Volume: 28, Issue: 1
Page: 115-126
2023

International Journal of Science and Business

Journal homepage: ijsab.com/ijsb

Foreign Direct Investment, Trade Openness and Economic Growth in Kenya: Empirical Analysis Using ARDL Approach

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Abstract

This study aimed to examine the impact of foreign direct investment and trade openness on Kenya's economic growth for the period between1975–2021. To do so, the study applied the Autoregressive Distributed Lags (ARDL) model to explore the long run and short run effect among the variables. The result of bound test cointegration confirms the presence of cointegration among the variables. Findings from ARDL suggest that FDI and trade openness positively influence economic growth in the long-run. The short-run results revealed that trade openness was found to have a positive and significant impact on FDI. However, in short run, the impact of FDI on economic growth is not statistically significant. Similarly, economic growth had a favorable and long-run impact on FDI, while its short-run effect was minimal. The error correction term shows annual adjustment from any deviation in the previous period will be corrected by a speed of 99% in the long run. Therefore, the study recommends that directing FDI towards industries that are focused on exports is significant and promotion of export-led growth would enhance economic growth in Kenya economy.

IJSB
Accepted 10 September 2023
Published 20 September 2023
DOI: 10.58970/IJSB.2208

ISSN: 2520-4750 (Online) 2521-3040 (Print)

Keywords: *FDI, Trade openness, Economic growth, ARDL model, Kenya.*

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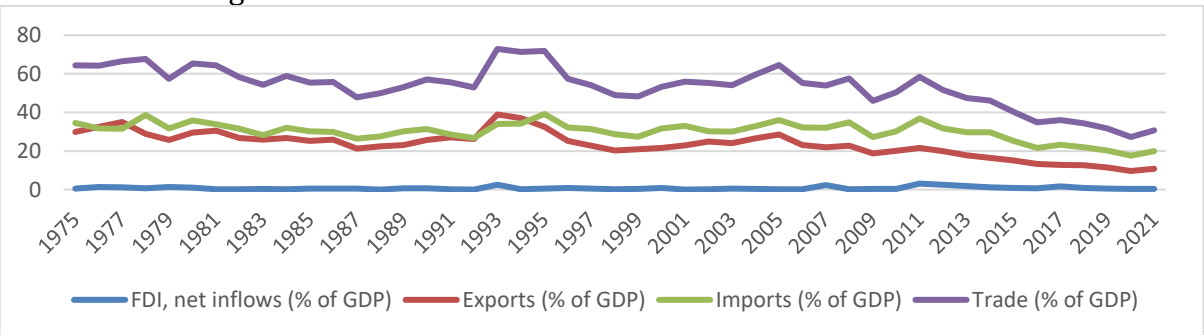
1. Introduction

Since the early 1980s, Kenya has undertaken significant economic reforms through Structural Adjustment Programmes (SAPs), marking a shift from the controls and inward-looking trade policies that dominated the 1960s and 1970s. The 1970s were marred by economic crises triggered by terms of trade shocks, fiscal mismanagement, and structural inefficiencies. Kenya achieved lower-middle income status in 2014, surpassing the World Bank's benchmark GDP per capita. Factors such as Foreign Direct Investment (FDI) and international trade have played a pivotal role in driving Kenya's economic growth. Recent literature in developing nations has placed substantial emphasis on the nexus between economic growth, FDI, and trade openness. Theoretically, economic growth, FDI, and trade openness exhibit positive correlations. Developing countries, constrained by budgetary limitations, seek to attract more FDI as their long-run growth and often relies on foreign assistance. Attracting inbound FDI is influenced by various factors, including skill development, knowledge transfer, technological innovation, and research and development (R&D) activities within host nations. However, there has been ongoing debate about the relationship between foreign direct investment, trade openness, and economic growth. Trade openness and FDI, as highlighted by Idris and Habibullah (2016), is a key driver of economic growth. Despite this correlation, empirical data also reveals occasional conflicts between FDI and economic expansion. This perspective aligns with dependency theory, which argues that heavy reliance on foreign investment can negatively impact income distribution and overall economic growth. The core premise of dependency theory is that an economy controlled by outsiders doesn't develop organically but rather in a fragmented manner (Amin 1974).

