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Article

Foreign Direct Investment Inflows to Selected Sub-Sahara African (SSA) Countries Behaved Differently in The Global Financial Crisis of (2007-2008) Relative to Previous Global Financial Crises

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Abstract: This study investigated the behavior of foreign direct investment inflows to selected Sub-Sahara African (SSA) Countries during (2007- 2008) global financial crisis relative to previous financial crises. This study was motivated by the assertion that developing economies are immune to the financial and economic meltdown that originated in developed world in 2007. Specifically, the study examined whether the behavior of foreign direct investment inflow to SSA differs in the context of (2007-2008) global financial crisis compared with the previous global financial crises in the short and long-run situations. Using panel datasets from 26 SSA countries, the study explored non-stationarity and heterogeneous – based dynamic panel estimators namely, mean group (MG) and pooled mean group (PMG) to empirically implement the objective. The findings of the study amongst others revealed that foreign direct investment (FDI) inflows to SSA significantly differs in behavior in the context of the (2007- 2008) global financial crisis in the short and long run situations. The study suggests policy that may stabilize growth of FDI inflows, such as allowing free license of operation, maintaining exchange rate stability, improving the business climate and guaranteeing strong and stable macroeconomic performance. Thus, more foreign investors should be attracted, and trust in current ones would rise, which should increase investment opportunities and growth in the region. Therefore, greater attention should be given to FDI whenever global financial crisis is experienced.

Keywords: global financial crisis, foreign direct investment, foreign portfolio investment, developing economies, sub-saharan africa

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1. Introduction

The global inter-relationship among countries gave rise for countries to depend on one another in terms of trade, travel, and migration. The spread of cultural differences and the transmission of information and understanding have also occurred as a result of global economic interdependence. Using globalization as a basis, interdependence entails flows of resources across borders to aid in the attainment of sustainable development [1].

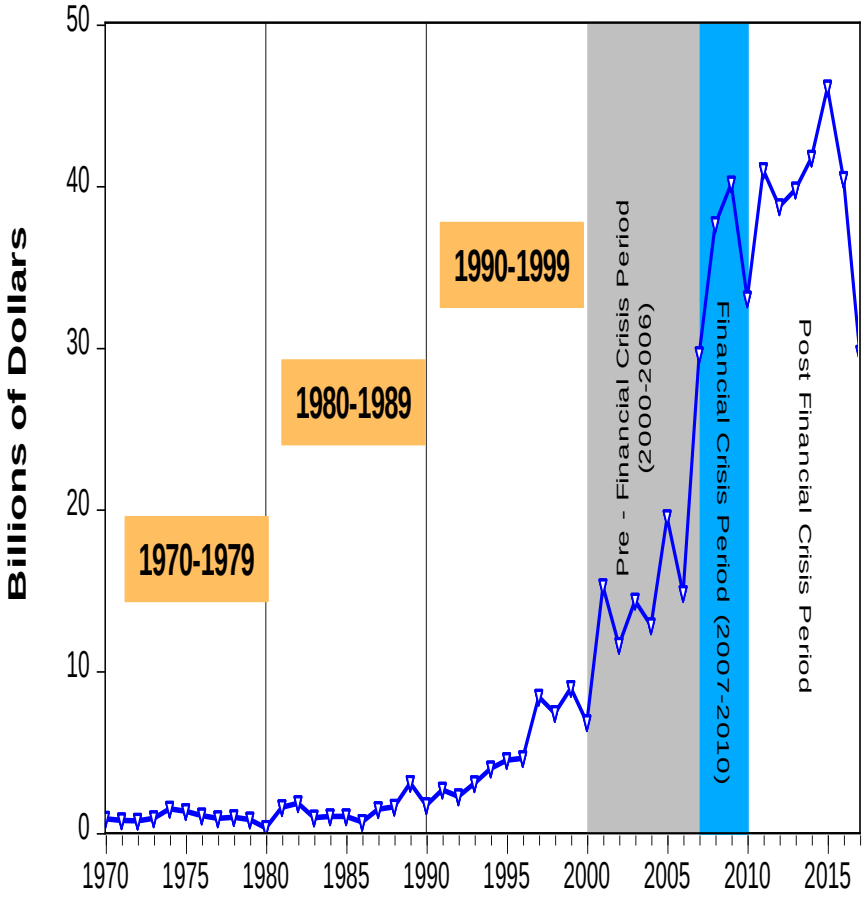
Two decades ago, capital flow globalization increased, particularly the globalization of Foreign Direct Investment (FDI). This confirmed the fact that less developed nations, where FDI has continuously been the most important and crucial part of capital flows, provided economic opportunities as well as technological capabilities [2].

Although Brunnermeier, Lane, and Dani [3] viewed capital flows as the financial counterpart to savings and investment decisions, in line with the narrative of capital flowing "downhills" from capital-rich countries with lower rates of return to capital-poor countries with higher returns. As noted by Ahuja [4], capital is defined as financial resources available for investment in productive activities. Foreign capital, therefore, refers to the capital (both real and financial) that originates from outside the domestic economy.

Jeffrey and Spraulding [5] and Obadan [6] stated that foreign investment inflows could be transmitted in the form of foreign direct investment (FDI), foreign portfolio investment (FPI), migrant workers' remittances, official development assistance (ODA) or foreign aid, and commercial loans (CL). Ndem, Okoronkwo, and Nwamuo [7] stated that the composition of foreign investment inflow to developing nations has shifted from commercial loans, ODA, and workers' remittances to foreign direct investment and foreign portfolio investment due to inadequate records and the passive nature of its operations. Hence, Obiechina [8] stated that foreign portfolio investment did not display any record to show its activities. Therefore, for the purpose of this study, FDI and FPI would be examined, but FDI is given more prominent attention because it is more significantly different from FPI inflow in selected Sub-Saharan African (SSA) countries during the 2007–2008 global financial crisis.

