

Impact of global economic uncertainty on illicit financial flows in sub-Saharan Africa

Marius Bendoma

bendoma@yahoo.fr

University of Douala

José Claude Nyamou Mokompea

University of Douala

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Abstract

This study examines the impact of global economic uncertainty on illicit financial flows (IFF) in Sub-Saharan Africa (SSA) over the period 2000–2023. Using robust econometric methods (dynamic GMM, IV-2SLS, IV-GMM2S, IV-LIML, and IV-CUE), it addresses endogeneity and Nickell bias. The results show that global economic uncertainty significantly increases IFFs, while per capita economic growth helps reduce them. Trade openness, natural resource abundance, and, paradoxically, political stability also encourage illicit capital outflows, reflecting region-specific institutional and elite-driven mechanisms. Regional heterogeneity analysis confirms the robustness of these findings, although the magnitude of effects varies across African sub-regions. The study highlights the importance of strengthening economic and financial governance to curb IFFs, while acknowledging limitations related to data availability and endogeneity challenges.

1. Introduction

Financial globalization and the increasing integration of economies expose countries to external risks and uncertainties that can affect their financial flows, both legal and illicit. Among these flows, illicit financial flows (IFF), defined as capital transferred or used in violation of national or international laws, constitute a major challenge to economic development, particularly in SSA (Ndikumana and Boyce, 2003). These flows weaken the fiscal capacity of states, undermine public and private investment, and exacerbate socioeconomic inequalities.

In this context, global economic uncertainty plays a central role in influencing the decisions of economic agents, particularly their propensity to secure their assets abroad during periods of volatility or macroeconomic shocks. Existing literature shows that political, trade, and financial uncertainties can amplify illicit capital outflows (Baker and al., 2016; Nana and al., 2025). However, few studies have combined measures of global uncertainty with robust econometric approaches to examine illicit financial flows in SSA, while also accounting for endogeneity and regional heterogeneity.

To address these gaps, this article analyzes the effect of global economic uncertainty on IFF in 43 African countries¹ over the period 2000–2023. We use advanced estimation methods, including dynamic GMM, IV-2SLS, IV-LIML, and IV-GMM2S, to control for endogeneity and instrument weakness. Our study also assesses the impact of institutional and macroeconomic variables, such as economic growth, trade openness, natural resources, and political stability.

The main contributions of this research are threefold. First, it provides a rigorous empirical analysis of the effect of global economic uncertainty on IFF in SSA. Second, it incorporates alternative measures of uncertainty, strengthening the robustness of the results. Third, it highlights the regional heterogeneity of the effects, offering perspectives for policies tailored to local specificities.

The remainder of the article is organized as follows: section 2 presents the stylized facts, section 3 reviews the existing literature, section 4 details the methodology and data used, section 5 sets out the empirical results and robustness analyses, and finally, section 6 concludes by summarizing the main findings, discussing the policy implications, and addressing the limitations and prospects for future research.

2. Stylized facts

Three stylized facts emerge from the observation of the effect of global economic uncertainty on illicit financial flows in SSA.

2.1. Dynamics of illicit financial flows

Figure 1 highlights the high structural volatility of IFF in SSA over the period 2000–2023, indicating a marked sensitivity of these flows to global macro-financial conditions, financial cycles, and institutional changes. The pre-crisis phase was characterized by a gradual increase in IFF, culminating in 2007, against a backdrop of expanding international liquidity, increased financialization, and a relatively accommodative regulatory framework.

The particularly pronounced peak observed in 2009, exceeding that of the pre-crisis period, is consistent with the hypothesis of intensified illicit capital outflows during periods of global financial stress, reflecting rapid portfolio adjustments and increased risk aversion in an environment marked by high macroeconomic uncertainty and expectations of regulatory tightening. This finding aligns with the literature suggesting that uncertainty acts as an amplifier of illicit flows, particularly in economies with limited institutional capacity.

The period 2010–2018 shows an overall downward trend in IFF, despite persistent fluctuations, which can be interpreted as the partial effect of multilateral initiatives aimed at strengthening tax and financial transparency, particularly the *Foreign Exchange The Account Tax Compliance Act* (FATCA) and the OECD's² *Base Erosion and Profit Shifting* (BEPS) project³. However, the persistence of significant levels of financial inefficiencies suggests that these mechanisms have not fully compensated for structural weaknesses in international implementation and coordination.

Finally, the moderate recovery observed around 2020, concurrent with the exogenous shock of the COVID-19 pandemic, is consistent with the idea that systemic crises can temporarily reduce the effectiveness of surveillance mechanisms, creating increased opportunities for corrupt behavior and illicit capital outflows.

Source: Authors

2.2. Evolution of the level of global uncertainty in developing countries

Figure 2 traces the evolution of the *World Uncertainty Index* (WUI) over the period 2000–2030 and highlights marked episodes of increased global uncertainty, closely linked to major macroeconomic and geopolitical shocks. A first peak was observed in 2002, when the WUI reached 0.025, following the attacks of September 11, 2001, and the rise in international security instability.

During the 2008–2009 global financial crisis, the index rose to 0.035, reflecting a sharp increase in uncertainty linked to panic in financial markets, credit contraction, and worsening fiscal imbalances in several advanced economies, notably Greece, Spain, and Italy. An even higher level was reached in 2017, peaking at 0.04, a historical high for the period under consideration, coinciding with escalating trade tensions between the United States and China, as well as episodes of political instability in some major emerging economies, such as Brazil and Turkey.

In 2018, the WUI declined but remained at a relatively high level (0.028), reflecting persistent uncertainties related to trade conflicts and international political dynamics. The 2019–2021 period was marked by a renewed surge in the index, peaking at 0.038, driven by the exogenous shock of the COVID-19 pandemic, which profoundly disrupted global economic activity through lockdowns, supply chain disruptions, and the implementation of emergency economic policies in many countries, including India, Brazil, and Italy.

