ANSER PRESS

Climate Economics and Finance

Homepage: https://www.anserpress.org/journal/cef

Navigating Economic and Climate Uncertainties on Output: A Case Study of Nigeria

Dalhatu Bello [a, *]

[a] *Monetary Policy Department, Central Bank of Nigeria, Garki Abuja, Nigeria*

ABSTRACT

This is the first study to examine how Nigerian output is affected by the news-based Economic Policy Uncertainty Index by Tumala et al. (2023) and Climate Uncertainty Index by Salisu et al. (2023). Using ARDL and Granger causality on quarterly data from 2016Q2 to 2024Q1, the findings show that increased economic and climate uncertainties result in decreased output. Additionally, the study reveals that climate uncertainty has a more significant effect on output compared to economic policy uncertainty. The Granger causality indicates one-way causality from climate uncertainty to output, thereby reinforcing the substantial influence of climate uncertainty on output in Nigeria.

KEYWORDS

Economic Policy Uncertainty; Climate Uncertainty; Output; ARDL; Nigeria

* Corresponding author: Dalhatu Bello
E-mail address:dbello2@cbn.gov.ng; bellodalhatu1@gmail.com

ISSN
doi: 10.58567/cef03010001

Received 7 October 2024; Accepted 14 March 2025; Available online 10 June 2025; Version of Record 15 March 2025

1. Introduction

The Nigerian economy is heavily dependent on oil production, which makes it vulnerable to fluctuations in global oil prices. The economy is currently experiencing stagnation, as evidenced in figure 1. COVID-19 pandemic and global oil price plunge triggered a sudden and harsh recession in 2020Q2 as GDP plummeted to negative 6.10. While the growth has recently remained positive since 2021Q3 (hovering around 2.3 to 3.5 percent), the stagnation suggests the economy hasn't regained its pre-pandemic momentum. However, the consistent growth over several quarters could also hint an initial stages of a new expansion phase.

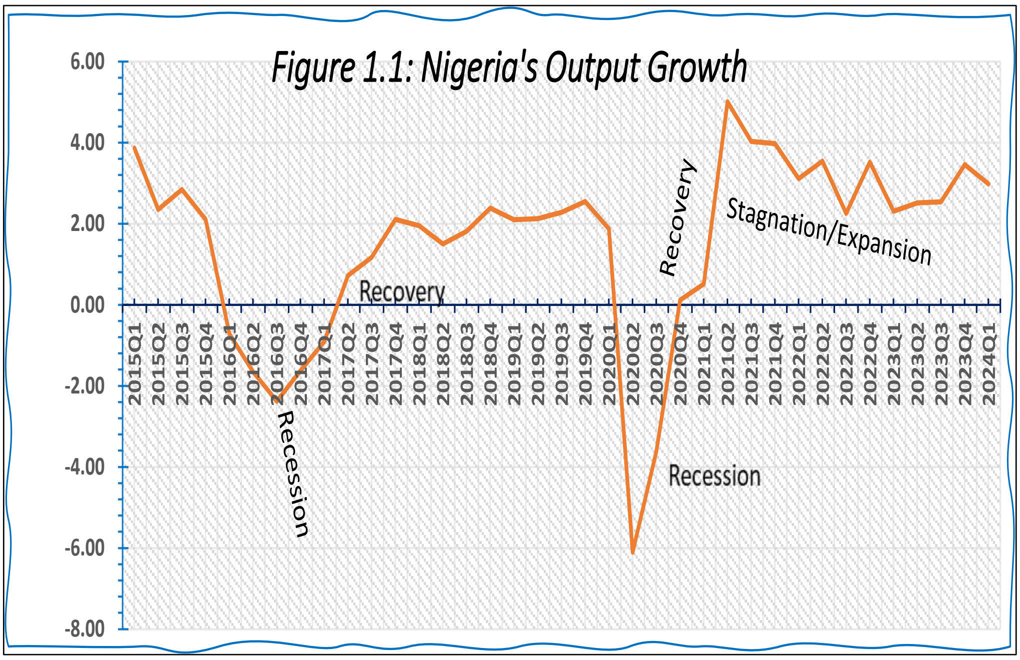

Figure 1. Nigeria's Output Growth.

Uncertainty plays a significant role in shaping the financial and economic decisions of economic agents, investors, and government policymakers, as well as influencing macroeconomic fluctuations within the economy (Baker et al., 2016). Understanding the relationship between output dynamics and uncertainty measures is essential for conducting effective policy analysis, especially during periods of heightened uncertainty, to ensure optimal economic performance. Uncertainty has emerged as key concerns for policymakers worldwide. The unpredictable nature of uncertainty measures has a substantial impact on various macroeconomic indicators, particularly output (Leduc and Liu, 2016; Jones and Olson, 2013). Nigeria has seen several uncertainty-inducing events. Examples of such events that have in addition to those due to the global shocks like 2015/2016 commodity price shocks, Covid-19 pandemic and Russia-Ukraine war, also includes internal uncertainties like the conduct of general elections, oil subsidy removal and exchange rate crises (see figure 2).

