Foreign Direct Investment and Economic Growth in Kenya: A Comprehensive Analysis

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

The study investigates the relationship between foreign direct investment (FDI) and economic growth in Kenya through comprehensive regression analysis and causality tests. Theoretical literature argues that FDI inflow can transfer great advantages to the host country, however, empirical studies show that the benefits of FDI vary greatly across countries. Kenya has traditionally been one of the largest recipients of FDI in Africa, foreign investors provide intangible assets to support the operation of the domestic firms. However, recently Kenya has experienced dwindling FDI levels. Despite an increasing empirical focus on the relationship between foreign inflow and the economy, little is known about the role of FDI in this nexus in Kenya. The study investigated the contribution of foreign direct investment to economic growth in Kenya using an Autoregressive Distributed Lag (ARDL) regression approach and causality tests. Secondary time series data for Kenya were used during empirical analysis. The time series data is from 1990 to 2021. The findings indicate that increasing FDI inflow will lead to an increase in economic growth. Additionally, the result indicates trade openness and climate change matter from a growth perspective. Notably, the results show that short-run to long-run foreign direct investment kindles economic

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growth in Kenya. Accordingly, Kenya must have more effective FDI strategies and pursue macroeconomic policies that attract FDI into the country, offers investor friendly environment, reduces bureaucratic hurdles and addresses the challenges of accumulating domestic investment and foreign exchange, particularly by productively opening the market and allowing FDI inflow to boost investment accumulation and economic growth.

Keywords: Foreign direct investment; economic growth; foreign exchange; ARDL.

JEL Classification: F21, F23, F43

1. INTRODUCTION

Across most developing countries foreign direct investment (FDI) has proved to be resilient during financial crises and more recently during the Covid-19 era Benetrix et al., [1] Nguyen, [2]. The major components of foreign capital inflows for developing economies are FDI, foreign aid and remittance inflows [3]. In contrast to other forms of foreign capital inflow, FDI has been stable in developing states and has contributed much by complementing negligible domestic investment in those economies. Most empirical studies on foreign direct investment and economic growth are founded on endogenous and neoclassical growth theories [2]. The empirical relationship has been explored on determinants of FDI or sources of economic growth, the role of FDI on economic growth and the causality between economic growth and FDI. According to neoclassical growth theory FDI has had minimal contribution towards economic growth. In contrast, endogenous growth theories recognize the significance of FDI inflow on growth via capital transfer, technology spillover, foreign exchange earnings and human capital development through training and skills acquisition and changing labour market [4,5]. Further, empirical literature reports that FDI is an important source of capital that complements domestic private investment, generates new employment opportunities and stimulates technology transfer and spillovers De Mello, [4] Asongu et al., 2021; Benetrix et al. [1]. In contrast, Griffith et al. [6] reported a negative relationship between FDI and economic growth. This has been attributed to limited knowledge transfers and weak research and development spillovers in most developing economies. Furthermore, most empirical studies acknowledge that the effect of FDI is limited by the absorptive capacities of the host countries, financial development, environment quality, and institutional and structure development, and therefore the effects differ across countries. Furthermore excessive FDI inflow, poor governance quality and high transaction costs

will reduce the benefit of FDI in the host country [5]. From available empirical information, many studies have been conducted on the relationship between FDI level and economic growth, but there is no consensus. This ambiguity in the empirical literature highlights the need for further research on the subject, to enhance further understanding.

At the global stage inequality occurs at the FDI level, African countries have received less foreign direct investment in comparison to Asia, Latin America and Caribbean states [7,2]. However, the minimal FDI inflow has improved infrastructure, domestic investment and human capital development in Africa and other developing countries. Despite all the positive effects, the FDI inflow faces challenges like poor financial development, bureaucratic hurdles, poor domestic investment, corruption, high inflation rate, political instability and deprived trade policies (Musimbi & Mose, [8] Okello & Badj, [9]. In 2020, Kenya was Africa's fifth largest FDI recipient. However, despite Kenya being ranked number five in Africa, EY [10] and World Bank [3] report declining FDI inflow in 2020 compared to the period between 2011 and 2017 in Kenya, and this has been attributed to the COVID-19 pandemic. Particularly, between 2011 and 2016, FDI inflows were, on average, above 0.5% of the GDP. Further, between 2019 and 2021, FDI decreased year on year from $1.1bn in 2019 to $717m in 2020 to $448m in 2021, continuing a general pattern of decline [7]. However, in contrast, most East African countries have recorded a rise in FDI inflow, where on average FDI inflow increased by 35% between 2019 and 2021, to a total of $8.2bn in East African Community [7]. Kenya's dwindling foreign investment has been underpinned by a high corruption rate, political unrest after the general election and uncompetitive FDI returns when compared to neighbouring countries.