Although WUI levels remain below 5%, these episodes correspond to periods of exceptionally high uncertainty compared to the index's historical distribution. They underscore the importance of resilient economic governance mechanisms and strengthened international cooperation, issues that are particularly crucial for developing countries, which are more exposed to the macroeconomic effects of global shocks.

Source: Authors

2.3. Spread of global economic uncertainty and energy poverty in developing countries

Figure 3 analyzes the relationship between global economic uncertainty, as measured by the *World Uncertainty Index* (WUI), and IFF at the country level, highlighting a positive but weak correlation. The regression line suggests that an increase in global uncertainty is, on average, associated with a slight increase in IFF, which is consistent with the idea that economic agents tend to secure their assets or exploit opportunities presented by disorganized macro-financial environments.

Nevertheless, the wide dispersion of observations around the average relationship indicates significant heterogeneity between countries, suggesting that determinants specific to national economies play a dominant role in the magnitude of illicit flows. Some outliers, such as Botswana (BWA) and São Tomé and Príncipe (STP), exhibit relatively high levels of IFF, close to 0.09, despite moderate levels of global uncertainty. This pattern is consistent with the hypothesis that domestic structural factors, including the quality of institutions, economic specialization, dependence on natural resources, or, in some cases, the role of international financial platforms (as in Mauritius or Seychelles), are key drivers of IFF.

Conversely, countries such as Tanzania (TZA) and Niger (NER) exhibit particularly low levels of IFF, despite their exposure to global uncertainty, reinforcing the idea that global uncertainty, taken in isolation, is insufficient to explain the observed differences. Overall, these results suggest that global uncertainty acts more as a conditional or amplifying factor, the effects of which are closely dependent on national institutional and economic characteristics, thus justifying the use of multivariate econometric analysis to isolate its specific impact.

Source: Authors

The stylized facts presented suggest that global economic uncertainty is an amplifying, but not sufficient, factor in illicit financial flows in SSA, justifying a review of the literature on the determinants of IFF and the mechanisms of transmission of global uncertainty to developing economies.

3. Literature review

This section offers a synthesis of the theoretical foundations and empirical results relating to the links between global economic uncertainty and IFF, with a particular focus on SSA countries.

3.1. Theoretical framework: illicit financial flows and economic uncertainty

IFF refer to cross-border capital movements that violate national or international legal and regulatory frameworks, including tax evasion, money laundering, and corruption-related transfers (Baker, 2005; Kar and Cartwright-Smith, 2009). These flows represent a substantial drain on public resources, undermine macroeconomic stability, and hinder the long-term growth trajectories of the countries involved.

Theoretical literature highlights the central role of governance and institutional quality in the dynamics of IFF. Abed and Gupta (2002) demonstrate that corruption, weak rule of law, and ineffective public policies increase the propensity of economic agents to transfer capital abroad. In this context, global economic uncertainty is likely to amplify these behaviors by strengthening risk aversion and encouraging actors to secure their assets outside jurisdictions perceived as unstable.

Hermes and Lensink (2001, 2014) highlight that the combination of financial liberalization and policy uncertainty significantly increases the risk of capital flight, particularly in economies characterized by low institutional resilience, such as many African countries. Furthermore, the presence of natural resources is an aggravating factor, fostering extractive rents, corrupt practices, and opportunities for capital diversion (Leite and Weidmann, 1999; Le Billon, 2008).

More generally, macroeconomic uncertainty, whether resulting from international financial shocks, abrupt changes in interest or exchange rates, or systemic crises, influences not only productive investment decisions but also illicit behavior, as agents seek to protect their assets against potential losses (Garrett, 1995; Reinhart and Rogoff, 2009). Capital mobility is thus strongly conditioned by tax transparency, institutional credibility, and the effectiveness of control mechanisms (Gray and Kaufmann, 1998).

From this perspective, global economic uncertainty appears less as an autonomous determinant than as a catalytic factor, whose effects on IFF depend closely on the institutional characteristics, governance and degree of financial openness of the economies concerned.

3.2. Empirical evidence on illicit financial flows in Africa

3.2.1. Estimates and scale of illicit financial flows

Empirical studies highlight the considerable scale of IFF in Africa. According to Global Financial Integrity (GFI, 2010), the cumulative amount of illicit capital outflows from the continent between 1970 and 2008 totaled approximately \$854 billion, contributing to a chronic development finance gap and limiting states' capacity to invest in infrastructure, health, and education. These estimates underscore the structural nature of IFF and their role in the persistent budgetary constraints faced by African countries.

Kar and Cartwright-Smith (2009) show that resource-rich countries and those with weak institutions are particularly vulnerable to capital outflows. Complementarily, Ndikumana and Boyce (2003, 2011) establish a close relationship between external debt and capital flight, highlighting a vicious cycle in which borrowed resources are partially diverted abroad instead of financing domestic investment. This dynamic contributes to chronic underinvestment, sluggish growth, and increased dependence on external debt.

3.2.2. Role of institutions and political factors

A robust consensus is emerging in the literature regarding the crucial role of institutions and governance in the dynamics of illicit financial flows. Gray and Kaufmann (1998) and Abed and Gupta (2002) show that corruption, weak rule of law, and ineffective control mechanisms reduce the expected costs of illicit behavior and facilitate capital outflows.

Country-specific analyses of African countries confirm these findings. Gankou and al. (2016) highlight, in the case of Cameroon, that institutional quality influences the relationship between inflows of capital and illicit outflows. Geda and Yimer (2016) reach similar conclusions for Ethiopia, emphasizing the importance of robust institutional frameworks to limit the flight of financial resources.

Institutional reports, including those of the High-Level Panel on Illicit Financial Flows in Africa (ECA, 2011; African Union/AU and AU Commission, 2021) and recent work by the African Development Bank (AfDB, 2023), also emphasize the role of tax transparency, regional cooperation and information sharing in reducing IFF.