Analyzing the relationship between trade openness and economic growth, various theories come into play, such as Endogenous Growth Theory (Romer 1986; Lucas 1988), Transaction Cost Theory (Coase 1937; Williamson 1981), and International Product Life Cycle Theory (Vernon 1966). According to the Endogenous Growth Hypothesis, a nation can redirect its production resources towards industries in which it has a competitive advantage. This approach underscores the potential for achieving a higher equilibrium growth rate over time by increasing specialization and reducing input costs, as factor endowments are more efficiently utilized due to trade openness (Romer 1989).

Based on actual data from the World Bank (WDI, 2023), the relationship between FDI inflows, exports, imports, and total trade as a percentage of GDP in Kenya indicates that trade growth has outpaced the increase in foreign direct investment. It is noteworthy that there was a trade surplus between1976-1977 and 1993-1994, during which Kenya earned more from its exports than it spent on imports. However, in recent years, FDI, exports, and imports have experienced a decline with slight increase in 2021.



Time progression of FDI inflow, exports, imports, and total trade (1975-2021). Sources: author's design

2. Literature review

The exploration of the interplay between foreign direct investment (FDI) and global trade has always drawn the attention of many researchers, approached from diverse angles. The empirical findings are not always consistent, there's a prevailing notion that international trade and FDI are intertwined with a country's economic growth. Several studies have scrutinized the nexus between economic growth, FDI, and trade openness, revealing that FDI inflows can stimulate a host country's economic growth by facilitating the assimilation of novel technologies (examples include Asghar and Hussain 2014; Blomstrom, Lipsey, and Zejan 1992; De Mello 1997; Borensztein, Gregorio, and Lee 1998), among others. For instance, Szkorupova (2014) delved into the relationship between FDI, economic expansion, and exports in Slovakia during the period from 2001 to 2010. The study confirmed a long-run association among these variables and underscored the positive contributions of both FDI and exports to the nation's GDP. Similarly, in Cote d'Ivoire, Zambe and Yaoxing (2010) used the ARDL bounds testing co-integration approach and Granger causality tests to examine the long run impacts of FDI and trade openness on economic growth. Their findings echoed a significant long-run correlation between FDI, trade openness, and economic growth. However, Demir & Lee (2022) widened the scope by examining the relationship between FDI and economic growth across different regions from 1990 to 2012. Their conclusions suggested substantial and beneficial effects of FDI on the economic growth of specific sub-national groups but found no long run impacts on the overall economic growth of host countries. Koojaroenprasit (2012) investigated the influence of FDI on South Korea's GDP growth during the period spanning 1980 to 2009. The study uncovered a meaningful positive influence of FDI on GDP growth, complemented by contributions from employment, exports, and human capital. Contrastingly, Durham (2004) introduced the idea that the effects of FDI are contingent on a host nation's "absorptive capability" rather than establishing a direct link to economic development. Meanwhile, Li and Liu's (2005) analysis of FDI's impact on 84 diverse countries argued that neither developed nor developing nations can solely rely on FDI to revamp their economies. Examining Ghana's context, Sakyi, Commodore, and Opoku (2015) utilized the ARDL model to scrutinize the long run connections between FDI, trade openness, and economic growth, affirming the notion that trade openness and economic growth are interconnected. In summary, despite a general consensus among many economists regarding FDI's significance in a country's growth, the empirical literature concerning its relationship with trade openness and economic growth remains inconclusive. Discrepancies in findings are attributable to divergent viewpoints, sample selections, research methodologies, and analytical approaches. Additionally, country-specific attributes play a pivotal role in unraveling these empirical relationship. This study seeks to provide a country-specific analysis, encompassing both immediate and protracted effects of these factors. Subsequent sections will delve into the research methodology, data analysis, policy implications, and conclusions.

3. Methodology

3. 1 Data and description

The empirical study looked at the effects of trade openness and foreign direct investment on economic growth in Kenya during a time period extending from 1975 to 2021. The main source of the data was from World Development Indicators. The study made use of the STATA software version 14 to analysis the data. FDI inflows, trade openness (export plus import divided by GDP), and economic growth are the three variables included in the research. In order to accurately measure GDP growth, FDI inflows, and trade openness in the context of the study, the variables were chosen based on their theoretical and empirical importance.

Table 1: Details list of variables.

