Examining the link between FDI and economic growth in Tanzania through financial development, capital formation and labor inputs

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World Bank Organization. National accounts data files from the World Bank and the OECD. The indicator is available online at https://data.worldbank.org/indicator/.

UNCTAD. World Investment Report: Prosperity for All. Accessible at: https://unctad.org/data-visualization/global-foreign-direct-investment-flows-over-the-last-30-years

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Note: Data have also been deposited to Data First repository, University of South Africa.

I will also send the DOI if needed upon receiving it from the repository

Examining the nexus between FDI and Tanzanian economic growth through financial development, capital formation, and labor inputs

Abstract

Through financial development, capital formation, and labor inputs, this study investigates the short- and long-run relationships between inbound FDI and economic growth in Tanzania. For developing economies, this is a critical policy issue. Such studies, however, are limited or nonexistent in countries such as Tanzania. As a result, the study assesses the relationship between variables concurrently from 1991 to 2021, employing autoregressive distributed lag (ARDL) and Granger causality approaches. The outcome demonstrates the existence of a long-term link between the variables. In the long run, inbound FDI and labor inputs have a positive and statistically significant impact on economic growth. From causality tests, inbound FDI, labor input, and economic growth exhibit bidirectional causality in both the short and long run. The other explanatory variables are all positive but not significant. Therefore, we conclude that Tanzania should adopt policies that boost inbound FDI and labor inputs to further stimulate economic growth.

Keywords: Developing country; foreign direct investment; financial development; economic growth

1. Introduction

The relationship between foreign direct investment, financial development, labor inputs, capital formation, and economic growth is assumed to be positive in theory. Nevertheless, according to Wang et al. (2022), investment is the key driver of economic growth. As a result, over the past three decades, numerous countries have opened their economies for FDI entry (Hayat, 2019). The inflow of FDI, particularly for countries in Sub-Saharan Africa, is expected to fuel economic growth through added capital and new technology from more advanced economies (Anh-Tu Nguyen et al., 2022; Miao et al., 2021; and Seck, 2012). Neoclassical and endogenous growth models also claim that FDI boosts the stock of capital and technology in host countries (Solow, 1956; Romer, 1986; Lucas, 1988). However, the recipient country must have achieved a certain minimum level of financial development that allows a host country to absorb the positive effects of FDI inflows (Abdul Bahri et al., 2019; Ashakah & Ogbebor, 2020; Indrajaya, 2021; Omar Bakar et al., 2022; Solarin & Shahbaz, 2015). As argued by Budiharto et al. (2017), inbound FDI as an external source of capital contributes significantly to capital formation through increased savings as a result of increased productivity and then the earnings of people. This inward FDI from industrially advanced economies provides finance for development projects, therefore hastening the course of industrialization in the developing economies (Le et al., 2021; Sarker & Khan, 2020). Moreover, inbound FDI helps to bridge the gaps in investments in countries where capital is scarce (Majid & Elahe, 2016; Melisa et al., 2020). Developing countries acquire these investments in the form of FDI from transnational companies that expand their operations abroad through globalization (Kouassi, 2019). According to UN-Habitat (2018), FDI is an essential tool for fueling economic growth in African countries. However, empirical studies on the tie between FDI inflows and economic growth still yield mixed results (Alvarado et al., 2017; Dinh et al., 2019; Majid & Elahe, 2016; Md. Reza et al., 2018; Nicholas, 2021). This could be due to variations in absorptive capacity among host countries, particularly those with unstable economies. Nevertheless, the answer to whether foreign FDI inflows, financial

development, capital formation, and labor inputs interact positively with economic growth is lacking, particularly in the countries like Tanzania.

Scholars such as Hermes & Lensink (2003; Wei Zhou & Ning Chen, 2022; and Yeboua, 2019) claim that inbound FDI is incapable of boosting economic growth in countries that have not reached a certain degree of financial development. Chien-Chiang and Chun-Ping Chang (2009) and Kouassi Yeboua (2019) emphasized that countries that have attained a minimal level of financial development benefit from the growth-improving effects of FDI inflows. When sufficient capital stock is added, a country with smaller initial capital tends to have higher productivity, enhancing growth in the long term, according to Adhikary (211). However, endogenous growth models assert that enhanced investment efficiency brought about by FDI provides a comparative advantage to economies with limited capital stock in catching up with wealthier economies in the long term (Romer, 1986). In this consideration, the financial markets provide avenues for saving that, in turn, would lead to new capital formation. Following this fact, the linkage among inward FDI, financial development, labor participation, and economic growth is indispensable for policy purposes. But another question arises as to whether this linkage can apply to developing economies like Tanzania for the past three decades following the attainment of lower-middle-income status in 2020, five years earlier than predicted due to the remarkable economic growth (Battaile, 2020; Gray, 2018).