3.2.3. Global economic uncertainty and illicit financial flows

Recent research highlights the importance of global economic uncertainty in the dynamics of illiquid financial flows. This includes financial market volatility, global economic crises, geopolitical shocks, and commodity price fluctuations, all of which affect investor confidence and the macroeconomic stability of African countries.

Hermes and Lensink (2014) show that, in a context of financial liberalization, an increase in global uncertainty can lead to massive capital outflows as investors seek to reduce their risk exposure. Analyses by the International Monetary Fund (IMF, 2024) confirm that global macro-financial volatility promotes a rapid reallocation of capital, often towards opaque jurisdictions or offshore financial centers (Shaxson, 2011; Schneider and Windischbauer, 2008).

Recent work (De Saituma, 2025; De Saituma and Cagiza, 2025) shows that the perception of political and economic risk is a key determinant of capital location decisions, including illicit flows. These findings suggest that global uncertainty acts as an amplifier of illicit financial flows, interacting with governance and institutional quality.

3.2.4. Consequences of illicit financial flows on development

The effects of IFF on economic development are well documented. They reduce domestic resource mobilization, weaken states' fiscal capacity, and exacerbate economic inequalities (Kar and Cartwright-Smith, 2009; Signé, Sow and Madden, 2020). Ndikumana (2015) emphasizes that capital flight deprives African economies of resources essential for productive investment, jeopardizing growth and macroeconomic stability.

Herkenrath (2014) and U4 (2018) highlight the multidimensional nature of the impacts of IFF, affecting not only public finances, but also governance, financial security and social cohesion.

3.2.5. Literature review and gaps

Existing literature highlights the central role of governance, institutional quality, and global economic shocks in the dynamics of illicit financial flows in SSA. While global economic uncertainty appears to be a significant factor in the volatility of illicit financial flows, its precise effect remains conditional and highly dependent on national structural and institutional characteristics.

However, several gaps remain. On the one hand, most studies adopt an aggregated macroeconomic approach, which limits a detailed analysis of transmission mechanisms at the regional, national, or sectoral level. On the other hand, constraints related to data availability and quality hinder rigorous empirical assessment of the impact of global uncertainty on illiquid financial flows.

4. Data and Empirical Strategy

4.1. Data

This study uses an unbalanced panel covering 39 Sub-Saharan African countries over the period 2000–2023. Sub-Saharan Africa is the region most vulnerable to foreign capital flight and highly exposed to exogenous shocks, making the analysis of the impact of global economic uncertainty on these

capital outflows crucial. The inclusion of the four Maghreb countries in the estimation (Table 7, totaling 43 countries) enhances statistical robustness and allows for the generalization of results across the African continent. The 2000–2023 period was chosen not only based on data availability but also to capture the post-2000 era of heightened financial integration and liberalization, while encompassing major economic and health crises (2008, COVID-19) that represent key recent sources of global uncertainty, thereby enabling a comprehensive modeling of transmission mechanisms.

4.2. Dependent variable

The dependent variable studied is illicit capital flight, measured, as in the work of Avom and al. (2025), by the global indicator (2021). This variable measures capital outflows from one country to another where the source (corruption, smuggling), transfer (tax evasion), or use (terrorist financing) is illegal (IMF, 2024). Some authors have shown that illicit capital flight has an impact on economic growth (Pastor, 1990; Ajayi and Ndikumana, 2014; Ndikumana and al., 2015). However, to date, and to our knowledge, no link has yet been established between global economic uncertainty and illicit capital flight.

4.3. Independent variable

Researchers consider the Economic Uncertainty Index (EPU) as a barometer of uncertainty, but the EPU has been criticized by academics for several reasons. First, the economic policy uncertainty highlighted by Baker and al. (2016) applies only to a limited number of countries, primarily developed economies (Ho and Gan, 2021). Furthermore, the calculation of the EPU index does not include political uncertainties, as it focuses solely on those related to economic policies (Ahir and al., 2022). Finally, the calculation of the EPU index is based on various newspapers rather than a single source, which can generate ideological biases and credibility issues (Anser and al., 2021b; Ahir and al., 2022). In this context, this research used the Word Uncertainty Index (WUI), proposed by Ahir and al. (2022), as a comprehensive indicator of uncertainty (Anser and al., 2021b; Li and al., 2024). It was extracted from the Global Uncertainty Index website. As in the work of Afzali and al. (2021), Nguyen and Lee (2021), and Yasin and al. (2025), information was collected quarterly and converted into annual data by calculating the four-quarter average.

$$WUI_y = \frac{\sum_{t=1}^4 WUI_t}{4}$$

Where WUI_t is the global uncertainty index for quarter t, and WUI_y is the annual figure based on the average global uncertainty value. The index is based on national reports from the Economist Intelligence Unit (EIU) that mention the concept of "uncertainty" (and its variants). The WUI index, constructed from aggregate data from 143 nations, was developed using a single source and incorporates specific themes related to economic and political events (Ahir and al., 2022). For robustness, we use economic policy uncertainty (EPU) and trade-related economic uncertainty (WTUI_index).

4.4. Control variables

To limit the well-known omission bias that can result from omitting important determinants of illicit financial flows, we follow the empirical literature on the determinants of illicit financial flows and include five control variables.