Theoretical motivation follows the work of Brunnermeier, (2009) and Gilchrist, et al., (2014) that uncertainty affects business planning, increase costs, and inflation. Bloom (2009) reported that economic policy uncertainty (EPU) adversely impacts the macroeconomy. Similarly, Baker et al (2016) and Montes and Nogueira (2021) reveal that economic policy uncertainty results to a decrease in aggregate economic output, business confidence and investment.

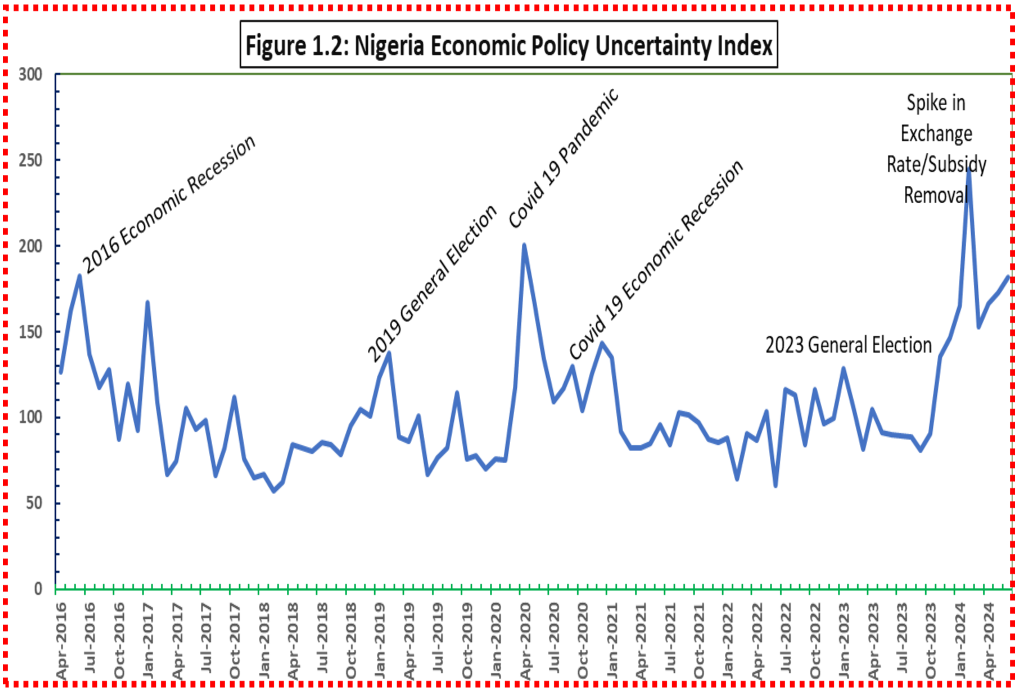

Figure 2. Nigeria Economic Policy Uncertainty Index.

A plethora of empirical studies have examine the impact of both economic policy and climate uncertainties on various macroeconomic variables including inflation (Ashiru and Oladele, 2023; Jones and Olson, 2013), unemployment (Edeme et al. 2024), stock market performance (Salisu et al. 2024; Arouri, 2016), growth (Edeme et al. 2024; Sheng et al. 2022; Ayeni, 2022; Giglio, 2016; Bhagat et al. 2013; Arndt and Thurlow, 2015; Jones and Olson, 2013; Fatima and Waheed, 2011; Ali, 2001), exchange rates (Salisu et al. 2024; Olanipekun et al. 2019); Balcilar et al. 2016), COVID 19 (Adeiza et al. 2023) and investments (Bahmani-Oskooee and Maki-Nayeri, 2019; Bhagat et al. 2013; Gilchrist, 2014; Fatima and Waheed, 2011) across various jurisdictions. A summary of their findings is tabulated in table 1.

The existing literature indicates that in Nigeria, there is no record of any study employing Tumala et al. (2023) economic policy uncertainty index and Salisu et al. (2023) climate uncertainty index on any macroeconomic variable in the Nigerian context. Therefore, this study is believed to be the first to utilize quarterly data on the newly developed news-based economic policy uncertainty index by Tumala et al. (2023) and the climate uncertainty index by Salisu et al. (2023) to evaluate their impact on Nigeria's output.

The results from the analysis indicate that rising economic and climate uncertainties are associated with a reduction in output in Nigeria. Furthermore, the analysis demonstrates that the impact of climate uncertainty on output is more significant than that of economic policy uncertainty within the Nigerian context. Additionally, the Granger causality test shows a unidirectional causality from climate uncertainty to output, underscoring the substantial impact of climate uncertainty on output in Nigeria.

Table 1. Summary of the Reviewed Empirical Studies.