A number of studies (Ashakah & Ogbebor, 2020; Budiharto et al., 2017; Dinh et al., 2019; Kouassi Yeboua, 2019; Mtar & Belazreg, 2023; Nicholas, 2021; Olorogun et al., 2022; Sethi et al., 2022; Siddikee and Rahman, 2021; Taylor, 2020; Umer Jeelanie Banday et al., 2021) have investigated the relationships between the inflows of FDI and economic growth using different multivariate models. However, few, if any, have examined the relationship between FDI inflows and economic growth by considering financial development, labor participation, and capital formation, notably in Tanzania. Therefore, this study examines the nexus among the underlying variables simultaneously in Tanzania from 1991 to 2021 using the autoregressive distributed lag (ARDL) model. It fills a knowledge gap in Sub-Saharan Africa and helps policymakers develop economic strategies to boost Tanzania's growth. The study employs ARDL

co-integration and Granger causality methods, which offer advantages over conventional methods (Nicholas, 2021). The ARDL test is more efficient with a small sample size. Third, the ARDL model can be used to generate long-run unbiased estimates (Adeleye et al., 2018; Mwakabungu & Kauangal, 2023; Shrestha & Bhatta, 2018). Furthermore, the study investigates the causative connection among the variables in the short and long run. Understanding this linkage is fundamental for promoting economic growth. For example, if the variables under study have a positive impact on economic growth, this will imply that policymakers should focus on policies that attract FDI, strengthen the financial system, and encourage saving habits for the prosperity of the country.

The remainder of the paper is as follows: Section 2 is a review of the literature. Section 3 contains the study's data and methods. Section 4 presents the findings. Section 5 discusses the findings. Section 6 contains the conclusion and policy recommendations.

2. Literature review

In developing nations, foreign direct investment (FDI) is seen as a major driver of economic growth (Luo et al., 2022; Reza et al., 2018; Wang et al., 2022). Neoclassical and endogenous growth models provide a theoretical foundation for the FDI-led growth hypothesis (Adhikary, 2011). Neoclassical theory holds that FDI stimulates economic development in a host nation by encouraging capital accumulation and technological advancement (Melisa et al., 2020). To the economic system, however, technical and labor growth are exogenous. As a result, FDI inflows simply rise the investment rate and have no long-term effects on the economy. Endogenous growth theories contend that, in addition to capital growth, FDI inflows provide new ideas and know-how via which advanced economies pass on benefits to local companies. (Asamoah et al., 2019; Dinh et al., 2019; Seng Sothan, 2017). However, the know-how and new ideas via FDI inflows are real if the financial system of the recipient nation is well-developed (Chien-Chiang Lee & Chun-Ping Chang, 2009; Olulu-Briggs, 2021). Particularly, effective technology transfer via incoming FDI is reliant on the level of development of the financial system of a host nation. Yet, according to Meade (2013), capital and labor are what drive the growth of the economy.

Scholars have investigated the relationship between FDI inflows and economic growth (Nguyen, 2020; Nicholas, 2021; Magazzino & Mele, 2022; Sarker & Khan, 2020). However, the likelihood of a positive impact of FDI on economic growth depends on some facets such as the level of financial development, labor involvement, capital formation, level of technology, and trade policy of a host country (Adegboyega & Odusanya, 2014; Adeleye et al., 2018; Budiharto et al., 2017; Chien-Chiang Lee &Chun-Ping Chang, 2009; Indrajaya, 2021; Omar Bakar et al., 2022; Siddikee and Rahman, 2021; Solarin & Shahbaz, 2015). For the purposes of this study, financial development refers to the provision of credit to the private sector, which in turn drives economic activity, increasing output and promoting growth. Growth of capital and diffusion of technology via FDI are key to sustainable growth in developing countries (Li & Chen, 2010).