As variables, we consider economic growth, which is measured by GDP per capita. GDP per capita measures the value of a country's total economic output divided by its population. It is a key indicator of average living standards and overall economic development. High GDP per capita is generally associated with better institutional quality and greater economic sophistication; therefore, the expected economic sign for IFF is negative. A higher level of development is expected to strengthen governance and anti-corruption institutions, thus reducing opportunities for IFF (Collin, 2020). Trade openness reflects the share of international trade in GDP. While it promotes growth, it can also increase opportunities for transfer pricing manipulation and capital flight. The expected sign is positive because more openness leads to more IFF. The work of Mekpor and al. (2025) shows that vulnerability to IFF increases with trade openness. Natural resources are often linked to the "resource curse", where resource rents encourage corruption and illicit outflows. Overall, the expected sign of the NRT is positive because more resources lead to more illicit financial flows (Afolabi, 2023). Foreign direct investment (FDI) represents foreign capital invested in an economy. While it stimulates growth, it can also serve as a channel for illicit financial flows through transfer pricing manipulation. The expected sign of FDI is positive because more FDI leads to more illicit financial flows. Efthimiou (2024) notes that FDI is often linked to illicit financial outflows in developing countries globally. Political stability reflects the quality of institutions and the state's capacity to control corruption. Greater stability reduces opportunities for illicit financial flows, and the expected sign is negative because greater political stability allows for less illicit financial flows. Jeke and al. (2025) show that macroeconomic and institutional stability limits illicit outflows. All other variables are taken from the World Bank database (2023).

4.5. Empirical strategy

To test the effect of global economic uncertainty on illicit financial flows, we draw on the earlier work of Jeke and al. (2025), which examines the effects of financial liberalization on illicit financial flows in African countries. In this case, we will replace financial liberalization with global economic uncertainty. We specify the following equation:

$$IFF_{it} = \beta_0 + \beta_1 IFF_{it-1} + \beta_2 WUI_{it} + \beta_3 X_{it} + \epsilon_{it}$$

1

Where IFF represents illicit financial flows; IFF_{it-1} represents the delay of illicit financial flows; WUI represents global uncertainty, X_{it} the vector of control variables and ϵ_{it} the error term.

Equation 1 is estimated using several techniques. The basic estimation employs ordinary least squares (OLS), widely used in the empirical literature for two reasons: (i) it minimizes measurement error, and (ii) it assumes sample countries are perfectly homogeneous. OLS generally serves as an initial framework to identify overall trends. However, with panel data, OLS is biased due to unobserved specific effects. The Hausman test led us to adopt a fixed-effects model; the Breusch-Pagan test indicates heteroskedasticity, and the Wooldridge test confirms first-order autocorrelation. To improve efficiency, we use fixed-

effects OLS with Driscoll-Kraay (1998) panel-corrected standard errors (following Castañeda-Rodríguez, 2018). Additionally, a GLS estimator (Aitken, 1936) accounts for residual correlation and heteroskedasticity, while Driscoll-Kraay standard errors address cross-sectional and temporal dependence, providing reliable results. Generalized least squares (GLS) are justified because heteroskedasticity and temporal correlations, including autocorrelations or seasonal variations, can bias parameter estimates; GLS mitigates these issues (Semykina and Wooldridge, 2013). Finally, to address potential Nickell bias (1981) from lagged dependent variables, we employ system GMM, preferred over difference GMM (Roodman, 2009a; Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998). This estimator is validated using the Hansen over-identification test and the Arellano-Bond autocorrelation test for first- and second-order residuals.

5. Results and discussions

5.1. Basic results

Table 1 summarizes the results of the baseline estimations using the fixed-effects OLS model. Column (1) presents the results of the bivariate regression estimating the effect of global economic uncertainty on illicit financial flows. The coefficient associated with global economic uncertainty is positive and statistically significant at the 1% level. This suggests that an increase in global economic uncertainty has, on average, a pulsating effect on illicit financial flows. More specifically, all else being equal, a one-unit increase in global economic uncertainty is associated with a 0.105-unit increase in illicit financial flows. In column (6), which includes the control variables, global economic uncertainty still has a positive and significant effect on illicit financial flows. Global economic uncertainty structurally exacerbates illicit financial flows by creating an environment conducive to opportunism and capital flight. Major exogenous shocks, such as the COVID-19 pandemic or geopolitical tensions, generate extreme volatility that drives wealthy and criminal actors to seek opaque safe havens. This instability often diverts the attention of supervisory authorities and creates windows of opportunity, as analyzed by Skinner (2025), who highlights how crises facilitate money laundering.

Although fixed-effects OLS results support our hypothesis, they suffer from limitations related to unobserved factors and cross-sectional dependence. To address these issues, we employ the Driscoll-Kraay and generalized least squares (GLS) estimators. The results reported in Table 2 (columns 1–6 for Driscoll-Kraay and 7–12 for GLS) show that global economic uncertainty significantly increases illicit financial flows, especially in countries with weak or medium governance. This finding aligns with Ndikumana and Boyce (2003, 2011), Hermes and Lensink (2001, 2014), the IMF (2024), and Schneider and Enste (2002), who highlight that macroeconomic instability drives capital outflows through informal or illicit channels.

Table 1
Economic uncertainty and illicit financial flows: ordinary least squares estimation with fixed effect

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS					
VARIABLES	IFF					
WUI	0.105***	0.106***	0.104***	0.103***	0.098***	0.083***
	(0.027)	(0.027)	(0.027)	(0.027)	(0.028)	(0.027)
GDP per capita		0.001	0.004	0.004	0.001	0.001
		(0.009)	(0.009)	(0.009)	(0.010)	(0.009)
Trade			-0.095***	-0.096***	-0.096***	-0.179***
			(0.022)	(0.022)	(0.022)	(0.025)
NRT				-0.003	-0.005	0.000
				(0.007)	(0.007)	(0.007)
FDI					-0.003	-0.002
					(0.058)	(0.057)
Political Stability						0.048***
						(0.007)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.064***	0.064***	0.071***	0.072***	0.072***	0.079***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Observations	837	820	820	820	780	780
R-squared	0.294	0.294	0.310	0.310	0.312	0.350
Source: Authors; *** – significant at the 1% level, ** – significant at the 5% level, * – significant at the 10% level. Robust standard deviations are shown in parentheses.						