Kenya's FDI stock is majorly concentrated in the financial sectors, information and technology, wholesale and retail and manufacturing sectors.

In aggregate, between 2015 and 2021, Kenya's total stock of FDI stood at $10.4bn and major foreign investors are from the United Kingdom, Mauritius, the US, South Africa and France. Until the Covid-19 period, Kenya was one of the fastest-growing economies in Africa with an accumulative annual gross domestic product (GDP) growth rate of 5.4 % between 2010 and 2022 [3]. Kenya's GDP growth trajectory has been underpinned by a rise in FDI inflow, growth in the agriculture output and construction sector, financial sector growth and human capital development. However, despite Kenya receiving substantial FDI coupled with a developed financial sector, human capital development and improved domestic FDI strategies and policies, still Kenya faces several development challenges such as a high perceived corruption rate, uncompetitive FDI returns, political unrest, income inequality, high youth unemployment, poverty, and the economy continue to register dismal performance with cyclical fluctuations in growth Mose, [11] UNCTAD, [7] World Bank, [3].

2. LITERATURE REVIEW

2.1 Theoretical Review

The main theories of FDI are classical theory, dependence theory, middle path theory and product theory (Asongu et al., 2021). The classical theory argues that FDI can be beneficial to the host country's economy in many ways: stimulate the development of domestic infrastructure, improve transfer of payment, transfer of capital skills, increase foreign earnings, technology spillover and expansion of tax revenue for the government De Mello, [4] Benetrix et al. [1]. In contrast, advocates of dependence theory maintain FDI can slow growth. The dependence theory is built on a Marxist foundation that perceives globalization via exploitation of cheap labour, expansion of foreign markets, the introduction of the capitalist system, the introduction of obsolete technology and exploitation of primary resources from developing countries will slow growth (Asongu et al., 2021). The advocates of dependence theory hold that FDI can negatively influence economic growth through local political and economic elites collaborating with foreign investors to exploit citizens of host countries; Multinationals can distort domestic investment by using capital-intensive technology to cause unemployment increase, income inequality and change taste and preferences; Finally, most foreign investors will send back profits generated to their motherland and thus crowd out local assets and harm domestic investment (Griffith et al. [6] Jensen, [12] Taylor & Thrift, [13]. With opposing views, the middle path theory was developed as a cautions theory that focuses on the development consequences of FDI. Middle path theory encourages a mixture of regulations and openness. The host economy should pursue strategies that attract FDI but also put in place strategies and policies that reduce the negative effect of FDI on the host economy (Blin & Ouattara, [14] Gammoudi et al. [15]; Asongu et al., 2021).

Endogenous and neoclassical growth theories acknowledge the role of FDI in economic growth. According to neoclassical growth theory FDI has had minimal contribution towards economic growth. Solow growth model recognizes the role of FDI level on an economy via changes in savings rate, population growth rate, and rate of technological progress (Solow & Swan, [16] De Mello, [4] Ofori & Asongu, 2022). FDI level can influence the technological progress of a country via technological transfer and spillover. Adjusted Solow model supports FDI-led growth through technology spillover and human capital development. The human capital augmented version of the Solow-Swan model explains that failure of FDI to flow to poor countries leads to low marginal product of capital and less human capital development in these countries thus harming economic growth [16]. Further, endogenous growth theories recognize the significance of FDI level on growth via capital development and technology spillover [4,5]. Endogenous growth theory holds that investment in technical progress, innovation, human capital and knowledge will lead to growth through internal forces. Thus FDI can influence growth through foreign capital transfer to the host country via growth in knowledge and technical skills [5].

