



DETERMINANTS OF FOREIGN DIRECT INVESTMENT INFLOWS TO SUB-SAHARAN AFRICA

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ABSTRACT

As government assistance shrinks, foreign investment (FDI) is becoming an increasingly important source of funding for Africa. SSA is the only rising region that has attracted foreign direct investment. Increased returns on investment and improved infrastructure benefit non-SSA countries, whereas SSA countries do not. The goal of the study was to determine what factors influence the flow of foreign direct investment into Sub-Saharan Africa. The analysis was conducted using World Bank World Development Indicators from 1996 to 2020. Both standard least squares and modified ordinary least squares approaches were used in the analysis. According to the conclusions of the study, research and development has a negative impact on investment in Sub-Saharan Africa, whereas human development has a favourable impact. The findings suggest that governments should strengthen and defend policies that assist the private sector in attracting new investment in order to boost economic growth. The country's human capital must be strengthened in order to achieve growth.

KEYWORDS: *Foreign direct investment, institutional quality, business environment, FMOLS, OLS estimation, Sub-Saharan Africa*

1.0 INTRODUCTION

Foreign direct investment (FDI) inflows to Africa were US\$1.26 billion in 1970 (the first year for which FDI figures were available), rising to US\$55.04 billion in 2010. Foreign direct investment (FDI) inflows have increased by 4,268 percent in nominal terms during the last 40 years. It is critical to contextualise Africa's performance in order to acquire a comprehensive understanding of the situation. Things are drastically different in this scenario. Inflows of foreign direct investment into Africa peaked at 9.5 percent in 1970, then fell to 4.4 percent in 2020. Indeed. From 1970 to 2010, FDI inflows to poor countries declined in a similar way, with Africa accounting for only 9.6% of total FDI. Despite the fact that Africa's overall attractiveness has improved in absolute terms, it remains less attractive to FDI than other developing regions. So, how might African countries increase their FDI inflows? This is an important topic since FDI might play a vital role in the continent's progress. Foreign direct investment (FDI) can assist both imports and exports, as well as domestic investment and technology transfer.

As Africa's net government development financing diminishes, foreign direct investment (FDI) is becoming an increasingly important source of capital. From 5.3 percent in 2005 to 4.2 percent in 2008, and then to 3.2 percent in 2020, Africa's average net ODA as a percentage of GDP fell (Indicators of World Development). As many Western donor countries are struggling financially, aid to Africa and other developing regions will be reduced. In spite of a drop in Africa's ODA, the continent's development financing needs have not reduced. According to current projections, Africa will require 186 billion dollars each year to achieve its post-2015 development goals (Bhushan et al. 2013).

Several factors influence the impact of institutional development on FDI in Sub-Saharan Africa (SSA). The economic climate in developing countries has changed dramatically as a result of technology transfer and market liberalisation in the 1980s (Ullah and Arshad 2017). Other elements that have influenced this policy shift include foreign direct investment (FDI) regulation and the ease of doing business. Second, as a result of these changes, foreign direct investment (FDI) into emerging countries began to rise. Because of the richness of natural resources and the quick growth of economies in this region, Sub-Saharan Africa attracted US\$11 billion in FDI in 2001 and US\$36 billion in 2016 (Bartels et al. 2009). Rodríguez-Pose and Cols (2017) found that Angola, Mozambique, Nigeria, and Ghana got 43 percent of all FDI delivered to the SSA area in 2020, making them the top recipients. Third, FDI to the region fell 10% to US\$32 billion in 2019, owing to lower investment flows in South Africa, Nigeria, and Ethiopia (Awadhi et al. 2022). Many rising countries are unable to accelerate their economic growth due to a lack of foreign



direct investment (FDI) (Trentini 2021). In developing countries, particularly in Sub-Saharan Africa (SSA), inadequate institutional structures, as well as political and economic risks, have been highlighted as contributory causes (Ezeoha and Cattaneo 2012). According to Alfaro et al. (2008), weak institutional quality countries are more likely to get slower capital flows from wealthy countries. To summarise, Sub-Saharan Africa (SSA) continues to get the least share of global foreign direct investment (FDI).