Author(s)	Focus	Jurisdiction	Method	Positive Relationship	Inverse Relationship
Salisu et al. (2024)	Economic policy uncertainty-exchange rate nexus Economic policy uncertainty-stock returns nexus	Nigeria	in-sample and out-of-sample predictability analysis		

Bhagat et al. (2013)	Economic policy uncertainty-Growth-Investment nexus	India	OLS, Quantile Regresssion and VAR Model		
Arndt and Thurlow, (2015)	Climate uncertainty and economic development	Mozambique	Dynamic General Equilibrium Model		
Edeme et al. (2024).	Global Uncertainty-Climate Change-Unemployment-growth nexus	Nigeria	Multiple Regression Analysis		
Arouri (2016)	Economic policy uncertainty-stock market nexus	US	Regime switching model		
Adeiza et al. (2023)	COVID-19-induced EPU-macroeconomy nexus	Nigeria	VAR and nonlinear DSGE		
Balcilar et al. (2016)	Economic Policy Uncertainty- Exchange Rate volatility nexus	developed and developing countries	causality-in-quantile approach		
Ashiru and Oladele, (2023)	Economic Policy Uncertainty-inflation nexus	Nigeria	ARDL		
Olanipekun et al. (2019)	Economic Policy Uncertainty- Exchange Rate nexus	20 countries	CCEMG and AMG		
Sheng et al. (2022)	Climate risk-growth nexus	50 US states	IRF		
Ayeni, (2022)	Uncertainty-growth nexus	Nigeria	Bayesian VAR	No impact	No impact
Gilchrist, (2014)	Uncertainty-Investment nexus	US	General equilibrium model,		
Giglio, (2016)	systemic risk-macroeconomyy nexus	US and Europe	Quantile Regression		
Fatima and Waheed, (2011)	Uncertainty-investment-growth nexus	Pakistan	GARCH		
Bahmani-Oskooee, and Maki-Nayeri, (2019)	Uncertainty-Investment nexus	G7 Countries	ARDL	mixed	mixed
Ali, (2001)	Uncertainty-growth nexus	119 Countries	OLS		
Jones and Olson, (2013)	Uncertainty-inflation nexus Uncertainty-Output nexus	US	DCC-GARCH		

Subsequently, the paper is laid out as follows: methodology will be presented in the next section, followed by the presentation and discussion of estimation results in Section 3. Section 4 concludes the study and provide policy recommendations for decision makers.

2. Methodology

To accomplish the specified objective, the study employs quarterly data for all variables, including the purchasing managers index, economic policy uncertainty index, and the climate uncertainty index. While the purchasing managers index and economic policy uncertainty index are accessible monthly, we opt for a quarterly dataset because the climate uncertainty index for Nigeria is typically reported quarterly. The study encompasses the period from Q2, 2016 to Q1, 2024, aligning with the timeframe covered by the economic policy uncertainty and climate uncertainty index datasets. See Table 2 for the data description.

Table 2. Variables Descriptions.

Variables	Description	Label	Source
Output	Purchasing Managers Index	PMI	Central Bank of Nigeria
Economic Uncertainty	based on news articles published in five major newspapers	EPU	Tumala, et.al (2023) www.policyuncertainty.com
Climate Uncertainty	Captures key climate issues reported in the news	CUI	Salisu, et.al (2023) www.epuindexng.com

To ascertain the short- and long-term linkages, there is need to specify a model that captures the relationship between the variables. Thus, for the study, the relationship is specified into the following model:

To ascertain the short- and long-term linkages, there is need to specify a model that captures the relationship between the variables. Thus, for the study, the relationship is specified into the following model:

$$PMI = F(EPU, CUI)$$

The econometric model can be specified as:

$$PMI_t = \beta_0 + \beta_1 EPU_t + \beta_2 CUI_t + \mu_t$$

Where:

PMI = Purchasing managers' index

EPU = Economic Uncertainty

CUI = Climate Uncertainty

β_0 = constant

β_1 and β_2 = coefficients to be estimated,

μ_t = Error term

The study utilizes E-views 13.0 and Stata 14.0 software versions for conducting econometric analysis. Initially, the study employs ADF and PP unit root test to examines the stationarity properties of the series after reviewing line plots of the variables, summary statistics, and correlation matrix. Following the outcomes of the stationarity test, Pesaran et al. (2001) ARDL bounds testing approach is employed to investigate the influence of the explanatory variables (EPU and CUI) on output. This methodology is chosen to address potential issues of spurious regression that may arise when a regressor is I(1) or I(0), and to capture both long-run relationships and short-run dynamics among the variables under scrutiny, aligning with the study's objectives. Furthermore, it aims to mitigate potential endogeneity concerns that could result from omitting relevant variables in the model. Given that the model includes only two explanatory variables, there is a risk of correlation with the error term, leading to biased and inconsistent estimates. The estimated model is then put through a battery of diagnostic tests to make sure the model is reliable. These tests include the Ramsey Reset test for linearity, the Jarque-Bera test for normality, the Breusch-Godfrey Serial Correlation LM Test, the Heteroscedasticity Breusch-Pagan-Godfrey Test, and the CUSUM and CUSUM SQ test for stability. The best lag length is found at every level of study using the Schwarz Information criterion.

Furthermore, the study utilizes the pairwise Granger causality test to ascertain whether economic and climate uncertainties can predict Nigeria's output during the study period and if it does to identify the direction of causality.

