

Impact of GDP and Exchange Rates on Foreign Direct Investment in East African Community

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Abstract: *This study investigates the impact of macroeconomic factors, specifically Gross Domestic Product GDP and exchange rates, on Foreign Direct Investment FDI in the East African Community EAC. The research aims to determine the effect of these factors on FDI and to establish if there is an endogeneity of exchange rate and GDP with respect to FDI in the EAC. The study uses nonexperimental research design and various statistical methods to analyze published annual data from 2000 to 2021. The results reveal that GDP, infrastructural development, trade openness, and ease of doing business significantly influence FDI in the EAC, while exchange rate negatively affects FDI. The study also finds an endogeneity of exchange rate and GDP with respect to FDI in the EAC. These findings suggest that policymakers in the EAC need to prioritize improving economic growth and stabilizing exchange rates to attract more FDI. Further research is recommended in other regions for comparative analysis.*

Keywords: Gross Domestic Product, Exchange Rates, Ease of Doing Business, Foreign Direct Investment, East African Community

1. Introduction

The economic prosperity and development of many nations are significantly influenced by FDI which is money put up by a company or person in one nation to support a business in another. This has led to governments of many countries actively seeking FDI to promote economic growth and development and may offer incentives [21]. FDI has resulted from globalization through the integration of local or domestic markets with international markets. FDI is stimulated by environment affecting the local and foreign investors.

Countries like the United Kingdom, United States, China, Netherlands, Luxembourg, Singapore, and Hong Kong among others have been listed as the leading recipients of FDI across the world in 2020 [16]. There was a significant FDI position increase of \$2.2 trillion (approximately 6%) compared to the growth in 2019. The increase was a result of Low tax jurisdictions, favourable business environments and regulations, robust infrastructure, political stability, skilled labour forces, market size and access, technological advancements, tax incentives, and strategic geographic locations were highlighted as key FDI driving factors [25]; [11]; [14]; [10]. Additionally, factors such as economic growth prospects, financial stability, innovation capabilities, and government policies were mentioned as FDI influencing factors in some countries such as the Netherlands, Luxembourg, Singapore, and Hong Kong among others.

Due to the favourable economic environment, many international investors choose to expand their investments outside of their own countries. For instance, Japanese automobiles have built an assembly in Mexico, and Italian software has opened a sales office in Kenya as depicted by [23]. This has seen the creation of job opportunities for citizens in the host country, transferring technology and knowledge, enhancing productivity, and fostering innovation. It has promoted international trade and

integration, facilitated the transfer of managerial skills, and strengthened supply chains in countries such as China. Similarly, according to [14], FDI has helped to create jobs and improve the standard of living in the recipient country such as the United Kingdom, and the United States. However, FDI can also have negative impacts, such as contributing to income inequality and cultural homogenization.

In Africa, FDI has also been considered impactful on the long-term economic progress and prospects of the majority of growing African states, specifically EAC countries [21]. The EAC has been actively working to attract FDI to promote economic growth, industrialization, and regional integration. FDI inflows into the EAC contribute to job creation, technology transfer, knowledge sharing, and expansion of essential industries and facilities, including production, agriculture, power, and service provision. FDI also stimulates exports, enhances productivity, and encourages innovation and entrepreneurship within the region. The EAC countries have implemented policies and initiatives to improve the investment climate, protect investors' rights, and provide incentives for foreign investors. The promotion of FDI in the EAC is aimed at boosting economic development, improving living standards, and fostering regional cooperation and integration [28].

The inflows of FDI into East African countries remain low compared to other regions. The EAC is dedicated to expanding its economy, consistent with findings from the UN Conference on Trade and Development (UNCTAD). For example, FDI inflows to the EAC were only \$1.8 billion in 2019, representing 2% of total FDI inflows to Africa [29]. More so, UNCTAD reports that EAC received an estimated \$3.6 billion in FDI in 2018, which represents 3.5% of total FDI flows to Africa, which is however significantly lower than the FDI received by other regions such as North Africa, which received an estimated \$11.5 billion in FDI in 2018 [27]. In addition, FDI as a percent of GDP in EAC has been

below the optimal [31]. This has posed the need to find a lasting solution for the researcher to enable EAC partner states to enjoy more favourable mutual benefits.

2. Statement of the problem

The inflows of FDI into East African countries remain low compared to other regions. A study by the UN Conference on Trade and Development (UNCTAD) found that foreign direct investment (FDI) into the EAC were only \$1.8 billion in 2019, representing 2% of total FDI inflows to Africa [29]. In addition, UNCTAD reports that EAC received an estimated \$3.6 billion in FDI in 2018, which represents 3.5% of total FDI flows to Africa, which is significantly lower than the FDI received by other regions such as North Africa, which received an estimated \$11.5 billion in FDI in 2018 [27].