Table 2
Driscoll-Kraay estimate (2008) and estimate generalized least squares (GLS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Driscoll-Kraay					MCG						
VARIABLES	IFF											
WUI	0.105*** (0.027)	0.106*** (0.027)	0.104*** (0.026)	0.103*** (0.025)	0.098*** (0.026)	0.083*** (0.026)	0.024** (0.011)	0.024** (0.012)	0.023** (0.012)	0.019** (0.011)	0.020** (0.011)	0.019** (0.011)
GDP per capita		0.001 (0.012)	0.004 (0.012)	0.004 (0.012)	0.001 (0.012)	0.001 (0.011)		0.007 (0.005)	0.007 (0.005)	0.007 (0.005)	0.007 (0.005)	0.007 (0.005)
Trade			-0.095*** (0.019)	-0.096*** (0.019)	-0.096*** (0.020)	-0.179*** (0.016)			0.000 (0.010)	0.022* (0.012)	0.019 (0.013)	-0.019 (0.013)
NRT				-0.003 (0.009)	-0.005 (0.008)	0.000 (0.010)				0.019*** (0.005)	0.019*** (0.006)	0.019*** (0.006)
FDI					-0.003 (0.003)	-0.002 (0.003)					0.001 (0.009)	-0.019 (0.009)
Political Stability						0.048*** (0.007)						0.019*** (0.007)
Constant	0.064*** (0.001)	0.064*** (0.001)	0.071*** (0.002)	0.072*** (0.002)	0.072*** (0.002)	0.079*** (0.002)	0.070*** (0.001)	0.070*** (0.001)	0.070*** (0.001)	0.067*** (0.001)	0.067*** (0.002)	0.067*** (0.002)
Observations	837	820	820	820	780	780	837	820	820	820	780	780
R-squared	0.294	0.294	0.310	0.310	0.312	0.350						
Number of id	39	39	39	39	39	39	39	39	39	39	39	39
Source: Authors; *** – significant at the 1% level, ** – significant at the 5% level, * – significant at the 10% level. Robust standard deviations are shown in parentheses.												

5.2. Control of endogeneity

Although the results in Table 1 show a positive and statistically significant relationship between global economic uncertainty and illicit financial flows, these results have several limitations. Among these are the Nickel (1981) bias and the endogeneity of the explanatory variables, which are not taken into account. To address these limitations, we use the two-stage GMM system, the estimation results of which are summarized in Table 3. Diagnostic tests of the dynamic GMM system reveal the following: all models passed the AR(2) tests, as indicated by the p-value showing that the autocorrelation of the errors is not second order. The number of instruments is less than the number of countries. Overall, the validity of the instruments used, necessary for the GMM system, is confirmed, as indicated by the p-values of the Hansen OIR test. Therefore, based on the diagnostic tests of these models, we can conclude that the estimated models are correctly specified. From column (1) to column (6), we observe that the coefficient associated with global economic uncertainty remains positive and significant at the 1% level.

Regarding the control variables, we found that only per capita economic growth, trade openness, natural resources, and political stability significantly impacted illicit financial flows. However, a one-unit increase in per capita economic growth reduced illicit financial flows by 0.011 at the 1% significance level. This finding corroborates Collin's (2020) work, which suggests that a higher level of development strengthens governance and anti-corruption institutions, thereby reducing opportunities for illicit financial flows. A one-unit increase in trade openness also increased illicit financial flows by 0.274 at the 1% significance level, which aligns with Mekpor and al.'s (2025) findings that vulnerability to illicit financial flows increases with trade openness. For natural resources, a one-unit increase is associated with a 0.203-unit increase in IFF at the 1% threshold, a result consistent with Afolabi's (2023) findings, as more natural resources lead to more IFF. Finally, a one-unit increase in political stability increases IFF by 0.215 units at the 1% threshold, a result that contradicts Jeke and al.'s (2025) findings that macroeconomic and institutional stability limits illicit outflows. Political stability in SSA, far from reducing illicit financial flows, can paradoxically increase them due to the consolidation of power among elites. According to Ndikumana and Boyce (2003), institutional stability in several countries in the region has often allowed governments to strengthen patronage networks and maintain capital flight practices under the guise of political legitimacy. Indeed, when regimes are stable but lack transparency, economic actors have a predictable environment in which to organize over-invoicing, under-registration of exports, and the clandestine transfer of resources. This stability then becomes a factor in the continuity of opportunistic behavior, as it reduces the risk of institutional breakdown that could threaten these networks. Thus, instead of fostering good governance, political stability can consolidate entrenched predatory structures. Consequently, illicit financial flows persist and intensify, fueling the contradiction between apparent stability and real economic fragility.

Table 3
Estimation using the generalized method of moments in a system (MMGS)

	(1)	(2)	(3)	(4)	(5)	(6)
	GMM_system					
VARIABLES	IFF					
L.IFF	-0.307***	-0.306***	-0.327***	-0.244***	-0.267***	-0.261***
	(0.006)	(0.007)	(0.008)	(0.008)	(0.007)	(0.022)
WUI	0.150***	0.134***	0.150***	0.137***	0.139***	0.125***
	(0.010)	(0.014)	(0.019)	(0.017)	(0.018)	(0.032)
GDP per capita		-0.011***	-0.012***	-0.038***	-0.038***	-0.025***
		(0.004)	(0.004)	(0.007)	(0.008)	(0.005)
Trade			0.274***	0.336***	0.258***	0.001
			(0.016)	(0.036)	(0.033)	(0.066)
NRT				0.203***	0.202***	0.203***
				(0.015)	(0.016)	(0.014)
FDI					0.112	-0.444
					(0.201)	(0.641)
Political Stability						0.215***
						(0.019)
Constant	0.090***	0.090***	0.068***	0.046***	0.053***	0.070***
	(0.000)	(0.001)	(0.002)	(0.004)	(0.003)	(0.004)
Observations	795	780	780	780	741	741
Number of id	36	36	36	36	34	34
Instruments	34	34	34	34	30	30
AR(1)	0.00668	0.00636	0.00403	0.000197	0.000272	0.000363
AR(2)	0.507	0.516	0.881	0.761	0.487	0.440
Hansenp	0.326	0.357	0.686	0.568	0.605	0.788
Source: Authors; *** – significant at the 1% level, ** – significant at the 5% level, * – significant at the 10% level. Robust standard deviations are shown in parentheses.						