From the perspective of the Sub-Saharan African (SSA) region of the developing world, the region, according to Macias and Maasa [9], has enjoyed robust capital inflows over the past decades. Figure 1.1 shows the graphical view of how FDI inflow to SSA has been on an increasing trend over the years. It grew progressively from an average of $0.9 billion between 1970 and 1979 to about $1.3 billion between 1980 and 1989. The average inflow of FDI to SSA exceeded $4.7 billion in the 1990s by a wide margin compared to the size recorded in the 1970s and 1980s, respectively. However, the financial and economic meltdown, which started in advanced countries in August 2007, spread to other developing countries, including SSA, which was affected in the second-round effect. For instance, in the immediate pre-financial crisis periods ranging between 2000 and 2006/07, the FDI inflow to SSA appears to have been fluctuating. The up-and-down trends that characterized the inflow of FDI to SSA in the twentieth century tend to have lingered on until 2006. In conformity with the global inflows of FDI, which reached its historical height of about $2 trillion in 2007, the inflows of FDI to SSA also reached its historical height of about $30 billion in 2007.

Figure 1.1: Trends in FDI Inflow to SSA (1970-2017)



Source: Author's illustration based on UNCTAD database (www.unctad.org/fdi statistics)

The inflows of FDI to SSA increased by 124% in the year 2001, moving from $6.8 billion in 2000 to $15.2 billion in 2001, but later declined by 24% in 2002. Nevertheless, 2008 signaled the beginning of a new phase in the global evolution of FDI inflows. Several years ago, it was widely believed that 2008 marked the start of an economic crisis, first referred to as a financial and then an economico-financial crisis. This was a global crisis at the time but was actually a crisis of the old-world order that did not affect all world economies equally but completely rewrote global hierarchies [10].

In 2008, global FDI inflows plummeted by 16%, and then by 40% in 2009, due to the accompanying worldwide decline in real estate values, stock markets, consumer confidence, output, availability of financing, and global trade [11].

Figure 1.1 divides the crisis into three periods: pre-global financial crisis (2000–2006), during the global financial crisis (2007–2009), and post-global financial crisis (2010–2017). The table clearly shows that FDI inflows to SSA during the pre-global financial crisis period experienced fluctuations. Additionally, the global financial crisis period saw both robust and decreasing growth rates in FDI inflows to SSA countries. Furthermore, during the post-global financial crisis period, FDI inflows declined outright and were abysmal.

The 2008 global financial crisis is said to have stifled multinational firms' appetite for fresh foreign investment and bred a loss of interest among executives, leading to a shift away from high-risk projects (such as big infrastructure) toward safer assets (such as government bonds). While these factors, among others, seem to have prompted an immediate inverse reaction in global FDI flows, particularly in the developed world, FDI inflows to SSA, on the other hand, appeared relatively resilient to the crisis, at least in the early stages. However, while FDI inflows to SSA remained robust in 2008 and 2009,

growing at a decreasing rate, an outright decline in inflows was observed in 2010, and the trend has been abysmal since then.

There is no gainsaying that the setback in FDI flows attributed to the 2008 global financial crisis was severe in the developed world. However, the fact that FDI inflows to developing economies such as SSA were not entirely immune to the financial crisis but had only received little attention in the literature is significant. This is not entirely surprising, given that advanced nations were the most affected by the financial crisis, and its impacts on emerging economies like SSA were rather indirect. Unlike developed economies, most of which are donors of FDI, inflows of FDI to developing economies such as SSA represent a critical tool for encouraging investment, production, employment, infrastructure development, and poverty eradication. It, therefore, becomes imperative for researchers to investigate the extent to which the impact of the recent global financial crisis accelerated or retarded FDI inflows to SSA.

The macroeconomic finance literature stipulates that foreign direct investment has traditionally been less responsive to global financial crises than other forms of capital flows. This school of thought is based on the commonly held belief that foreign direct investment (FDI) was immune to the Latin American and Mexican crises of the 1980s, as well as the East Asian financial crisis of the late 1990s and early 2000s [12].

The high-interest mortgage crisis, which gave birth to a recession era in the United States of America in 2007-2008, was not expected to impact or be transmitted to developing economies. Consequently, the financial and economic catastrophe that resulted from the high-interest mortgage crisis was far worse than the Asian financial crisis of the 1990s or the post-September 11 global financial disaster of 2001 [13]. It was widely agreed that the global financial crisis of 2007-2008 was more severe than the Great Depression of 1929 for the world's financial system. It harmed the global real economy in ways that extended beyond the financial sector [14].

Global trade and financial flows have been identified as major transmission mechanisms for the crisis's influence on the global economy. Between 2007 and 2009, global FDI fell due to two primary factors that affected both domestic and international investment [15]. First, a decrease in corporate earnings and a rise in the cost of capital restricted enterprises' ability to invest. This was due to a reduction in the availability of financial resources as well as an increase in the cost of capital. Second, economic prospects had a detrimental impact on investment intentions, particularly in developed countries that were severely affected by the recession. As early as 2009, corporations saw significant risks, prompting them to reduce expenses and investment plans to become more resilient. The effects of these factors have since compounded. In nations and regions with varying levels of financial and economic interconnectedness with other parts of the globe, the impact of the crisis varied greatly in scale.

Many believed that Africa would be spared the worst effects of the financial crisis since its financial markets were not fully integrated with global financial markets or exposed to toxic assets in crisis-hit countries, particularly the United States [16]. Africa's economy was mostly unaffected by the first phase of the global financial crisis, which began in 2008. As a result, research on the impact of the 2007-2008 global financial crisis on capital inflows to Africa was lacking in the literature. Furthermore, a large body of research in finance literature has shown that foreign direct investment was not significantly affected by previous financial crises. This school of thought argues that foreign direct investment (FDI) did not react significantly to the Latin American and East Asian crises of the 1980s and 1990s [12].