2. LITERATURE REVIEW

Almost majority of the research focused on foreign direct investment in Africa and Sub-Saharan Africa (SSA). FDI flows to Africa are influenced by a number of factors, according to Morisset (2000). In addition to Africa's enormous natural resources and large market size, African governments may be able to attract more foreign direct investment through strengthening the business climate (FDI). According to the author, an FDI barometer can be used to determine if the business climate is favourable to FDI. The study looked at 29 nations in Sub-Saharan Africa from 1990 to 1997, using both cross-sectional and panel data. Asiedu (2002) examines the relative relevance of natural resources and market size in drawing foreign direct investment to Sub-Saharan Africa, taking into account government policies, host nation institutions, and political instabilities. The majority of foreign direct investment (FDI) goes to countries with large populations or significant natural resources. Countries with well-developed infrastructure, an educated workforce, stable macroeconomics, FDI openness, an effective legal system, low corruption, and political stability attract foreign direct investment (FDI). Small and resource-poor countries can benefit from improved institutions and policies to attract foreign direct investment (FDI). From 1984 through 2000, the study examined annual panel data from 22 nations in the Southern Hemisphere (SSA).

In terms of attracting FDI, only SSA stands out among developing areas. Non-SSA countries profit from increased returns on investment and enhanced infrastructure; SSA countries, on the other hand, do not. However, trade openness is beneficial to both nations, but SSA has a smaller marginal advantage. To conduct this cross-sectional analysis of data from the developing nations during 1988–1997, we used the following data: (32 in Sub-Saharan Africa and 39 elsewhere). Asiedu (2004, 2006) examine the relative success of SSA in attracting FDI and improving the FDI environment in comparison to other emerging economies. Over time, the author claims, SSA has been less appealing to FDI than other developing regions since there have been less improvements. SSA saw minimal institutional change, infrastructural expansion, and FDI regulatory environment liberalisation between 1980–89 and 1990–99; but, SSA's reforms pale in comparison to those of other developing countries.

According to Bende-Nabende (2002), long-term FDI inflows into Sub-Saharan Africa can be influenced by a number of factors. The most important long-term predictors of FDI in SSA are market growth, export orientation, and FDI liberalisation, according to a cointegration analysis of 19 SSA nations. The current exchange rate, market volume, and market openness are all calculated after that. Since 1970 to 2000, the study has covered the period of time. In 2003, Lemi and Asefa analysed Africa's economy's dependence on foreign direct investment. Investigations are conducted on FDI flows to Africa from all nations, including the United States, as well as manufacturing and non-manufacturing FDI from the United States. Both the types of FDI and their origins, as well as the effect of these flows' uncertainty, are linked. The research period spans from 1987 to 1999.

Yasin (2005) used panel data to examine government development assistance and foreign direct investment (FDI) in Sub-Saharan Africa between 1990 and 2003. Development support from one country to another is inextricably tied to foreign direct investment (FDI). Foreign direct investment has no association with a country's GDP per capita growth rate, composite risk rating, or political freedom and civil rights index (FDI). Anyanwu (2012) conducts research on African FDI. If a country's market size is open to commerce, the rule of law, foreign aid, natural resources, and previous FDI, FDI influx will be beneficial. Financial development, on the other hand, has a detrimental effect on FDI inflows. The study analysed data from 53 nations between 1996 and 2008.

In Dupasquier and Osakwe (2006), analyse the performance of foreign direct investment (FDI) in Africa, as well as its promotion and future prospects. Political and macroeconomic instability, low growth, weak infrastructure, bad governance, hostile regulatory environments, and ill-conceived investment promotion schemes all contribute to the region's poor FDI record. Anyanwu and Yameogo (2015), on the other hand, used data from that era to investigate the drivers of FDI to West Africa from 1970 to 2010. The data show a U-shaped link between FDI flows and development-related factors in the subregion. FDI inflows have been shown to be negatively impacted by a number of factors, including the loan component of official development assistance and lending to the private sector. Each of the publications we've looked at so far has put in a significant amount of effort. However, there are three major flaws in these papers.

To begin, most studies on the factors that influence foreign direct investment (FDI) in Africa rely on cross-sectional data and ignore endogeneity issues. Cross-sectional data, on the other hand, make it impossible to account for country and time fixed effects, leading to estimation bias due to missing variables. Rather of providing a complete picture, many studies rely on data from the 1980s, 1990s, and early 2000s. Only Bende-Nabende (2002), Anyanwu (2012), and Anyanwu and Yameogo (2015) use data that goes back to the 1970s but only up to 2000; Anyanwu and Yameogo (2015) use data that goes back to the 1970s but only up to 2010 but only for West African countries. The length of the analysis period is likely to have an impact on the findings of the investigations. Third, the current articles only cover a few African countries. Indeed, the majority of the studies cover between 11 and 32 countries.