Figure 4 is an essential econometric tool whose value lies in its ability to visualize, in a concise and rigorous manner, the results of a regression model using the Generalized Method of Moments (GMM). This allows for a rapid assessment of the magnitude, direction, and, most importantly, the statistical robustness of each determinant on the dependent (implicit) variable. The key interpretation is based on the vertical zero line: a coefficient is considered statistically significant if its confidence interval (the horizontal bar) does not cross this line. The analysis reveals that the majority of variables are significant and have a positive impact, notably WUI, GDP per capita, NRT, and Political Stability, suggesting that an improvement in these factors is positively associated with the modeled phenomenon. Only the L.IFF coefficient is significant, but with a negative sign (around - 0.4), indicating an inverse relationship. In contrast, the variables Trade and, more markedly, FDI (which has the widest confidence interval, ranging from - 2 to + 1) are not statistically significant, as their bars largely cross the zero line, implying high uncertainty or no measurable effect of these variables within the framework of the GMM model used.

5.3. Robustness analyses

5.2.1. Alternative measures of uncertainty

The robustness of our analysis relies on the integration of alternative measures of global economic uncertainty, allowing us to test the strength of our results. Indeed, illicit financial flows in SSA are sensitive to external shocks, and global uncertainty acts as a catalyst for capital flight behavior. Using different measures of uncertainty ensures that our conclusions do not depend on a single indicator but reflect a broader dynamic. Thus, we utilize the Economic Policy Uncertainty Index (EPU) by Baker and al. (2016), which captures tensions related to government decisions and international regulations. Simultaneously, we consider trade-related uncertainty (Nana and al., 2025), which reflects disruptions in global trade and their impact on fragile economies. This dual approach allows us to verify the consistency of our results and avoid the biases associated with a single measure. It highlights that illicit financial flows increase when global uncertainty intensifies, as agents seek to secure their assets outside the continent. Methodological robustness thus strengthens

the credibility of our work and its applicability in various contexts. Therefore, the combined use of the EPU and trade uncertainty in Table 4 constitutes a relevant strategy for understanding the effects of global instability on illicit financial flows in SSA.

Table 4
Alternative measures of economic uncertainty

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
GMM_system											
VARIABLES	IFF										
L.IFF	-0.312***	-0.304***	-0.306***	-0.225***	-0.222***	-0.233***	-0.280***	-0.294***	-0.303***	-0.214***	-0.212
	(0.042)	(0.003)	(0.005)	(0.004)	(0.004)	(0.021)	(0.006)	(0.001)	(0.005)	(0.009)	(0.010)
EPU	0.066***	0.069***	0.075***	0.074***	0.080***	0.062***					
	(0.003)	(0.003)	(0.005)	(0.004)	(0.005)	(0.005)					
WTUI_index							0.104***	0.096***	0.096***	0.177***	0.184*
							(0.007)	(0.004)	(0.010)	(0.008)	(0.013)
GDP per capita		-0.025***	-0.025***	-0.048***	-0.052***	-0.032***		-0.025***	-0.021***	-0.046***	-0.048
		(0.001)	(0.002)	(0.005)	(0.005)	(0.006)		(0.002)	(0.003)	(0.006)	(0.007)
Trade			0.138***	0.132***	0.038**	-0.232**			0.147***	0.190***	0.090*
			(0.010)	(0.013)	(0.017)	(0.094)			(0.004)	(0.014)	(0.010)
NRT				0.226***	0.226***	0.231***				0.220***	0.220*
				(0.010)	(0.012)	(0.017)				(0.016)	(0.012)
FDI					0.006	1.256**					0.047
					(0.059)	(0.553)					(0.066)
Political Stability						0.261***					
						(0.019)					
Constant	0.088***	0.087***	0.075***	0.057***	0.064***	0.083***	0.089***	0.090***	0.078***	0.055***	0.063*
	(0.003)	(0.000)	(0.001)	(0.001)	(0.001)	(0.006)	(0.000)	(0.000)	(0.001)	(0.002)	(0.001)
Observations	864	826	826	826	786	786	864	826	826	826	786
Number of id	39	38	38	38	36	36	39	38	38	38	36
Instruments	34	34	34	34	34	34	34	34	34	34	34
AR(1)	0.00964	0.00323	0.00299	0.000174	0.000122	0.000126	0.00946	0.00891	0.00834	0.000483	0.0007
AR(2)	0.226	0.364	0.433	0.318	0.308	0.241	0.303	0.399	0.557	0.583	0.473
Hansenp	0.710	0.350	0.479	0.376	0.426	0.326	0.658	0.393	0.622	0.395	0.428
Source: Authors; *** – significant at the 1% level, ** – significant at the 5% level, * – significant at the 10% level. Robust standard deviations are shown in parentheses											

5.2.2. Alternative approaches for controlling endogeneity

5.2.2.1. IV-2SLS, Lewbel, (2012)

To address potential endogeneity bias, we employ the instrumental variables approach. However, identifying a valid instrument, one that is correlated with the endogenous variable, orthogonal to the error term, and correctly excluded from the model (Baum et al., 2012), remains challenging. In this context, the Lewbel (2012) method provides a suitable alternative, as it identifies structural parameters by exploiting heteroskedasticity without relying on external instruments. Internal instruments are constructed from the residuals of the auxiliary equation combined with mean-centered exogenous variables and are implemented within a two-stage least squares (2SLS) framework. This approach reduces exclusion bias and yields estimates comparable to those obtained using external instruments. Widely applied in the literature (Domguita et al., 2022; Ngounou et al., 2023; Soumtang et al., 2024), this method confirms, based on the results reported in Table 5, that global economic uncertainty has a positive and statistically significant effect on illicit financial flows at the 1% level.