In addition, FDI as a percent of GDP in EAC has been below the optimal [31]. [20] indicates that the optimal percent of FDI to GDP to significantly spur economic growth in developed countries should be greater than 2.5 percent and 5 percent for developing countries. However, between 2000 and 2021, the FDI as a percent of GDP has been below 5%. The below 5% FDI as a percent of GDP in EAC implies that FDI in those countries have not significantly influenced economic growth.

Furthermore, [5] investigating foreign direct investment, trade liberalization, and BRICS economic growth, neglected the potential variations across different sectors or countries but looked at FDI as independent variable rather than dependent variable unlike in this study. [22] looked at whether or not there was a foreign direct investment and the Bangladeshi currency have an asymmetrical connection, however they found no evidence for such a connection. Additionally, [24] investigated the effect of trade liberalization on GDP growth and foreign direct investment in Romania, although the study did not touch upon the spill over effects of FDI, yet there is a need for more comprehensive analysis of these effects. Other gaps identified include the non-generalization of the result to other countries due to economic variation. And lastly, inadequate literature depicting the relationship between macroeconomic factors specifically GDP, and exchange rate with FDI in EAC [2]. These gaps, therefore, necessitated the need for this research to assess the correlation amongst macroeconomic factors (GDP and exchange rate) and FDI in EAC.

2.1 Objectives of the Study

- 1) To determine the impact of exchange rate on foreign direct investment in the East African Community
- 2) To establish if there is an endogeneity of exchange rate and GDP with respect to foreign direct investment in the East African Community

2.2 Significance of the Study

The study shall be significant to practice, policy, and research. In practice, the EAC countries may streamline their investment activities to stimulate the growth of FDI. To policy, the EAC countries may review or enact investment

policies to enhance FDIs. The significant determinants of FDI remain non-consensus among scholars, hence new information has been added for building new knowledge.

3. Theoretical Review

This study was anchored on three theories eclectic paradigm theory, Keynesian theory, and Classical theory.

John Dunning created the Eclectic Paradigm in 1995. The theory's recognition of the interplay of ownership, location, and internalization advantages provides a framework for understanding the motivations behind FDI decisions. Additionally, the eclectic nature of the Paradigm allows for incorporating various other theories and concepts, making it flexible and adaptable to changing economic conditions and industries [7]. MNCs seek to maximize these advantages by choosing the location that offers the best combination of all three factors. However, some criticism has been directed against this theory. It is argued by [6] that foreign direct investments, in most cases, only benefit elites and thus, the flow of resources to a host country does not bring about the development of the state as a whole. The eclectic nature of the paradigm allows for the incorporation of various other theories and concepts, making it flexible and adaptable to changing economic conditions and industries. As a result, the Eclectic Paradigm has been widely adopted in both academia and business practice and continues to shape the understanding of FDI and MNC behavior. Therefore, the theory was considered pertinent to guide the investigation, and it fully demonstrates the rationale that stimulates FDI in a country.

New investments are not attractive when the macroeconomic factors are not conducive [9]. Individual firms have no control over macroeconomic factors. The macroeconomic factors can include labour productivity, market size, political stability, and inflation [1]. [26] indicated that macroeconomic factors can include infrastructure development, labour productivity, and political stability. The critical determinants of investment decisions include changes in technology, and labour productivity among others [9]. As stated by the theory, the critical determinants of investments are the economy's growth rate, change in technology, labour productivity, changes in the rate of interest, increase in capital stock, and inflation. Businesses looking to increase their investments in East Africa should do extensive research on the real interest rates and marginal capital efficiency of the local businesses. To make investments and get higher returns, the marginal efficiency of capital must be higher than the real interest rate.

Adam Smith developed classical theory in the 18th century. The theory indicates that the determinants of investments, whether local or foreign, include cost, return, and expectations [3]. Investors are reluctant to invest in countries where business costs are high and expected returns are low. Some factors determining the cost of doing the businesses include technology, infrastructure, trade openness, and the country's stability based on the political situation [17]. However, [6] argued that foreign direct investments, in most cases, only benefit elites. Thus, the flow of resources to a host country does not bring about the development of the

state as a whole, although, investments create opportunities for countries, they could lead to the exploitation of others, and the theory side-lined to establish a framework that could lead to equivalent benefits and opportunities resulting from the investments. Foreign investors are wary of investing in developing countries with high business expenses and poor projected returns. Some factors determining the cost of doing business include technology, infrastructure, trade openness, and the country's stability. Foreign direct investments in East African Countries could be attracted by infrastructure development, political stability, and security levels, among others.