Yimer (2023) assessed the growth effects of foreign direct investment (FDI) in Africa between 1990 and 2016. The results showed that FDI has a positive long-term impact on growth in factor investment-driven economies but no significant short- or long-term impact on fragile factor-driven economies. However, the spillovers vary over time amongst the nations. According to Asafo-Agyei and Kodongo (2022), countries that attained a minimum threshold level are likely to benefit from a growth-enhancing effect embodied in FDI. Alvarado et al. (2017) found that FDI's effect on growth is marginal and limited to the host country's level of development. Hayat (2019) found that both FDI and institutional quality contribute to growth.

Foreign direct investment boosts economic growth by increasing the capital stock in potential areas (Sultanuzzaman et al., 2018). However, it is argued that in a recipient country with a well-developed and well-functioning financial sector, FDI is more likely to boost economic growth more efficiently (Choong et al., 2005). Neoclassical growth models suggest low beginning capital stock in developing economies leads to high productivity and growth rates but declines with long-term capital flow (Adhikary, 2011). Adhikary went on to say that the greater efficiency of investment brought about by FDI inflows gives capital-scarce economies a competitive edge in catching up with wealthy countries in the long run. However, internal effects, such as financial development, among others, play a function as absorptive capacity in rising FDI to foster growth. (Abdul Bahri et al., 2019; Budiharto et al., 2017). Based on a

review of the literature, the nexus among inward FDI, financial development, labor inputs, capital formation, and economic growth in Tanzania from 1991 to 2021 is uncertain. Therefore, for policy objectives, this study employs autoregressive distributed lag (ARDL) and Granger causality methods to respond to this dilemma by considering internal factors in tandem with FDI inflows.

3. Methodology

3.1 *Descriptions of the data source and variables*

The goal of this study is to assess the relationship between FDI inflows, financial development, labor force participation, capital formation, and economic growth in Tanzania using time series data from 1991 to 2021. In this era, Tanzania experienced sustained growth, allowing the country to attain lower-middle-income status in July 2020 (Battaile, 2020). Figure 1 shows the trends of the variables under study.

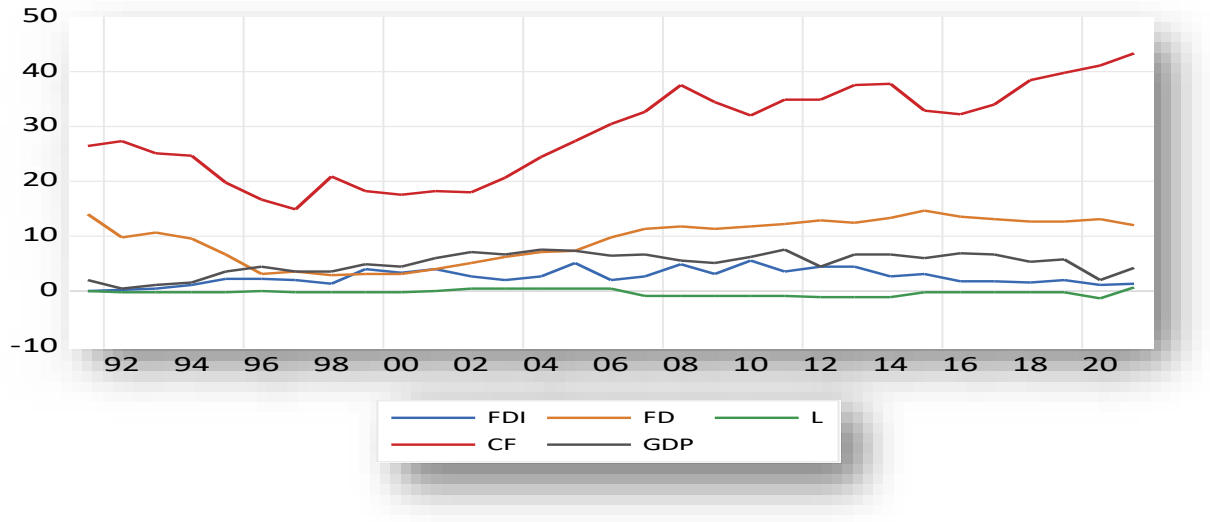

Figure 1: Graphical presentation of the dataset

Notes: FDI stands for foreign direct investment; FD stands for financial development; L stands for labor force; CF stands for capital formation; and GDP stands for gross domestic product.