2. 1 Overview of FDI inflows to Sub-Saharan Africa

The 1970s oil crises are believed to have reduced FDI to an average of \$22.6 million between 1975 and 1979, down from \$24.4 million between 1970 and 1974. Foreign direct investment (FDI) has been increasing since the 1980s, reaching a new high of \$1.06 billion per year between 2005 and 2009. If the recent global economic crisis had not occurred, Africa's average FDI inflows would have been higher between 2005 and 2009.

Contrary to common assumption, FDI inflows into Africa increased at a quicker rate than in previous years between 1995 and 1999. Between 1995 and 1999, the region got an average of \$170 million in FDI per year, according to World Bank data. Since the mid-1990s, Africa has seen a rise in FDI inflows as political and economic conditions have improved. FDI inflows into all African subregions have expanded considerably since the mid-1990s, according to data. With the exception of 1975–79 and 1985–89, subregional statistics reveal that Eastern Africa has continuously received the least FDI. Over the last two decades, South-eastern Africa has received the least foreign direct investment. According to the data, there was no leading subregion in terms of FDI attractiveness prior to the 1980s. Since the 1980s, northern Africa has had a substantial source of foreign direct investment (FDI). Southern Africa was the primary source of foreign direct investment in the beginning (FDI). In the early 1970s, Central Africa received an average of \$15.7 million in foreign direct investment (FDI). Central Africa experienced continuous increase in foreign direct investment (FDI) until the early 1990s, when it began to decline. Political instability and civil wars in Central Africa in the early 1990s may have contributed to a decrease in FDI inflows to the region. During the second part of the 1990s, oil and mineral extraction increased in many Central African countries. As a result, Eastern Africa has been seen as inferior to the rest of Africa for a long time. Eastern Africa's potential to attract foreign direct investment has been hampered by political instability and communist ideology (FDI). In the 1980s, there was an increase in foreign investment in Eastern Africa.

Northern Africa has continuously surpassed the rest of Africa throughout history. FDI inflows to Northern Africa averaged more than three times the African average between 2005 and 2009, despite the recent global crisis and Arab Spring events having a substantial influence. Northern Africa is an attractive target for foreign direct investment due to its natural resources (oil and gas) and closeness to Europe (FDI). South Africa's apartheid government, which lasted from 1975 to 1979 and then again from 1985 to 1989, was a major source of FDI outflows in the region. Apartheid's impending fall, on the other hand, has led in a massive rise in FDI flows into the Southern African sub-region, which peaked in the mid-1990s. Between 1995 and 1999, Southern Africa outperformed the rest of the continent on average.

Investments in Western Africa increased from \$26.7 million in 1970 to \$40.1 million from 1975 to 1979 before dropping back to \$26.9 million in the early 1980s (on an annualised basis). Between 1985 and 1989, FDI steadily increased, reaching a total of US\$613 million between 2005 and 2009, albeit well below the continent's average. Western Africa has been plagued by civil wars and political upheaval since the early 1980s, hampering its economic development. During the years 1974–75, West Africa attracted more foreign direct investment than any other African subregion. According to sources, foreign direct investment flows into Western Africa are still shaky in the aftermath of recent events. Despite Senegal and Sub-Saharan Africa's successful democratic transitions and political stability, the governments of this area have a long way to go before they can be deemed attractive to international investors.

The 2021 World Investment Report places a premium on investing in a long-term recovery from the epidemic. The study discusses FDI and recovery-phase investment goals, as well as the global impact of the COVID-19 pandemic on FDI. Due to the pandemic's complex health and economic consequences, FDI into and out of Africa has been considerably limited. Between 2019 and 2020, however, Africa's share of global FDI inflows to emerging nations fell from 6.3 percent to 5.9 percent. COVID-19 had a severe effect on investment both globally and regionally, despite the fact that FDI inflows were already dropping. Between 2019 and 2020, Sub-Saharan Africa witnessed a 12% decline in FDI, however select countries saw a rise. As a result, FDI inflows to Central Africa increased to \$9.2 billion, up from \$8.9 billion a year before. East Africa and southern Africa both recorded a 16% decline in inflows since the start of the year. Even within regions, the pandemic had a range of effects. Ghana, for example, had a 52 percent decline in foreign direct investment from \$3.9 billion in 2019 to \$1.9 billion in 2020, whereas Nigeria saw a slight increase from \$2.3 billion to \$2.4 billion.