4. Overview of the Literature

The theoretical literature review has included the analysis of eclectic paradigm theory, Keynesian theory, and Classical theory. The theoretical literature review is a set of concepts and theories that provide a framework for understanding a particular phenomenon. It serves as a guide for research by outlining the key variables and relationships being studied, and it helps provide a logical structure for the research. The discussed theories are regarded as the most relevant based on the study objectives. In addition, based on the empirical literature, a number of studies were comprehensively analysed and evaluated based on this study's key variables (GDP, exchange rate, and FDI) revealing their interrelationship as well as the existing gaps.

To mention a few, research by [5] investigated the link between FDI, trade liberalization, and GDP expansion in the BRICS nations. The analysis result revealed that both FDI and trade openness have a positive and significant impact on economic growth in the BRICS countries. However, the study neglected the potential variations across different sectors or countries. [22] investigated foreign direct investment (FDI) in Bangladesh has an asymmetric relationship with the country's exchange rate. The research findings indicated that a lower exchange rate led to a rise in foreign direct investment (FDI), suggesting that a weaker domestic currency attracts more foreign investment but did not find a significant relationship between exchange rate appreciation and FDI. The research conducted by [4] focused on exploring the influencers of FDI in BRICS nations. According to the results of the study; trade, tourism, and GDP as the Key FDI inflows driver. However, the study's weakness is that the findings can only apply to developed countries.

Additionally, [24] conducted research aimed to investigate the link between Romania's trade liberalization and FDI inflows. The findings of the research indicated there is a two-way causal connection between FDI and trade openness in Romania, however, the study did not touch upon the spill over effects of FDI, yet there is a need for a more comprehensive analysis of these effects. [8] objectively researched to gain insights into the factors influencing foreign direct investment (FDI) from OECD involved states from 1996 to 2015 Poland. The research finding revealed that geographical distance, GDP sum, investment cost, and labour ratio were important determinants of FDI, however, there is interest for more research to identify endogeneity of exchange rate and GDP. Other gaps identified include non-

generalization of the result to other countries due to economic variation, and inadequate literature depicting the relationship among macroeconomic factors (GDP, and exchange rate), and investment from abroad in East African societies [2].

5. Research Methodology

This study used a non-experimental research design. The design was the most relevant to be adopted in the study since the study used secondary data. Additionally, to develop the model, the Eclectic Paradigm Theory was used. According to the eclectic paradigm, ownership advantages are the particular skills and resources that a company has, which provide it with a competitive edge in the global market. The study used empirical model, where the explanatory variables (exchange rate, GDP, infrastructural development, trade openness, inflation, resource endowment, and ease of doing business) included in the empirical model fall into broad categories of OLI.

The study estimated pooled panel ordinary least squares (OLS) to answer the first objective and estimated instrumental variable (IV) method and control function approach (CFA) to address the second objective. The first objective studied how the rate of currency exchange impacted FDI in EAC while the second objective established if there is an endogeneity of exchange rate and GDP with respect to FDI in EAC. Endogeneity refers to correlation between the independent variable and the error term in a study [3]. This problem can be addressed by using an instrumental variable, a control variable, or by using a method such as two-stage least squares. The control function approach (CFA) and the instrumental variable estimating technique (IV) in the form of two-stage least squares (2SLS) were employed in the present investigation to address this endogeneity concern.

Before then, the regressions were checked for inconsistency and spuriousness by unit root, normality, multicollinearity, and heteroscedasticity diagnostics. This implied that the results would be relied upon for decision making and forecasting if the conditions of the mentioned diagnostic tests were met.

5.1 Empirical Findings Introduction

Empirical findings include the results and analysis of a research study, which include various quantitative data and interpretations. Research findings include a summary of the data collected and the statistical analyses performed, including any significant relationships or patterns observed. The discussions typically involve interpreting these findings considering the research questions as well as reviewing and comparing the results to previous studies. Descriptive statistics, correlation analysis, diagnostic tests, and regression analysis findings are all included in the sections. The discussions of the results are grounded on the aims of the research.

5.2 Descriptive Analysis

Descriptive statistics summarize and describe the key characteristics of a set of data. The mean, standard deviation, minimum and maximum are among the descriptive statistics used in the study. Table 1 below displays the results.

