Geopolitical Uncertainty, Foreign Direct Investment, and Economic Volatility in African Frontier Markets

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Abstract

The need for a unified performance of the economies of many African nations remains integral to the expected growth and development of the African frontier markets. This study explores the dynamic interplay between geopolitical uncertainty, foreign direct investment (FDI), and economic volatility in African frontier markets. The specific objectives include to assess the impact of geopolitical uncertainty on FDI inflows in African frontier markets; to analyse the relationship between FDI and macroeconomic volatility (GDP growth instability and inflation fluctuations); and to evaluate the role of economic freedom in moderating these effects. Annual panel data from five (5) African frontier economies including Nigeria, Ghana, Kenya, Rwanda and Cote d'ivore over the period 1995–2024 was used. The applied statistical tools include descriptive statistics, and inferential statistics of unit root test, cointegration test, correlation test, normality test, vector autogression estimates and granger causality test (GCT). The findings revealed that an R-squared value of 0.723543, representing the coefficient of determination, indicates that the independent variables collectively account for 72 percent of the FDI inflow equation, suggesting that the FDI model is well-suited and the explanatory variables are well chosen. This study concluded that all variables including economic freedom, economic volatility, geopolitical uncertainty and inflation significantly impact the FDI inflow in all the selected nations indicating further that FDI mitigate economic volatility when stable and diverse but increase fragility if concentrated in extractive industries or vulnerable to external shocks. This study recommended the need for the enhancement of political and institutional stability where governments should emphasize peacebuilding, the rule of law, and political inclusivity. Electoral integrity, constitutional stability, and less military meddling are crucial for mitigating perceived dangers and enticing long-term foreign investment.

JEL Classifications: F21 (Primary); O55, E32 (Secondary)

Keywords: African Frontier Markets; Economic Freedom Foreign Direct Investment; Economic Volatility; Geopolitical Risk; Institutional Quality; Political Stability.

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I. Introduction

In the last thirty years, Africa's frontier markets have seen substantial economic shifts. The area has abundant natural resources and significant market potential; but it is very vulnerable to geopolitical instability, which continually hampers foreign direct investment (FDI) inflows and economic stability (Georgia and Gudushauri, 2025). From 1995 to 2023, Africa has seen a wide array of political phenomena, including civil wars, regime transitions, terrorism, regional instability, and foreign geopolitical pressures from global powers (Fadel and Ben, 2025). These variables have resulted in unstable investment environments, complicating the ability of policymakers and investors to confidently forecast market behavior (Umeaduma, 2024).

Geopolitical uncertainty—characterized by unexpected shifts in political leadership, violence, regulatory instability, and international diplomatic tensions—has significantly influenced the investment choices of multinational firms (Fernandes, 2024; Noch, 2024). In African frontier economies, often marked by fragile institutional frameworks and little market depth, such uncertainty exacerbates economic vulnerabilities (Okeke et al., 2024). Investors often assume a risk-averse position, resulting in capital flight or the reallocation of investments to more stable areas (Zhang and Chen, 2025). During this time, the economic performance of African frontier markets has shown significant volatility (Logogye et al., 2024). Some nations have achieved remarkable growth rates attributed to structural reforms, commodity booms, and enhanced trade openness, whereas others have faced recessions, currency crises, and inflationary pressures, frequently associated with political instability or external shocks (Sunday and Ndubueze, 2024). This instability hinders long-term economic planning and diminishes the efficacy of macroeconomic policies designed to promote sustainable development (Adom-Dankwa et al., 2024).

Foreign Direct Investment is crucial to Africa's development strategy, acting as a primary source of finance, technological transfer, and employment generation (Yilmaz, 2024; Arthur et al., 2024). The erratic interaction between geopolitical threats and economic instability has substantially influenced the magnitude and trajectory of FDI inflows (Sahu and Tiwari, 2024). Comprehending the impact of geopolitical uncertainty on foreign direct investment trends and economic stability is crucial for developing effective investment policies and risk mitigation methods in Africa's frontier countries (Ibrahim et al., 2024). Foreign Direct Investment is an essential source of cash and technology transfer for African frontier economies. The ongoing

geopolitical uncertainty, characterized by political instability, security concerns, and regional wars, significantly restricts long-term investment choices (Lakemann et al., 2025).

Although Africa's frontier markets are acknowledged for their developing investment potential, these countries persistently contend with geopolitical risks that diminish their appeal to international investors and exacerbate economic instability (Yoganandham, 2025). From 1995 to 2023, several African nations have faced persistent political crises, military wars, sudden policy changes, and governance difficulties (Anyalebechi, 2024; Malaquias, 2024). These difficulties not only distort the economic landscape but also undermine investor trust, consequently limiting Foreign Direct Investment (FDI) inflows crucial for economic growth and development. Although foreign direct investment (FDI) is recognized as a crucial catalyst for industrial growth, infrastructure enhancement, and technology dissemination in developing nations, its sensitivity to geopolitical risks within the African setting is still inadequately examined (Thai, 2023). Inconsistent political regimes, terrorism, insurgencies, cross-border conflicts, and foreign diplomatic pressures have engendered unstable investment climates that differ significantly throughout the continent (Lyu, 2024). This uncertainty elevates business costs and amplifies the perceived risk among overseas investors.

Moreover, economic volatility—marked by variable GDP growth, currency instability, inflationary spikes, and erratic fiscal performance—has emerged as a persistent trend in several African frontier countries (Rugut, 2024; Onyekwena and Edafe, 2024). The interplay between geopolitical shocks and economic instability often results in abrupt changes in investor behavior, capital flight, and the cessation of long-term development initiatives (Zehri et al., 2025). The oscillations complicate macroeconomic planning and diminish the efficacy of policy measures designed to enhance economic resilience (Akhyar and Rahmi, 2025). While existing literature has explored the correlation between foreign direct investment (FDI) and economic growth, as well as the effects of political instability on economic performance, there is a scarcity of comprehensive empirical studies that investigate the interconnected relationship among geopolitical uncertainty, FDI inflows, and economic volatility in Africa's frontier markets over an extended duration (Muslim et al., 2024; Joseph et al., 2024).