Despite various policy measures taken by developed countries to curb the menace of the global financial crisis on foreign investment inflows, as well as measures implemented by developing or Sub-Saharan African (SSA) countries to protect their economies, SSA countries were nonetheless affected in the secondary phase of the crisis. In other words, the global financial crisis impacted SSA countries immediately after the crisis period (2007-

2008). The SSA region began feeling the impact in 2010 when foreign direct investment (FDI) inflows started to decline (Figure 1.1), primarily due to the consequences of policy measures taken by developed economies to reduce the engagement of transnational companies in host communities within SSA.

Review of Literature

Theoretical Literature

i) Macro-economic theories of FDI

The desire of developing countries in Sub-Saharan Africa (SSA) to enhance economic performance would be futile in the absence of foreign direct investment (FDI). In support of this, Lipsey [17] defines FDI as "a flow of foreign capital across national borders, from home to host countries, as measured by balance-of-payments numbers." Market size and growth rate (GDP), infrastructure, natural resources, and institutional variables like a country's political stability are all macro-level (country-level) factors that influence an economy's ability to attract FDI. Lipsey [17] also argues that the microeconomic perspective analyzes FDI incentives from the investor's point of view, which is equivalent to considering an investment decision at the firm or industry level. This section aims to provide a rationale for some of these FDI-determining factors in the empirical research that follows, examining FDI inflows to SSA.

Microeconomic Theories of FDI

The Early Neoclassical and Portfolio Investment Approaches

This theory suggests that interest rate differences are the primary cause for a corporation to go global. It also asserts that capital moves from countries with low returns on capital to those with high returns. The strategy is based on the premise of perfect competition and risk-free capital movement [18]. Hence, the portfolio theory of FDI incorporates return differentials and risk [19].

Foreign direct investment (FDI) relies on expected rates of return and risk, which is why the portfolio diversification theory is vital in explaining it. According to Agarwal [20], the portfolio method of analyzing FDI has the major advantage of being universally applicable.

Vernon's Product Life Cycle Theory of FDI

Vernon's central thesis is that the high level of revenue and demand in the United States compels it to innovate [21]. According to Vernon, manufacturing begins in a developed country and later shifts to a developing country. The decision on where to locate FDI is influenced by multinational corporations (MNCs) [22]. However, this theory applies only to new, innovative products and does not explain FDI in existing products already available in the market [21].

Internalization Theory of FDI

The internalization theory explains why multinational corporations (MNCs) expand and provides insights into the motivations for FDI abroad. International business scholars Buckley and Casson [23] have supported this approach for decades. This idea focuses on intermediate inputs and technology to provide an additional explanation for FDI. One of the primary reasons multinational corporations exist is to maximize profitability by conducting certain transactions within the company rather than between entities. This process, known as "internalization," reduces transaction costs while maintaining or increasing profitability. Market imperfections play a crucial role in driving internalization [24].

The Eclectic Theory of Dunning

Foreign direct investment (FDI) was extensively studied by Dunning [25]. One of Dunning's key contributions was the combination of two kinds of market imperfections required for FDI to take place, representing a breakthrough in FDI theory. It is important to note that Dunning's theory builds upon other existing theories. By providing a comprehensive framework, Dunning's eclectic theory contributes to our understanding of various types of foreign investment activities and the environments in which they occur.

This approach integrates multiple theories that examine FDI motivations, investment locations, and FDI as an internalization strategy.

Dunning constructed a blend of three different theories to explain FDI, which Denisia [26] refers to as the "eclectic theory." As a result, economists formulated the OLI paradigm—Ownership, Location, and Internalization—also known as the eclectic theory of FDI. Theoretically, according to Dunning, these components address critical questions such as how, why, and where FDI occurs. However, the theory has been criticized for its complexity, the large number of variables affecting its accuracy in making predictions, and the blurred distinctions between OLI and other concepts [27].

iii) The Kojima Theory

Direct investment, according to the Kojima hypothesis, is a method for transferring capital, technology, and management expertise from the country of origin to the country of destination [28]. Kojima highlighted resource orientation, labor orientation, and market orientation as the three most important drivers of overseas investment by corporations. He argued that foreign direct investment (FDI) was necessary to boost the competitiveness and efficiency of global markets and to improve industrial processes in countries with abundant natural resources. Unlike the "international business approach" to FDI, this is a "macroeconomic approach" or a "factor endowment approach". Kojima divides FDI into two categories: exports in short supply and imports in demand, where initial trade terms generate excess demand and supply. This type of FDI improves the economies of both the host and home countries [29].

v) Empirical Review of Literature

i) FDI Activities in Previous Financial Crises

Stoddard and Noy [30] analyzed FDI inflows and found that they tend to follow a pattern linked to financial crises. Using Arellano-Bond GMM estimation with a country-panel regression technique, the study indicated a detrimental impact of financial crises on inward FDI. Poulsen and Hufbauer [31] also examined FDI trends during crises and found that the 2008 global financial crisis led to a more severe FDI recession compared to past crises.

Takagi and Shi [32] studied the Asian financial crisis's impact on Japanese FDI flows between 1987 and 2008, finding that the crisis negatively influenced Japanese FDI in nine dynamic Asian nations. Similarly, Edgington and Hayter [33] examined Japanese FDI in manufacturing and found that while total FDI remained stable, short-term reductions were evident during the Asian financial crisis.

Desai et al. [34] investigated how foreign firms react when local currencies depreciate sharply. Using U.S. multinational data, they found that significant currency devaluation increases foreign firms' investments more than domestic firms. Aguiar and Gopinath [35] found that mergers and acquisitions (M&A) activity during crises aligns with the liquidity constraint theory, showing that firms with lower liquidity are more likely to be acquired.