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
Exchange rate	1215.191	906.4491	67.6500	3726.566
GDP	24.1319	23.8495	0.7847	110.3471
Infrastructural Development	0.0116	0.0014	0.0004	0.1460
Trade openness	0.2175	0.0698	0.0235	7.3226
Inflation	7.4373	6.4323	-2.8147	51.4609
Resource endowment	11.5831	8.8510	1.1000	40.4922
Ease of Doing Business	42.0244	12.8723	18.0800	76.5000
FDI	0.0895	0.0316	0.0117	3.6613

Source: Study Data

The descriptive statistics presented in Table 1 show that the minimum exchange rate of East African countries between 2000 and 2021 was 67.65, with the maximum being 3726.566. The mean score was 1215.191, with a standard deviation of 906.4491. The findings are in agreement with [30] who examined the influence of ASEAN economies' currency rates and macroeconomic policies on FDI. The study established that changes in trade volumes, investments, interest rates, and political and economic stability can all contribute to shifts in demand for US dollars and, therefore, the exchange rates of East African currencies. Various factors, including the value of the US dollar, can influence exchange rates in East African countries. The US dollar is widely traded and is used as a benchmark currency in many international transactions, which can impact the demand for it in East African countries. As a result, fluctuations in the value of the US dollar can impact the purchasing power and economic growth of East African countries.

The mean GDP across the EAC countries is approximately 24.1319 billion USD, with a standard deviation of 23.8495 billion USD. This indicates considerable variation in the size of the economies among the six countries. The minimum GDP is 0.7847 billion USD, while the maximum GDP is 110.3471 billion USD. [13] asserted that this wide range in GDP signifies disparities in economic development and growth within the EAC region. Policymakers should consider these differences when formulating policies to promote regional integration and collaboration. The reliance on agriculture as the main source of income for many of these countries has led to fluctuations in GDP as weather patterns can impact crop yields. Secondly, political instability and conflict can disrupt economic activity and discourage investment, hindering growth. Thirdly, corruption and poor governance can result in a lack of investment in critical infrastructure and human capital, further stifling growth. In addition, reliance on commodity exports can make countries vulnerable to changes in global prices, which can negatively affect the GDP.

The study found that the minimum and maximum infrastructural development index of the EAC countries

between 2000 and 2021 was found to be 0.0004 and 0.1460, respectively. The mean score was 0.0116, with a standard deviation of 0.0014. The results are similar to that of [19], they looked at how different variables affect FDI in Uganda. The study revealed that infrastructure development in East African countries has been varying due to various factors. Firstly, many of these countries face funding constraints and might not have enough money to start major infrastructure projects. In addition, political instability and conflicts can disrupt infrastructure development by diverting resources from investment in this area. Corruption can also stifle infrastructure development by reducing the availability of resources and deterring foreign investment. Insufficient technical expertise and a lack of coordination between government agencies can also pose challenges to infrastructure development.

The study found that the minimum and maximum trade openness of the EAC countries between 2000 and 2021 was 0.0235 and 7.3226, respectively. The mean was 0.0698, with a standard deviation of 0.0235. These analysis findings agree with [13], who found trade openness to be a key factor of FDI. [13] further alluded that trade openness varied across East African countries over time, according to the value of products and services exported and imported as a percentage of GDP. In recent years, countries such as Kenya, Rwanda, and Uganda have seen an increase in their trade openness due in part to reforms aimed at promoting trade and reducing barriers to entry. Tanzania and Burundi, on the other hand, have seen a decline in their trade openness, possibly due to a lack of investment in infrastructure and an over-reliance on a few key exports. It is important to note that trade openness is influenced by a complex array of factors, including political stability, macroeconomic conditions, and global trends.

The average inflation across the EAC countries is 7.4373%, with a standard deviation of 6.4323%. The minimum recorded inflation is -2.8147%, indicating a period of deflation, while the maximum rate is 51.4609%, which suggests a period of high inflation. This analysis result agrees with [2] who depicted that inflation stimulated Pakistan's economic growth, though sometimes there is variation in time. This can affect any country's economy including developing EAC countries. The substantial variation in inflation as per the analysis among the EAC countries has implications for economic stability and monetary policy coordination. A more harmonized approach to inflation targeting could be beneficial for promoting regional trade and investment, as well as mitigating the negative impacts of inflation on consumers and businesses. The inflation in East African countries has been varying due to a combination of domestic and external factors. Variations in the price of food and fuel have been one of the main causes of inflation since they may significantly affect the entire cost of living. Additionally, government spending and money supply in the economy can influence Inflation. Furthermore, external factors, such as global economic conditions, can also affect inflation in East Africa.