Table 5
IV-2SLS Lewbel, (2012)

	(1)	(2)	(3)	(4)	(5)	(6)
	IV-2SLS					
VARIABLES	IFF					
WUI	0.514***	0.512***	0.502***	0.529***	0.479***	0.437***
	(0.162)	(0.161)	(0.159)	(0.169)	(0.163)	(0.162)
GDP per capita		-0.001	0.001	0.001	-0.001	0.001
		(0.011)	(0.012)	(0.012)	(0.012)	(0.011)
Trade			-0.089***	-0.086***	-0.088***	-0.160***
			(0.030)	(0.030)	(0.030)	(0.033)
NRT				0.011	0.008	0.011
				(0.011)	(0.011)	(0.011)
FDI					-0.023*	-0.020
					(0.014)	(0.013)
Political Stability						0.040***
						(0.010)
Constant	0.055***	0.055***	0.062***	0.060***	0.062***	0.069***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Observations	771	758	758	758	720	720
R-squared	0.087	0.090	0.114	0.089	0.133	0.195
jp	0.359	0.363	0.385	0.376	0.397	0.399
idstat	23.60	23.89	23.79	22.71	22.14	21.84
Source: Authors; *** – significant at the 1% level, ** – significant at the 5% level, * – significant at the 10% level. Robust standard deviations are shown in parentheses.						

5.2.2.2. Approaches IV: 2SLS, LIML and two-step GMM (GMM2S)

Second, beyond the traditional IV-2SLS approach, we employ the IV-LIML and IV-GMM2S estimators. The IV-GMM2S estimator improves coefficient efficiency by using an optimal weighting matrix based on the inverse of the covariance matrix of the orthogonality conditions. Efficiency gains relative to the conventional IV-2SLS estimator stem from exploiting overidentifying restrictions and less restrictive orthogonality conditions. In an exactly identified model, the GMM2S and IV-2SLS estimators coincide, and under conditional homoskedasticity and independence, they remain equivalent (Davidson and MacKinnon, 1993; Baum, 2006; Hayashi, 2011).

The IV-LIML and IV-CUE approaches also address the weak-instrument problem. Inference relies on consistent estimation of the asymptotic variance and asymptotically normal overidentification tests (Fuller, 1977; Davidson and MacKinnon, 1993; Baum, 2006; Anatolyev, 2019). The results reported in Table 7 show that coefficients estimated using IV-LIML and GMM2S differ markedly from those obtained with the traditional IV-2SLS method, suggesting both a correction for weak-instrument bias and improved estimation efficiency. These findings confirm that global economic uncertainty increases illicit financial flows.

Finally, instrument quality is satisfactory. The Kleibergen–Paap and Sanderson–Windmeijer F-statistics, all exceeding the threshold of 10 (Table 6), indicate the absence of weak identification problems.

Table 6
IV-2SLS, IV-GMM2S, IV-LIML and IV-Cue

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	IV-2SLS	IV-GMM2S		IV-Liml		IV-Cue		
VARIABLES	IFF							
WUI	0.514***	0.437***	0.514***	0.437***	0.522***	0.444***	0.527***	0.447***
	(0.162)	(0.162)	(0.162)	(0.162)	(0.166)	(0.166)	(0.164)	(0.163)
GDP per capita		0.001		-0.000		0.001		-0.000
		(0.011)		(0.011)		(0.011)		(0.011)
Trade		-0.160***		-0.161***		-0.160***		-0.160***
		(0.033)		(0.033)		(0.033)		(0.033)
NRT		0.011		0.011		0.011		0.011
		(0.011)		(0.011)		(0.011)		(0.011)
FDI		-0.020		-0.021		-0.021		-0.021
		(0.013)		(0.013)		(0.013)		(0.013)
Political Stability		0.040***		0.041***		0.040***		0.040***
		(0.010)		(0.010)		(0.010)		(0.010)
Constant	0.055***	0.069***	0.055***	0.069***	0.055***	0.069***	0.055***	0.069***
	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)
Observations	771	720	771	720	771	720	771	720
R-squared	0.087	0.195	0.086	0.195	0.079	0.189	0.073	0.186
jp	0.359	0.399	0.359	0.399	0.362	0.401	0.361	0.400
idstat	23.60	21.84	23.60	21.84	23.60	21.84	23.60	21.84
Source: Authors; ***-significant at 1% **- significant at 5% *-significant at 10% robust standard deviations are in parentheses.								

5.2.3. Heterogeneity of Results (Regional Disaggregation)

This subsection examines the heterogeneity of the effects of global economic uncertainty on illicit financial flows based on the regional disaggregation of the sample. Although the baseline results indicate a positive effect of global economic uncertainty on illicit financial flows, these estimates may be influenced by region-specific macroeconomic and geographical characteristics. To test the robustness of the results, countries are grouped by geographical areas (North, West, Southern, East, and Central Africa), and the model is re-estimated for each subsample.

The results reported in Table 7 show that the coefficients associated with global economic uncertainty remain positive and statistically significant across all regions, although the levels of significance vary. The effect is significant at the 1% level in North, West, and East Africa, at the 5% level in Central Africa, and at the 10% level in Southern Africa. These findings suggest that the positive relationship between global economic uncertainty and illicit financial flows is robust and does not depend on any specific region within the sample.