3. EMPIRICAL STRATEGY

3.1 Methodology

Econometric techniques such as the unit root test, correlation matrix, cointegration test, ordinary least square regression method, and fully modified ordinary least square regression method are used to estimate the parameters of variables.

After converting the variables to their natural logarithms, unit root tests are done. In this context, Im et al. (2003), Levin et al. (2002), and Maddala and Wu (1999) unit root testing. If there is evidence of a unit root, the null hypothesis is projected to be rejected with a probability of less than 5%. After establishing that the variables are stationary, a cointegration test must be conducted to see whether there is a long-term relationship between the variables and the dependent variable. Nonetheless, evidence of cointegration is expected to be recognised at a 5% or greater level of significance. As cointegration rank tests, the Trace and Max-Eigen tests were used in this work. Additionally, a correlation matrix can be utilised to establish the relationship between the dependent and independent variables. The model is said to be multicollinear if the coefficients of correlation between two or more independent variables and the dependent variable are more than -0.70.



Preliminary tests are conducted to check the validity of given variables and data. After that, the coefficients of the selected parameters are determined. Regardless of the approach used, ordinary least squares regression is the primary method for regression analysis. OLS is a good fit in this context due to the normal distribution of the data, but it has various drawbacks, including serial correlation, endogeneity, and heterogeneity. As a result, this study recommends the totally modified ordinary least square regression as the best alternative for small samples (Pedroni 2001). The FMOLS is used to assess the most frequently used regression, ordinary least squares regression.

Model Specification

$$\ln fdi_t = \beta_0 + \beta_1 \ln gdp_t + \beta_2 \ln infl_t + \beta_3 \ln trade_t + \beta_4 \ln lume_t + \beta_5 hdi_t + \beta_6 \ln ctax_t + \beta_7 \ln R\&D_t + \beta_8 IQ_t + \varepsilon_t$$

In the model, $\ln fdi$ is the dependent variable, $\ln gdp$ is the independent variable, $\ln trade$ is the openness of trade, $\ln R\&D$ is research and development, hdi is the human development index, $\ln infl$ is the inflation rate, $\ln corptax$ is corporate tax, $\ln lume$ is the unemployment rate, and $INSTQTY$ is institutional quality. β_0 is the intercept coefficient, whereas β_1 through β_8 are the coefficients of the parameters to be estimated.

3.2 Data

The World Bank's World Development Indicators and Worldwide Governance Indicators were utilised to generate time series data for the period 1996 through 2020. The details of the variable can be seen in table 1 below.

Table 1 Variables Description

Indicators	Variable descriptions	Data Source
LGDP	Gross domestic product per capita, constant prices	World Development Indicators, World Bank
LINF	Inflation, average consumer prices	World Development Indicators, World Bank
LFDI	Foreign direct investment, net inflows (BoP, current US\$)	World Development Indicators, World Bank
LTRADE	Trade (% of GDP)	World Development Indicators, World Bank
LUME	Unemployment, total (% of the total labor force) (modeled ILO estimate)	World Development Indicators, World Bank
HUMDEV	Human development index (HUMDEV)	World Development Indicators, World Bank
LCORPTAX	Profit tax (% of commercial profits)	World Development Indicators, World Bank
LR&D	Scientific and technical journal articles	World Development Indicators, World Bank
INSTQTY	Political stability, absence of terrorism, regulatory quality, voice and accountability and government performance are all indicators of institutional quality. Strength and weakness are rated on a scale of -2.5 to +2.5.	Worldwide Governance Indicators, World Bank

4. RESULTS AND DISCUSSIONS

4.1 Summary statistics

Data on the variables may be found in Table 2. With the exception of LR&D, which has a probability of 0.02 according to the Jarque-Bera test, the data appears to be regularly distributed. The standard deviations, on the other hand, show that the variables are connected. It is important to note that throughout the time period studied, the yearly growth rate of foreign direct investment (FDI) averaged 21.317%; economic growth (0.761%); inflation (1.606%); trade (3.489%); unemployment (1.639%); corporate tax (1.797%); and R&D (3.924%). In addition, the quality of institutions has decreased by 0.075 index points every year in human development.