2.2 Empirical Review

Many substantial empirical studies have explored the effect of FDI on economic growth. For instance, Benetrix et al. [1], conducted a study in selected developed and low-income countries for the period between 1990 and 2009 using different baseline estimation methods. Benetrix et al. [1] observe that FDI has a positive connection with economic growth in nations that experience high global value chains and have low initial levels of human capital accumulation and financial development. The study identified

the key role of human capital and financial development in attracting FDI to developing nations. Ofori and Asongu (2022) conducted a panel data estimation in sub-Saharan Africa for the period 1990-2020 based on a generalized method of moments (GMM) estimator. From the result, FDI was able to generate economic growth in both the long-run and short-run. However, the study noted most of the positive effect results will depend on the country's governance dynamics. The study concluded that a country with strong institutional and governance quality will gain more from FDI inflow and thus grow its economy. In contrast, Griffith et al. [6] estimated the effect of FDI level on the economic growth of Caribbean countries using descriptive analysis for the period between 1995 and 2005. The finding indicated that FDI had an insignificant effect on the growth of Caribbean countries. This poor performance of FDI can be underpinned by poor institutional and structural changes complemented by weak human capital

development and underdeveloped research and development sector. In addition, Nguyen [2] study in Asia and Okello and Badj [9] study in Kenya using the ordinary least squares method for the period from 1970 to 2019. The study aimed to investigate the relationship between growth and foreign direct investment. The findings show that the association between FDI and economic growth is negative. The negative result was attributed to the fact Kenya's history as an import-substituting country and the counter effect of the implemented trade policies to spur economic growth in Asian countries. From the above review, several empirical studies have established a positive and negative relationship between FDI and economic growth as shown in Table 1. The study filled this empirical gap by assessing the dynamics behind the mixed results and trend between FDI and growth. Table 1 displays the summary of selected studies relating to the nexus between FDI and economic growth.

Table 1. A summary of selected empirical studies

Author (s)	Period/Sample	Methods	Main findings
De Mello [4]	1970-1990 for OECD countries	OLS	An increase in FDI leads to an increase in economic growth
Li & Liu [17]	1970-1999 for 84 countries	OLS	FDI is not significant
Griffith et al. [6]	1975-2005 for Caribbean states	OLS	FDI is not significant
Blin & Ouattara [14]	1975-2000 for Mauritius	ARDL	An increase in FDI leads to an increase in economic growth
Mamingi & Kareem [18]	1988-2013 for Caribbean states	GMM	FDI is not significant
Sarker & Khan [19]	1972-2017 for Bangladesh	ARDL	An increase in FDI leads to an increase in economic growth
Wiredu et al. [20]	1998-2017 for Côte d'Ivoire, Ghana, Nigeria, and Senegal	OLS	FDI has a negative effect on economic growth
Odhiambo (2022)	1980-2018 for African states	ARDL	An increase in FDI leads to an increase in economic growth
Ofori & Asongu [5]	1990-2020 for Sub-Saharan African states	GMM	An increase in FDI leads to an increase in economic growth
Benetrix et al. [1]	1990-2009 for Developed and developing states	OLS	An increase in FDI leads to an increase in economic growth
Mawutor et al. [21]	1980-2018 for Ghana	ARDL	FDI has a negative effect on economic growth
Okello & Badj [9]	1970-2019 for Kenya	OLS	FDI is not significant
Nguyen [2]	1990-2019 for Southeast Asian countries	ARDL	FDI has a negative effect on economic growth

ARDL: Autoregressive Distributed Lag; GMM: Generalized Method of Moment; OLS: Ordinary Least Squares Regression
Source: Authors' compilation (2024)

3. METHODOLOGY AND DATA

This chapter captures relevant data collection method and data analysis technique.

3.1 Data Collection Methods

This study adopted a longitudinal research design to analyze the effect of FDI on economic growth in Kenya for the period 1990 to 2021. Kenya was chosen as the study area since it has been receiving a substantial amount of FDI, particularly in 2020 Kenya was ranked as Africa's fifth-largest recipient of FDI [9]. The secondary data was collected from Statistical abstracts, Economic surveys, World Development Indicators and the World Bank database. The study adopted a time series regression model based on the endogenous growth theory and used annual data covering the period 1990-2021 for Kenya. Economic growth measured by changes in gross domestic product (GDP) was used as the dependent variable. Apart from FDI, the control variables in the matrix include trade openness, climate change and exchange rate. Since macroeconomic policies affect growth performance through their impact on trade openness, exchange rate and climate change variables, these effects are used in the growth equation to capture the impacts of such policies, strategies and macroeconomic conditions. The economic growth variables were selected from Mamingi and Borda [22] and Gisore [25] empirical studies on macroeconomic determinants of economic growth in selected countries. Table 2 describes the measurements and data sources of the data series for the period between 1990 and 2021.