Source: *Drawn by the authors using EViews® 12*

Table 1: Variable and data source descriptions

We obtained the annual data on FDI, financial development (FD), Labor (L), Capital formation (CF), and GDP growth of Tanzania from 1991 to 2021 from mixed sources (see Table 1 below).

Variables	Description of variables	Data source
FDI	Foreign direct investment, net inflows (% of GDP)	World Bank Group, and UNCTAD
FD	Financial development measured in terms of domestic credit to the private sector (% of GDP)	World Bank Group, and WIPO
L	Labor force, measured in terms of participation rate, for ages 15–24 (annual change%)	Macrotrends LLC
CF	Gross capital formation (% of GDP)	World Bank Group
GDP	Gross domestic product (annual%), a measure of economic growth	World Bank Group

Notes: UNCTAD stands for the United Nations Conference on Trade and Development.

WIPO stands for the World Intellectual Property Organization.

Source: *Authors' compilation*

Table 2 shows the highest standard deviation of capital formation (CF) in the data set, indicating greater variability during the study period. Absolute skewness is close to zero, indicating normal distribution, with significant kurtosis showing a more peaked distribution. (see Hair et al., 2021).

Table 2: Descriptive statistics of the variables

	FDI	FD	L	CF	GDP
Mean	2.619707	9.547384	-0.234516	28.80371	5.115884
Median	2.310066	11.26739	-0.130000	30.32396	5.686417
Maximum	5.663728	14.61354	0.770000	43.21770	7.672155
Minimum	0.000202	2.940982	-1.170000	14.89974	0.584322
Std. Dev.	1.449260	3.897814	0.517738	8.280423	2.005624
Skewness	0.267274	-0.567353	-0.184954	-0.096169	-0.765362
Kurtosis	2.390046	1.820052	2.148153	1.756272	2.525924
Jarque-Bera	0.849641	3.461453	1.114031	2.045811	3.316822
Probability	0.653887	0.177156	0.572916	0.359549	0.190441
Sum	81.21091	295.9689	-7.270000	892.9151	158.5924
Sum Sq. Dev.	63.01065	455.7885	8.041568	2056.962	120.6758
Observations	31	31	31	31	31

Note: FDI stands for foreign direct investment; FD stands for financial development; L stands for labor inputs; CF stands for gross capital formation; and GDP stands for gross domestic product.

Source: *Authors' computation via EViews® 12*

3.2 *Hypotheses*

The null hypotheses for this investigation are as follows, based on the study objectives:

H01: In Tanzania, there is no significant long-run relationship between inbound FDI and financial development, labor participation, capital formation, and economic growth

H02: Net inbound FDI has no significant impact on Tanzanian economic growth.

H03: Financial development has no significant impact on Tanzanian economic growth.

H04: Labor participation has no significant impact on Tanzania's economic growth.

H05: Capital formation has no significant impact on Tanzania's economic growth.

3.2.1 *Model selection*

Economic models analyze short- and long-term relationships of time series variables. We have used co-integration and Granger causality in ARDL method for limited sample size. Dickey-Fuller and Phillips-Perron stationarity tests were used to ensure proper levels of integration.

3.2.2 *Lag selection*

Prior to performing stationarity tests, the optimal lag(s) must be defined. Because of its exclusive power in determining the ideal lag duration for small samples (see Islam et al., 2018; Shahbaz et al., 2018), the Akaike information criterion (AIC) was used to find the optimal lag (s). Table 3 shows the ideal lag length for each variable.

Table 3 shows the appropriate lag order selection for VAR based on AIC.

Lag	Endogenous Variables				
	FDI	FD	L	CF	GDP
0	3.446524	5.614662	-7.598706	7.164085	4.027021
1	3.233961	3.37271	-7.841485*	5.038465*	3.337576
2	3.188241*	3.335284*	-7.815077	5.066843	3.335280*

Notes: * Indicates lag order selected by AIC criterion

VAR stands for vector autoregressive; AIC stands for Akaike information criterion; FDI stands for foreign direct investment; FD stands for financial development; L stands for labor inputs; CF stands for capital formation; and GDP stands for gross domestic product.

