reduce the quantum of exposure to risk that comes from proceeding with oil sales and develop a short-run framework that would shield the domestic economy against global uncertainty that exposes the

domestic economy. The study also recommends future studies on the quantum of domestic uncertainties embedded in the global foreign policy uncertainty that the domestic economy is exposed to. This will contribute to the existing empirical works.

CRedit authorship contribution statement

Emmanuel Ayeni: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Data curation, Visualization, Project administration, Writing – original draft, Writing – review & editing. **Oluwaseyi Fanibuyan:** Writing – original draft, Writing – review & editing, Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix

Variance Decomposition of UI:						
Period	S.E.	UI	LASI	LCOP	LGDP	LMS
1	0.137012	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.138143	98.90328	0.311358	0.011322	0.679557	0.094483
3	0.138547	98.37023	0.413841	0.112858	0.953248	0.149827
4	0.138762	98.06811	0.452099	0.194818	1.067467	0.217501
5	0.138887	97.89220	0.455428	0.251987	1.123046	0.277341
6	0.138974	97.77026	0.457258	0.288036	1.154789	0.329659
7	0.139053	97.66068	0.477988	0.311875	1.175732	0.373725
8	0.139139	97.54001	0.529270	0.329220	1.191197	0.410300
9	0.139242	97.39544	0.617110	0.343458	1.203650	0.440339
10	0.139368	97.22025	0.744028	0.356526	1.214352	0.464840

Variance Decomposition of LASI:						
Period	S.E.	UI	LASI	LCOP	LGDP	LMS
1	0.326243	0.037132	99.96287	0.000000	0.000000	0.000000
2	0.424314	0.031444	99.33908	0.402175	0.185845	0.041457
3	0.505830	0.036418	98.70129	0.834210	0.390760	0.037324
4	0.574933	0.036401	97.98362	1.335671	0.606559	0.037748
5	0.636651	0.034976	97.29126	1.828074	0.807520	0.038173
6	0.693186	0.033121	96.65469	2.285578	0.987081	0.039533
7	0.745911	0.031290	96.08624	2.696261	1.144642	0.041570
8	0.795712	0.029636	95.58610	3.058214	1.281859	0.044187
9	0.843209	0.028198	95.14906	3.374310	1.401180	0.047257
10	0.888852	0.026969	94.76787	3.649380	1.505114	0.050671

Variance Decomposition of LCOP:						
Period	S.E.	UI	LASI	LCOP	LGDP	LMS
1	0.311649	3.640599	2.903086	93.45631	0.000000	0.000000
2	0.348984	3.541573	6.595008	89.00121	0.807140	0.055071
3	0.374695	3.239249	11.15363	84.15526	1.381142	0.070721
4	0.394159	2.966591	15.83093	79.32039	1.804800	0.077285
5	0.411252	2.735265	20.36196	74.75123	2.075174	0.076369
6	0.427063	2.538963	24.60431	70.53918	2.245057	0.072495
7	0.442092	2.369744	28.51561	66.69599	2.350769	0.067891
8	0.456579	2.221768	32.09589	63.20180	2.416876	0.063667
9	0.470664	2.090810	35.36549	60.02481	2.458614	0.060274
10	0.484436	1.973767	38.35229	57.13075	2.485351	0.057834

Variance Decomposition of LGDP:						
Period	S.E.	UI	LASI	LCOP	LGDP	LMS
1	0.398557	0.266923	3.816158	0.265181	95.65174	0.000000
2	0.449736	0.771448	6.617770	4.657494	87.31902	0.634272
3	0.490806	0.735216	10.60966	8.904364	78.58570	1.165063

(continued on next page)

(continued)

Variance Decomposition of UI: Period	S.E.	UI	LASI	LCOP	LGDP	LMS
4	0.526489	0.655616	15.75785	11.27902	70.68866	1.618852
5	0.561632	0.582466	21.61769	12.37211	63.49894	1.928799
6	0.597604	0.519485	27.71537	12.65739	56.99748	2.110270
7	0.634901	0.465432	33.67182	12.50362	51.16965	2.189467
8	0.673520	0.419017	39.24871	12.13380	46.00315	2.195328
9	0.713280	0.379026	44.32811	11.67679	41.46364	2.152434
10	0.753956	0.344411	48.87511	11.20288	37.49809	2.079503

Variance Decomposition of LMS:

Period	S.E.	UI	LASI	LCOP	LGDP	LMS
1	0.112019	1.069406	3.026471	3.056407	5.916866	86.93085
2	0.146949	1.038247	12.82171	2.825118	7.296213	76.01871
3	0.181931	0.977870	24.63448	2.697533	7.320178	64.36994
4	0.217575	0.879206	36.15205	2.753971	7.033285	53.18149
5	0.254915	0.770153	46.14170	2.900319	6.600068	43.58776
6	0.293878	0.666263	54.31907	3.101501	6.149521	35.76364
7	0.334186	0.574616	60.83192	3.325393	5.731114	29.53696
8	0.375512	0.496693	65.96693	3.553342	5.361972	24.62106
9	0.417558	0.431554	70.01405	3.774278	5.043658	20.73646
10	0.460075	0.377427	73.21956	3.982420	4.771689	17.64890

Cholesky Ordering: UI LASI LCOP LGDP LMS

References

- Abubakar, M. Y., & Ahmad, S. S. (2016). Analysis of the impact of oil revenue on the Nigeria economy. *Journal of Economic and Finance*, 07(04), 2321–5933.
- Adarov, A. (2021). Dynamic interactions between financial cycles, business cycles and macroeconomic imbalances: A panel VAR analysis. *International Review of Economics & Finance*, 74, 434–451.
- Adjasi, C. K. (2009). Macroeconomic uncertainty and conditional stock-price volatility in frontier African markets: Evidence from Ghana. *The Journal of Risk Finance*.
- Aikman, D., Haldane, A. G., & Nelson, B. D. (2015). Curbing the credit cycle. *The Economic Journal*, 125(585), 1072–1109.
- Anzuini, A., Rossi, L., & Tommasino, P. (2020). Fiscal policy uncertainty and the business cycle: Time series evidence from Italy. *Journal of Macroeconomics*, 65, Article 103238.
- Bachmann, R., Elstner, S., & Sims, E. R. (2013). Uncertainty and economic activity: Evidence from business survey data. *American Economic Journal: Macroeconomics*, 5 (2), 217–249.
- Batabyal, S., & Killins, R. (2021). Economic policy uncertainty and stock market returns: Evidence from Canada. *The Journal of Economic Asymmetries*, 24, e00215.
- Baum, C. L. (2006). The effects of government-mandated family leave on employer family leave policies. *Contemporary Economic Policy*, 24(3), 432–445.
- Bernanke, B. S. (1983). Irreversibility, uncertainty, and cyclical investment. *The Quarterly Journal of Economics*, 98(1), 85–106.
- Bhuiyan, E. M., & Chowdhury, M. (2020). Macroeconomic variables and stock market indices: Asymmetric dynamics in the US and Canada. *The Quarterly Review of Economics and Finance*, 77, 62–74.
- Bhuiyan, R. A., Rahman, M. P., Saiti, B., & Ghani, G. M. (2019). Co-movement dynamics between global sukuk and bond markets: New insights from a wavelet analysis. *International Journal of Emerging Markets*.
- Bloom, N. (2009). The impact of uncertainty shocks. *Econometrica*, 77(3), 623–685.
- Borio, C. E. (2013). The great financial crisis: Setting priorities for new statistics. *Journal of Banking Regulation*, 14(3), 306–317.
- Born, B., & Pfeifer, J. (2014). Risk matters: The real effects of volatility shocks: Comment. *American Economic Review*, 104(12), 4231–4239.
- Chen, N. F., Roll, R., & Ross, S. A. (1986). Economic forces and the stock market. *Journal of Business*, 383–403.
- Cho, Y., & Honorati, M. (2014). Entrepreneurship programs in developing countries: A meta regression analysis. *Labour Economics*, 28, 110–130.
- Christiano, L. J., Motto, R., & Rostagno, M. (2014). Risk shocks. *American Economic Review*, 104(1), 27–65.
- Chugh, S. K. (2016). Firm risk and leverage-based business cycles. *Review of Economic Dynamics*, 20, 111–131.
- Claessens, S., Kose, M. A., & Terrones, M. E. (2012). How do business and financial cycles interact? *Journal of International Economics*, 87(1), 178–190.
- Drehmann, M., & Juselius, M. (2012). Do debt service costs affect macroeconomic and financial stability? *BIS Quarterly Review September*.
- Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, 25(2), 383–417.
- Fama, E. F. (1981). Stock returns, real activity, inflation, and money. *The American Economic Review*, 71(4), 545–565.
- Fama, E. F. (1990). Stock returns, expected returns, and real activity. *The Journal of Finance*, 45(4), 1089–1108.
- Fama, E. F., & French, K. R. (1989). Business conditions and expected returns on stocks and bonds. *Journal of Financial Economics*, 25(1), 23–49.
- Fernández-Villaverde, J., & Guerrón-Quintana, P. A. (2020). Uncertainty shocks and business cycle research. *Review of Economic Dynamics*, 37, S118–S146.
- Fernandez-Villaverde, J., & Krueger, D. (2011). Consumption and saving over the life cycle: How important are consumer durables? *Macroeconomic Dynamics*, 15(5), 725–770.
- Ferson, W. E., & Harvey, C. R. (1991). Sources of predictability in portfolio returns. *Financial Analysts Journal*, 47(3), 49–56.
- Giovannoni, F., & de Dios Tena, J. (2008). Market concentration, macroeconomic uncertainty and monetary policy. *European Economic Review*, 52(6), 1097–1123.
- Gourio, F. (2012). Disaster risk and business cycles. *American Economic Review*, 102(6), 2734–2766.
- Greene, W. (2012). H. (2012): Econometric analysis. *Journal of Boston: Pearson Education*, 803–806.
- Gupta, R., Ma, J., Risse, M., & Wohar, M. E. (2018). Common business cycles and volatilities in US states and MSAs: The role of economic uncertainty. *Journal of Macroeconomics*, 57, 317–337.
- Ha, J. (2020). Nonlinear transmission of US monetary policy shocks to international financial markets. *International Finance*, 23(3), 350–369.
- Hamao, Y. (1988). An empirical examination of the arbitrage pricing theory: Using Japanese data. *Japan and the World economy*, 1(1), 45–61.
- Hasen, D. (2021). Forget (Arguing about) redistribution. *Geo. J. on Poverty L. & Pol'y*, 29, 41.
- Ibrahim, M. H., & Shah, M. E. (2012). Bank lending, macroeconomic conditions and financial uncertainty: Evidence from Malaysia. *Review of Development Finance*, 2 (3–4), 156–164.
- Ikue, N. J., & Amabuike, I. L. (2021). Economic growth and crude oil revenue in Nigeria: A control for industrial shocks. *Research in Business and Social Science*, 10(8), 2147–4478.
- Joëts, M., Mignon, V., & Razafindrabe, T. (2017). Does the volatility of commodity prices reflect macroeconomic uncertainty? *Energy Economics*, 68, 313–326.
- Jurado, K., Ludvigson, S. C., & Ng, S. (2015). Measuring uncertainty. *American Economic Review*, 105(3), 1177–1216.
- Liljeblom, E., & Stenius, M. (1997). Macroeconomic volatility and stock market volatility: Empirical evidence on Finnish data. *Applied Financial Economics*, 7(4), 419–426.
- Luo, Y., & Zhang, C. (2020). Economic policy uncertainty and stock price crash risk. *Research in International Business and Finance*, 51, Article 101112.
- Martinez, M. A., & Rubio, G. (1989). Arbitrage pricing with macroeconomic variables: An empirical investigation using Spanish data. Working Chapter, Universidad del Pais Vasco.
- Mukherjee, T. K., & Naka, A. (1995). Dynamic relations between macroeconomic variables and the Japanese stock market: An application of a vector error correction model. *Journal of financial Research*, 18(2), 223–237.
- Nasseh, A., & Strauss, J. (2000). Stock prices and domestic and international macroeconomic activity: A cointegration approach. *The Quarterly Review of Economics and Finance*, 40(2), 2.