Alfaro et al. [36] examined how FDI growth effects are linked to domestic financial markets, concluding that weakened banking sectors reduce FDI inflows. Athukorala [37] found that in five crisis-affected Asian countries (Thailand, Malaysia, Indonesia, Korea, and the Philippines), FDI remained relatively stable compared to portfolio investments. Cheong [38] found that exporters outperformed non-exporting domestic firms in sales, profitability, and operational capacity during crises.

Loungani and Razin [39] and Kim and Hwang [40] also confirmed that FDI remains more stable than portfolio investments during crises. Lipsey [41] found that while Latin American FDI inflows declined during the 1982 crisis, they remained positive. Graham and Wada [42] discovered that although Mexico's total FDI fell slightly, U.S. FDI inflows to Mexico remained stable.

Urata [43] and Lipsey [41] further analyzed Mexican FDI before and after the 1994 crisis, concluding that while total FDI dropped 15%, it remained less volatile than portfolio investments.

ii) FDI Activities in Recent Financial Crises

Odhiambo [44] studied FDI in Botswana, Kenya, Malawi, and Mozambique, finding that despite the global financial crisis, FDI in SSA countries increased due to natural resource-driven investments. Guris, Sacildi, and Genc [13] used Panel Tobit models to analyze FDI determinants in high-FDI countries and found that the 2008 crisis had no significant effect on FDI inflows.

Dorneana, Isan, and Oanea [45] studied Central and Eastern European countries, concluding that financial crises reduce FDI inflows significantly. Vintila [46] found that compared to past financial crises, FDI was more volatile in the 2008 crisis, indicating higher risk sensitivity. Mamata [47] analyzed India's real estate sector and found that FDI declined sharply due to the financial crisis.

Ucal et al. [48] analyzed 148 developing countries between 1995 and 2007 and found that financial crises negatively impacted FDI inflows. Alfaro and Chen [49] concluded that during the crisis, foreign firms outperformed domestic firms, suggesting FDI resilience during economic downturns.

UNCTAD [50] reported that FDI inflows to developed nations fell by 30% in 2008, while developing countries saw a 17% increase in FDI until 2009, after which FDI declined globally. UNCTAD [51] also surveyed global investment trends and found that MNCs became more cautious about FDI after the financial crisis.

FDI Activities under Different Types of Financial Crises

Esho and Verhoef [52] conducted a study on the effects of FDI, foreign aid, and trade between 1990 and 2017. Their study examined how FDI, trade, and foreign aid influenced poverty reduction in 29 Sub-Saharan African (SSA) countries, using a feasible generalized least squares (FGLS) model. They found that FDI and foreign aid had a detrimental impact on poverty reduction in the nations investigated, while trade played a positive role, particularly in emerging economies.

Joshua, Rotimi, and Sardokie [53] examined the impact of FDI on economic growth in 200 global economies between 1990 and 2018. Their study used Pooled Ordinary Least Squares (POLS), Dynamic Panel Estimation, and the Generalized Method of Moments (GMM). The results showed that FDI, debt stock, and official development assistance (ODA) significantly contributed to economic growth in SSA nations, highlighting FDI inflows as a critical factor for economic progress.

Joshua [54] used an Autoregressive Distributed Lag (ARDL) model to examine the relationship between GDP, FDI, and government spending in Nigeria. The empirical findings indicated that FDI inflows complement domestic resources, making them crucial for economic advancement.

Buchanan, Le, and Rishi [55] investigated the effect of FDI levels and volatility on institutional quality. A panel data analysis of 164 nations (1996–2006) indicated that FDI matters for strong institutional quality, as higher institutional quality attracts more FDI inflows.

Bogach and Noy [56] examined how FDI responded to different financial crises, using a cross-country sample of 44 developing nations (1987–2009). Their findings revealed that financial crises negatively impact inward FDI. Specifically, banking crises, inflation crises, hyperinflation crises, and external debt crises significantly reduced FDI inflows, including horizontal, vertical, and mergers & acquisitions (M&A) FDI. However, stock market crashes, currency crises, and local debt crises had only minor effects on FDI inflows.

Udoh and Egwaikhide [57] confirmed that exchange rate volatility and inflation uncertainty had a considerable negative impact on FDI inflows to Nigeria between 1970 and 2005. Similarly, Ezirim and Muoghalu [58] investigated exchange rate conditions and

Nigeria's external debt burden, employing four foreign investment models. Their findings suggested that external debt crises had a significant and positive impact, whereas currency crises and fluctuations in international oil prices had a significant and negative impact on Nigeria's investment burden.

Soliman [59] analyzed the impact of currency crises on FDI in emerging markets between 1966 and 2000, using an unbalanced panel of 48 developing nations. His research examined the sensitivity of US external non-bank FDI (FDI stock, affiliate sales, and the number of affiliates) in 21 emerging markets to currency crises. The study found that currency crises did not significantly reduce FDI inflows in these markets.

Blonigen [60] investigated the effect of exchange rate fluctuations on currency crises, predicting that FDI acquisitions involve the transfer of firm-specific assets, such as technology and managerial skills, which may increase or decrease in value depending on exchange rate movements. His findings aligned with earlier studies by Froot and Stein [61] and Klein and Rosengren [62], which argued that currency crises can have effects distinct from normal exchange rate fluctuations.

2. Materials and Methods

Theoretical Framework

The theoretical framework of this study is explored from three different perspectives. However, FDI is expressed as a function of cost-related factors (C), investment environment-improving factors (E) and macro-economic uncertainty. This is functionally expressed as follows;

FDIit = f(C, E, M)

Model Specification and Estimation Technique

From the theoretical literature reviewed, we specify our model in functional form as follows:

Where,

LBC = cost related factors in this regard include labour cost (LBC),

INTR = cost of capital, using interest rate (INTR) as proxy,

INFL = domestic inflation (INFL) representing inflation rate and;

EXR = exchange rate (EXR). Other variables that measure investment environment factors in the specification are;

MKZ = Market size (MKZ) proxy for host country population,

TOP = trade openness (TOP), while;

GDP = represents economic growth and;

IFR = denotes infrastructure.