Source: *Authors' computation via EViews® 12*

3.2.3 *The ARDL Co-integration test*

We use the autoregressive distributed lag (ARDL) bounds testing approach to test for co-integration among the variables under consideration. This methodology addresses the constraints of previous approaches, such as Johansen and Juselius (1990), especially in the case of mixed integration orders (Nicholas, 2021; Pesaran et al., 2001). This ARDL model is more efficient for small and finite sample sizes. Furthermore, the ARDL model can produce unbiased findings when some of the regressors in the

model are endogenous (Islam et al., 2018). As a result, the conditional ARDL (p, q1, q2, q3, q4) model with 5 variables is set for the co-integration test:

Hypotheses: H_0: $\alpha_{6i} = \alpha_{7i} = \alpha_{8i} = \alpha_{9i} = \alpha_{10i} = 0$

H_1: $\alpha_{6i} \neq \alpha_{7i} \neq \alpha_{8i} \neq \alpha_{9i} \neq \alpha_{10i} \neq 0$ Where i=1,2,3,4,5

$$D(GDP)_t = \alpha_0 + \sum_{i=1}^{P} \alpha_{11} D(GDP)_{t-i} + \sum_{i=1}^{q_1} \alpha_{21} D(FDI)_{t-i} + \sum_{i=1}^{q_2} \alpha_{31} D(FD)_{t-i} + \sum_{i=1}^{q_3} \alpha_{41} D(L)_{t-i} + \sum_{i=1}^{q_4} \alpha_{51} D(CF)_{t-i} + \alpha_{6i}(GDP)_{t-i} + \alpha_{7i}(FDI)_{t-i} + \alpha_{8i}(FD)_{t-i} + \alpha_{9i}(L)_{t-i} + \alpha_{10i}(CF)_{t-i} + \mu_{1t} \quad (1)$$

$$D(FDI)_t = \beta_0 + \sum_{i=1}^{P} \alpha_{12} D(FDI)_{t-i} + \sum_{i=1}^{q_1} \alpha_{22} D(GDP)_{t-i} + \sum_{i=1}^{q_2} \alpha_{32} D(FD)_{t-i} + \sum_{i=1}^{q_3} \alpha_{42} D(L)_{t-i} + \sum_{i=1}^{q_4} \alpha_{52} D(CF)_{t-i} + \alpha_{6i}(GDP)_{t-i} + \alpha_{7i}(FDI)_{t-i} + \alpha_{8i}(FD)_{t-i} + \alpha_{9i}(L)_{t-i} + \alpha_{10i}(CF)_{t-i} + \mu_{2t} \quad (2)$$

$$D(FD)_t = \delta_0 + \sum_{i=1}^{P} \alpha_{13} D(FD)_{t-i} + \sum_{i=1}^{q_1} \alpha_{23} D(GDP)_{t-i} + \sum_{i=1}^{q_2} \alpha_{33} D(FDI)_{t-i} + \sum_{i=1}^{q_3} \alpha_{43} D(L)_{t-i} + \sum_{i=1}^{q_4} \alpha_{53} D(CF)_{t-i} + \alpha_{6i}(FD)_{t-i} + \alpha_{7i}(GDP)_{t-i} + \alpha_{8i}(FDI)_{t-i} + \alpha_{9i}(L)_{t-i} + \alpha_{10i}(CF)_{t-i} + \mu_{3t} \quad (3)$$

$$D(L)_{t} = \sigma_0 + \sum_{i=1}^{P} \alpha_{14} D(L)_{t-i} + \sum_{i=1}^{q_1} \alpha_{24} D(GDP)_{t-i} + \sum_{i=1}^{q_2} \alpha_{34} D(FDI)_{t-i} + \sum_{i=1}^{q_3} \alpha_{44} D(FD)_{t-i}$$
$$+ \sum_{i=1}^{q_4} \alpha_{54} D(CF)_{t-i} + \alpha_{6i}(L)_{t-i} + \alpha_{7i}(GDP)_{t-i} + \alpha_{8i}(FDI)_{t-i} + \alpha_{9i}(FD)_{t-i}$$
$$+ \alpha_{10i}(CF)_{t-i} + \mu_{4t} \quad (4)$$

$$D(CF)_{t} = \pi_0 + \sum_{i=1}^{P} \alpha_{15} D(CF)_{t-i} + \sum_{i=1}^{q_1} \alpha_{25} D(GDP)_{t-i} + \sum_{i=1}^{q_2} \alpha_{35} D(FDI)_{t-i} + \sum_{i=1}^{q_3} \alpha_{45} D(FD)_{t-i}$$
$$+ \sum_{i=1}^{q_4} \alpha_{55} D(L)_{t-i} + \alpha_{6i}(CF)_{t-i} + \alpha_{7i}(GDP)_{t-i} + \alpha_{8i}(FDI)_{t-i} + \alpha_{9i}(FD)_{t-i}$$
$$+ \alpha_{10i}(L)_{t-i} + \mu_{5t} \quad (5)$$