Variables	Proxy	Measurement	Source
Foreign direct investment inflows	FDI inflows	Foreign direct investment, net inflows (BoP current US$)	WDI
Trade openness	Openness	Exports plus imports (BoP current US$) divided by GDP (current US$)	WDI
Economic growth	GDP	GDP (current US$)	WDI

Source: Author

3.2. Model

The data for the research were taken from the World Development Indicator (WDI), which covers the years 1975 to 2021. The research equation is as follows:

FDIt = β0 + β1GDPt + β2OPENNESSt + εt (1)

Where;

FDI = Foreign direct investment

t = Time

GDP = Economic Growth

OPENNESS = Trade openness

β0, β1 and β2=coefficient

εt= error term

3.3. Econometric techniques

To verify the unit root in time series, many tests have recently been proposed in the literature (Phillips-Perron (PP test, 1988); Kwiatkowski et al., 1992; Augmented Dickey and Fuller (ADF), 1981; and Dickey and Fuller, 1979). Only the ADF test and PP test were applied in our study to assess if the series had a unit root or not. Consider calculating the following equation with the ADF and PP tests.

For ADF test: $\Delta y_t = \beta_o + \beta_1 y_{t-1} + \sum_{t-1}^{n} \beta y_i + \sigma + \varepsilon_t$ (2)

For PP test: $\Delta y_t = \beta_o + \beta_1 y_{t-1} + \varepsilon_t$ (3)

Where y stands for the time series, t for the period's linear trend, Δ for the first difference operator, β for constant, n is the optimal integer of lags in the dependent variable, and t for the random error component.

Autoregressive distributed lag bounds test: We use the bounds test with the dynamic simulated ARDL technique to assess the long-run relationship between variables for cointegration. The following is the model equation that we used:

$\Delta FDI_t = \beta_0 + \Sigma B_1 \Delta FDI_{t-1} + \Sigma B_2 \Delta GDP_{t-1} -$

$\Sigma B_3 \Delta OPENNESS_{t-1} + \varphi_1 FDI_{t-1} + \varphi_2 GDP_{t-1} + \varphi_3 OPENNESS_{t-1} + \varepsilon_t$ (4)

In Equation 4 β0, β1, β2, and β3 show the short-run coefficients; contrary to, and represent the long-run coefficients and white noise. For short-run relationships, the ECM equation is also provided below.

$\Delta FDI_t = \beta_0 + \Sigma B_1 \Delta FDI_{t-1} + \Sigma B_2 \Delta GDP_{t-1} + \sum \omega_3 \Delta OPENNESS_{t-1} + \partial ECM_t + v_t$ (5)

4. Results and discussion

4.1 Descriptive Statistics

Table 2 below provide the descriptive statistics for all variable involved in our analysis as a basis for further statistical testing and are transformed into a log form. From Table 2 all the variables has a standard deviation smaller than their mean, indicating that the observed values are valid and no control variables are needed. Foreign direct investment has the highest standard deviation, it's a clear indication that FDI is highly volatile. From this table, we can see that the mean value of InGDP is 23.5114, the median is 23.28, the maximum value is 25.42105 and the minimum value is 21.90479. In the case of InFDI, the mean is 18.1167, the median is

17.86, the maximum value is 21.09516 and the minimum value is 12.8852. The InOPENNESS mean is 0.5785071, the median is -0.61, the maximum level is 0.4007322 and the minimum level is -1.300213.

Table 2: Descriptive statistics for different variables.

	InGDP	InFDI	InOPENNESS
Mean	23.5114	18.1167	0.5785071
Maximum	25.42105	21.09516	0.4007322
Median	23.28	17.86	-0.61
Minimum	21.90479	12.8852	-1.300213
Std. Dev.	1.042463	1.726401	0.3412553
Skewness	0.4882455	-.2076756	0.6539861
Kurtosis	1.888016	3.356475	4.276961
Sum	1105.036	851.4848	-27.18983
Sum sq. dev	137.10113	49.9895127	5.35693967
Observations	47	47	47

Source: Authors' calculation using Stata 14.