It was found that the minimum and maximum resource endowment index of the EAC countries between 2001 and 2021 was 1.1000 and 40.4922, respectively. The mean was 11.5831, with a standard deviation of 8.8510. The global

resource endowment index, which measures a country's access to natural resources, has been varying across East African Community countries due to a number of factors. The study findings are consistent with [19], who conducted a comprehensive analysis of the factors affecting FDI in Uganda. This study observed that countries such as Tanzania have significant natural gas and mineral reserves, contributing to their high resource endowment scores. However, the extent to which these resources are developed and utilized can also impact a country's score. In contrast, countries such as Burundi and Rwanda have limited natural resources, resulting in lower scores. Overall, the resource endowment is just one of many factors that contribute to a country's economic development, and policymakers should carefully balance utilizing natural resources with long-term sustainability and equitable distribution of wealth.

The study found the minimum and maximum ease of doing business score of the EAC countries between 2001 and 2021 to be 18.0800 and 76.5000, respectively. The average score was 42.0244, with a 12.8723 standard deviation. The ease of doing business score varies across East African countries due to various factors. Countries such as Rwanda, Kenya, and Uganda have implemented reforms to streamline administrative processes, reduce regulatory burdens, and improve access to credit, resulting in higher scores. In contrast, countries such as Burundi and South Sudan have faced political instability and a challenging business environment, resulting in lower scores. Other factors that can impact a country's ease of doing business score include the strength of property rights, the efficiency of the judicial system, and the level of corruption. A favourable business climate can drive economic expansion and draw in foreign

capital. This analysis result agrees with [8];[30], who revealed that lower interest rates, lower inflation rates, and increased government spending and practices are associated with higher FDI inflows.

Finally, the study found the minimum and maximum FDI of the EAC countries between 2001 and 2021 were found to be 0.0117 and 3.6613, respectively. The mean score and standard deviation were found to be 0.0895 and 0.0316, respectively. FDI can be driven by a country's natural resources, market potential, and investment climate, among other factors. Countries such as Tanzania, Kenya, and Ethiopia have seen an increase in FDI inflows due to reforms that promote investment, such as creating special economic zones and tax incentives. In contrast, countries such as Burundi and South Sudan have experienced political instability and a difficult business environment, resulting in lower levels of FDI [13]. Other factors that can impact FDI inflows include the strength of property rights, the availability of skilled labour, and the overall stability of the economy.

5.3 Correlation Analysis

Correlation analysis is a statistical method for examining the magnitude and direction of a relationship between two or more independent variables. Pearson's r , which runs from -1 (perfectly negative correlation) to 1 (perfectly positive correlation), with 0 denoting no connection, is the most common correlation coefficient. In Table 2, the correlation findings are enumerated.

Table 2: Correlation Analysis

	1	2	3	4	5	6	7	8
1. FDI	1							
2. Exchange rate	-0.0256	1						
3. GDP	0.9404	0.0564	1					
4. Infrastructural Development	0.7900	-0.0411	0.7865	1				
5. Trade openness	0.9124	0.0046	0.8753	0.6920	1			
6. Inflation	-0.0037	-0.0271	-0.0254	0.0354	-0.0099	1		
7. Resource endowment	0.8846	-0.1270	0.8123	0.6568	0.7688	0.0263	1	
8. Ease of Doing Business	0.9349	0.0977	0.9427	0.7467	0.8886	0.0191	0.7811	1

Source: Study Data

The correlation results presented in Table 2 shows that GDP, infrastructural development, trade openness, resource endowment, and ease of doing business are positively associated with FDI, while exchange rate and inflation are negatively associated with FDI. Hence, policymakers should consider more factors that are positively associated with FDI when developing policies aimed at attracting FDI. The study results concur with the findings of [2] who found a favourable correlation between the currency market, economic growth, interest rates, remittances, trade openness, and foreign direct investment. Further, [19] showed that increases in both gross capital formation and gross domestic output are positively associated with FDI while [13] showed that trade openness has a positive effect on FDI. Lastly, [18] suggested that improvements in the ease of doing business positively affect FDI inflows in African countries, indicating that a conducive investment climate is crucial for attracting foreign investment.

5.4 Diagnostics Tests

Diagnostic tests are statistical techniques used to evaluate the assumptions and validity of a statistical model. These tests help to identify potential problems or limitations of a model and to assess its overall accuracy and reliability. The following diagnostic test was carried out, unit root test, multicollinearity, normality tests, and heteroscedasticity. The test ensures the regression results have correct results that can be relied on for decision-making.

5.4.1 Unit Root Test

The researcher conducted a unit root test to examine the stationarity of variables used while adopting the Levi Lechun test. The panel unit root test was performed so that non-stationary variables wouldn't be used to obtain misleading regression findings. Table 3 presents the findings of the Unit Root Test.