- Obboh, V. U., Tule, M. K., & Ebuh, G. U. (2019). Does monetary policy matter for agricultural sector performance? *Empirical evidence from Nigeria. Changes, 10*(12).
- Ozili, P. K. (2021). Financial reporting under economic policy uncertainty. *Journal of Financial Reporting and Accounting, 19*(2), 325–338.
- Popp, A., & Zhang, F. (2016). The macroeconomic effects of uncertainty shocks: The role of the financial channel. *Journal of Economic Dynamics and Control, 69*, 319–349.
- Punzi, M. T. (2019). The impact of energy price uncertainty on macroeconomic variables. *Energy Policy, 129*, 1306–1319.
- Ross, S. (1976). The arbitrage pricing theory. *Journal of Economic Theory, 13*(3), 341–360.
- Saijo, H. (2017). The uncertainty multiplier and business cycles. *Journal of Economic Dynamics and Control, 78*, 1–25.
- Sánchez-Gabarré, E. M. (2020). Stock prices, uncertainty and risks: Evidence from developing and advanced economies. *European Journal of Government and Economics, 9*(3), 265–279.
- Schwert, G. W. (1990). Stock returns and real activity: A century of evidence. *The Journal of Finance, 45*(4), 1237–1257.
- Segal, G. (2019). A tale of two volatilities: Sectoral uncertainty, growth, and asset prices. *Journal of Financial Economics, 134*(1), 110–140.
- Shi, X., & Shen, Y. (2021). Macroeconomic uncertainty and natural gas prices: Revisiting the Asian premium. *Energy Economics, 94*, Article 105081.
- Taylor, S. P. S., & Poon, S. (1991). Macroeconomic factors and the UK stock market. *Journal of Business Finance and Accounting, 18*(5), 619–636.