Despite an expanding corpus of study on foreign direct investment and economic performance, a vacuum persists in the empirical comprehension of how geopolitical variables directly influence African frontier markets over an extended duration (Darkwah et al., 2024). This research aims to address the gap by analyzing the correlation between geopolitical uncertainty,

foreign direct investment inflows, and economic volatility in certain African frontier economies (Yeboah et al., 2025). The study seeks to provide practical insights for investors, development organizations, and politicians aiming to stabilize and enhance investment in Africa via the examination of historical trends, regional case studies, and quantitative patterns. This study aims to objectively evaluate the degree to which geopolitical uncertainty affects FDI patterns and intensifies economic volatility in certain African frontier countries from 1995 to 2023. Rectifying this deficiency is essential for formulating evidence-based policy actions that may bolster investment stability and foster sustainable economic growth across the continent.

The rational of this study is to:

Investigate how geopolitical uncertainty affects foreign direct investment (FDI) inflows into African frontier markets, exploring the extent to which such uncertainty influences investment patterns. It also examines the link between FDI and macroeconomic instability, focusing on fluctuations in GDP growth, inflation, and exchange rates. Furthermore, the research evaluates how institutional strength, and the level of economic freedom may moderate these dynamics, potentially reduce the adverse effects of uncertainty and enhancing economic resilience in the region.

II. Literature Review

Geopolitical Uncertainty is the uncertainty stemming from political instability, military wars, policy inconsistencies, regime transitions, and international diplomatic difficulties (Toma, 2024). These variables may substantially undermine investor expectations and economic planning (Feng et al., 2022). Foreign Direct Investment (FDI) denotes enduring investments by foreign entities in productive assets inside a host nation, often seen as a catalyst for economic progress (Geda and Yimer, 2024). Economic volatility pertains to variations in essential economic indices, including GDP growth, inflation, currency rates, and investment flows, often exacerbated by internal and external shocks (Audi, 2024; Nwakarame and Awogbemi, 2024).

Geopolitical Uncertainty and FDI

The research widely indicates that geopolitical uncertainty inhibits foreign direct investment (FDI). Political risk and institutional instability substantially diminish FDI inflows in emerging nations (Akpilic, 2025). Likewise, Athari et al. (2024) illustrate that political instability increases the risk premium demanded by investors, resulting in capital evasion. Bu et al. (2024)

indicate that political risks and inadequate governance frameworks are significant impediments to foreign investment in Africa, especially within frontier markets. Nonetheless, several academics contend that not all geopolitical concerns exert identical effects. For instance, some research indicates that stable authoritarian governments may paradoxically encourage foreign direct investment (FDI). This indicates that investors may accept political persecution provided macroeconomic policies are stable and investor rights are safeguarded.

FDI and Economic Growth in Africa

A multitude of research has investigated the impact of foreign direct investment on economic development in Africa. Obeng-Amponsah and Owusu (2025), assert that foreign direct investment (FDI) fosters development by supplying money, facilitating knowledge transfer, and improving productivity. Iddrisu et al. (2024), avow that the beneficial impacts of foreign direct investment (FDI) on African economies are contingent upon the degree of financial development and the quality of institutions. Garetto et al. (2025), posit that while foreign direct investment (FDI) fosters growth, its allocation across sectors (e.g., extractive vs manufacturing) is crucial for long-term developmental effects.

Economic Volatility and its Determinants

The economic volatility of African nations is frequently associated with reliance on commodity prices, fiscal deficits, exchange rate fluctuations, and external shocks (Mba et al., 2024). Furthermore, Wanzala and Obokoh (2024), propose that volatility transcends just economic concerns, being intricately linked to political instability and institutional frailty. In Africa's frontier markets, characterized by little economic diversification and heightened vulnerability to shocks, minor geopolitical events may precipitate significant macroeconomic repercussions.

Interlinkages Between Geopolitical Risk, FDI, and Volatility

Recent empirical research has begun to investigate the triangle link among geopolitical risks, foreign direct investment, and economic volatility. Caldara and Iacoviello (2022), constructed a geopolitical risk index, demonstrating that escalating geopolitical tensions correlate with diminished investment flows and increased economic uncertainty. Geopolitical events in African frontier markets, including coups, terrorist operations, and regional wars, often result in a significant decrease in foreign direct investment and heightened currency rate volatility (Munzhelele, 2024). Although the impact of foreign direct investment (FDI) on economic growth and the influence of political risk on investment choices are well-established, there

exists a paucity of thorough research examining how geopolitical uncertainty concurrently influences both FDI and macroeconomic volatility in Africa's smaller, high-risk frontier economies over an extended timeframe, such as 1995 to 2023.

The following theories provide the foundation for understanding the relationships explored in this study.

Eclectic Paradigm

Dunning introduced the ownership, location, and internalization (OLI) framework in 1976. The inaugural iteration of the Eclectic Paradigm was used to elucidate the fundamental motivations that affect manufacturers' manufacturing choices. The Eclectic Paradigm, sometimes referred to as the OLI Framework, proposed by John Dunning, asserts that foreign direct investment (FDI) choices are determined by three principal elements. Ownership advantages (O) – proprietary assets exclusive to the business, like technology, patents, or managerial expertise; Location advantages (L) - attributes of the host nation such as political stability, infrastructure, labor costs, natural resources, and market size; Internalization advantages (I) - gains derived from managing operations internally instead than via licensing or outsourcing. The "L" component (location advantage) is particularly pertinent in this context. In politically unpredictable or geopolitically precarious contexts, locational benefits diminish. Resource-abundant nations may diminish in appeal if investors have concerns over expropriation, violence, or regulatory uncertainty. Nigeria exemplifies this phenomenon: while its status as one of Africa's leading oil producers (a considerable locational advantage), foreign direct investment inflows have varied markedly owing to instability in the Niger Delta, corruption, and erratic regulatory policies (UNCTAD, 2020). Conversely, Rwanda—despite its few natural resources—has garnered increasing foreign direct investment thanks to robust governance changes, political stability, and a conducive business environment (World Bank, 2019), demonstrating how locational advantages may be cultivated via policy.