4.2 Correlation Analysis

The study used the Pearson correlation coefficient to assess the linear relationship between GDP, FDI, and OPENNESS and to establish its strength and direction (Pearson, 1896). The coefficient indicates how closely the two variables are related and in which direction. The results of this study show that the correlation coefficient between GDP and FDI was 0.7520, indicating a strong positive relationship between the two variables. In other words, when FDI increases, GDP tended to increase as well and vice versa. The coefficient between GDP and OPENNESS was -0.6226 while FDI and OENNESS was -0.3960 indicating a negative relationship. It is important to note that correlation does not imply causation. While a strong relationship existed between FDI and GDP, it did not necessarily mean that FDI caused GDP or vice versa. Hence, further analysis was required to model the nature of the link between these three variables.

Table 3: Correlation matrix

Variables	InGDP	InFDI	InOPENNESS
InGDP	1.000		
InFDI	0.7520	1.000	
InOPENNESS	-0.6226	-0.3960	1.000

Source: Authors' calculation using Stata 14

4.3 Unit root test

We checked to see if the data was stationary before starting the analysis. Current advancement in the literature suggests a number of methods (Dickey and Fuller, 1979; To examine the unit root in time series, researchers enhanced Kwiatkowski et al., 1992, Dickey and Fuller (ADF)and Phillips-Perron (PP test, 1988). The unit root test has been performed independently using the two widely used test techniques, such as ADF and PP, on the annual series of GDP, FDI, and OPENNESS variables at transformed series by taking the log, first difference, and incorporating constant, and both trend and constant. A stationary time series is preferred in the analysis due to its predictability, as it possesses constant statistical properties over time, such as a consistent mean and variance. In contrast, a unit root series has statistical properties that change over time, making its behavior less predictable. Additionally, a time series with a unit root has a mean that grows or declines over time, making its behavior unpredictable too. Results for stationarity for each of the series used in the analysis are presented in Table 4. The results indicate that GDP and Trade openness had unit roots, hence it was transformed to the first difference before model analysis were undertaken. While trade openness is claimed to follow the I(0) process, foreign direct investment and economic growth follow the I (1) type process, reflecting a mixed order of integration. This may imply that ARDL bound approach

should be employed in place of other methodologies to examine the possibility of a common trend that all possible series could display.

Table 4: Results of Unit Root Tests

Variables	ADF test				PP test				
	Level		Difference		Level		Difference		Stationary order
	Constant	Constant & trend	Constant	Constant & trend	Constant	Constant & trend	Constant	Constant & trend	
InFDI	-2.066	-3.739	−5.135 **	−5.288 **	-3.249	-3.539	−4.275 **	−4.199 **	I(1)
InOPENNES	−3.198 **	−3.353 **	-	-	−5.129 ***	−4.456 ***	-	-	I(0)
InGDP	-0.042	-1.777	-3.651**	-3.736 **	0.097	-1.571	-4.782 **	-4.743**	I(1)

Source: Authors' calculation using Stata 14

Notes: Null hypothesis is that the time series is nonstationary (time series has a unit root), against the alternative hypothesis of stationary series (time series has no unit root). The numbers that are displayed are the results of the test statistic and their corresponding degrees of statistical significance. Significant levels of 10%, 5%, and 1% are indicated by the symbols *, **, and ***, respectively.

4.4 Optimum lag selection

Selecting the right number of lags for the ARDL model is important after evaluating the unit root and making sure that none of the variables are integrated of order 2 or higher. It is crucial because an excessive number of lags or an insufficient number of lags could, respectively, increase forecast inaccuracy and exclude important information (Stock & Watson, 2006). For annual data, CEPR (2001) advised taking a maximum lag of 1-2 (Ivanov & Kilian, 2001). Initial lag length selection is also required to estimate the ARDL model, which is necessary for performing the bounds cointegration test and evaluating the error correction model. In the case of conflicting results, CEPR (2001) suggested following the SBIC for any sample size for the quarter and annual data (Ivanov & Kilian, 2001). This study has yearly data of 47 observations, so we follow the SBIC criterion and the optimal lag length of 1 for further operations. The results of the ARDL analysis's ideal lag order selection criteria are shown in Table 5. The ARDL model's accuracy and dependability in determining the link between foreign direct investment, trade openness, and economic development are improved by the adoption of the optimum lag order. The Likelihood Ratio (LR), Schwartz Bayesian Information Criteria (SBIC),Akaike Information Criteria (AIC), Hannan Quinn Information Criteria (HQIC), and Forecast Prediction Error (FPE) Criteria, were among the statistical methods used to find the ideal lag order (k). Because SBIC is preferred because it has the ability to choose the true model, Hussain (2009) utilised the minimum value of the SBIC to choose the lag order.

