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A Note on the Spillover of Geopolitical Risks in Nigeria Into Global Energy Markets

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This study investigates whether domestic geopolitical risks in Nigeria extend into global energy-related uncertainties. To fulfil this objective, it employs time-varying Granger causality tests covering the period from January 2012 to October 2022. Observable spillovers are identified during significant events such as the EndSARS protests, herdsmen attacks, and the kidnapping of Chibok schoolgirls. These findings illustrate how Nigeria's geopolitical turmoil impacts not only the country's oil production and local economy but also the global energy markets. The results indicate a feedback loop where Nigeria's geopolitical challenges amplify uncertainties around the world's energy supply, which can further compromise Nigeria's internal security.

I. Introduction

Global energy markets are shaped by geopolitical risks, particularly in resource-rich regions like Nigeria, where political unrest has significant consequences (Wang et al., 2024). As an important oil exporter, Nigeria's energy industry is closely connected to its geopolitical environment, affecting global supply chains, price dynamics, and market volatility (Gong et al., 2023). It is crucial to understand how local crises, such as conflicts, insurgencies, and policy shifts, impact global energy markets (Moran & Russel, 2009).

With approximately 37 billion barrels of oil reserves and production of 1.9 million barrels per day, Nigeria ranks as the 10th largest reserve holder and 15th largest producer globally. As a member of OPEC, Nigeria's Bonny Light crude, known for its low sulfur content, plays an important role in both regional and international markets. However, the nation's political instability often disrupts oil production and global supply.

Geopolitical risks affect energy markets through two main channels (Minesso et al., 2024). First, increased geopolitical tensions act as a global demand shock, increasing uncertainty about the economic outlook, which reduces consumption, investment, and trade, thereby lowering global economic activity and energy prices. Second,

financial markets factor in the risk of future supply disruptions, amplifying price volatility. For example, geopolitical shocks in Venezuela, Russia, Israel, China, the U.S., and Saudi Arabia have been shown to significantly increase Brent crude volatility.

Tensions involving major oil producers disproportionately impact markets. Conflicts in nations with limited economic influence have minimal effects on global growth. However, for key oil producers like Nigeria, supply concerns can create substantial price pressures (Minesso et al., 2024). Nigeria's geopolitical dynamics, including militant activities by groups like the Movement for the Emancipation of the Niger Delta (MEND), have caused production disruptions, tightened global supply, and driven price spikes (Obi, 2009). Illegal bunkering, pipeline vandalism, and post-election violence further highlight the risks to Nigeria's production stability.

Nigeria's role in OPEC+ production cuts during the COVID-19 pandemic demonstrated its strategic importance in balancing global supply, though disputes over quotas affected market confidence. Similarly, the Russia-Ukraine war redirected attention to Nigeria as a potential alternative supplier, but challenges such as pipeline insecurity and underinvestment limited its capacity to bridge supply gaps. These examples illustrate Nigeria's influence on global en-

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ergy security and oil market dynamics despite accounting for only 2.2% of global oil supply (Obi, 2009).

Existing research on geopolitical risks and energy markets often overlooks nation-specific influences, particularly in high-risk countries like Nigeria (Alita et al., 2023). While Nigeria's global oil share is modest, oil-dependent powers remain highly sensitive to developments in the country due to strategic energy security concerns. This emphasizes the need to examine how Nigeria's unique geopolitical challenges contribute to global energy price volatility and unpredictability.

This study uses time-varying Granger causality tests to analyze how domestic geopolitical risks in Nigeria influence global energy uncertainties from January 2012 to October 2022. By addressing the gap in nation-specific geopolitical influences on energy markets, the study offers insights for policymakers and energy investors, enabling informed risk-reduction strategies in international energy policy.