3.2 Model Specification

As captured in growth theories the study analysed a production function where economic growth is estimated using FDI as the main input to capture the fraction of goods and services produced by foreign firms. The estimation model is founded on the endogenous growth model as formulated by Borensztein et al. [23]. Borensztein et al. [1] and Alfaro et al. [24] explored and concluded that FDI will grow the economy via technical advancement complemented with development in human capital, institutions and infrastructure development. To examine the relationship between FDI and growth, this study specifies the model as shown in equation 1.

$$\ln Y_t = \alpha_0 + \alpha_1 \ln F_t + \alpha_2 \ln C_t + \mu_t \dots \dots \quad [1]$$

Where;

Y_t – Economic growth;
F_t – Foreign Direct Investment;
C_t – Matrix of Control variables;
t – Time dimension;
μ_t – Stochastic term;
ln – Natural log;
α_0 – Constant term;
$\alpha_1 \ and \ \alpha_2$ – Coefficients are associated with the logarithms of FDI and control variables, respectively.

The variables were transformed into logarithms to reduce the serial correlation problem [25].

3.3 Data Analysis Technique

Autoregressive Distributed Lag (ARDL) estimation technique was employed to assess the relationship between FDI inflow and economic growth in Kenya. ARDL estimation model was preferred as it was correct for both potential endogeneity and serial correlation problems [26]. Before ARDL estimation, it is necessary to scrutinize the stationarity and cointegration statistics of the sample data, ARDL approach rejects any series integrated of order 2 or higher. Phillips-Perron (PP) was used to test for a unit root in the series based on a 5 per cent level of significance. A bounds cointegration test was deployed to check for the presence of long-run relationships in the series based on a 5 per cent level of significance. The use of the bound test allows the cointegration link to be ascertained by OLS after the lag order of the model is identified (Mawutor et al., 2023). Before estimation, the lag length was identified and the best model estimation criterion was chosen. The Granger causality test was applied to define the association between FDI and economic growth. Finally, since autocorrelation (Breusch-Godfrey test) and heteroscedasticity (Breusch-Pagan test) problems are common in time series data, the two econometric problems were tested and corrected to avoid misleading findings.

3.4 Estimation for ARDL Model

To scrutinize the effect of FDI on economic growth in Kenya the study adopted the ARDL bounds test technique developed by Pesaran et al. [26]. The ARDL model was specified as reported in Equation 2.

$$\Delta \ln Y_t = \alpha_{01} + \sum_{i=1}^{p} \alpha_{1i} \Delta \ln Y_{t-i} + \sum_{i=0}^{w} \alpha_{2i} \Delta \ln F_{t-i} + \sum_{i=0}^{w} \alpha_{3i} \Delta \ln C_{t-i} + \beta_{11} \ln Y_{t-1} + \beta_{21} \ln F_{t-1} + \beta_{31} \ln C_{t-1}$$
$$+ \mu_{1t} \ldots \ldots \ldots \qquad [2]$$

To investigate the long-run relationship equation 3 was applied as shown below.

$$\ln Y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \ln Y_{t-i} + \sum_{i=0}^{w} \alpha_{2i} \ln F_{t-i} + \sum_{i=0}^{w} \alpha_{3i} \ln C_{t-i} + \mu_{it} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \qquad [3]$$

Further, since the variables are cointegrated, the causality test was obtained using an error correction model derived from ARDL equation 4 specification:

$$\Delta ln Y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \Delta ln Y_{t-i} + \sum_{i=0}^{w} \alpha_{2i} \Delta ln F_{t-i} + \sum_{i=0}^{w} \alpha_{3i} \Delta ln C_{t-i} + \emptyset_1 ECT_{t-1} + \varepsilon_{1t}. \qquad [4]$$

The lagged error correction term ECT_{t-1}, in equation 4 measures the speed of adjustment to the long-run equilibrium and also the long-run causality relationship.