3. Results

3.1. Line plots, Data summary and Correlation matrix

The line plots of the variables shows that none of them perhaps except for EPU is mean reverting. a clue that the data we are working with is non-stationary (see Figure 3). The Phillips-Perron and Augmented Dickey-Fuller unit root tests will be used to verify this. The trend of the study variables can be seen in Figure 4.

Table 3. Variables Descriptions.

Variable	Mean	Std. Dev.	Min	Max
PMI	49.927	7.104	35.7	62.3
EPU	98.369	29.723	60.31	182.699
CUI	69.26	18.46	39.363	100

Source: Researcher's computation using Stata.

From the descriptive statistics (Table 3), economic policy uncertainty index and the climate uncertainty index both have a moderate negative association with purchasing managers index, according to the correlation matrix. This suggests that both economic policy uncertainty index and the climate uncertainty index tend to move in inverse direction with output. In simpler terms, as economic policy uncertainty index and the climate uncertainty index Gini increases, output tends to decrease slightly, and vice versa (Table 4).

Table 4. Matrix of correlations.

Variables	PMI	EPU	CUI
PMI	1.000		
EPU	-0.517	1.000	
CUI	-0.485	0.069	1.000

Source: Researcher's computation using Stata.

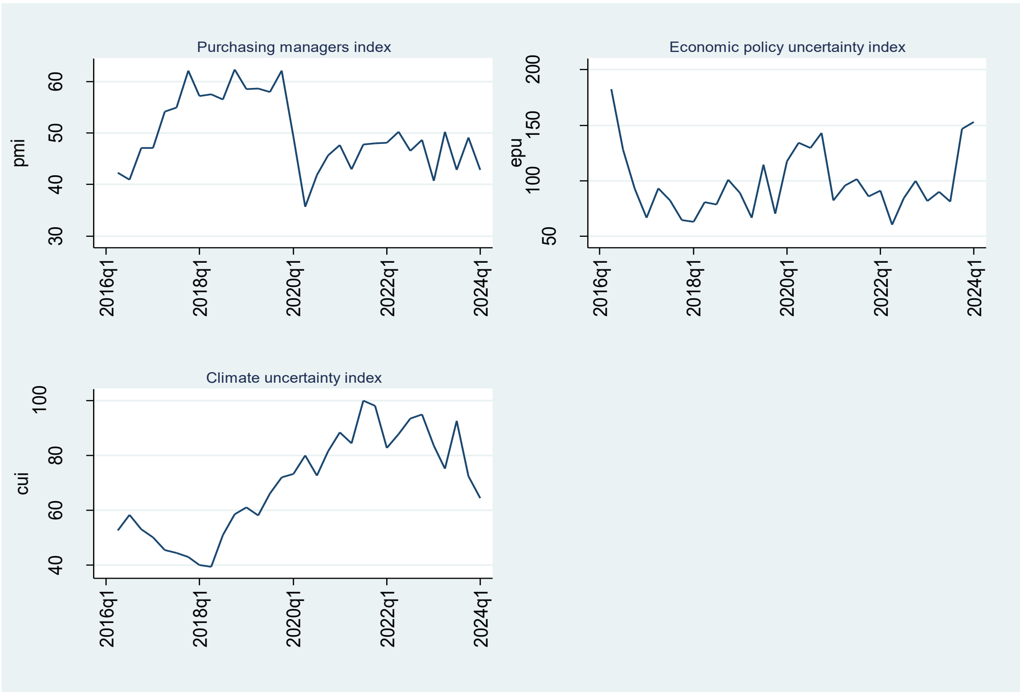

Figure 3. Line plots of the study variables.