II. Methodology and Data

To assess whether geopolitical risks serve as significant predictors of global energy-related uncertainty, we utilize time-varying Granger causality tests. A crucial factor in analyzing these relationships is the potential variation in the connection between variables over time. This suggests that the reliability of tests examining such relationships may change based on the selected time periods for analysis (Ante & Saggu, 2023). In instances where variable connections are apparent during certain periods but not others, it becomes imperative to employ sophisticated methods that account for structural stability (Ante & Saggu, 2023). Researchers have developed tools designed to detect and timestamp changes within periods by leveraging right-tailed unit root tests and date-stamping techniques (Phillips et al., 2011, 2014, 2015). Building upon these methodologies, Shi et al. (2020) propose an advanced approach for Granger causality testing that captures the time-dependent characteristics of data series. This time-varying Granger causality methodology is employed to more accurately analyze the spillover effect of geopolitical risks in Nigeria on global energy-related uncertainty. The objective is to ascertain if fluctuating geopolitical conditions in Nigeria have sufficient influence to affect the degree of energy-related uncertainty on a global scale, while accommodating time variations. The analysis commences with the specification of a bivariate VAR(m) model, as outlined by Baum et al. (2022):

$$y_{1t} = \alpha_0^1 + \sum_{k=1}^m \alpha_{1k}^1 y_{1t-k} + \alpha_{2k}^1 y_{2t-k} + \varepsilon_{1t} \quad (1)$$

$$y_{2t} = \alpha_0^2 + \sum_{k=1}^m \alpha_{1k}^2 y_{1t-k} + \alpha_{2k}^2 y_{2t-k} + \varepsilon_{2t} \quad (2)$$

Wald tests are employed to evaluate the combined significance of multiple parameters, with the aim of determining whether there is a need to reject the null hypothesis of no causality. To address the issue of integrated variables within the VAR model in Granger causality testing, lag-augmented VAR models, as recommended by Toda and Yamamoto (1995) and Dolado and Lütkepohl (1996), are uti-

lized. To account for changes in causality over time and identify the timing of such changes, three alternative algorithms that generate a sequence of test statistics are employed—namely, the forward expanding window, the rolling window, and the recursive evolving window. A detailed discussion of this methodology can be found in Phillips et al. (2015).

This analysis utilizes monthly data on geopolitical risk and global energy-related uncertainty from January 2012 to October 2022. The recently developed geopolitical risk index by Salisu et al. (2023), which provides a record of geopolitical risks specific to Nigeria, is used as the measure of geopolitical risks. This index offers a news-based metric for Nigeria's geopolitical events, encompassing aspects such as tensions, war threats, and terrorism. To effectively represent Nigeria's geopolitical landscape, key terms for newspaper searches include “geopolitical risk,” “geopolitical tension,” “Boko Haram,” “ISWA,” “militancy,” “Biafra,” “IPOB,” “piracy,” “EndSARS,” “bandits,” and “terrorism.” Major Nigerian newspapers analyzed include *The Punch*, *This Day*, *The Guardian*, *Business Day*, *Daily Trust*, *Nigerian Tribune*, *PM News*, and *Leadership*. The measure of energy-related uncertainty applied in the empirical analysis is the energy-related uncertainty index developed by Dang et al. (2023), following the methodology outlined in Ahir et al. (2022).

III. Empirical Results

The aggregate results of the causal connections between Nigeria's geopolitical risks and global energy-related uncertainty are presented in [Table 1](#). A relationship is deemed significant if the test statistic exceeds the corresponding critical value. As shown in [Table 1](#), the null hypothesis of no causal effect from Nigeria's geopolitical risk to global energy-related uncertainty is rejected by the three test statistics (Max Wald Forward, Max Wald Rolling, Max Wald Recursive) all at the 1% significance level. The consistency of the results produced by these three different algorithms confirms that changes in Nigeria's geopolitical climate significantly influence energy-related uncertainty globally. This indicates that geopolitical crises in Nigeria impact not only Nigeria's oil production and economy but also affect the level of energy-related uncertainty in the global energy markets. These findings are in line with previous studies by Yilmazkuday (2024), Yousfi and Bouzgarrou (2024), Yang et al. (2023), Zhang et al. (2023), and Lee et al. (2021). This study further extends these previous findings by showing that country-specific GPR can also contribute to global energy uncertainties.