Table 2. Data and variable definitions

Variable	Measurement	abbreviation	Data source	Expected sign
Dependent variables				
Economic Growth	Gross Domestic Product (GDP)	Y	World Development Indicators	Dependent Variable
Independent variables				
Foreign Direct Investment	FDI, net inflow	F	World Development Indicators	Positive (Ofori & Asongu, [5])
Trade openness	Total trade per GDP	T	World Development Indicators	Positive (Malefane & Odhiambo, 2018)
Exchange rate	value of Kenyan shilling to the US dollar	X	World Development Indicators	Negative (Nyoni et al., 2021)
Climate change	Carbon dioxide emissions (metric tons per capita)	O	World Development Indicators	Positive (Espoir et al., 2023)

Source: Authors' compilation (2024)

4. RESULTS AND DISCUSSION

This chapter reports the analysis results and discussions.

4.1 Unit Root Test

Phillips-Perron (PP) unit root test was conducted to check whether a time series variable is stationary or contains a unit root. Table 3 displays the unit root results of the sample data.

The PP unit root test confirms that economic growth, FDI, trade openness and climate change are non-stationary while the exchange rate is stationary at the level. Therefore it implies the three variables need to be differentiated to be stationary. Stationary implies the variable has a constant mean and variance over time. ARDL was the preferred estimation method since it is applicable in a mixed order of integration [26]. From the result, the study proceeded to test for cointegration using the ARDL bounds test.

4.2 Choice of Lag Length

Information criterion is usually used to compare and choose among different models with the

same independent variable. To reduce residual correlation, optimal lag length and model selection criteria were determined before conducting the bounds cointegration test. The result of the information criteria is presented in Table 4.

Based on the results of the information criteria lag of four is the most appropriate. This is because of the lowest value of AIC (-12.301) and SIC (-7.305) among all models. Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC) are the most commonly used criteria to measure how well the models fit the given data. Further, AIC was selected as the ideal criterion to be used in the analysis because it has the lowest value when compared to SIC. In addition, AIC performs better in small sample data sets than SIC.

4.3 ARDL Bounds Cointegration Test

ARDL bounds test of Pesaran et al. [26] was used to explore the cointegration or long-run relationship between the study variables. Table 5 displays the bound cointegration test results.

Based on the results of the bounds cointegration test long-run relationship exists between the variables at a 5 percent level of significance. The findings are confirmed by calculated F-statistics (6.65) which is greater than the upper bound critical value (4.01) obtained from Narayan's [27] critical values table for ARDL cointegration. Based on the findings, there is a need to evaluate the long-run and short-run relationship between the study variables.

Table 3. Unit root test results

	PP (Level)		PP(First difference)			
Variable	t-Statistics	P-Value	Variable	t-Statistics	P-Value	Status
LnY	-1.396	0.571	ΔlnY	-5.749	0.0000	I(1)
LnF	-0.924	0.767	ΔlnF	-8.500	0.0000	I(1)
LnT	-1.489	0.526	ΔlnT	-5.375	0.0001	I(1)
LnO	0.671	0.989	ΔlnO	-5.673	0.0001	I(1)
LnX	-4.159	0.003				I(0)

Source: Authors' computation (2024)

Table 4. Information criteria results

Lag	LogL	LR	FPE	AIC	SIC	HQIC
0	16.561	NA	3.01e-07	-0.826	-0.588	-0.753
1	142.963	198.631	2.23e-10	-8.069	-6.641	-7.632
2	169.845	32.643	2.35e-10	-8.203	-5.586	-7.403
3	199.784	25.662	2.89e-10	-8.556	-4.749	-7.392
4	277.212	38.714*	2.91e-11*	-12.301*	-7.305*	-10.774*

*Indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
HQIC: Hannan-Quinn information criterion
FPE: Final Predictor Error
Source: Authors' computation (2024)

Table 5. Bounds Co-Integration test results

Narayan	Value	Significance Level	Bounds Critical values	
F-Statistics	6.65		I(0)	I(1)
		1%	3.74	5.06
K	4	5%	2.86	4.01
		10%	2.45	3.52

Null hypothesis: No level relationship.
Source: Narayan (2004) and Authors' Computation (2024)

4.4 Empirical Results

Following the confirmation of the long-run panel cointegration relationship between sample data, the study estimated the long-run and short-run coefficients of the chosen ARDL model (4, 4, 3, 4, 4) based on the Akaike information criterion (AIC). The results estimated ARDL long-run and short-run coefficients are displayed in Table 6.