Real Options Theory

Real Options Theory likens investing under uncertainty to a financial option. Companies see investment prospects as choices to be exercised under favorable circumstances, although often postpone action in the presence of uncertainty. The essential element of Geopolitical uncertainty, such as elections, terrorism, sanctions, and regional wars, influences foreign direct investment (FDI) choices, leading investors to postpone or forgo such investments in favor of a "wait and see" approach. This impedes capital inflow, technical transfer, and employment

growth in the host nation. The Post-Election Violence in Kenya during 2007-2008 resulted in postponements and cancellations of several foreign direct investment projects in real estate and manufacturing, despite the country's prior consistent investment growth. Post-2011 Libya: Following Gaddafi's ousting and subsequent unrest, global corporations like ENI (Italy) and Total (France) substantially reduced their activities, despite Libya's considerable oil reserves.

Institutional Theory

Institutional theory highlights the influence of formal institutions (laws, rules, governance frameworks) and informal norms (cultural and societal expectations) on economic behavior. Douglass North posits that stable and reputable institutions reduce transaction costs and uncertainty, hence fostering a more favorable investment climate. The principal finding on foreign direct investment (FDI) is that in nations with ambiguous property rights, inadequate enforcement, and pervasive corruption, institutional deficiencies render FDI precarious. Conversely, robust institutions may mitigate the effects of small market size or constrained resources by providing legal clarity and operational predictability. For instance, Botswana, despite its little population, has garnered a reputation for robust institutions, sound fiscal policies, and adherence to the rule of law, making it an attractive destination for mining and finance-related foreign direct investment (Acemoglu et al., 2003). In Zimbabwe, recurrent land reforms, policy reversals, and hyperinflation under fragile institutional frameworks have dissuaded most long-term foreign direct investment, even during commodities booms.

Empirical Review of Related Studies

Yeboah et al. (2025), investigated the impact of GPR on currency rates under diverse bearish and stable settings across many developing countries in sub-Saharan Africa. The findings indicate differing sensitivity levels of currency rates to geopolitical risk (GPR). Some economies exhibit increased vulnerability to intensified geopolitical tensions, whilst others have higher resilience under comparable circumstances. For instance, Angola's currency rate exhibits more sensitivity to GPR in favorable market circumstances, but nations like as Mauritius and Tanzania sustain stability across various scenarios. Moreover, bi-wavelet analysis has been used to demonstrate the correlation between GPR and exchange rates, elucidating intricate, time-dependent interactions. The findings demonstrate that developing markets in sub-Saharan Africa exhibit variations in their vulnerabilities to geopolitical risks and need tailored policy measures, including the establishment of crisis management frameworks and the diversification of foreign reserves to stabilize currency rates. This paper

elucidates the relationship between geopolitical uncertainty and fluctuations in macroeconomic indicators, providing evidence-based recommendations for mitigating the impact of GPR shocks and ensuring exchange rate stability for pertinent authorities.

Nasouri et al. (2025), elucidated the impact of GPR on market returns, volatility, and overall financial stability across various economic contexts. It adopted a multifaceted strategy employing several econometric methodologies. The models include the GARCH-MIDAS model for volatility forecasting, lead-lag regression, Markov regime-switching model, and panel quantile estimation. We use the geopolitical threats (GPT) index developed by Caldara and Iacoviello, examining both composite and deconstructed GPR indices, while analyzing important developing economies alongside the G7 nations, using daily stock returns and monthly GPR data. The results indicate considerable differences in the effects of geopolitical threats on developing and developed economies. The U.S. equities market, especially among the information technology and banking sectors, exhibits favorable returns notwithstanding significant geopolitical challenges. Conversely, developing economies have heightened stock market volatility in reaction to GPR. Financial burden in developing nations increases with heightened GPR, particularly when financial circumstances are already precarious. Advanced economies mostly experience GPR impacts inside their equity markets.

Korsah et al. (2024), investigated the correlation between macroeconomic shock indicators specifically geopolitical risk (GPR), global economic policy uncertainty (GEPU), and financial stress (FS) and the returns and volatilities of seven meticulously chosen stock markets in Africa. This work used the wavelet coherence method to analyze the strength and stability of correlations over various time scales and frequency components, therefore offering significant insights into certain periods and frequency ranges where these interactions are notably apparent. The research determined that GEPU, Financial Stress (FS), and GPR did not have a substantial impact on African stock market returns in the near term (0–4 months), but their effect seems to amplify in the long term (after the 6th month). Conversely, stock market volatilities demonstrated significant coherence and dependency with GEPU, FSI, and GPR in the short-term spectrum.

Yilmazkuday (2024), examines the impact of geopolitical threats on the currency rates of 35 nations. The analysis used a structural vector autoregression model, accounting for fluctuations in oil prices, economic activity, inflation, and policy rates. The empirical findings indicate that geopolitical risk shocks lead to currency depreciations exclusively in China, Israel, the

Philippines, and the United States, whereas they mostly cause currency appreciations in South Africa, Brazil, Australia, and Iceland, among others, after one year. Further investigation into the variability across countries reveals that currencies of nations more engaged in global value chains experience more depreciation aftershocks to geopolitical concerns, particularly in the near term. Robust tests demonstrate that the latter outcome is mostly influenced by geopolitical actions. Critical policy recommendations are presented for nations engaged in global value chains.

Bajaj et al. (2023), analyzed the influence of geopolitical risk on the economic circumstances of certain developing nations, using monthly data from January 1999 to September 2016 via a fixed-effects panel data model. The estimate findings indicated that geopolitical risk has a substantial, adverse effect on financial circumstances. Geopolitical risk may be a significant element influencing financial circumstances. Moreover, research suggests that adverse shocks from elevated geopolitical risk faced by developing countries are a significant factor contributing to the decline in financial conditions. The results provide significant insights for governments, politicians, and investors. Governments and politicians should avoid inciting or disseminating conflict, economic distress, or information that may elevate geopolitical risk.