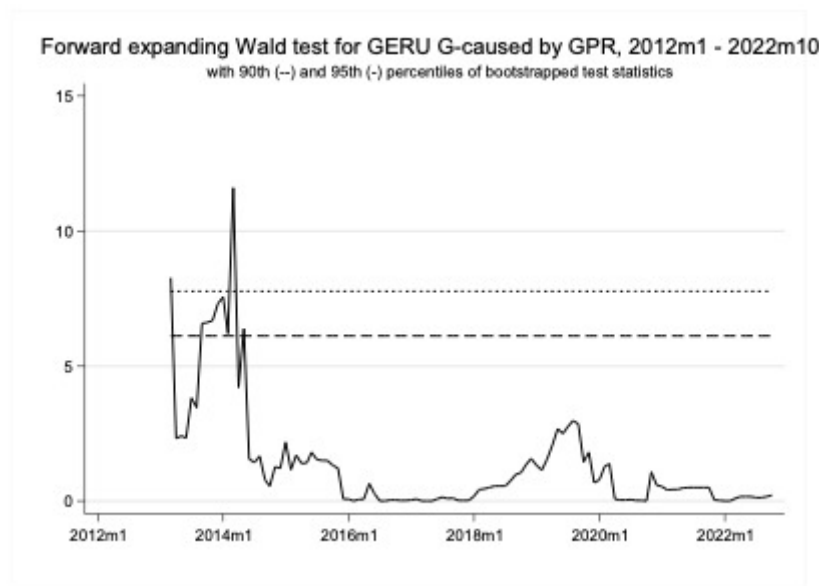
The time-specific graphs delineating specific periods of causal connections are illustrated in [Figures 1-3](#). The dashed lines represent the 90%, 95%, and 99% critical thresholds of the bootstrapped statistics. When the Granger curve exceeds a critical threshold, it indicates a significant causal link.

[Figure 1](#) displays the time-varying causality between Nigeria's geopolitical risks and global energy-related uncertainty, generated via the forward expanding window algorithm. Statistical significance is observed around the

Table 1. Wald tests of time-varying Granger causality

Direction of causality	Max Wald Forward	Direction of causality	Max Wald Rolling	Direction of causality	Max Wald recursive
$GPR \xrightarrow{GC?} GERU$	11.610*** (6.116) [7.777] {11.036}	$GPR \xrightarrow{GC?} GERU$	74.082*** (6.410) [7.798] {11.302}	$GPR \xrightarrow{GC?} GERU$	74.082*** (6.683) [8.195] {11.494}
$GERU \xrightarrow{GC?} GPR$	7.946** (5.923) [7.459] {9.791}	$GERU \xrightarrow{GC?} GPR$	45.216*** (6.172) [7.756] {10.329}	$GERU \xrightarrow{GC?} GPR$	61.859*** (6.483) [7.994] {10.714}

Notes: *** and ** indicate statistical significance at 1% and 5% levels, respectively. The 90th, 95th, and 99th percentiles of the distribution of the bootstrap statistics are represented by (), [], and {}, respectively.

**Figure 1. Graphical plots of time varying causality from GPR to GERU generated via the forward expanding window algorithm**

years 2013 and 2014. This period aligns with the tumultuous events surrounding the Chibok schoolgirls abduction in Nigeria, during which 276 female students were kidnapped by the Boko Haram terrorist group.

Figure 2 illustrates the time-varying causal relationships between Nigeria's geopolitical risks and global energy-related uncertainty, derived using the rolling window algorithm. The causal effects of Nigeria's geopolitical risks on global energy-related uncertainty are apparent in the years 2014, 2017, 2019, and 2021. These periods correspond to significant geopolitical events, such as the aftermath of the Chibok kidnappings in 2013, herdsmen attacks and the designation of the "Indigenous People of Biafra" as a terrorist organization in 2017, and the repercussions of the EndSARS protests in 2021.

Figure 3, which illustrates the time-varying causal links between Nigeria's geopolitical risks and global energy-related uncertainty using the recursive evolving window algorithm, closely resembles Figure 2. These findings clearly demonstrate that significant geopolitical crises in Nigeria

often impact the global energy markets. It is also noteworthy that time-varying causal effects from global energy-related uncertainty to geopolitical risks in Nigeria are evident in all three cases. Overall, there is a feedback time-varying causal interaction between Nigeria's geopolitical risk and global energy-related uncertainty.