Table 3: Unit Root Test

Variable name	Statistic (adjusted)	P-value	Comment
FDI	2.0795	0.0188	Stationary
Exchange rate	1.6590	0.0486	Stationary
GDP	2.4315	0.0124	Stationary
Infrastructural Development	2.2076	0.0136	Stationary
Trade openness	3.300	0.0000	Stationary
Inflation	2.2315	0.0128	Stationary
Resource endowment	6.3180	0.0000	Stationary
Ease of Doing Business	3.8088	0.0001	Stationary

Source: Study Data

The findings in Table 3 demonstrate that the p-value for each variable was less than 0.05. As a result, all of the variables are stationary, and at a 5% level of significance, unit roots are not present. Therefore, it may be concluded that none of the study's variables had a unit root. This suggested that the results were legitimate.

5.4.2 Multicollinearity Test

Variance inflation factors (VIF) were used to examine the data for multicollinearity; the findings are shown in Table 4.

Table 4: Multicollinearity Test

Variable	VIF	1/VIF
Exchange rate	1.18	0.8475
GDP	1.06	0.9434
Infrastructural Development	2.37	0.4219
Trade openness	5.2	0.1923
Inflation	1.01	0.9900
Resource endowment	3.08	0.3247
Ease of Doing Business	6.9	0.1449

Source: Study Data

The table 4 findings demonstrate that no variable had a VIF value more than 10, which indicates the lack of multicollinearity. According to [15], multicollinearity is present when the VIF values are more than 10. Multicollinearity produces unstable coefficient estimates for individual predictors due to exaggerated standard errors and confidence ranges.

5.4.3 Normality Test

The Kurtosis and Skewness tests were used to check if the variables in the study followed a normal distribution. The assumption that observations are not regularly distributed was the null hypothesis. At a 5% confidence level, the null of normality is not accepted if the p-value is less than 0.05. The results of the normalcy test are shown in Table 5.

Table 5: Normality Test

Variable	Pr (Skewness)	Pr (Kurtosis)	adj chi2(2)	P-value
FDI	0.0000	0.0001	18.57	0.0701
Exchange rate	0.0003	0.2534	12.21	0.5960
GDP	0.0125	0.0001	20.01	0.9761
Infrastructural Development	0.0003	0.0146	29.96	0.2107
Trade openness	0.3342	0.6816	9.44	0.0890
Inflation	0.0000	0.9136	8.32	0.1560
Resource endowment	0.0394	0.0049	15.43	0.3475
Ease of Doing Business	0.6484	0.0701	18.47	0.0873

Source: Study Data

From table 5, the findings show that all variables had p-values higher than 0.05, indicating that the data utilized was normally distributed. Data that is normally distributed, also known as Gaussian distribution, means that it follows a specific pattern or shape in which the majority of the data falls in the middle of the distribution, with fewer values towards the extremes.

5.4.4 Heteroskedasticity Test

The Breusch-Pagan test was used to determine whether there was heteroskedasticity. The null hypothesis is that the error terms are homoscedastic, or have the same variance. The null hypothesis is rejected if the p-value is less than 0.05. Table 6 below displays the heteroscedasticity test findings.

Table 6: Heteroscedasticity Test

Breusch-Pagan test for heteroskedasticity	
Ho: Constant variance	
Variables: Fitted values of FDI	
chi2 (5)	= 26.85
Prob > chi2	= 0.904

Source: Study Data

The findings in table 6 indicated a p-value of 0.904, which is more than 0.05. As a result, the null hypothesis was not rejected, supporting the finding that the data utilized did not exhibit heteroskedasticity. When the error variance of a regression model varies across values of the independent variable(s), the model is said to have non-constant error variance, the situation is known as heteroskedasticity. As an alternative put, the dependent variable's variability (i.e., the response variable) differs across the range of values of the independent variable(s) (i.e., the predictor variable(s)). When there is no heteroskedasticity in the data used, therefore, all values of the independent variable(s), the regression model's error variance is constant. This is also known as homoskedasticity.

5.5 Regression Results

The goal of regression analysis is to learn more about the connection between a dependent variable and a number of potential predictors. The study estimated equations 3.2 and 3.6 to achieve the results. The first model to achieve the first objective of the study was:

$$FDI_i = \alpha + \delta EXC_i + \theta_1 x_{it} \beta + \epsilon_i \dots \dots \dots 3.2$$

Where $i = 1, \dots, N$ (countries), x_i = GDP, infrastructural development, trade openness, inflation, resource endowment, and ease of doing business.

Moreover, the second model to achieve the second objective of the study was:

$$FDI = w_1^f \phi + \theta^1 EXC + \theta_2 GDP + \alpha \hat{u}_1 + \alpha_2 \hat{u}_2 + v \dots \dots \dots 3.6$$

where $\hat{u}_1$ and $\hat{u}_2$ are OLS residuals. The control variables in the study included infrastructural development, trade openness, inflation, resource endowment, and ease of doing business. The regression results from the two models are presented in Table 7.