Table 5: Results of Optimal lags

Lag	LL	LR	df	P	FPE	AIC	HQIC	SBIC
0	-130.063				.097818	6.18896	6.23427	6.31183
1	-15.2906	229.54*	9	0.000	.000715*	1.26933*	1.45058*	1.76083*
2	-6.9137	16.754	9	0.053	.000742	1.29831	1.6155	2.15843
3	-3.28601	7.2554	9	0.611	.000969	1.54819	2.00131	2.77693
4	4.01459	14.601	9	0.102	.001083	1.62723	2.21629	3.2246

Source: Authors' calculation using Stata 14

4.5 The Bounds Test Results

Cointegration testing serves as the initial step in the analytical process when employing the ARDL (AutoRegressive Distributed Lag) model. To assess the presence of cointegration, the ARDL bound test is employed, which aims to examine the "null hypothesis" that cointegration

is absent. Under this null hypothesis, the joint F-statistic, a key parameter in the bounds tests, follows an unusual asymptotic distribution. In this context, the ARDL bounds testing method becomes applicable once it has been established that the variables exhibit a combination of integration orders, such as I(0) and I(1), as per the findings (Pesaran & Shin, 1999; Pesaran et al., 2001). The ARDL framework enables the assessment of cointegration, and the results of the ARDL bounds test are presented in Table 6.

Table 6: Results of Optimal lags selection

Test Statistic	Value	K
F-statistic	13.392	2
Critical Value Bounds	I(0) Bound	I(1) Bound
Significance		
10%	3.17	4.14
5%	3.79	4.85
2.5%	4.41	5.52
1%	5.15	6.36

Source: Authors' calculation using Stata 14.

Note: * The variables' lag length (1 0 0). In the context of cointegration testing, the decision process involves comparing the calculated F-statistic with critical values associated with different orders of integration, specifically I(0) and I(1) regressors.

For instance, at a significance level of 1%, the critical values provided in Table 6 fall within the range of 5.15 for I(0) and 6.36 for I(1). In this case, the calculated F-statistic, which is 13.392 based on the data, exceeds the critical values for I(1) regressors but falls below the critical values for I(0) regressors. This outcome signifies that, at the 1% significance level, the null hypothesis of no cointegration is rejected. Instead, the evidence points to the existence of a long-run relationship between the dependent and independent variables (P. K. Narayan, 2005). This conclusion suggests that cointegration is present, and as a result, the ARDL framework is fitted with an error correction model (ECM) to account for both short-run and long-run interactions between the variables.

4.6 Long run and short run coefficients

The long-run and short-run coefficients are derived through the ARDL (AutoRegressive Distributed Lag) and ECM (Error Correction Model) methods, respectively. The selection of the optimal lag order for the model is based on Schwarz's Bayesian Information Criterion (SBIC). In this case, the ARDL model is estimated with a maximum lag length of 1. Table 8 presents the results outlining the long-run effects of the economic relationship between the predictand (Foreign Direct Investment) and the predictors (Trade Openness and FDI). These coefficients provide insights into how changes in the predictor variables influence the predictand in the long run, offering valuable information for understanding the dynamics of the economic relationship under consideration.

4.7 ARDL Short-Run Results

Table 7: Results of short-run analysis

Variables	Coefficient	St. Error	t Value	Prob
InFDI(-1)	0.0082899	.1573658	0.05	0.958
lnGDP	0.6376895	.6532535	0.98	0.335
InTD	0.587823	.3024008	4.59	0.000
Constant	-14.30883	5.339884	-2.68	0.010
F(3, 42)=18.61 Prob > F= 0.0000 R squared=0.5707 Adj R-squared=0.5400				

Source: Authors' calculation using Stata 14

The ARDL model's findings show a positive short-run relationship between trade openness and FDI. Additionally, if trade openness changes by 1%, FDI changes by 58.9%, and vice versa. Furthermore, the results suggested that there was no short-run correlation between GDP and FDI. Additionally, all of the predictors employed account for 57.07% of the fluctuations in foreign direct investment, whereas 42.93% are outside the model. Table 7 displays these relationships.