The functional form model specification in equation (4.1) can be re-specified in an estimable form as follows:

$$FDI_{it} = \alpha + \beta_1 lbc_{it} + \beta_2 \text{intr}_{it} + \beta_3 \text{infl}_{it} + \beta_4 exr_{it} + \beta_5 mkz_{it} + \beta_6 top_{it} + \beta_7 gdp_{it} + \beta_8 ifr_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (4.2)$$

Again, the FDI remain as earlier defined for instance measured as a ratio of GDP, labour cost (LBC) is measured as nominal GDP per hour of work, while log of interest rate (INTR) is a proxy for cost of capital. Others are inflation rate (INFL) measured as log of consumer price index and log of exchange rate (EXR) as a proxy for relative price. The market size (MKZ) is measured via the population growth of the host country expressed in percentage changes, while trade openness (TOP) is measured as the sum of export and import as a ratio of GDP. The level of economic growth and infrastructure (IFR) representing investment environment factors in the specification, were captured via log of GDP and the number of telephones per 1,000 inhabitants, respectively. More importantly, the term r represent each cross-sectional unit or FDI recipient country in SSA,t denotes time period, capture country specific effect, is specific effect, while is the error term.

To achieve the study's objective which states, to examine whether foreign direct investment (FDI) inflows to SSA behaves differently in the context of (2007 – 2008) global

financial crisis relative to previous financial crises in the short and long run situations. The re-specified baseline model in equation (4.2) will be extended to capture the effect of previous financial crises for example the Asian financial crisis of 1997-1998 by introducing dummy variable D1, and D2 representing the previous prior to the 2007-2008 global financial crisis respectively.

$$FDI_{it} = \alpha + \beta_1 lbc_{it} + \beta_2 \text{intr}_{it} + \beta_3 \text{infl}_{it} + \beta_4 exr_{it} + \beta_5 mkz_{it} + \beta_6 top_{it} + \beta_7 gdp_{it} + \beta_8 ifr_{it} + \beta_9 D_1 + \beta_{10} D_2 + \mu_i + \lambda_t + \varepsilon_{it} \quad (4.3)$$

The concern here is on the mean value ( ) of the inflows of FDI. If appears to be greater (less) than , and significant, then it can be inferred that, relative to the previous financial crisis, the 2007-2008 global financial crisis is likely to enhance or reduce the inflows of FDI to SSA the more.

Descriptive Statistical Analysis of the Research Data

The result of the descriptive statistics is presented in the table below;

Tabel 1: Descriptive Statistics

Table 1A: Full –sample					
Variable	**No. Observation**	**Mean**	**STD**	**Minimum**	**Maximum**
FDI	858	3.128	6.972	-53.530	70.350
FPI	858	0.026	6.755	-88.880	116.600
Labour Cost (LBC)	858	30.480	22.650	4.884	85.840
Interest Rate (INTR)	858	17.170	10.750	4.737	113.300
Inflation (INFL)	858	68.840	42.530	0.014	342.200
Exchange Rate (EXR)	858	344.100	497.400	0.003	3,611
Market Size (MKZ)	858	2.575	1.090	-6.185	7.918
Trade Openness (TOP)	858	73.410	48.660	4.612	501.900
Growth (GDP)	858	29,377	75,448	240.100	464,282
Infrastructure (IFR)	858	26.590	39.850	0.000	162.000
Table 1(B): Pre –global financial crisis sample					
FDI	572	3.260	7.406	-53.534	70.355
FPI	572	-0.051	1.431	-5.769	11.615
Labour cost (LBC)	572	28.885	21.992	4.884	81.866
Interest Rate (INTR)	572	17.725	10.635	4.737	113.308
Inflation (INFL)	572	45.807	24.761	0.014	91.910
Exchange Rate (EXR)	572	278.189	362.631	0.003	2142.302
Market Size (MKZ)	572	2.589	1.228	-6.185	7.918
Trade Openness (TOP)	572	68.568	52.626	4.612	501.905
Growth (GDP)	572	22,343	55,293	240.10	340,238
Infrastructure (IFR)	572	3.510	9.260	0.000	80.345
Table 1(C): Post –global financial crisis sample					
FDI	286	2.865	6.013	-21.589	51.079
FPI	286	0.181	11.535	-88.878	116.568
Labour cost (LBC)	286	33.666	23.633	6.434	85.838
Interest Rate (INTR)	286	16.068	10.906	4.752	60.000
Inflation (INFL)	286	114.914	31.869	65.006	342.179
Exchange Rate (EXR)	286	476.004	674.094	0.935	3611.225
Market Size (MKZ)	286	2.547	0.744	0.069	4.183
Trade Openness (TOP)	286	83.097	37.800	31.229	242.983
Growth (GDP)	286	43,444	103,411	793.83	464,282
Infrastructure (IFR)	286	72.754	37.360	3.401	161.994

Note: STD denotes standard deviation.

As evident in the B & C parts of table 1, we further partitioned the sample into pre - GFC and post - GFC periods. We found the average inflow of FDI as a ratio of GDP to be 3.26% in the period before the global financial crisis compared to 2.86% during and after the GFC period. This portends that the average inflows of FDI into SSA for the period under consideration was relatively higher in the pre – GFC period compared to the post – GFC period. With respect to the FPI, the exact reverse was the case. More so, the standard

deviation statistical value of 7.40% reveals FDI as relatively the most volatile in the pre – GFC period compared to the standard deviation statistic of 1.43% for FPI in the same period was the other way round in the post- GFC period, where the FDI was the least volatile compared to FPI. Again, the market size has the same minimum and maximum statistical values for both the full – sample and pre – GFC sample mainly reflect the fact that both the maximum and minimum values of the series in its current sample holds in the period before GFC.