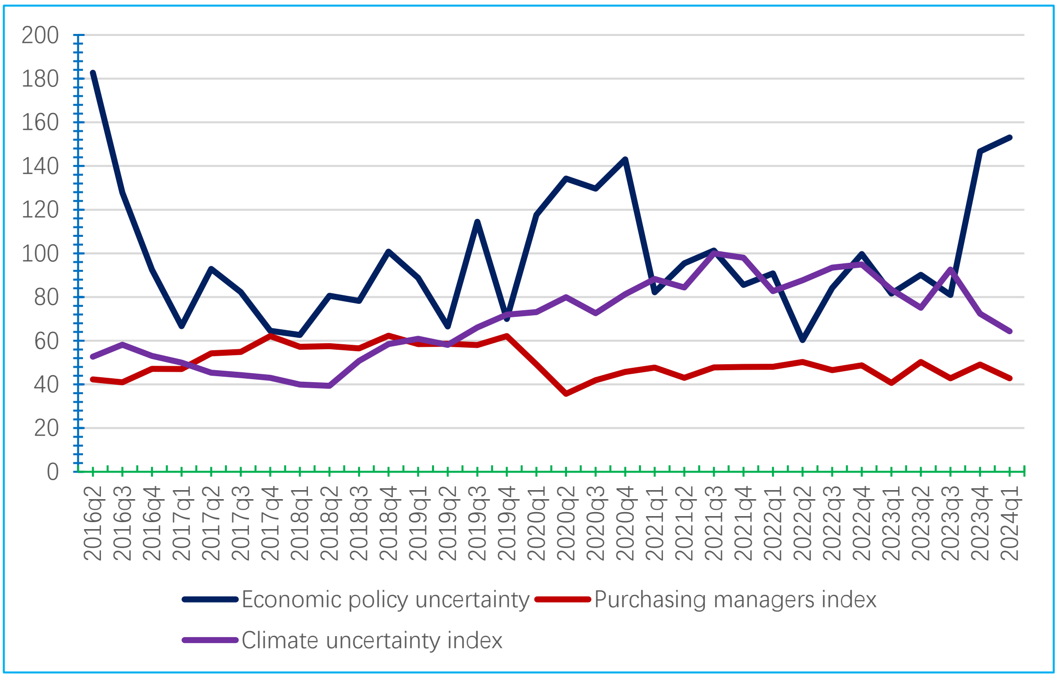

Figure 4. Trends of the Study Variables (2016Q2-2024Q1).

3.2. Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) Unit Root Test

For both PP and ADF test, output and climate uncertainty index were not stationary at levels, this indicates that while economic policy uncertainty index is I(0) series, output and climate uncertainty index are I(I) series. The mixed orders of integration I(I) and I(0) were taken into consideration when selecting the ARDL bounds method. A summary of the unit root test results for each variable is shown in table 5.

Table 5. Summary of ADF and PP Unit Root Test Results.

Levels Test Results				
Variable	PP test statistic	Probability value	ADF test satatistic	Probability value
PMI	-2.277	0.185	-2.417	0.145
EPU	-3.996	0.004	-3.996	0.004
CUI	-1.366	0.585	-1.411	0.564
1st Difference Test Results				
Variable	PP test statistic	Probability value	ADF test satatistic	Probability value
PMI	-7.144	0.000	-7.144	0.000
CUI	-6.038	0.000	-4.783	0.000

3.3. Autoregressive Distributed Lag Bounds Test

Results from the Pesaran et al. (2001) proposed ARDL limits test indicate that the calculated F-statistic values of 5.52 exceed the upper bound critical value of 3.79 and 4.85 at ninety nine percent (99%) confidence levels. This is further confirmed by the computed t-statistic of -3.89 exceeding the upper and lower bounds of -2.86 and -3.53 respectively (see Table 6). This suggests that output, economic policy uncertainty index and climate uncertainty index exhibit cointegration, at least at the five percent (5%) significance level. The cointegrating series is shown in Figure 5.

Table 6. The ARDL Bound Test Results.

		Critical Values		
Test	Value	Sig(%)	I(0)	I(1)
F-statistic	5.5242	5	3.790	4.850
t-statistic	-3.8915	5	-2.86	-3.53

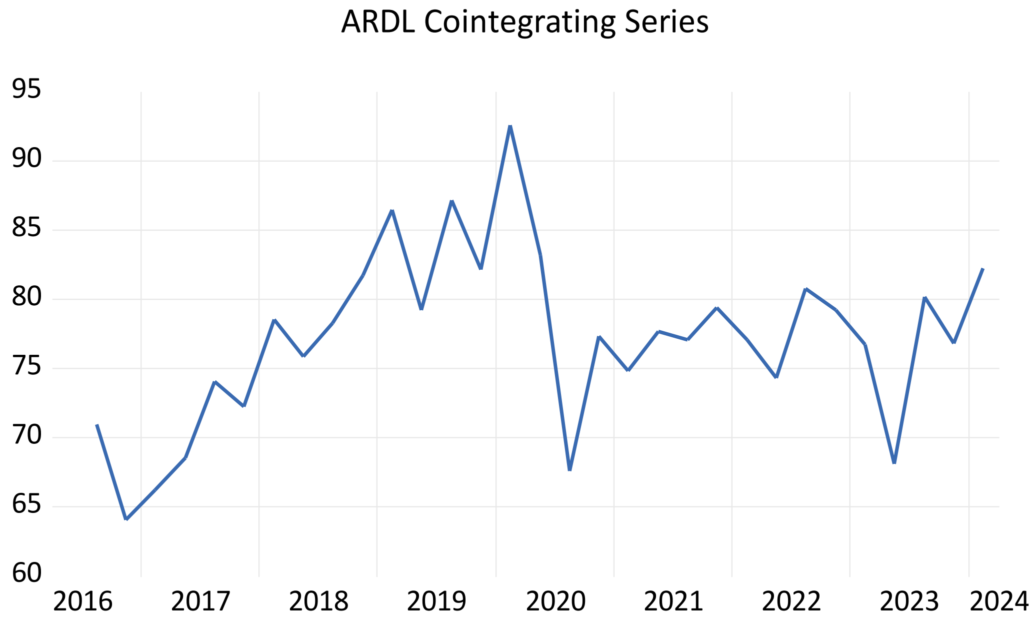

Figure 5. ARDL Cointegrating Series.