4.8 ARDL Long-Run Results

Table 8: Results of Long- run analysis

Regressor	Coefficient	St. Error	t Value	Prob
Error Correction Term (ECT)	-0.9917101	0.1573658	-6.30	0.000
InTD	0.6430201	0.6616539	0.97	0.037
InGDP	0.699424	.2212472	6.33	0.000
Constant	-14.30883	5.339884	-2.68	0.010
R squared= 0.4889 Adj squared= 0.4524				

Source: Authors' calculation using Stata 14

According to the ARDL findings, GDP and trade has long run, positive relationship with FDI. A 1% change in GDP will alter foreign direct investment by 69.94%, and the opposite is true. Additionally 1% change in trade will alter foreign direct investment by 64.94%, and the opposite is true. The R square value showed that 48.89% in FDI is due to all predictors used in the study. These connections are shown in Table 8.

The study's findings revealed a strong negative coefficient of ECT, indicating that over time, the dependent and independent variables would converge. This revealed a long-run link between the factors. The correction rate for any departure from the long-run equilibrium will be corrected by a speed of 99.17%.

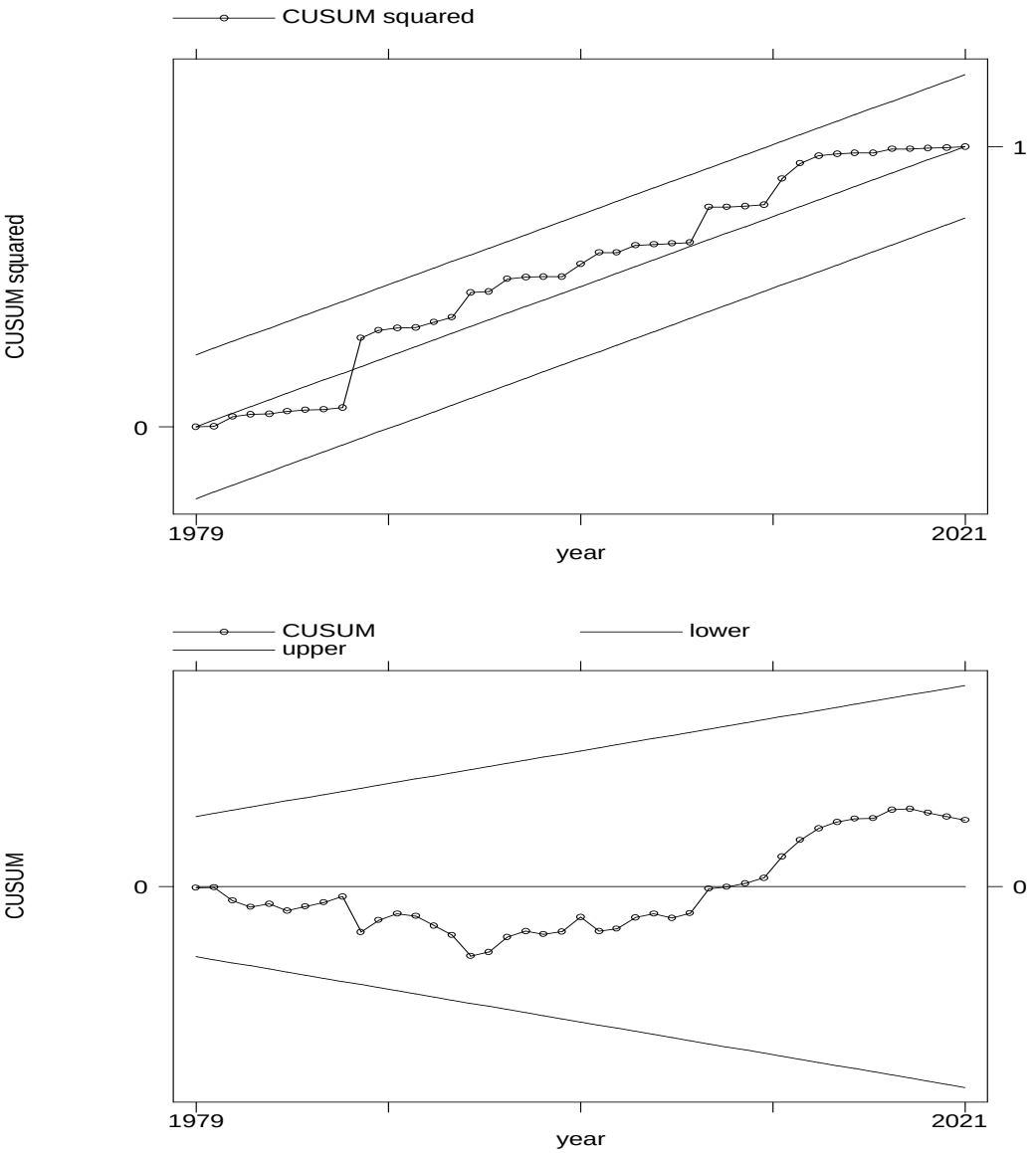
4.9 Sensitivity Analysis/Diagnostic test