The main empirical results are reported in Table 6. The empirical result shows that FDI has a positive effect on economic growth in Kenya in the long run, as expected. The result is significant, specifically, it indicates that with a percentage point increase in FDI, the rate of economic growth in the host country will increase by about 0. 09. The effect was modest, 0.09, suggesting untapped avenues for FDI to contribute to growth in Kenya. As expected FDI is growth enhancing and supports domestic investment, underpinning the preposition that sources of foreign exchange earning such as FDI will stimulate investment and growth as argued by Alfaro et al. [24] and Asongu et al. [28] empirical studies. Empirical literature document that FDI is an important source of capital that complements domestic investment, generate new employment opportunities and stimulates technology transfer and spillovers Borensztein et al., [23] De Mello, [4] Alfaro et al., [24] Further, FDI can stimulate growth if it does not compete for the product market or financial market with domestic investment (Asongu et al., [28]. This

result is consistent with the studies of Asong et al. [28] Ofori and Asongu [28] and Benetrix et al. [1] that are attributed to the ability of FDI to grow the productive capacity of the host country, technological transfer, human capital development, financial sector development and infrastructural development. This study findings contrast a study by Griffith et al. [6] in Caribbean states, Mawutor et al. (2023) in Ghana and Nguyen (2024) in Asian countries that reported a negative relationship attributed to weak institutions, underdeveloped human capital and slow technology spillover. In addition, Okello and Badj [9] findings show that the connection between FDI and economic growth is not significant in Kenya. The insignificant result was underpinned by the fact Kenya's history as an import-substituting country and the counter effect of the implemented trade policies to spur economic growth. The long-run and short-run results were identical, both had positive and significant effects. In the short-run FDI had a positive and significant result. This confirms in the short term FDI inflow can contribute to economic growth. This is appropriate since the increase in FDI inflow will increase employment opportunities and thus provide income to the population. As income increases, consumption will increase with the increase in demand for local goods and services and output Borensztein et al., [23]. According to Makki and Somwaru [29] FDI is an important catalyst for economic growth in developing countries via human capital growth, private investment growth and institutional development.

Table 6. Estimated ARDL long run and short run coefficient

Long run Coefficients			*Short run Coefficients*		
Regressors	**Coefficient**	**t-statistics**	**Regressors**	**Coefficient**	**t-Statistic**
Cons	8.502	3.046**	Cons	8.499	8.178***
lnF	0.086	7.350***	ΔlnF	0.016	6.161***
lnT	-0.441	-11.689***	ΔlnT	0.218	7.735***
lnO	0.392	5.361***	ΔlnO	0.189	6.622***
lnX	0.010	0.201	ΔlnX	-0.362	-6.604***
			ΔlnY	-0.399	-3.166**
			ECT(-1)	-0.770	-8.153***
Econometrics Problems	Test Statistic			F-statistics	Probability
Serial Correlation	Breusch-Godfrey LM test			0.808	0.553
Model misspecification	Ramsey RESET test			0.009	0.930
Heteroscedasticity	Breusch-Godfrey LM test			0.978	0.583
Goodness of fit	Adjusted R-Squared	0.984		R-Squared	0.989

* p < 0.1, ** p < 0.05, *** p < 0.01 are significance levels, in which the null hypothesis is rejected. Dependent variable: lny
Source: Authors' computation (2024)