Where *D* is the operator of first difference, GDP is gross domestic product, FDI is foreign direct investment, FD is financial development, L is labor inputs, and CF is capital formation., while, α_0, β_0, δ_0, σ_0, and π_0 denote respective constants; $\alpha_{11} - \alpha_{15}$, $\alpha_{21} - \alpha_{25}$, $\alpha_{31} - \alpha_{35}$, $\alpha_{41} - \alpha_{45}$, *and* $\alpha_{51} - \alpha_{55}$ signifies respective short-run coefficients; $\alpha_{6i} - \alpha_{10i}$ signifies respective long–run coefficients; letters p, q_1, q_2, q_3 and q_4 are the respective lag length; t = time period; μ_{1t}, μ_{2t}, μ_{3t}, μ_{4t} and μ_{5t} signifies white - white - error terms. The variables under consideration are co-integrated at a 5% level of significance, as shown in Table 5. To assess the short-run relationship among variables, we estimate the error correction models as: follows:

$$D(GDP)_{t} = \alpha_{08} + \sum_{i=1}^{P} \alpha_{11} D(GDP)_{t-i} + \sum_{i=1}^{q_1} \alpha_{21} D(FDI)_{t-i} + \sum_{i=1}^{q_2} \alpha_{31} D(FD)_{t-i} + \sum_{i=1}^{q_3} \alpha_{41} D(L)_{t-i}$$
$$+ \sum_{i=1}^{q_4} \alpha_{51} D(CF)_{t-i} + \lambda_1 \mathrm{ECT1}_{t-1} + \mu_{8t} \quad (6)$$

$$D(FDI)_{t} = \beta_{09} + \sum_{i=1}^{P} \alpha_{12} D(FDI)_{t-i} + \sum_{i=1}^{q_1} \alpha_{22} D(GDP)_{t-i} + \sum_{i=1}^{q_2} \alpha_{32} D(FD)_{t-i} + \sum_{i=1}^{q_3} \alpha_{42} D(L)_{t-i} + \sum_{i=1}^{q_4} \alpha_{52} D(CF)_{t-i} + \lambda_2 \mathrm{ECT2}_{t-1} + \mu_{9t} \quad (7)$$

$$D(L)_{t} = \sigma_{10} + \sum_{i=1}^{P} \alpha_{14} D(L)_{t-i} + \sum_{i=1}^{q_1} \alpha_{24} D(GDP)_{t-i} + \sum_{i=1}^{q_2} \alpha_{34} D(FDI)_{t-i} + \sum_{i=1}^{q_3} \alpha_{44} D(FD)_{t-i} + \sum_{i=1}^{q_4} \alpha_{54} D(CF)_{t-i} + \lambda_3 \mathrm{ECT3}_{t-1} + \mu_{10t} \quad (8)$$

$$D(CF)_{t} = \pi_{11} + \sum_{i=1}^{P} \alpha_{15} D(CF)_{t-i} + \sum_{i=1}^{q_1} \alpha_{25} D(GDP)_{t-i} + \sum_{i=1}^{q_2} \alpha_{35} D(FDI)_{t-i} + \sum_{i=1}^{q_3} \alpha_{45} D(FD)_{t-i} + \sum_{i=1}^{q_4} \alpha_{55} D(L)_{t-i} + \lambda_4 \mathrm{ECT4}_{t-1} + \mu_{11t} \quad (9)$$

where:

$\mathrm{ECT1}_{t-i}$ – $\mathrm{ECT4}_{t-i}$ = error correction term lagged one period; $\lambda_1 – \lambda_4$ = coefficient for the error correction term; α_{08}, β_{09}, σ_{10} and π_{11}= respective constants.

μ_{8t}, μ_{9t}, μ_{10t} and μ_{11t} are residuals with no correlation. The remaining variables and characters are defined in equations (1) through (5).