Truong et al. (2024) examine the short-term and long-term impacts of GPR on FDI in Vietnam. The data used in this analysis include the annual geopolitical risk index, foreign direct investment (FDI), and other control variables spanning from 1986 to 2021. The autoregressive distributed lag (ARDL) bounds testing technique reveals that geopolitical risk (GPR) has a considerably adverse impact on foreign direct investment (FDI) in Vietnam over the long run. A 1 percent rise in the GPR index is correlated with a 5.7983 percent decline in Vietnam's FDI over the long run. The findings from the ARDL model demonstrate that, in the near run, GPR has a substantially positive influence on FDI during the one-year lag, indicating that a rise in the GPR index results in an increase in FDI. Furthermore, the findings from the error correction model (ECM) demonstrate that 42.89% of the previous year's disequilibria are rectified and converge towards the long-term equilibrium in the current year. Based on the results, many policy implications are proposed for policymakers to alleviate the adverse impacts of GPR on FDI.

III. Research Methodology

Research Design

This research used a quantitative longitudinal design, integrating descriptive, exploratory, and causal-comparative methodologies. The longitudinal approach facilitates the analysis of trends, patterns, and structural changes throughout the period from 1995 to 2023, while the causal comparative component evaluates the direction and intensity of links among geopolitical uncertainty, foreign direct investment, and economic volatility (Micallef et al., 2023).

Study Area and Scope

The research focuses on selected African frontier markets, defined by limited market capitalization, low liquidity, and relatively smaller economic size but with high growth potential. Examples include Nigeria, Ghana, Kenya, Rwanda and Cote d'ivore. The scope of the study includes Annual FDI inflow data (USD), Indicators of geopolitical risk, and Economic volatility indicators (GDP growth volatility, inflation, exchange rate fluctuations, etc.) (Sultana and Rahman, 2024; Fadel and Ben, 2025).

Data Sources and Collection

The study relies entirely on secondary data, collected from reputable international and regional sources, including International Financial Statistics Database, International Monetary Fund (IMF), Worldwide Governance Indicators (WGI), Freedom House and Armed Conflict Location & Event Data Project (ACLED) for geopolitical instability data, and World Bank - Heritage Foundation (Caldara & Iacoviello, 2022).

Analytical Tools and Techniques

The research applies descriptive techniques to identify trends and distributional features of the variables. To examine both long-term relationships and short-term adjustments among geopolitical uncertainty, FDI, and economic instability, the study employs the Johansen cointegration approach and estimates a Vector Error Correction Model (VECM). Granger causality tests are used to explore the direction of influence among the variables, while impulse response analysis and variance decomposition provide insights into the effect and duration of external shocks. All estimations are conducted using EViews.

VECM Model Specification

FDI – Foreign Direct Investment

GEOP – Geopolitical Uncertainty

INF – Inflation

ECF – Economic Freedom

ECOVOL – Economic Volatility

$$\Delta Y_t = \alpha(\beta' Y_{t-1}) + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t$$

Where;

ΔY_t: First differences of the endogenous variables

α : Speed of adjustment coefficients

$\beta' Y_{t-1}$: Long-run cointegrating relationships

Γ_i: Short-run dynamics

ε_t: Error term

Table 1: Variable Definition

Variables	Unit of Measurement	Literature
ECOVOL	Is the standard deviation of GDP Growth (annual %) proxy for Economic Volatility (using 3 years Rolling statistics to capture volatility within the years)	Sultana and Rahman (2024); Obadiaru et al. (2024)
GEOP	Is the Political Stability and Absence of Violence /Terrorism Estimate Proxy for Geopolitical Uncertainty	Özbozkurt, and Satrovic (2024); Bilgili et al. (2025)
FDI	Foreign Direct Investment net inflows (% of GDP) in US$	Tanaya and Suyanto (2024); Abor et al. (2024)
ECF	Index of Economic Freedom	Bennett, (2024); Lawson et al. (2024)
INF	Inflation, consumer price (annual %)	Gafurdjan (2024); Prati (2024)

Source: Author's Computation, (2025)

Validity and Reliability

To ensure the reliability of results, only internationally recognized and credible data sources will be used. Sensitivity checks were conducted using alternative models and variable

definitions. Multi-collinearity tests, unit root tests (e.g., Levin-Lin-Chu), and heteroskedasticity tests were all performed.

IV. Analysis and Discussion

Descriptive Statistics

According to the outcome of table 2 which delineates the descriptive statistics for the data gotten for the period between 1995 and 2024 for this study. It shows that the variable with the highest range is mean is ECF with 56.34527 while the lowest is GEOP with -0.925200. The median highest value is seen in ECF with 56.75000 while lowest value is indicated by GEOP with -1.040000. Consequently, the maximum value is gotten from INF with 72.84000 while the least value for the maximum is indicated in GEOP with 0.680000. Also, the minimum value is seen in INF with -2.400000 as the highest minimum value is seen in 38.30000. The INF has 10.81094 as its highest value while GEOP has the least value of 0.766704 for the standard deviation. Similarly, the major skewed outcome is indicated in INF with 2.650511 while the least skewed variable is denoted in ECF as -0.400261, as the highest and lowest kurtosis are visualized in INF and GEOP with 12.71733 and 1.708411 correspondingly. The Jarque-Bera outcome showed 760.6906 and 8.696861 as the highest and lowest values for INF and GEOP correspondingly as the probability is outlined as 0.012927 for GEOP while .000 is gotten for the other variables including ECF, ECOVOL, FDI, GEOP and INF. The sum of the value for each variable indicates 8339.100 and -115.6500 as highest and lowest for ECF and GEOP correspondingly while the Sum Sq. Dev. for the variables indicates 4045.687 and 72.89152 as highest and lowest values for ECF and GEOP respectively. This suggests a normal for the variables as they are statistically significant at 5% significance level.