The results, presented in Table 6, show that trade openness led to a decline in economic activities by about 0.44 in the long run. The sign obtained although significant is different from our expectations. According to Musila and Yiheyis [30], the effect of trade openness on economic growth is negative due to unfriendly trade openness policies. This result is different from those reported by Malefane and Odhiambo [31] that more openness or outward trade orientation accelerates economic growth. However, this finding is similar to that of Moyo and Khobai [32], and Heshmati and Farahane (2020) who concluded that trade openness threatened growth in SADC member states. Several studies have attributed this negative effect to poor financial development in most developing countries, rising levels of imports and growing trade deficit (Moyo & Khobai, [32] Heshmati & Farahane, [33]). The long-run result contradicts the shot-run result, which reported a positive relationship between trade openness and growth in Kenya. In short-run trade openness is likely to attract foreign exchange through export growth but in long-run the benefit of trade openness will be hurt by growing imports due to an increase in population income and rising FDI inflow complemented by profit repatriation by foreign firms and thus slowing growth [33,1]. Results reported in Table 6 show that trade yields economic growth in the short run. It means, that countries that are open to trade are likely to attract greater amounts of FDI and also lead to growth in total trade and thus accelerate production and grow output (Makki & Somwaru, [29] Malefane & Odhiambo, [31]. The short-run result agrees with a similar study in four West African countries by Wiredu et al. [20]. Trade will lead to faster productivity growth, particularly for open countries and sectors engaged in global value chains. Trade will allow the country to specialize in one single commodity and thus attract FDI to the same sector. Export growth is an important component that provides foreign exchange to a country. Further, with the global value chain in trade, it will likely attract FDI investors to the host country to maximize benefits [1]. Several studies have also reported an insignificant relationship, for instance, Mose et al. [34] conducted a study in East Africa for the period 1980 and 2010, and the study concluded trade openness was positive but not significant, implying trade openness policy was not effective during the period. This was attributed to East African countries' primary exports being prone to price fluctuations.

The results from the long-run regressions displayed in Table 6 reveal a positive relationship between climate change and economic growth, as expected. Based on the findings growth in carbon dioxide emissions as a result of activities in the agriculture and energy sector leads to an increase in output and thus economic growth. Considering Kenya is still developing, the demand and consumption for fossil energy and CO_2 emissions are expected to continue upward trend [35]. Carbon basin countries like Kenya receives green financing from industrialized economies. This funds are used to grow industries and infrastructure in Kenya. During the early stages, economic growth is associated with increasing carbon emissions as a result of growth in domestic and foreign investment activities [36]. However, as technology, economies of scale, innovation, regulations and income grow carbon emissions tend to reduce [37]. In regression, reported in Table 6, the interaction term between climate change and economic growth is positive and statically significant in the short run. Implies in a short-term increase in energy consumption and agricultural activities will cause global warming at the same time grow output.

Based on the result in Table 6 the coefficient of exchange rate was not significant in Kenya. An increase in the exchange rate did not lead to a substantial increase in economic growth in Kenya. The results obtained are positive but are insignificant, and do not support the position that excessive shifting of exchange rate regimes has affected economic growth in Kenya [38]. In addition, several empirical studies conducted in developing countries have supported the idea that the depreciation of currency stimulates economic growth by enhancing net exports via an increase in total demand in foreign countries. In contrast, as reported in Table 6, the exchange rate hurts economic growth with an index of 0.36 in the short run. Structural economists confirm that there is a negative and significant relationship between exchange rates and economic growth [39]. Particularly in Kenya, the input structure of production depends on imports, so an appreciation of the exchange rate makes import production equipment more expensive and thus harms growth in the short run [40]. The result is similar to the findings of Mawutor et al. [21] in Ghana that the appreciation of domestic currency will slow growth.

Table 7. Causality results

Short-run model (pairwise Granger causality test)			
Direction	**F-Statistic**	**P-Value**	**Status**
$F \longrightarrow Y$	0.348	0.8425	
$Y \longrightarrow F$	3.369**	0.0303	One way causality
Long-run model (ARDL-ECM causality test)			

Direction	ECT	t-Statistic	P-Value	Status
$F \longrightarrow Y$	-0.770	-8.153***	0.0012	One way causality

Source: Authors' computation (2024)

The constant variable was positive and significant in the short-run and long-run implying unobservable sources of growth outside the model also inspire economic growth in Kenya. Based on the short-run result the initial level of GDP has a negative effect on current GDP and this can be underpinned by the rising inflation rate and demand for more leisure by labourers which depress economic growth. This means countries with high initial growth will experience low growth, indicating convergence. The coefficient of error term (ECT) was significant and had an appropriate negative sign (-0.770). This implies the speed of adjustment back to the equilibrium is about 0.770, meaning any disequilibrium or shock the economy will be able to correct about 77% in the current year and thus it will take about one and half years to go back to the equilibrium after any shock. This means in Kenya any disequilibrium will exist for a short time. Based on the findings, the declining FDI inflow during the COVID-19 era will have only short-term effects.