Unit Root Test

Unit Root Test Results

The applicability of the dynamic heterogeneous panel data model was primarily influenced by the variable's likely non-stationarity. In this regard, we apply the traditional panel data modeling approach for large time series (T) dimensions by subjecting relevant variables such as FDI, FPI, INTR, INFL, LBC, EXR, MKZ, TOP, GDP, and IFR to stationarity tests. The current study employed four different types of panel unit root tests for robustness.

Panel unit root tests that assume a common unit root process include Harris and Tzavalis [63], Breitung [64], and Levin et al. [65]. Conversely, Im et al. [66] and Maddala and Wu [67] assume individual unit root processes. In contrast, Pesaran [68] tests the null hypothesis of unit root with cross-section dependence, while Hadri [69] employs a Lagrange Multiplier test, testing the null hypothesis of no unit root under a common unit root process. Based on their assumptions, these tests classify variables as stationary (fourth type) or non-stationary (first, second, and third types).

Starting with capital flow measures, the unit root test results indicate that both FDI and FPI are stationary at level, exhibiting zero order of integration [I(0)] across various unit root tests. The only exception was for FPI under IPS, which showed non-stationarity. Among the independent variables, the unit root test results varied across different variables and test methods.

For LBC and MKZ, the former was stationary under LLC, while the latter was stationary under ADF-Fisher tests. However, these series exhibited higher-order integration (I(1)) when tested with Breitung, HT rho, IPS, and Hadri Z statistics.

For economic growth (GDP), infrastructure (IFR), and trade openness (TOP), the different unit root tests consistently classified these variables as I(1), indicating higher-order integration. However, for interest rate (INTR), exchange rate (EXR), and inflation (INFL), the results were mixed, with some tests classifying these variables as stationary at level [I(0)] and others as exhibiting higher-order integration [I(1)].

The findings, as documented in Tables 2a and 2b, reveal that the stationarity status of the series varies across different tests, but mainly hovers around I(0) and I(1) orders of co-integration. This validates the appropriateness of the panel Autoregressive Distributed Lag (panel-ARDL) model, which accommodates variables of different orders of integration within the same modeling framework, making it the preferred estimation method for this study.

Macroeconomic variables frequently change due to economic activity disruptions. To avoid erroneous analysis, stationarity tests were conducted using the Levin, Lin, and Chu (LLC) [65] and Im, Pesaran, and Shin (IPS) [66] methods. The results, presented in Tables 1a to 1c, indicate a mixed order of integration across all regions under investigation.

Table 2: Panel Unit Root Tests Results

Table 2a: Null Hypothesis: Unit Root with common process (LEVIN, LIN & CHU, 2002) LLC.

Result for Levin, Lin & Chu (2002) LLC unit root test

Variables	t-statistic	1% critical value	5% critical value	10% critical value	**P/value**	Order of integration
DFDI	-22.7601	-14.545			0.0000	1(0)

DFPI	-8.5936		-1.663		0.0481	1(0)
DLBC	-21.4941	-13.746			0.0000	1(0)
DMKZ	-16.4524	-13.554			0.0000	1(0)
DGDP	-16.9485	-8.889			0.0000	1(1)
DINTR	-8.5867	-3.101			0.0010	1(0)
DEXR	-7.2710	-4.373			0.0000	1(0)
DINFL	-7.7507	-6.764			0.0000	1(0)
DTOP	-20.3416	-11.855			0.0000	1(1)
DIFR	-11.8555		-1.721		0.0000	1(1)

Source: Author's computation from STATA 13.0 estimation result

Table 4.2b: Panel Unit Root Test Results

Table 4.2b: Null Hypothesis: Unit Root with individual unit root process, Augmented Dickey Fuller (ADF) Fisher unit root test.

Augmented Dickey Fuller (ADF) unit root test

Variables	t-statistic	1% critical value	5% critical value	10% critical value	**P/value**	Order of integration
DFDI	-3.422	-3.608			0.0004	1(0)
DFPI	-7.8877	-6.317			0.0000	1(1)
DLBC	-3.2649	-3.195			0.0007	1(1)
DMKZ	-4.8817	-4.633			0.0000	1(0)
DGDP	-2.6345	-2.626			0.0047	1(1)
DINTR	-5.2551	-5.301			0.0000	1(1)
DEXR	-3.9792	-3.908			0.0001	1(0)
DINFL	-3.5211	-3.501			0.0003	1(1)
DTOP	-2.1472		-2.250		0.0168	1(1)
DIFR	-3.5014		-2.226		0.0003	1(1)

Source: Author's computation from STATA 13.0 estimation result

Short and long Run Results for Baseline model estimation

Table 3: Empirical Estimates from Baseline

	Mean Group (MG) Estimator		**Pool Mean Group (PMG) Estimator**	
	Coefficient	**Standard Error**	**Coefficient**	**Standard Error**
Long-Run Estimates				
LBC	-0.0409	0.0371	-1.1921**	-0.3234
MKZ	-2.0942*	0.1103	-0.5060	0.1557
GDP	1.1370	0.0308	0.9140***	0.0084
INTR	4.8446	5.9561	0.5060	0.5495
EXR	0.2229	2.8695	0.6711	0.5362
INFL	9.2792	5.6944	0.0994	0.5753
IFR	0.1356	0.0903	0.0178**	0.0049
TOP	0.2286**	0.0871	0.0578**	0.0019
Short-Run Estimates				
Constant	18.8159***	6.5899	31.8524***	2.6202
ΔLBC	-0.9339	0.9859	-0.7351**	0.3172
ΔMKZ	3.8307	2.4879	0.7896	7.9837
ΔGDP	4.6511	4.0236	1.4827	1.8918
$\Delta INTR$	4.6573	10.7015	1.2052	5.4938
ΔEXR	-2.7839	5.4000	1.4248	2.7018
$\Delta INFL$	-0.3949	11.3089	1.0858	8.1336
ΔIFR	0.2353	0.1530	0.7536**	0.1479
ΔTOP	-0.1063	.1860	0.0580**	0.0192
ECM	-0.3597***	0.0071	-0.1579***	0.0056