3.4. Diagnostic Tests

To ensure the model passed the statistical sufficiency test, the estimated model underwent model diagnostic and stability tests. The error correction term showing how quickly output adjusts to its long-run equilibrium is also provided (see Table 7). Notably, the negative sign of the ECT coefficient in the model, in accordance with theory, indicates evidence of convergence should the long-run equilibrium be disrupted. The ECT's value of -0.562 (prob value = 0.0002) indicates that the system is expected to correct about 56.2% of errors per quarter, facilitating adjustment to its long-run equilibrium.

Table 7. Model Diagnostics.

Test Statistics	Value
Ecm(-1)	-0.5622
	(0.0002)
Heteroscedasticity	0.8135
	(0.4976)
Ramsey Reset	1.0366
	(0.3180)
Normality	0.7613
	(0.6832)
Serial Correlation LM Test	2.8078
	(0.1058)
Durbin-Watson	2.3684
CUSUM	Stable
CUSUMSQ	Stable

Source: Researcher's computation using EViews; P-values in parenthesis.

Furthermore, the table shows that the model passes the normality tests, heteroscedasticity, and serial correlation in addition to the elimination of the issues of serial correlation by the bounds test (Rahman and Kashem, 2017). Furthermore, it can be inferred from the Ramsey Reset test that the model is properly specified while Figures 6 and 7 depict that parameter stability is maintained within the critical point boundary according to the CUSUM and CUSUM of square tests.

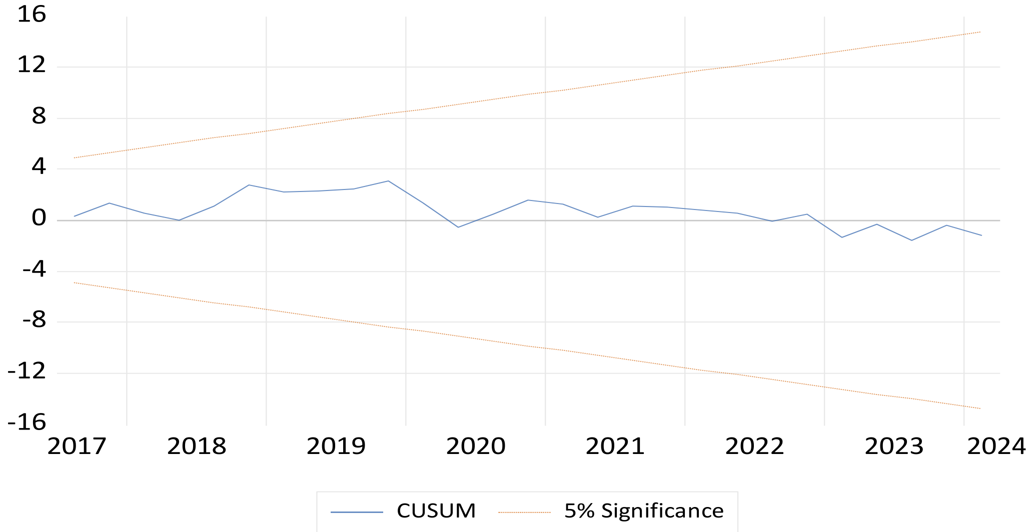

Figure 6. Cusum Results for the model.

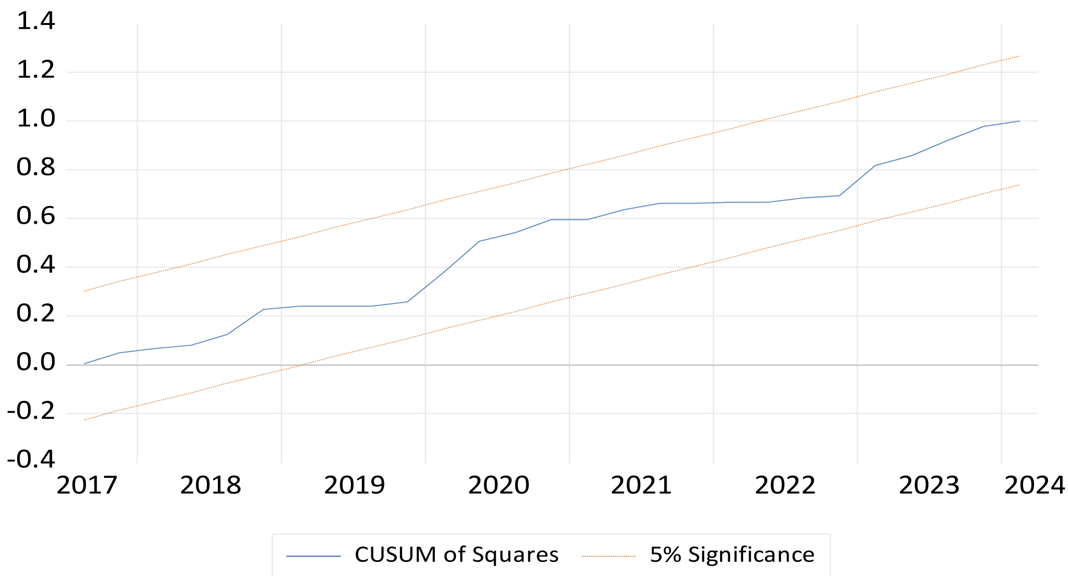

Figure 7. Cusum sum of square Results for the model.