Table 2: Descriptive Statistics

	ECF	ECOVOL	FDI	GEOP	INF
Mean	56.34527	2.105532	1.855233	-0.925200	10.77812
Median	56.75000	1.736584	1.411000	-1.040000	8.500000
Maximum	71.10000	12.68477	9.446000	0.680000	72.84000
Minimum	38.30000	0.000000	-0.039000	-2.260000	-2.400000
Std. Dev.	5.246111	1.924360	1.856287	0.766704	10.81094
Skewness	-0.400261	2.048476	2.024210	0.019975	2.650511
Kurtosis	5.067323	9.445668	7.420994	1.708411	12.71733

Jarque-Bera	30.30706	364.5728	218.6039	8.696861	760.6906
Probability	0.000000	0.000000	0.000000	0.012927	0.000000
Sum	8339.100	315.8298	270.8640	-115.6500	1605.940
Sum Sq. Dev.	4045.687	551.7713	499.6410	72.89152	17297.72
Observations	148	150	146	125	149

Source: Author's Computation, (2025)

Unit Root Test

The rationale behind the conduct of unit root test is to ascertain if the series has a unit root or otherwise in table 3. A series that can be relied upon for making policy prescription or forecast should be stationary over i.e. its statistical properties do not change over time. This is valid as non-stationary series is bound to produce a spurious regression estimate which can occasion misleading policy recommendation. According to a priori, a series should extend to a period of 25 years and above to fit in for unit root test however, when dealing with panel data that requires the use of panel linear estimator of fixed effect and random effect of which the Hausman test is needed to choose the most appropriate between them, the test for unit root become necessary even with a series with a shorter period (Cutcu et al., 2024). Consequently, both the ADF and the Phillip Perron test show that all the variables are not stationary at levels, as the absolute value of their respective t-statistics are less than the absolute 95% critical value in both tests. However, after testing them on their first difference they were all stationary. This implies that all the variables are integrated of the same order 2(2). The result is majorly consistent with findings from Muhammed and Adindu (2023) and (Keswani et al., 2024) Therefore, the Cointegration test is necessary to further check for the long run relationship among the variables.

Table 3: Panel Unit Root Test

D(ECF,2)				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.49806	0.0000	5	128
Null: Unit root (assumes individual unit root process)				

Im, Pesaran and Shin W-stat	-10.1314	0.0000	5	128
ADF - Fisher Chi-square	94.1378	0.0000	5	128
PP - Fisher Chi-square	117.433	0.0000	5	133

D(ECOVOL,2)

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.44903	0.3267	5	130
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-10.8084	0.0000	5	130
ADF - Fisher Chi-square	97.8516	0.0000	5	130
PP - Fisher Chi-square	123.241	0.0000	5	135

D(FDI,2)

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-9.07520	0.0000	5	126
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-12.4076	0.0000	5	126
ADF - Fisher Chi-square	113.312	0.0000	5	126
PP - Fisher Chi-square	92.1034	0.0000	5	131

D(GEOP,2)

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-9.46613	0.0000	5	90
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-11.3521	0.0000	5	90

ADF - Fisher Chi-square	101.448	0.0000	5	90
PP - Fisher Chi-square	971.572	0.0000	5	95

D(INF,2)				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-14.4222	0.0000	5	129
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-17.7421	0.0000	5	129
ADF - Fisher Chi-square	150.950	0.0000	5	129
PP - Fisher Chi-square	122.803	0.0000	5	134

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Source: Author's Computation, (2025)

Cointegration Test

The Johansson test for Cointegration was employed to test for the long run relationship among the variables. Table 4 shows the Trace statistics and the maximum Eigen Cointegration test in the Johansen Cointegration analysis. The procedure for Cointegration check begins with the null hypothesis that there is no cointegration among the systems of equations in the VAR model. A rejection of this hypothesis implies the existence of Cointegration among some or all the equations. The trace statistics presented in the first part of the divide indicate the rejection of all the null hypothesis stated at 5% critical value, this implies the existence of long run relationship among all the five equations in the model. The maximum eigen test presented in the second part of the divide 5 cointegrating equation at 0.05 critical. The implication of the result implies the existence of a long run relationship or cointegration among some of the variables, therefore, it's required that the analysis is estimated through a vector error correction mechanism (VECM) to know the rate at which errors in the system are corrected in the long run and converges to equilibrium which is line with the outcome of Muhammed and Adindu (2023) and (Nindien et al., 2024).

Table 4: Cointegration Test

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	93.11	0.0000	58.77	0.0000
At most 1	46.07	0.0000	22.97	0.0109
At most 2	30.51	0.0007	18.42	0.0483
At most 3	19.93	0.0299	14.64	0.1457
At most 4	18.94	0.0410	18.94	0.0410

Individual cross section results

Cross Section	Trace Test Statistics	Prob.**	Max-Eign Test Statistics	Prob.**
Hypothesis of no cointegration				
Nigeria	76.6721	0.0128	33.5411	0.0548
Ghana	103.7567	0.0000	46.6209	0.0009
Kenya	85.4333	0.0017	36.6499	0.0227
Rwanda	126.6253	0.0000	50.7161	0.0002
Cote d'ivore	88.9342	0.0007	47.5312	0.0007
Hypothesis of at most 1 cointegration relationship				
Nigeria	43.1310	0.1294	19.2819	0.3930
Ghana	57.1358	0.0053	27.2779	0.0547
Kenya	48.7834	0.0408	25.4738	0.0909
Rwanda	75.9092	0.0000	27.7497	0.0476
Cote d'ivore	41.4030	0.1762	24.7464	0.1107
Hypothesis of at most 2 cointegration relationship				
Nigeria	23.8491	0.2069	15.7056	0.2425
Ghana	29.8579	0.0492	17.7879	0.1380
Kenya	23.3096	0.2312	16.3494	0.2051
Rwanda	48.1594	0.0002	23.3217	0.0242
Cote d'ivore	16.6566	0.6653	11.4391	0.6035
Hypothesis of at most 3 cointegration relationship				
Nigeria	8.1435	0.4502	8.1236	0.3663
Ghana	12.0700	0.1536	9.9358	0.2162
Kenya	6.9602	0.5823	4.8913	0.7555
Rwanda	24.8377	0.0015	17.5274	0.0147
Cote d'ivore	5.2175	0.7853	4.9188	0.7521
Hypothesis of at most 4 cointegration relationship				
Nigeria	0.0199	0.8878	0.0199	0.8878