Hausman test $-\chi_k^2$	2.8800 (0.9414)

Standard errors are indicated and level of significance are such that *** p<0.01, ** p<0.05, * p<0.1

3. Results

Results of Model with Traditional Determinants of Inflows of FDI

Table 3 presents the empirical results obtained from the estimation of the study's baseline model in equation (4.3) using Mean Group (MG) and Pooled Mean Group (PMG) panel estimation techniques. To determine which is the more appropriate estimator between MG and PMG, the study began by using Hausman test whose result was 2.8800 as coefficient and 0.9414 as the standard error showing an insignificant relationship as an indication that the Hausman test result supports the non-rejection of the null hypothesis of the PMG as the more appropriate estimator as against MG which is the alternative. Even though the empirical results in Table 3 included estimates from both the MG and PMG, this study focused its discussion and analysis on the implication of the empirical finding based mainly on empirical estimates obtained using PMG. Thus, we focus on interpreting and analyzing the results based on PMG as being established as the more appropriate estimator as determined using the Hausman test.

Starting with the Error Correction Model (ECM), the negative coefficient of -0.1579 and positive standard error of 0.0056 shows both negative and significant relationship, thus supporting the potential of long run relationship between the FDI and its various determinants being considered. This also implies the reversibility of FDI to equilibrium adjustment state of 16% per unit of time after a shock to it in the long-run.

Determinants of FDI in Sub-Saharan African (SSA) Countries

Labour Cost (LBC) and FDI Inflows

Labour cost (LBC) significantly impacts FDI inflows in Sub-Saharan African (SSA) countries. The coefficient elasticities indicate that a 1% increase in labour costs reduces FDI inflows by 0.73% in the short run and 1.19% in the long run, as shown by the negative coefficient at a 5% significance level. This negative relationship aligns with economic theory, which suggests that higher labour costs discourage FDI inflows, while lower labour costs enhance FDI attractiveness. This finding is consistent with previous studies by Alavinasab [70], Okafor et al. [71], and Mfinanga [72], which support the notion that labour costs adversely impact FDI inflows in developing economies.

Market Size (MKZ) and FDI Inflows

Market size (MKZ), proxied by population growth, has a positive coefficient of 0.7896 in the short run and a negative coefficient of -0.5060 in the long run, but both are statistically insignificant. This implies that while MKZ initially encourages FDI inflows, its long-term effect is negative and insignificant. The study confirms that FDI inflows are not solely influenced by the market size but rather by economic strength, measured through Per Capita Income (PCI) and GDP growth. This assertion is validated by the positive and significant relationship of GDP with FDI inflows in the long run, as reported in Table 3.

GDP Growth and FDI Inflows

GDP growth plays a crucial role in attracting FDI. In the long run, GDP has a positive and statistically significant coefficient of 0.9140, implying that a 1% increase in GDP enhances FDI inflows by 91%. This result supports a priori theoretical literature, which states that host country GDP is a critical determinant of FDI. The findings align with previous empirical studies, including Hejazi [73], Medvedev [74], and Kahouli and Kadhraoui [75], which confirm that GDP growth strongly influences FDI inflows in developing economies.

Interest Rate (INTR) and FDI Inflows

The empirical results show that interest rate (INTR) has a positive but statistically insignificant impact on FDI inflows in SSA in both the short and long run. While economic theory suggests that higher interest rates deter FDI and lower interest rates encourage FDI, the estimated results indicate that INTR does not significantly influence FDI inflows in SSA.

Exchange Rate (EXR) and FDI Inflows

The estimated results indicate that exchange rate (EXR) has a positive but statistically insignificant relationship with FDI inflows in both the short and long run. According to a priori expectations, when the domestic currency appreciates, FDI inflows should decrease, and when the currency depreciates, FDI inflows should increase—implying an inverse relationship between EXR and FDI inflows. However, the empirical results suggest that EXR has no significant impact on FDI inflows in SSA.

Inflation (INFL) and FDI Inflows

Inflation (INFL) is expected to have an inverse and significant relationship with FDI inflows. However, the empirical results indicate that INFL has a positive and statistically insignificant effect on FDI inflows in SSA. This implies that inflation does not significantly influence FDI inflows in SSA countries.

Trade Openness (TOP) and FDI Inflows

Trade openness (TOP) plays a vital role in attracting international capital and FDI to host countries. However, it can also increase competition between foreign and domestic enterprises. The empirical results indicate that TOP has a positive and significant relationship with FDI at the 5% significance level, with coefficients of 0.580 in the short run and 0.0578 in the long run. This implies that a 1% increase in trade openness results in a 0.05% rise in FDI inflows in both the short and long run.

Infrastructure (IFR) and FDI Inflows

Infrastructure (IFR) is a crucial determinant of FDI inflows. It includes roads, ports, railways, telecommunications, and institutional development (e.g., legal services, accounting services, etc.). A well-developed infrastructure enhances productivity potential and improves investment attractiveness. The empirical results indicate that IFR has a positive and significant impact on FDI, with coefficients of 0.7536 in the short run and 0.0178 in the long run, both significant at the 5% level. This implies that a 1% increase in infrastructure enhances FDI inflows by 0.75% in the short run and 0.01% in the long run. This finding suggests that infrastructure development plays a crucial role in attracting FDI inflows in selected SSA nations.