These findings show that the value of the overall coefficient of determination (0.98) is high enough, meaning that the regressors explained about 98 per cent of the variations in economic growth during the study period and the remaining percentage is explained by other unobservable random factors captured by the error term that also stimulate economic growth. This test statistic signifies that the null hypothesis of homogeneity of variances is accepted. These results imply that the heteroscedasticity problem is absent in the model. Further, this test result tells us that the model is free of both autocorrelation and heteroscedasticity problems and implies that the estimates of the regression coefficients in question are consistent and efficient and the standard errors are unbiased.

4.5 Granger Causality Test

The short-run Granger causality and ECM long-run causality results are displayed in Table 7.

As reported in Table 7, there is one causality running from economic growth to FDI in the short run. This implies that economic growth will stimulate FDI inflow to Kenya. This finding is in line with the theoretical literature that economic growth presents profit potential for foreign investors because it motivates them to launch new products and increase investment. Thus investors pursue horizontal FDI aimed at profitmaking via internal market and economy of scale. The finding agrees with the study of Odhiambo [41] the relationship between FDI and economic growth was unidirectional, going from economic growth to FDI due to Kenya's strong economic growth [14,41]. In the long run, as reported by ECT, there is a long-run one-way causality from FDI to economic growth. This indicates that FDI causes economic growth via improved innovation, technology transfer, learning, competitiveness and human capital development. The presence of long-run causality running from FDI to growth suggests that any change in macroeconomic conditions or measures will influence FDI inflow.

5. CONCLUSION

The study investigates the relationship between foreign direct investment (FDI) and economic growth in Kenya through comprehensive regression analysis and causality tests. The estimate for the coefficient of foreign direct investment (FDI) is positive as expected for both short-run and long-run periods in Kenya. Meaning during the study period, an increase in FDI inflow led to a rise in economic growth in Kenya. The findings in our study suggest that FDI has a positive influence on economic growth in Kenya. The positive effect is mostly driven by high investment returns, a stable exchange rate, openness and friendly trade policies, market access, investor friendly environment, less bureaucratic hurdles, improved research and development, ready market and demand, better human capital and well-developed financial sector. This component may have been key in

attracting FDI to Kenya during pre and post-COVID-19. This finding is the same as past empirical studies and does confirm the preposition that sources of foreign exchange earnings such as FDI stimulate domestic investment and are growth enhancing. However, other empirical studies have observed that excess inflow of FDI will bring some potential risk to the economy owing to adverse selection. Thus the policy recommendations for developing countries such as Kenya should focus on improving the investment climate for all kinds of capital, domestic as well as foreign. From the result, Kenya needs to continue employing macroeconomic policies and pursue strategies that will attract FDI inflow to the host country. Kenya needs to build the confidence of foreign investors by introducing domestic policy changes that allow for foreign ownership in the service sector, information and communication technology and financial sector companies. Further, Kenya should provide investor friendly environment, reduce bureaucratic hurdles and increase market access to attract FDI. Kenya should also encourage the signing of a memorandum of understanding between host and foreign countries to grow the FDI partnership. Regional integration has grown the market, for instance, the East African community with Kenya being a member provides a greater market access and strategy for attracting FDIs, particularly in the manufacturing of basic consumer goods and agricultural inputs with an available market of over 300 million citizens. Any foreign firm interested in the East African region can enter the market through the Kenyan market. Furthermore, it has been observed that FDI will allow for speed integration into the global economy and help stabilize local prices. For further studies, it will be interesting to assess how regional integration has impacted FDI inflow into Kenya. Further investigation on how FDI inflow in different sectors of the economy contributes to economic growth in Kenya is key. The benefits of FDI vary greatly across primary, manufacturing and service sectors. The sectoral analysis will be useful for policy-making and stimulate knowledge about the role of FDI in the economy. Understanding the impact of sectoral FDI on economic growth is of paramount importance for guiding policy decisions and fostering sustainable development. Further research on determinants of FDI would be necessary to inform policymakers, particularly against FDI fragmentation due to the COVID-19 pandemic.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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