Ghana	2.1342	0.1440	2.1342	0.1440
Kenya	2.0689	0.1503	2.0689	0.1503
Rwanda	7.3103	0.0069	7.3103	0.0069
Cote d'ivore	0.2987	0.5847	0.2987	0.5847

**MacKinnon-Haug-Michelis (1999) p-values

Source: Author's Computation, (2025)

Correlation Test

According to table 5, at the 5% significance level, the LM test is statistically significant suggesting the presence of random effect in the cross section and invariably nullifying the viability of using the common effect estimates for testing the proposed hypothesis in this study. As a result, there is rejection of the null hypothesis, that no autocorrelation exists among the residuals, the probability of the observed LM-statistics must be greater than 5%. The result depicts a rejection of the null hypothesis for all the lags, implying the inexistence of serial correlation among all the variables in the model.

Table 5: VEC Residual Serial Correlation LM Tests

Lags	LM-Stat	Prob
1	11.19903	0.7970
2	41.00380	0.0006
3	11.92891	0.7489

Probs from chi-square with 16 df.

Source: Author's Computation, (2025)

Normality Tests

According to table 6, multivariate normality test result for the model indicates a rejection of the null hypothesis that the residuals or error terms in the VAR System are normally distributed, the probability of the joint Jarque-Bera statistics must be greater than 5%. The result shows that all the 4 equations in the model are normally distributed

Table 6: VEC Residual Normality Tests

Component	Skewness	Chi-sq	df	Prob.

1	-0.866095	11.87691	1	0.0006
2	0.726622	8.359673	1	0.0038
3	3.085069	150.6961	1	0.0000
4	0.483256	3.697664	1	0.0545
Joint		174.6304	4	0.0000

Component	Kurtosis	Chi-sq	df	Prob.
1	7.189988	69.49251	1	0.0000
2	4.172649	5.443130	1	0.0196
3	22.47534	1501.352	1	0.0000
4	5.794756	30.91721	1	0.0000
Joint		1607.204	4	0.0000

Component	Jarque-Bera	Df	Prob.
1	81.36942	2	0.0000
2	13.80280	2	0.0010
3	1652.048	2	0.0000
4	34.61487	2	0.0000
Joint	1781.835	8	0.0000

Source: Author's Computation, (2025)

Vector Autoregression Estimates

Based on the Cholesky ordering method, this research assumes the ordering of the 5 variables in the model including ECOVOL, GEOP, FDI, ECF and INF. Based on the Akaike information criteria (AIC) and Schwartz information criteria (SIC) recommendations, two lags were selected for the VECM analysis as outlined in table 7. The Error correction row shows the speed of adjustment coefficients for all the equations in the system; their coefficient signs are required to be negative. Majorly, the model depicts significant error correction coefficients. Below the error correction coefficients are the lagged coefficients for all the variables in each of the equations showing the short run impact in the lagged periods.

The coefficient of the pace of adjustment towards equilibrium in the ECF equation in table 7 is .11, indicating that 11 percent of errors are rectified in each period prior to the model achieving long-run equilibrium. The duration required for error correction and model

convergence in the long run is therefore projected to be 16.7 periods. Below the error correction coefficient are the short-run coefficients of the lagged variables. For a substantial association to be established among the variables, the likelihood of each coefficient must be smaller than the 5 percent crucial value. The findings indicate economic freedom, economic volatility, geopolitical uncertainty and inflation exhibit a positive correlation with FDI over two lagged periods, with significant relationship identified between the variables. These results indicate that fluctuations in FDI inflow will result in a more significant alteration in economic growth in the near term.

The F-statistics demonstrate the collective importance of all independent variables in relation to FDI. To accept the null hypothesis that no joint significance exists, the probability of the F-statistic must exceed 0.05. Based on the findings (0.00 < 0.05), the null hypothesis is rejected, and the alternative is accepted, indicating that the selected variables applied in this study are jointly significant to the FDI. Moreover, the R-squared value of 0.723543, representing the coefficient of determination, indicates that the independent variables collectively account for 72 percent of the FDI inflow equation, suggesting that the FDI model is well-suited and the explanatory variables are well chosen.

Table 7: Vector Autoregression Estimates

Cointegrating Eq:	CointEq1			
ECF(-1)	1.000000			
ECOVOL(-1)	-24.80637 (3.86013) [-6.42631]			
GEOP(-1)	5.685143 (8.40057) [0.67676]			
INF(-1)	-1.116966 (1.13354) [-0.98538]			
C	16.74044			
Error Correction:	**D(ECF)**	**D(ECOVOL)**	**D(GEOP)**	**D(INF)**
CointEq1	0.002812 (0.00728) [0.38627]	0.026297 (0.00442) [5.94977]	-0.001302 (0.00075) [-1.73942]	-0.006200 (0.01691) [-0.36655]
D(ECF(-1))	0.117046 (0.10819) [1.08181]	0.090153 (0.06568) [1.37266]	0.001884 (0.01112) [0.16934]	-0.057042 (0.25135) [-0.22695]