To determine how FDI behavior in (2007-2008) global financial crisis differs from that of the previous crises periods

Table 4: Empirical Estimates from model with the role Global Financial Crisis

	Foreign Direct Investment (FDI)		**Foreign Portfolio Investment (FPI)**	
	Coefficient	**Standard Error**	**Coefficient**	**Standard Error**
Long-Run Estimates				
LBC	-0.0453**	0.0194	0.2460	1.1442
MKZ	0.3850	0.1310	0.6118**	0.2444
GDP	1.7260***	0.5680	0.9515***	0.2317
INTR	-0.0300	0.5250	0.0102**	0.0045
EXR	1.1930**	0.5370	0.7147*	0.3272
INFL	-0.5560**	0.1020	-1.0600**	0.8002
IFR	0.0484**	0.0061	0.6224**	0.2020
TOP	-0.0024	0.0037	0.5144	1.0123
Short-Run Estimates				
Constant	20.3400***	1.9490	21.009***	11.229
GFC	-0.4302**	0.0126	-0.8782***	0.2122

ΔLBC	0.3160	0.6890	0.0111***	0.0009
ΔMKZ	0.8380**	0.3560	2.9211	2.9942
ΔGDP	1.6201	1.3401	0.1442	2.0101
$\Delta INTR$	1.2770	5.3300	-0.8881**	0.4213
ΔEXR	2.2300	2.6040	2.1102	1.9980
$\Delta INFL$	0.4290	6.5870	-0.0466**	0.0111
ΔIFR	0.0747**	0.0100	0.2811	0.7221
ΔTOP	0.0565**	0.0219	0.6121***	0.0166
ECM	-0.1731***	0.0368	-0.5011***	0.1921

Standard errors are indicated and level of significance are such that *** p<0.01, ** p<0.05, * p<0.1

Results of Model with the Role of Global Financial Crisis in the Inflows of FDI

So far, the authors have empirically investigated the inflows of FDI to SSA without taken cognizance of the GFC. Thus, the focus of this sub-section is to understand the extent to which the inflow of FDI is affected by 2007-2008 global financial crisis. Thus, presented in Table 4 is the empirical results obtained from the estimation of the model that accounts for the role of global financial crisis in the investigation of FDI inflows to SSA. Similar to our earlier finding, the ECM results in both the FDI and FPI models that controls for global financial crisis are negative and significant, which is an indication that the evidence of equilibrium and long run relationship between the independent variables namely, FDI and FPI and their respective determinants. To this end, the coefficient elasticities would be considered for both the short and long run situations.

Quite an important finding in Table 4 is the evidence of statistical significance of the coefficients on global financial crisis (GFC) both in FDI and FPI models respectively. Beyond this, however, the concern here is to determine the additive mean value of FDI and FPI individually and compare them to their respective mean values in the model without a dummy or GFC variable (i.e., is greater (less) than). The objective of this study is to determine the extent to which the 2007–2008 global financial crisis (GFC), captured using a dummy variable, slowed down or accelerated FDI inflows to Sub-Saharan Africa (SSA). To achieve this, the study compared the additive mean values given by the sum of the coefficients on the constant variable and the coefficient for GFC in Table 4, relative to the mean value of the coefficient on the constant variable in the same table.

The results indicate that (C + GFC) in Table 4 is (20.34 + (-0.430)) = 19.91, compared to 31.85, which represents the mean FDI inflow to SSA before the 2007–2008 financial crisis. This empirical evidence suggests that FDI inflows to SSA were relatively lower during the global financial crisis compared to previous financial crises and pre-crisis periods (before 2007–2008).

This finding contradicts the widespread hypothesis that developing economies such as SSA were immune to the 2007–2008 global financial crisis [76], [77]. Specifically, the evidence of relatively lower FDI inflows to SSA during the GFC period suggests a negative impact of the global financial crisis on FDI inflows to SSA, a conclusion consistent with previous studies such as Dornean et al. [78].

4. Conclusion

This study empirically examined whether FDI inflow to SSA differs in the structure of (2007-2008) global financial crisis in the short and long-run situations from 1985 to 2017. Haven shown that the variables under consideration are characterized with mixed order of integration, the study explore a non-stationarity and heterogeneity panel data estimators capable of accounting for such mixed order of integration as well as heterogeneity often associated with panel data with large time series dimension. Empirically, the study found that of all the traditional determinants of the inflows of FDI, labour costs, economic growth, infrastructure and the openness of trade are consistently

the most significant variables for explaining the dynamics of FDI in SSA relative to other factors such as interest rate, exchange rate and inflation nonetheless the period before, during or after the financial crisis.

The empirical evidence of declining in the inflows of FDI to SSA during the period of financial crisis when compared to the period before the crisis in the short and long run contradicts the wide-spread assertion that developing economies such SSA are immune to the impact of the crisis. To put it differently, comparing the period before the recent (2007 – 2008) financial crisis as well as the previous episodes of financial crises, the relatively declining effects of the (2007-2008) GFC on FDI is an indication that the SSA might have not been shielded from the secondary effects of the crisis. Originated in the developed world though, the spread of the global financial crisis has led to a slowdown of FDI inflows to SSA, thereby subjecting to risk the potential growth benefits expected to be accrued from the recent surge in FDI. In addition to our findings of evidence of relatively lower inflows of FDI to SSA during the period of the financial crisis as against the period before the crisis, which is an indication of adverse impact of the crisis on FDI, the study concludes that foreign direct investment (FDI) inflows to SSA significantly differs in the context of the (2007-2008) global financial crisis in the short and long-run situations.

Policy Recommendations

This study recommends the policies that may stabilize growth of FDI inflows, such as allowing free license of operation, maintaining exchange rate stability, improving the business climate, and guaranteeing strong/stable macroeconomic performance. Thus, more foreign investors should be attracted, and trust in current ones would rise, which should increase investment opportunities and growth in the region. Therefore, greater attention should be given to FDI whenever a global financial crisis is experienced.

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