Table 7: Regression Analysis

	Model 1	Model 2	Model 3
Variable	Pooled OLS coefficient (t values)	2SLS Coefficient (t values)	CFA coefficient (t values)
Exchange rate (EXR)	-1.45E-11 (-2.11)	-1.71E-11 (-2.32)	0.0154 (2.01)
Gross Domestic Product (GDP)	0.0044707 (2.56)	0.0007429 (3.07)	0.8261 (2.61)
Infrastructural Development (IFS)	2.415114 (3.72)	3.000602 (4.98)	0.049 (1.01077)
Trade openness (TO)	0.1051399 (5.60)	0.109622 (5.97)	0.3179 (1.9978)
Inflation (INFL)	-0.0000252 (-0.79)	-0.0000438 (-1.41)	0.1427 (1.3016)
Resource endowment (REI)	0.0019037 (8.74)	0.0020138 (9.76)	0.9521 (2.1458)
Ease of Doing Business (EDBS)	0.0010766 (4.5)	0.0015561 (8.39)	0.1674 (1.0575)
Constant	-0.0952659 (-8.79)	-0.1281924 (-11.6)	0.0467 (1.319)
Adjusted R ²	0.9599	0.9586	0.9183
Number of Observations	132	132	132

Source: Study Data

The first goal of the investigation was addressed using Pooled Panel Ordinary Least Square (OLS). The OLS model becomes: based on the model 1 outcomes shown in Table 7.

$$\text{FDI} = -0.0952659 - 1.45\text{E-}11\text{EXR} + 0.0044707\text{GDP} + 2.415114\text{IFS} + 0.1051399\text{TO} - 0.0000252\text{INFL} + 0.0019037\text{REI} + 0.0010766\text{EDBS} \dots \text{Model 1}$$

Where: TO=trade openness, IFS=infrastructure development, GDP=Gross Domestic Product, INFL=inflation, and EXR=exchange rate, REI= Resource Endowment Index, EDBS= Ease of Doing Business Score

It appears from the Pooled OLS results that all independent variables, with the exception of inflation, have statistically significant coefficients. The exchange rate has a negative coefficient (-1.45E-11), indicating that the dependent variable (FDI) increases as the exchange rate declines. GDP has a positive coefficient (0.0044707), showing that a rise in GDP results to an increase in the FDI. Infrastructural development has a positive coefficient (2.415114), indicating that an increase in infrastructural development leads to an increase in the FDI. Trade openness has a positive coefficient (0.1051399), demonstrating that increased commerce openness results to a rise in the FDI.

Resource endowment has a positive coefficient (0.0019037), indicating that an increase in resource endowment leads to an increase in the FDI. Ease of doing business also has a positive coefficient (0.0010766), demonstrating that a rise in the ease of conducting business results in more foreign direct investment. However, it is essential to keep in mind that the R-squared value for Pooled OLS is high (0.9599), indicating a good fit for the model. The study comes to the conclusion that the Investments from Outside the East African Community is negatively impacted by the exchange rate. The study's findings are both consistent and inconsistent with prior research. [2] exchange rate, trade openness, and infrastructural development were significant determinants of FDI, which is in line with the findings of the present investigation. Similarly, [19] found that GDP and gross capital formation were significant determinants of FDI in Uganda, which is consistent with the current study's findings. Also, [12] revealed that favourable business regulations positively influence FDI inflows, leading to enhanced economic growth in these countries. However, [13] revealed that only trade openness was an importance determinant of FDI, which is also inconsistent with the current study, which found that other factors, such as

infrastructural development, resource endowment, and easy business operations were important FDI criteria.

Furthermore, the study used the estimated Instrumental Variable (IV) method and Control Function Approach (CFA) to address the study's secondary goal. Based on the results in table 4.7, models 2 and 3 are estimated under 2SLS and CFA, respectively.

$$\text{FDI} = -0.1281924 - 1.71\text{E-}11\text{EXR} + 0.0007429\text{GDP} + 3.000602\text{IFS} + 0.109622\text{TO} - 0.0000438\text{INFL} + 0.0020138\text{REI} + 0.0015561\text{EDBS} \dots \text{Model 2}$$

$$\text{FDI} = 0.0467 - 0.0154\text{EXR} + 0.8261\text{GDP} + 0.049\text{IFS} + 0.3179\text{TO} + 0.1427\text{INFL} + 0.9521\text{REI} + 0.1674\text{EDBS} \dots \text{Model 3}$$

Thus, based on 2SLS results, the study found that the coefficients for the exchange rate, GDP, infrastructural development, trade openness, resource endowment, and ease of doing business are significant. This indicates that the 2SLS method, which accounts for endogeneity in the independent variables, provides more accurate coefficient estimates than Pooled OLS. The R-squared value for 2SLS is slightly lower than Pooled OLS since it was found to be 0.9586. Finally, based on CFA outcomes, the research discovered that the coefficients for all independent variables are significant.