IV. Conclusion

According to the analysis, geopolitical risks have a measurable impact on global energy-related uncertainty, with noticeable spillovers during significant events such as the EndSARS protests, herdsmen attacks, and the kidnapping of the Chibok schoolgirls. These findings underscore how Nigeria's geopolitical unrest influences not only the country's oil production and local economy but also the global energy markets. The results indicate a feedback loop wherein Nigeria's geopolitical challenges amplify uncertainties around the world's energy supply, further endangering Nigeria's internal security. This dynamic relation-

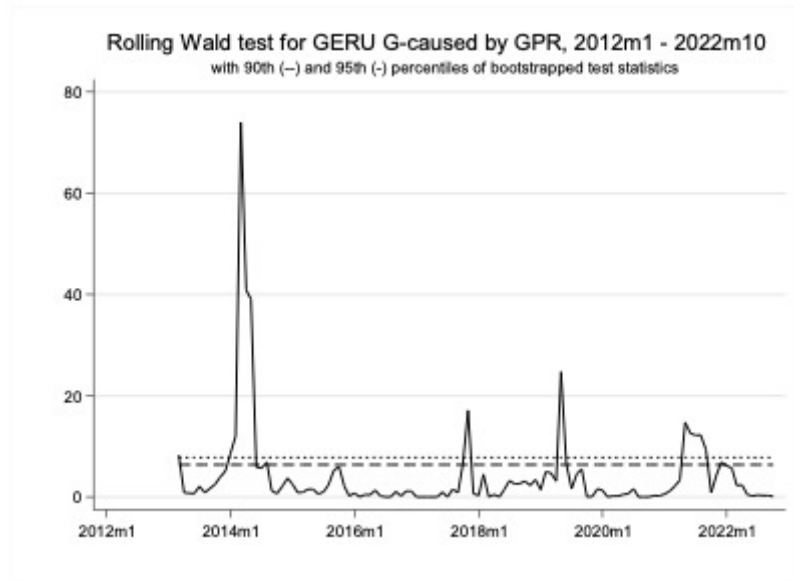


Figure 2. Graphical plots of time-varying causality from GPR to GERU generated via the rolling window algorithm

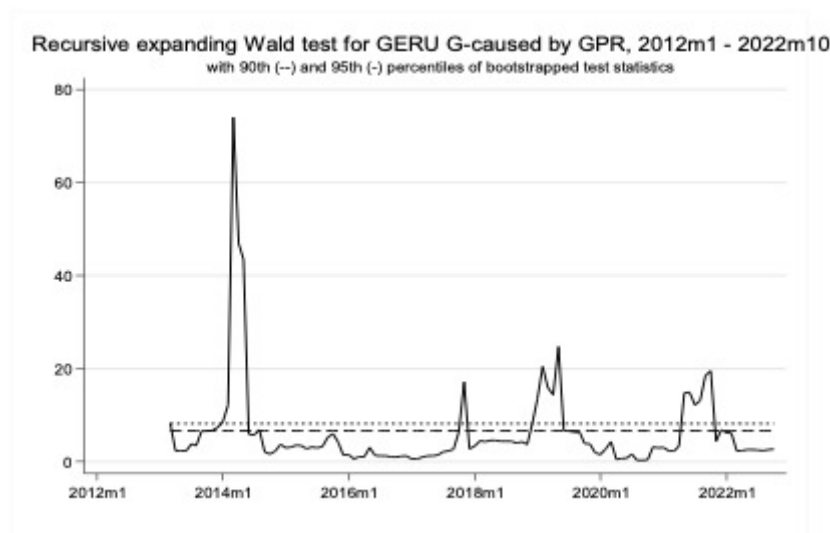


Figure 3. Graphical plots of time-varying causality from GPR to GERU generated via the recursive evolving window algorithm.

ship emphasizes the necessity of addressing Nigeria's specific geopolitical issues to mitigate their impact on the global energy markets.

Policymakers should prioritize strong security frameworks to prevent conflicts, insurgencies, and other crises that escalate geopolitical risk. Enhancing security can decrease the likelihood of spillover effects into international markets by minimizing disruptions in oil production and export activities. Nigeria and its trading partners should develop strategic partnerships aimed at reducing the impact of geopolitical conflicts on energy supply chains. Stabilizing prices during crises will reduce the susceptibility of the global energy market to country-specific shocks. Additionally, global policies should advocate for diversification into renewable energy and other sectors to minimize the

economic effects of dependency on non-renewable energy sources. This transition will support global efforts to lower carbon emissions while stabilizing the global economy.

It is, however, important to note that the GPR data does not cover the pre-amnesty period, a time marked by significant crises in the oil-producing regions of the Niger-Delta. Consequently, this study does not fully capture the spillover of oil-related geopolitical crises in Nigeria into global energy uncertainty.

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