Table 7
Regional heterogeneity

	(1)	(2)	(3)	(4)	(5)
	GMMs				
VARIABLES	IFF				
L.IFF	-0.289***	-0.289***	-0.253***	-0.291***	-0.298***
	(0.040)	(0.030)	(0.025)	(0.043)	(0.028)
WUI	0.195***	0.248***	0.096*	0.383***	0.104**
	(0.070)	(0.055)	(0.048)	(0.075)	(0.040)
GDP per capita	-0.029**	-0.027***	-0.022*	-0.011	-0.025***
	(0.012)	(0.009)	(0.012)	(0.015)	(0.008)
Trade	0.099	0.058	-0.059	-0.106	0.053
	(0.106)	(0.123)	(0.133)	(0.129)	(0.082)
NRT	0.184***	0.202***	0.262***	0.131***	0.209***
	(0.022)	(0.029)	(0.017)	(0.027)	(0.022)
FDI	-0.061	-0.275	0.006	0.888	0.003
	(0.204)	(1.055)	(0.076)	(1.075)	(0.064)
Political Stability	0.193***	0.168***	0.298***	0.233***	0.245***
	(0.046)	(0.045)	(0.053)	(0.038)	(0.034)
N_Africa	-0.145				
	(0.406)				
W_Africa		0.007			
		(0.016)			
S_Africa			0.062***		
			(0.013)		
E_Africa				-0.025	
				(0.019)	
C_Africa					-0.157**
					(0.069)
Constant	0.071***	0.064***	0.061***	0.088***	0.086***
	(0.009)	(0.009)	(0.008)	(0.015)	(0.009)
Observations	741	741	741	741	741
Number of id	34	34	34	34	34
Instruments	33	33	33	33	33
AR(1)	0.000420	0.000306	0.00148	0.000857	0.000121
AR(2)	0.496	0.399	0.393	0.693	0.334
Hansenp	0.798	0.726	0.626	0.757	0.669
Source: Authors; *** – significant at the 1% level, ** – significant at the 5% level, * – significant at the 10% level. Robust standard deviations are shown in parentheses.					

6. Conclusion: Implications of Economic Policy

This study examines the impact of global economic uncertainty on illicit financial flows (IFF) in sub-Saharan Africa, employing a set of rigorous econometric approaches to control for endogeneity and test the robustness of the results. The main findings show that global economic uncertainty has a positive and statistically significant effect on IFF, suggesting that global shocks incentivize economic actors to secure their assets outside the continent.

Our analyses are based on the generalized system method of moments (GMM), as well as several instrumental variable-based approaches, including IV-2SLS, IV-GMM2S, IV-LIML, and IV-CUE. These estimations confirm the robustness of the effect of uncertainty on illicit financial flows, while correcting for

biases related to weak instruments and regressor endogeneity. The AR(2), Hansen, and Kleibergen-Paap diagnostic tests indicate the validity of the instruments and the absence of second-order autocorrelation, ensuring the reliability of the results.

Regarding the control variables, the results show that:

- Per capita economic growth reduces illicit financial flows, confirming the hypothesis that higher development strengthens institutions and limits capital flight.
- Trade openness and the availability of natural resources increase illicit financial flows, illustrating the vulnerability of sub-Saharan economies to illicit flows in a context of international integration and resource rents.
- Political stability, contrary to some expectations, tends to increase illicit financial flows, reflecting the consolidation of elites and the maintenance of capital flight networks under stable but opaque regimes.

Finally, the analysis of regional heterogeneity confirms that the positive effect of global economic uncertainty is robust to geographical disaggregation, even if the level of significance varies across regions. These results suggest that vulnerability to illicit financial flows is a systemic phenomenon, exacerbated by external shocks, and that it is not confined to a particular region of sub-Saharan Africa.

In summary, this study contributes to the literature by providing robust empirical evidence of the amplifying effect of global economic uncertainty on illicit financial flows in sub-Saharan Africa and by highlighting the central role of institutional and structural factors in the persistence of these flows. These findings have important implications for public policy, particularly regarding strengthening governance, financial transparency, and natural resource management, in order to limit illicit capital outflows and protect the region's economic development.

In response to the challenges posed by illicit financial flows, it is imperative to implement institutional reforms aimed at strengthening the effectiveness of tax and financial administrations, while fostering closer international cooperation to improve the transparency of cross-border transactions and enhance coordination among regulators. Furthermore, diversifying the sub-Saharan economy and reducing dependence on natural resources is essential to mitigating the vulnerability of local economies to these flows, as is establishing stricter regulations in sensitive sectors, particularly real estate, to promote more transparent governance and reduce incentives for corruption.

However, this study has certain limitations. While the measurements of illicit financial flows are based on recognized data, they remain approximate due to the clandestine nature of these operations. Furthermore, despite the use of multiple instruments and advanced methods, the potential endogeneity of some variables may not be entirely eliminated. These limitations open up avenues for future research: the integration of microeconomic data on financial transactions and firms, the study of the specific mechanisms by which global uncertainty influences capital flight behavior, and the examination of the interactions between institutions, political stability, and governance regimes in different African contexts.

Despite these limitations, our results highlight the importance of strengthening financial transparency, market regulation, and natural resource governance to limit illicit capital outflows. They represent a valuable contribution for policymakers and researchers seeking to understand and mitigate the structural financial vulnerabilities of African economies to global shocks.

Declarations

Author Contribution

Author Contribution Declaration: Conceptualization: Marius BENDOMA & José Claude NYAMOU MOKOMPEA, Methodology: Marius BENDOMA & José Claude NYAMOU MOKOMPEA; Formal analysis and investigation: Marius BENDOMA & José Claude NYAMOU MOKOMPEA; Writing – original draft preparation: Marius BENDOMA; Review and editing: Marius BENDOMA & José Claude NYAMOU MOKOMPEA; Supervision: Marius BENDOMA.

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Footnotes

1. The study considers thirty-nine Sub-Saharan African countries (listed in the appendix). For comparison purposes, we also include the Maghreb countries: Algeria, Egypt, Morocco, and Tunisia; to enable comparisons and to generalize the findings to the African continent as a whole (Table 7).
2. Organisation for Economic Co-operation and Development.
3. FATCA (2010) and the OECD's BEPS project (2013) have strengthened international tax transparency and cooperation, targeting respectively tax evasion by individuals and aggressive tax optimization by multinationals.