The R-squared value (0.9183) for CFA is also lower than both Pooled OLS and 2SLS, indicating a less accurate fit of the model. The study found that the coefficient of determination (R²) in the three models was above 90 percent. This implied that the exchange rate, GDP, infrastructural development, trade openness, inflation, resource endowment, and ease of doing business could explain more than 90 percent of the variations of the FDI in EAC. The robust variance estimation results in various estimated coefficients for the OLS, 2SLS, and CFA.

From the CFA model, the exchange rate and GDP are significant, thus rejecting the null hypothesis. According to the predictions of the null hypothesis, there should not be any endogeneity between the GDP and the exchange rate with regard to foreign direct investment in the East African Community. Thus, since the research rejected the null hypothesis, there is an endogeneity of exchange rate and

GDP with respect to investment from abroad in the East African Community.

The research results are consistent and inconsistent with some of the previous studies. [19] found significant relationships between FDI and exchange rate, trade openness, infrastructural development, gross capital formation, and human development index, which is consistent with the current study's findings for the exchange rate, GDP, infrastructural development, trade openness, and resource endowment. [2] revealed significant relationships between FDI and exchange rate, GDP, inflation, interest rate, political stability, and trade openness, which is mostly consistent with the current study's findings for the exchange rate, GDP, and trade openness. However, [13] are inconsistent based on the findings of the present study. [13] found that only trade openness, not GDP or human capital, was a key factor of FDI, which is inconsistent with the current study's findings for GDP and resource endowment.

6. Conclusions

This study has found that GDP, infrastructural development, trade openness, and ease of doing business significantly influence FDI in the EAC, while exchange rate negatively affects FDI. The study also finds an endogeneity of exchange rate and GDP with respect to FDI in the EAC. These findings suggest that policymakers in the EAC need to prioritize improving economic growth and stabilizing exchange rates to attract more FDI. Further research is recommended in other regions such as COMESA, ECOWAS, and SADC for comparative analysis.

7. Policy Implications

The study found that a rising levels of FDI in the East African Community (EAC), increases in response to decrease in the exchange rate. Thus, governments of EAC countries need to take steps to maintain a stable exchange rate to attract foreign investment. They can do this by implementing appropriate monetary policies, such as managing inflation and interest rates and avoiding excessive fluctuations in the exchange rate. Governments can also provide incentives for foreign investors, such as tax breaks or subsidies, to encourage them to invest in the area.

Additionally, the research discovered that FDI in the EAC rises as GDP rises. Hence, EAC governments should focus on policies that promote economic growth and stability to attract foreign investment. This can be done by investing in infrastructure development, improving education and healthcare, and providing a favourable business environment. Governments can also work to reduce barriers to entry for foreign investors, such as simplifying regulatory frameworks and streamlining administrative procedures.

The study found that a rise in infrastructural development results to a rise in FDI in the EAC. It is recommended that the EAC governments should prioritize investments in transportation, telecommunications, and energy infrastructure to enhance supply chain effectiveness and eliminate payments of doing business. This can be done by

implementing public-private partnerships or attracting foreign investment in infrastructure development. Governments can also develop policies that encourage private sector investment in infrastructure development.

Besides, the study established that greater trade openness causes more flow of FDI into the EAC. The research informs EAC governments to promote trade liberalization and regional integration to attract foreign investment. This can be done by reducing trade barriers, improving customs procedures, and harmonizing regulations. Governments can also develop policies that promote exports, such as providing export credits and developing export processing zones.

The study discovered that as more resources are endowed, it results to a rise in FDI in the EAC. Thus, EAC governments need to develop policies that promote sustainable resource management and responsible investment in resource-based industries. This can be done by regulating resource extraction, promoting local content development, and ensuring that resource revenues are used for economic development. Governments can also work to ensure that resource-based industries provide benefits to local communities and protect the environment.

The research revealed that a rise in ease of doing business leads to a boost in FDI in the EAC. Thus, EAC governments need to develop policies that improve the regulatory environment and reduce bureaucratic hurdles for foreign investors. This can be done by simplifying business registration procedures, improving transparency and accountability, and streamlining administrative procedures.

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