**Table 2 Summary statistics**

	LFDI	LGDP	LINF	LR&D	LTRADE	LUME	INSTQTY	HUMDEV	LCORPTAX
Mean value	21.317	0.761	1.606	3.924	3.489	1.639	-0.075	0.610	1.797
Med. value	22.038	0.848	2.778	3.980	3.325	1.776	-0.032	0.730	2.688
Max. value	22.772	2.340	3.695	6.851	3.954	2.439	0.196	0.578	3.741
Min.value	18.994	-0.667	1.803	0.001	4.228	1.527	-0.349	0.477	0.010
SD	1.788	0.922	0.496	2.398	0.881	0.268	0.179	0.074	1.479
Skew	-0.237	-0.347	0.389	-1.484	0.439	0.287	-0.677	0.090	-0.448
Kurtosis	1.296	3.191	2.848	3.487	2.073	2.198	2.047	1.419	1.293
JBera	3.117	0.495	0.567	7.517	1.590	0.899	2.390	2.733	3.987
Prob.	0.119	0.894	0.759	0.029	0.467	0.618	0.329	0.197	0.176
Observations	23	23	23	23	23	23	23	23	23

4.2 Unit root tests

Table 3 shows the results of unit root tests, which were carried out. According to a single test, the variables are stationary, indicating that the graph level unit root is not present. On the other hand, significance was set at 1% for all tests, and it appears that stationarity was found across the board. Neither of the variables has a significant unit root.

Table 3 Unit root tests

Group unit root test: Summary			
Level Form	Stat.	P-value	Sign
LLC	-0.742	0.229	
IPS	-1.450	0.074	
ADF	29.272	0.045	**
PP	24.307	0.145	
First Difference			
Method	Statistic	Prob.**	
LLC	-18.036	0.000	***
IPS	-9.938	0.000	***
ADF	198.674	0.000	***
PP	114.887	0.000	***

Note: *** indicates 1% significance level, ** indicates 5% significance level. Levin, Lin & Chu = LLC, Im, Pesaran & Shin = IPS, ADF - Fisher Chi-square = ADF, PP - Fisher Chi-square =PP

4.3 Cointegration test

The cointegration test results are shown in Table 4. The table shows the cointegration of the dependent and independent variables. As a result, the variables have a long-term relationship. The trace test confirms the existence of cointegration between 0 and 4. A 1% and a 5% significance level Max-Eigen test shows that the variables are cointegrated as well.

**Table 4 Cointegration test**

Cointegration Rank Test (Unrestricted)						
Trace Test			(Maximum Eigenvalue)			
No. of CE(s)	Stat.	P value	No. of CE(s)	Stat.	P value	
0 *	216.773	0.001 ***	0 *	117.219	0.001	***
At M 1 *	292.334	0.001 ***	At M 1 *	75.819	0.031	**
At M 2 *	193.995	0.000 ***	At M 2	48.681	0.142	
At M 3 *	177.374	0.007 **	At M 3	38.312	0.363	
At M 4 *	84.992	0.030 **	At M 4	28.318	0.592	

Note: *** denote 1% significance level, ** denote 5% significance level. M = Most, 0 = None

4.4 Correlation Matrix

Additionally, multicollinearity in the dependent and independent variables can be determined by calculating the correlation matrix computation. The correlation matrix's findings are shown in Table 5. The only correlation coefficient found to be above the collinearity criterion was for LUME, which showed a -0.678-correlation coefficient. Because of this, the researchers were able to decisively reject the idea of multicollinearity. There was a strong correlation between LR&D and LFDI, but only a weak one between LGDP and the rest of the variables studied, including INSTQTY, HUMDEV, LCORPTAX, and LFDI. While there was no correlation between LINF and LTRADE, LLUME and LUFDI, there was a correlation between LINF and LFDI.