3.5. ARDL Long-and Short-run Regression

The analysis of the ARDL short and long run estimates reveals that both economic policy uncertainty index and climate uncertainty index have an inverse and significant relationship with output both in the short and long run. This aligns with the apriori expectation. In simpler terms, a unit increase in economic policy uncertainty index will lead to a 7% and 13% decrease in output in the short run and long run period, while a unit increase in climate uncertainty index would result in 12% and 21% decrease in output over short and long run period respectively (see

Table 8). It is noteworthy that the study suggests a greater impact of climate uncertainty on output compared to economic policy uncertainty.

Table 8. Estimation of short and long run coefficients.

Dependent Variables (PMI) Explanatory Variables	Short-run	Long-run
EPU	-0.0719*** (0.0369)	-0.1279** (0.0618)
CUI	-0.1182** (0.0516)	-0.2103** (0.0878)

*Source: Researcher's computation using EViews; ** and *** significant at 5% and 10% level.*

3.6. Pairwise Granger Causality Tests

The findings shown in Table 9 indicates that, at the 95% confidence level, the null hypotheses that economic policy uncertainty does not Granger cause output and vice versa cannot be rejected. Additionally, the null hypotheses that climate uncertainty does not Granger cause output and vice versa cannot be rejected. However, a uni-directional causality is observed from climate uncertainty to output at the 5% levels. Thus, during the study period, one-way causality exists between climate uncertainty and output in Nigeria. However, no causality exists between economic uncertainty and output in Nigeria during the study periodThese findings further supports the ARDL short and long run results on the magnitude of climate uncertainty on output in Nigeria.

Table 9. Estimation of short and long run coefficients.

H_0	F-Statistic	P-value	Decision
$\Delta EPU \rightarrow \Delta PMI$	0.4466	0.6448	Accept
$\Delta PMI \rightarrow \Delta EPU$	1.5732	0.2272	Accept
$\Delta CUI \rightarrow \Delta PMI$	3.8519	0.0348	Reject
$\Delta PMI \rightarrow \Delta CUI$	0.5531	0.5820	Accept
$\Delta CUI \rightarrow \Delta EPU$	0.7064	0.5030	Accept
$\Delta EPU \rightarrow \Delta CUI$	0.5995	0.5568	Accept

Source: Researcher's computation using EViews.

4. Conclusion and Policy Recommendation

This study examine how Nigerian output was affected by climatic and economic uncertainties between 2016Q2 and 2024Q1. Leveraging EViews version 13 and Stata version 14 for econometric analysis, the study utilised ARDL and Granger causality analysis to reveal that higher levels of Economic and Climate Uncertaintiesare associated with decrease in output in Nigeria. The study highlights that climate uncertainty has a more significant impact on output compared to economic policy uncertainty. This was further supported by the outcome of the pairwise granger causality test. The test reveals a one-way causality from climate uncertainty to output at the 5% level of significance. Thus, during the study period, one-way causality exists between climate uncertainty and output in Nigeria. However, no causality exists between economic policy uncertainty and output in Nigeria.

Our findings regarding the inverse relationship between economic policy uncertainty and output as well as climate uncertainty and output aligns with the apriori expectation and is in line with the overall pattern shown in other jurisdictions' empirical literature (Edeme et al. (2024), Sheng et al. (2022), Giglio, (2016), Bhagat et al. (2013), Arndt and Thurlow, (2015), Fatima and Waheed, (2011), Ali, (2001)).

In line with the findings, policymakers should align economic policies with climate objectives to reduce uncertainty and promote sustainable long-term growth particularly in climate-sensitive regions. Furthermore, given the measure impact of climate uncertainty, the Nigerian government and other international players should prioritise investments in infrastructure and technologies that enhance resilience against climate risk in the face of rising uncertainties. This can be implemented through investment in renewable energy sources and climate-smart agriculture, public awareness of the risks of climate change, provision of subsidies and tax incentives for renewable energy projects and developing early warning systems for natural disasters.

Funding Statement

This research received no external funding.

Acknowledgments

Acknowledgments to anonymous referees' comments and editor's effort.

Conflict of interest

The author claims that the manuscript is completely original. The author also declares no conflict of interest.

References

Adeiza, A., Oye, Q. E., and Alege, P. O. (2023). The macroeconomic effect of COVID-induced economic policy uncertainty in Nigeria: a DSGE approach. *African Journal of Economic and Management Studies*, 14(1), 106-120. https://doi.org/10.1108/AJEMS-04-2022-0154

Ali, A. M. (2001). Political instability, policy uncertainty, and economic growth: An empirical investigation. *Atlantic Economic Journal*, 29, 87-106. https://doi.org/10.1007/BF02299934

Arndt, C., and Thurlow, J. (2015). Climate uncertainty and economic development: evaluating the case of Mozambique to 2050. *Climatic Change*, 130, 63-75. https://doi.org/10.1007/s10584-014-1294-x