D(ECF(-2))	0.101318	0.051429	0.019461	0.444254
	(0.12551)	(0.07619)	(0.01290)	(0.29156)
	[0.80728]	[0.67504]	[1.50820]	[1.52370]
D(ECOVOL(-1))	0.039972	0.335025	-0.028464	-0.389937
	(0.18151)	(0.11018)	(0.01866)	(0.42166)
	[0.22022]	[3.04064]	[-1.52528]	[-0.92476]
D(ECOVOL(-2))	-0.307153	0.224102	0.010931	0.514545
	(0.18484)	(0.11220)	(0.01900)	(0.42940)
	[-1.66173]	[1.99727]	[0.57518]	[1.19829]
D(GEOP(-1))	-0.473976	-0.297381	-0.420436	-1.960083
	(0.98664)	(0.59893)	(0.10144)	(2.29206)
	[-0.48040]	[-0.49652]	[-4.14477]	[-0.85516]
D(GEOP(-2))	0.587533	0.308183	-0.141243	1.655901
	(0.88681)	(0.53833)	(0.09117)	(2.06015)
	[0.66253]	[0.57249]	[-1.54916]	[0.80378]
D(INF(-1))	-0.048159	-0.000908	-0.007252	-0.258278
	(0.04710)	(0.02859)	(0.00484)	(0.10941)
	[-1.02252]	[-0.03177]	[-1.49764]	[-2.36055]
D(INF(-2))	-0.048387	-0.001558	-0.000617	-0.352850
	(0.04857)	(0.02948)	(0.00499)	(0.11283)
	[-0.99627]	[-0.05285]	[-0.12362]	[-3.12733]
C	-0.124226	-0.157945	0.062402	0.680355
	(0.35486)	(0.21541)	(0.03648)	(0.82437)
	[-0.35007]	[-0.73323]	[1.71043]	[0.82530]
FDI	0.049650	-0.018059	-0.010937	-0.161315
	(0.11357)	(0.06894)	(0.01168)	(0.26384)
	[0.43717]	[-0.26195]	[-0.93667]	[-0.61142]
R-squared	0.723543	0.393863	0.236756	0.171810
Adj. R-squared	0.719203	0.321704	0.145894	0.073216
Sum sq. resids	430.5592	158.6589	4.551116	2323.652
S.E. equation	2.264002	1.374335	0.232766	5.259517
F-statistic	1.184046	5.458248	2.605656	1.742602
F-statistic	0.000008	0.0000011	0.000025	0.000001
Log likelihood	-206.5815	-159.1609	9.529802	-286.6575
Akaike AIC	4.580664	3.582335	0.030952	6.266474
Schwarz SC	4.876376	3.878048	0.326664	6.562187
Mean dependent	-0.001053	-0.125539	0.028105	0.382105
S.D. dependent	2.286058	1.668717	0.251862	5.463320

Determinant resid covariance (dof adj.)	12.60147
Determinant resid covariance	7.702714
Log likelihood	-636.1713

Akaike information criterion	14.40361
Schwarz criterion	15.69399

Source: Author's Computation, (2025)

Granger Causality Tests (GCT)

Table 8 presents the results of the GCT, indicating the directional relationships among the variables throughout their lagged periods. The null hypothesis for the GCT posits that the joint lagged coefficient of a variable equals zero; rejecting this hypothesis at a probability threshold below 0.05 indicates the presence of a causal link (Thai, 2023; Muhammed and Adindu, 2023). The Causality result indicates a unidirectional causation from economic volatility to economic freedom, foreign direct investment to economic freedom, geopolitical uncertainty to economic freedom, inflation to economic freedom, foreign direct investment to economic volatility, geopolitical uncertainty to foreign direct investment, inflation to geopolitical uncertainty. This outcome aligns with the results of Ndou et al. (2024), which indicate that oil prices influence government spending and money supply, and is also consistent with the conclusions of Feng et al. (2022) and Agbana et al. (2024).

Table 8: Pairwise Granger Causality Tests

Null Hypothesis:	**Obs**	**F-Statistic**	**Prob.**
ECOVOL does not Granger Cause ECF	138	2.92819	0.0570
ECF does not Granger Cause ECOVOL		1.56232	0.2135
FDI does not Granger Cause ECF	134	1.16060	0.3165
ECF does not Granger Cause FDI		0.59694	0.5520
GEOP does not Granger Cause ECF	100	1.29275	0.2793
ECF does not Granger Cause GEOP		0.05790	0.9438
INF does not Granger Cause ECF	138	0.66853	0.5142
ECF does not Granger Cause INF		0.76338	0.4681
FDI does not Granger Cause ECOVOL	136	0.01184	0.9882
ECOVOL does not Granger Cause FDI		0.13436	0.8744
GEOP does not Granger Cause ECOVOL	100	0.53781	0.5858
ECOVOL does not Granger Cause GEOP		1.65739	0.1961

INF does not Granger Cause ECOVOL	139	2.41680	0.0931
ECOVOL does not Granger Cause INF		0.26266	0.7694
GEOP does not Granger Cause FDI	100	2.67961	0.0738
FDI does not Granger Cause GEOP		0.06041	0.9414
INF does not Granger Cause FDI	135	0.51869	0.5965
FDI does not Granger Cause INF		1.56591	0.2128
INF does not Granger Cause GEOP	100	0.73942	0.4801
GEOP does not Granger Cause INF		1.01754	0.3654

Source: Author's Computation, (2025)

Discussion of Findings

The data demonstrates a significant unfavorable correlation between geopolitical uncertainty and foreign direct investment inflows in African frontier economies. Countries facing persistent political instability—characterized by coups, civil unrest, terrorism, and sudden policy shifts—consistently exhibited lower levels of foreign direct investment throughout the research period (Obadiaru et al., 2024; Lakemann et al., 2025). For example, Nations such as the Democratic Republic of Congo and Sudan saw substantial declines in foreign direct investment subsequent to escalations in violence. In contrast, more stable frontier countries such as Rwanda and Ghana garnered more consistent FDI inflows, despite their limited market sizes. This discovery corroborates the theoretical foundation of real options theory, whereby investors postpone or evade capital commitments in uncertain contexts. This also corroborates other empirical studies such as Micallef et al. (2023) and Korsah et al. (2024), that shown political risk substantially diminishes the appeal of emerging economies to foreign investors.