Table 5 Correlation Matrix

Correlation	LFDI	LGDP	LINF	LR&D	LTRADE	LUME	INSTQTY	HUMDEV	LCORPTAX
LFDI	1								
LGDP	0.139	1							
LINF	-0.629***	0.405*	1						
LR&D	0.665***	0.053	-0.496**	1					
LTRADE	-0.660***	0.031	0.280	-0.159	1				
LUME	-0.571***	0.201*	0.590**	-0.475**	0.913**	1			
INSTQTY	0.385***	0.260	-0.649**	0.830***	-0.366*	0.664***	1		
HUMDEV	0.470***	0.096	-0.892**	0.680***	-0.180**	0.595***	0.697***	1	
LCORPTAX	0.555***	0.182	0.628***	0.701***	-0.616**	0.834***	0.813***	0.843***	1

Note: *** denote 1% sig level, ** denote 5% sig level, * denote 10% sig level

4.5 Results: Long run estimation (ordinary least square method)

Table 6 shows the results of the OLS regression study. According to the study's findings, foreign direct investment in Ghana is influenced by various factors. Human development, institutional quality, and FDI inflows in Sub-Saharan Africa all have positive correlations. Human development can attract 31.413 percent of FDI as a percentage of GDP at a significance level of 1 percent. At a 5% significance level, an increase of 6.331 percent in FDI inflows might be attributed to a 1% increase in institutional quality. Foreign direct investment is drawn to Sub-Saharan Africa's human development. Advanced human development can be seen by having a well-educated and healthy workforce that enjoys a good quality of life and reasonable level of living. If you want to attract foreign direct investment (FDI), you need to have a strong legal system and democratic



participation, as well as sound regulations in the private as well as the public sectors, as well as political stability, combating corruption, and making sure that government effectiveness ensures democratic institutions' independence.

The influx of foreign direct investment is harmed by scientific and academic papers that function as a stand-in for R&D. Every percentage point increase in R&D reduces inflows by 0.256 percent at a significance level of 5%. Foreign direct investment is not affected by other variables such as economic growth, inflation, trade openness, unemployment, or corporate tax.

That the model was able to act as a test subject is shown in Table 6. While tests for heteroskedasticity and serial correlation yielded p-values larger than 0.05, the r-square indicates that the independent variables explain for 96% of the variation in the dependent variable. There was a 1% significance threshold indicated by the F-statistics.

Table 6 Ordinary least square estimation results

Dep. Var: LFDI (OLS)					
Var	Coeff.	Std. Error	t-Stat.	P value	Sign.
LGDP	-0.023	0.165	-0.142	0.889	
LINF	-0.063	0.245	-0.256	0.802	
LR&D	-0.256	0.101	-2.540	0.024	**
LTRADE	-0.955	0.895	-1.066	0.304	
LUME	0.439	0.695	0.632	0.538	
INSTQTY	6.331	1.730	3.660	0.003	**
HUMDEV	31.413	4.707	6.674	0.000	***
LCORPTAX	-0.019	0.155	-0.122	0.904	
C	8.691	4.889	1.778	0.097	*
R ²	0.966				
Adj. R ²	0.947				
Log likelihood	-3.872				
F-stat.	49.671***				
Prob(F-stat.)	0.000				
Breusch-Pagan-Godfrey Heteroskedasticity Test					
F-statistic	1.278	Prob		0.387	
Breusch-Godfrey Serial Correlation LM Test:					
F-statistic	0.874	Prob.		0.482	

Note: *** denote 1% sig level, ** denote 5% sig level, * denote 10% sig level

4.6 Robust Check: Fully modified ordinary least square method

To demonstrate the resilience of OLS as the primary regression method, an ordinary least squares regression approach with considerable changes is used. The findings are summarised in Table 7. With the exception of the coefficients, the FMOLS estimates are almost identical to the OLS estimates. There are, however, no variations in the coefficient signs of HUMDEV and INSTQTY when compared to LFDI, although LR&D has a negative and significant sign when compared to LFDI.

International FDI into SSA is influenced favourably by institutional quality and human development, but negatively by R&D. This conclusion is supported by evidence.

**Table 7 Robust check: FMOLS**

Dep Var: LFDI					
Method: FMOLS					
Var	Coeff.	Std. Error	t-Stat.	P value	
LGDP	-0.042	0.175	-0.377	0.734	
LINF	-0.117	0.172	-0.683	0.519	
LR&D	-0.215	0.082	-3.721	0.008	**
LTRADE	-1.211	0.887	-1.711	0.131	
LUME	0.341	0.894	0.742	0.389	
INSTQTY	6.325	1.709	5.224	0.000	***
HUMDEV	29.011	3.391	7.492	0.000	***
LCORPTAX	0.017	0.188	0.533	0.866	
C	10.572	3.718	3.721	0.008	**
R ²	0.972				
Adj. R ²	0.939				
Cointegration Test - Hansen Parameter Instability					
			Prob.*		
Lc stat.	0.933		0.050**		