Arouri, M., Estay, C., Rault, C., and Roubaud, D. (2016). Economic policy uncertainty and stock markets: Long-run evidence from the US. *Finance Research Letters*, 18, 136-141. https://doi.org/10.1016/j.frl.2016.04.011

Ashiru, Y., and Oladele, L. (2023). Impact of Economic Policy Uncertainty on Inflation in Nigeria: Evidence from ARDL Model. Available at SSRN 4481113. https://doi.org/10.2139/ssrn.4481113

Ayeni, E., and Fanibuyan, O. (2022). The dynamics of uncertainty, macroeconomic variables, and capital market performance: A case study of Nigeria. *Research in Globalization*. https://doi.org/10.1016/j.resglo.2022.100107

Bahmani-Oskooee, M., and Maki-Nayeri, M. (2019). Asymmetric effects of policy uncertainty on domestic investment in G7 countries. *Open Economies Review*, 30, 675-693. https://doi.org/10.1007/s11079-019-09523-z

Baker, S. R., Bloom, N., and Davis, S. J. (2016). Measuring economic policy uncertainty. *The quarterly Journal of Economics*, 131(4), 1593-1636. https://doi.org/10.1093/qje/qjw024

Balcilar, M., Gupta, R., Kyei, C., and Wohar, M. E. (2016). Does economic policy uncertainty predict exchange rate returns and volatility? Evidence from a nonparametric causality-in-quantiles test. *Open Economies Review*, 27, 229-250. https://doi.org/10.1007/s11079-016-9388-x

Bhagat, S., Ghosh, P., and Rangan, S. (2013). Economic policy uncertainty and growth in India. *Economic and Political Weekly*, 72-81. https://doi.org/10.2139/ssrn.2246882

Bloom, N. (2009). The impact of uncertainty shocks. econometrica, 77(3), 623-685. https://doi.org/10.3386/w13385

Brunnermeier, M. K. (2009). Deciphering the liquidity and credit crunch 2007–2008. *Journal of Economic Perspectives*, 23(1), 77-100. https://doi.org/10.1257/jep.23.1.77

Edeme, R. K., Emeka, E. T., and Ogbuabor, J. E. (2024). Global Uncertainty, Climate Change and the Unemployment-Economic Growth Relationship in Nigeria. *Journal of Development Policy and Practice*, 24551333231208296. https://doi.org/10.1177/24551333231208296

Fatima, A., and Waheed, A. (2011). Effects of macroeconomic uncertainty on investment and economic growth: evidence from Pakistan. *Transition Studies Review*, 18, 112-123. https://doi.org/10.1007/s11300-011-0188-0

Giglio, S., Kelly, B., and Pruitt, S. (2016). Systemic risk and the macroeconomy: An empirical evaluation. *Journal of Financial Economics*, 119(3), 457-471. https://doi.org/10.1016/j.jfineco.2016.01.010

Gilchrist, S., Sim, J. W., and Zakrajšek, E. (2014). Uncertainty, financial frictions, and investment dynamics (No. w20038). *National Bureau of Economic Research*. https://doi.org/10.17016/FEDS.2014.69

Jones, P. M., and Olson, E. (2013). The time-varying correlation between uncertainty, output, and inflation: Evidence from a DCC-GARCH model. *Economics Letters*, 118(1), 33-37. https://doi.org/10.1016/j.econlet.2012.09.012

Leduc, S., and Liu, Z. (2016). Uncertainty shocks are aggregate demand shocks. *Journal of Monetary Economics*, 82, 20-35. https://doi.org/10.1016/j.jmoneco.2016.07.002

Montes, G. C., and Nogueira, F. D. S. L. (2021). Effects of economic policy uncertainty and political uncertainty on business confidence and investment. *Journal of Economic Studies*, 49(4), 577-602. https://doi.org/10.1108/JES-12-2020-0582

Olanipekun, I. O., Olasehinde-Williams, G., and Güngör, H. (2019). Impact of economic policy uncertainty on exchange market pressure. *Sage Open*, 9(3), 2158244019876275. https://doi.org/10.1177/2158244019876275

Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326. https://doi.org/10.1002/jae.616

Salisu, A., Salisu, S., and Salisu, S. (2024). A news-based economic policy uncertainty index for Nigeria. *Quality & Quantity*, 1-16. https://doi.org/10.46557/001c.23492

Sheng, X., Gupta, R., and Çepni, O. (2022). The effects of climate risks on economic activity in a panel of US states: The role of uncertainty. *Economics Letters*, 213, 110374. https://doi.org/10.1016/j.econlet.2022.110374

Rahman, M. M., and Kashem, M. A. (2017). Carbon emissions, energy consumption and industrial growth in Bangladesh: Empirical evidence from ARDL cointegration and Granger causality analysis. *Energy Policy*, 110, 600-608. https://doi.org/10.1016/j.enpol.2017.09.006

Tumala, M. M., Omotosho, B. S., Mohammed, M. G., Musa, M., and Eguasa, B. E. O. (2023). Economic policy uncertainty index for Nigeria. Available at SSRN 4570762. https://doi.org/10.2139/ssrn.4570762