Table 9. Diagnostic statistics tests.

Diagnostic Statistics Tests	*p*-Values	Results
Breusch Godfrey LM Test	0.6416	No evidence of serial correlations
Breusch-Pagan-Godfrey Test	0.1167	No evidence of heteroscedasticity
Heterogeneity Test	0.7446	No evidence of heterogeneity

Source: Authors' calculation using Stata 14

To determine the reliability and validity of the outcomes of the foreign direct investment model, a number of diagnostic tests were carried out. The error terms were not serially correlated, according to the results of the Breusch and Godfrey (1978) LM autocorrelation test (0.6416>0.05). The model was homoscedastic (0.1167>0.05), according to the heteroskedasticity test conducted by Breusch and Pagan in 1979. Furthermore, because the P-value 0.7446 is higher than 5%, we are unable to reject the null hypothesis of the heterogeneity indicating there is no heterogeneity problem. To ascertain whether the coefficients are stable, we employed the CUSUM graphs in Figure 1, as well as the CUSUM of squares graph in Figure 2. The graphs below show that at the 5% level of significance, coefficients are stable.



Source: Authors' calculation using Stata 14

5.0 Conclusion and Policy Implications

The primary objective of this study is to assess the impact of Foreign Direct Investment (FDI) and trade openness on the economic growth in Kenya. To achieve this objective, the study employs the ARDL (AutoRegressive Distributed Lag) bounds test model using time series data spanning from 1975 to 2021. Initially, the stationarity of the variables was examined using enhanced Dickey-Fuller and Phillips-Perron tests. The results revealed a mix of stationary variables at the level and others that became stationary after differencing. This variability in stationarity findings prompted the use of cointegration tests to explore the existence of long-run relationships among the variables. The ARDL bounds cointegration test identified a long-run equilibrium relationship between GDP, trade openness, and FDI. However, when GDP and trade openness were treated as dependent variables, no cointegration was observed. To obtain short-run insights, the study also conducted an Error Correction Model (ECM) analysis. The ECM results, which were consistently negative and statistically significant, provided further validation of a long-run relationship between FDI, trade openness, and GDP. In summary, this study confirms the existence of a long-run connection between Kenyan economic growth and Foreign Direct Investment. The findings suggest that FDI plays a significant role in influencing Kenya's economic growth in the long run. Similarly, GDP and trade positively and significantly

impacted foreign direct investment in the long run. Trade openness was found to have a short-run, favourable, and considerable impact on foreign direct investment. However there was no short-run relationship between GDP and FDI. These findings imply that in order to attain high and stable economic growth in the future, the Kenyan government should take into account suitable favorable policies regarding FDI and trade openness. Kenya may increase its foreign direct investment, in particular, by embracing more trade openness and integrating with the international market. For example, Kenya should promote its exports, which have been declining in recent years. Overall, the study suggests interventions that focus on improving GDP, and trade openness policies that specifically consider the effects of the export industry on foreign direct investment. This should be a goal of government, private, and foreign firm partnerships.

Funding.
No funding sources were provided for this paper.

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Cite this article:

Gachoki Emilio Munene (2023). Foreign Direct Investment, Trade Openness and Economic Growth in Kenya: Empirical Analysis Using ARDL Approach. *International Journal of Science and Business, 28*(1), 115-126. doi: https://doi.org/10.58970/IJSB.2208

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