Note: *** denote 1% sig level, ** denote 5% sig level, * denote 10% sig level

4.7 Granger causality test

Determine the direction in which the relationship between the variables of interest is influenced. Both unidirectional and bidirectional causality are expected by the granger causality test. In a "unidirectional" relationship, one variable causes the other, but not the other way around. A bidirectional relationship, on the other hand, means that every change in one variable also causes a change in the other. Unemployment and inflation, corporate tax and foreign direct investment, gross domestic product and unemployment, inflation and research and development, inflation and human development, corporate tax and inflation, research and development and trade openness are all linked by a single-way causality. There was a two-way relationship found between the two variables of unemployment and trade openness.

Table 8 Granger causality test results

Null Hypothesis:	Obs	F-Statistic	Prob.	Sig.
LINF -----> LFDI	22	5.198	0.034	**
LFDI -----> LINF		2.063	0.167	
LUME -----> LFDI	22	11.334	0.003	**
LFDI -----> LUME		0.134	0.719	
LCORPTAX -----> LFDI	22	36.017	0.000	***
LFDI -----> LCORPTAX		0.130	0.722	
LUME -----> LGDP	22	2.165	0.158	
LGDP -----> LUME		3.368	0.082	*
LR&D -----> LINF	22	1.120	0.303	
LINF -----> LR&D		3.455	0.079	*
LUME -----> LINF	22	9.204	0.007	**
LINF -----> LUME		0.461	0.506	
INSTQTY -----> LINF	22	4.313	0.052	
LINF -----> INSTQTY		10.068	0.005	**
HUMDEV -----> LINF	22	1.668	0.212	



LINF -----> HUMDEV		4.196	0.055	*
LCORPTAX -----> LINF	22	3.974	0.061	*
LINF -----> LCORPTAX		2.559	0.126	
LTRADE -----> LR&D	22	0.181	0.832	
LR&D -----> LTRADE		3.141	0.088	*
LUME -----> LR&D	22	0.482	0.413	
LR&D -----> LUME		11.073	0.003	**
LUME -----> LTRADE	22	9.095	0.006	**
LTRADE -----> LUME		3.687	0.079	*
INSTQTY -----> LTRADE	22	2.931	0.078	*
LTRADE -----> INSTQTY		0.052	0.886	
HUMDEV -----> LTRADE	22	3.390	0.041	**
LTRADE -----> HUMDEV		0.056	0.733	
LCORPTAX -----> LTRADE	22	19.382	0.001	***
LTRADE -----> LCORPTAX		0.528	0.338	
HUMDEV -----> LUME	22	0.742	0.394	
LUME -----> HUMDEV		5.772	0.028	**
HUMDEV -----> INSTQTY	22	1.094	0.215	
INSTQTY -----> HUMDEV		3.915	0.081	**
LCORPTAX -----> INSTQTY	22	8.925	0.005	**
INSTQTY -----> LCORPTAX		0.064	0.785	
LCORPTAX -----> HUMDEV	22	7.172	0.020	**
HUMDEV -----> LCORPTAX		0.639	0.501	

Note: *** denote 1% sig. level, ** denote 5% sig. level, * denote 10% sig. level

5. CONCLUSION

The goal of this research was to figure out what factors impact foreign direct investment into Sub-Saharan Africa. The World Bank's World Development Indicators were used to examine time series data from 1996 to 2020. However, ordinary least squares and fully modified ordinary least squares approaches were used in the analysis. While research and development (scientific and academic publications) have a negative impact on foreign direct investment inflows into Sub-Saharan Africa, human development has a positive impact. These results back up those of Awadhi et al. (2022) and (Trentini 2021). According to the findings of the study, strong institutional quality free of corruption and political instability, as well as the proper establishment of private sector regulation and the strengthening of the rule of law, voice, and accountability, and the effectiveness of government all positively affect the attraction of FDI inflows (Vitenu-Sackey and Alhassan 2019; Vitenu-Sackey 2020; Hongli and Vitenu-Sackey 2020; Ding et al. 2021). Economic development, corporate taxes, inflation, unemployment, and trade openness all have no discernible effect on Ghana's potential to attract foreign direct investment, according to the findings Xinying et al. (2019) found similar results.

In order to fulfil their growth target, governments should improve and preserve institutional rules that allow the private sector to attract additional investment. There are several ways to achieve the country's growth target, including prioritising human development.

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