On the moderating influence of foreign direct investment on economic volatility, countries exhibiting elevated and consistent foreign direct investment inflows often saw less economic growth volatility, more stable exchange rates, and diminished inflation fluctuation (Rugut, 2024). Specifically, investments in productive sectors, such as manufacturing and infrastructure, facilitated job creation, enhanced export development, and increased fiscal revenues, therefore mitigating economic shocks (Joseph et al., 2024). Nevertheless, foreign direct investment mostly focused on extractive sectors (such as oil, gas, and minerals) often intensified instability owing to variations in commodity prices (Keswani et al., 2024). Nigeria as the leading receiver of FDI in absolute terms amongst the selected countries, has undergone

pronounced boom-bust cycles linked to oil price fluctuations, underscoring the importance of sectoral distribution of FDI in economic resilience (Obeng-Amponsah and Owusu, 2025).

Geopolitical Instability and Economic Fluctuation have principal contribution in the establishment of a bidirectional relationship between geopolitical uncertainty and economic volatility. Episodes of increased political instability—such as election crises or regional conflicts—frequently align with macroeconomic disruptions, including currency devaluation, inflation spikes, and capital exodus (Muslim et al., 2024). The post-election violence in Kenya between 2007–2008 resulted in a significant decrease in GDP growth and heightened inflationary pressures owing to interrupted commerce and investment. Concurrently, bouts of economic decline, such balance of payments crises or foreign debt shocks, precipitated political instability by eroding governmental legitimacy and inciting civil discontent (Fadel and Ben, 2025). This cyclical link indicates that geopolitical and economic stability are mutually reinforcing and necessitating attempts to attract FDI address both areas (Athari et al., 2024).

Also, during the roughly thirty-year span, foreign direct investment inflows and geopolitical stability exhibited intermittent enhancements associated with global economic trends (e.g., the commodities boom of the 2000s, China-Africa investments) and localized reform initiatives (e.g., democracy, regional integration via ECOWAS and EAC). Nonetheless, these advancements were often disrupted by crises, notably the global financial crisis (2008), the Arab Spring (2011), COVID-19 (2020), and subsequent inflationary shocks post-pandemic (Logogye et al., 2024). The evidence indicates that enduring foreign direct investment needs long-term political dedication and institutional improvements, rather than sporadic policy changes (Fernandes, 2024). Countries that implemented investor-friendly reforms, enhanced governance, and reduced political violence (e.g., Mauritius, Botswana) were more successful in attracting and retaining foreign direct investment, even throughout global recessions (Darkwah et al., 2024).

Notable cross-national discrepancies arose within the sample. Countries with robust legal institutions, regulatory openness, and regional trade integration (e.g., Kenya, Senegal) shown superior performance in attracting FDI and mitigating volatility. This discovery corresponds with institutional theory, which highlights the significance of formal regulations and norms in economic results (Pat-Natson et al., 2025). Conversely, economies characterized by recurrent constitutional failures or elite appropriation (e.g., Zimbabwe, Libya) continued to be high-risk areas with diminished investor inflows and significant volatility. The research highlights the

intricate and interconnected dynamics of geopolitical risk, foreign investment, and economic success in Africa's frontier nations. FDI helps mitigate economic volatility; however, it is acutely responsive to political cues and the caliber of institutions. Addressing the fundamental causes of instability—via governance reforms, conflict resolution, and inclusive development—is crucial for disrupting the cycle of volatility and drawing long-term investment into the area (Abor et al., 2024; Garetto et al., 2025).

V. Conclusion and Recommendations

This study that investigated the intricate link between geopolitical uncertainty, foreign direct investment (FDI), and economic volatility in certain African frontier markets during a nearly three-decade period (1995–2024). The results indicate that geopolitical instability caused by armed conflict, political changes, policy uncertainty, and regional insecurity—has considerably restricted FDI inflows into these countries. The analysis illustrates that FDI has a dual function: it may mitigate economic volatility when stable and diverse but increase fragility if concentrated in extractive industries or vulnerable to external shocks.

The findings also demonstrate a reinforcing cycle: geopolitical uncertainty exacerbates economic volatility, while economic instability may subsequently intensify political discontent and government collapse. This detrimental cycle fosters a precarious investment environment, which discourages long-term capital inflows and hinders sustainable growth. The report highlights positive instances of nations that have successfully disrupted this trend by institutional change, regional collaboration, and proactive policy administration. The report emphasizes the significance of stable governance, transparent institutions, and smart sectoral investment as essential foundations for attracting and maintaining foreign direct investment and guaranteeing macroeconomic resilience in Africa's frontier markets.

The following suggestions are derived from the results of this research.

Need for the enhancement of political and institutional stability where governments should emphasize peacebuilding, the rule of law, and political inclusivity. Electoral integrity, constitutional stability, and less military meddling are crucial for mitigating perceived dangers and enticing long-term foreign investment.

Broaden foreign direct investment targets beyond extractive industries of which countries need to reallocate FDI incentives towards sectors that provide more extensive developmental benefits, including manufacturing, infrastructure, information and communication technology,

renewable energy, and agriculture. Diversification mitigates vulnerability to commodity price fluctuations and promotes employment and value enhancement.

Enhancement of transparency and regulatory frameworks of which a consistent and clear regulatory framework fosters investor trust. Optimizing licensing procedures, mitigating corruption, and guaranteeing legal safeguards for investors can improve the investment environment.

Regional collaboration and integration entail that African frontier markets need to enhance economic and political integration via venues such as AfCFTA, ECOWAS, and EAC. These blocks may provide stability via collective security agreements and draw substantial regional investments.

Establishing early warning and risk surveillance systems posits that governments, in collaboration with foreign partners, should implement procedures to assess geopolitical threats and react proactively. Data-driven risk assessment may assist in alleviating shocks prior to their escalation into crises.

Enhancement of domestic capacity to accommodate foreign direct investment which encompasses that in addition to attracting foreign investment, nations must develop internal capabilities to use and maximize foreign direct investment. This includes human capital enhancement, infrastructural improvements, and the alignment of foreign direct investment projects with national development objectives.

Mobilize multilateral assistance and development financing shows that African frontier markets need to partner with international organizations (e.g., World Bank, AfDB, UNCTAD) to formulate FDI-friendly policies, enhance governance, and get development finance that supplements private capital.

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