3.2.4 *ECM diagnostic and stability analysis*

To ensure the model's reliability and stability, we used the Breusch-Pagan-Godfrey test for heteroscedasticity, the Breusch-Godfrey serial correlation LM test for autocorrelation, and the Jarque-

Bera normality test. The robustness of the computed coefficients is explained by the diagnostic test (John Kwaku et al., 2023). Tables 8–10 include the findings of diagnostic tests. The cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) of the recursive residuals were used to test the stability of the model estimates, as shown in Figures 2–4.

3.2.5 *Granger causality test*

The presence of a long-run link (i.e., co-integration) among the variables implies that at least one causality exists among the variables, but it does not specify the specific direction of causality (Majid & Elahe, 2016; Islam et al., 2018). As a result, we used the Granger causality technique displayed in Table 11 for the causality analysis. (Engle and Granger 1987) to ascertain the causal relationship between the underlying variables. The approach is beneficial for determining time series causation (Walker & Calcagno, 2013). The error correction models were used to define the variables' short- and long-run connections.

4. Empirical results

4.1 *Tests for unit root (stationarity)*

The results of augmented Dickey-Fuller and Phillips-Perron (PP) stationarity demonstrate that the variables under consideration are integrated into distinct orders, namely order zero I (0) and order one I (1). Table 4 presents the detailed results of the stationarity tests.

Table 4. Stationarity tests results

Variables	Augmented Dickey-Fuller (ADF)		Phillips-Perron (PP)		Status
	t-stats at I (0)	t-stats at I (1)	t-stats at I (0)	t-stats at I (1)	Stationary
FDI	-2. 57986	-8.852299	-3.070788	-9.104406	I (1)
FD	-1.842365	-4.568756	-3.217520	-4.596841	I (1)
L	-2.577439	-5.787133	-2.541218	-5.787133	I (1)

CF	-2.176376	-4.512516	-2.199420	-4.504587	I (1)
GDP	-1.018126	-5.735377	-1.829670	-9.758487	I (1)

Notes: FDI stands for foreign direct investment; FD stands for financial development; L stands for Labor inputs; CF stands for capital formation; GDP stands for gross domestic product.

Source: *Authors' computation via EViews® 12*

4.1.1 *Bounds tests (Co-integration)*

Since the variables under study are integrated in mixed orders, we used the autoregressive distributed lag (ARDL) co-integration. Results in Table 5 indicates variables are co-integrated in the long run. In line with this result, Table 6 shows the long-run connection among the variables.

Table 5: Table 5: Co-integration results

Dependent variable	Optimal Lag(AIC)	Selected Model: ARDL	*F*-statistic	Co-integration remarks at the 5% level
GDP(GDP/FDI,FD,L,CF)	2	(1, 2, 1, 1, 0)	4.319768	Co-integrated
FDI(FDI/GDP,FD,L,CF)	2	(1, 0, 0, 2, 0)	4.964247	Co-integrated
FD(FD/GDP,FDI,L,CF)	2	(1, 0, 2, 1, 0)	3.313496	No co-integration
L(L/GDP,FDI,FD,CF)	1	(1, 0, 2, 1, 0)	4.264160	Co-integrated
CF(CF/GDP,,FDI,FD,L)	1	(1, 2, 0, 0, 2)	4.643532	Co-integrated
Critical values significant level	Lower bound I (0)		Upper bound I (1)	
10% level	2.2		3.09	
5% level	2.56		3.49	
1% level	3.29		4.37	

Notes: GDP stands for gross domestic product; FDI stands for foreign direct investment; FD stands for financial development; L stands for labor inputs; CF stands for capital formation.

Source: *Authors' computation via EViews® 12*

Table 6: Long-run relationship results

Dependent variable: GDP Independent variables	Coefficient	t-statistic	Probability
C	-1.003504	-0.814719	0.4253
FDI	1.720443*	6.576290	0.0000
FD	0.121001	0.842675	0.4099
L	3.336667*	4.390897	0.0003
CF	0.049995	0.775089	0.4478

Notes: GDP stands for gross domestic product; FDI stands for foreign direct investment; FD stands for financial development; L stands for labor force; and CF stands for capital formation. *, **, and *** represent the level of significance at 1%, 5%, and 10%, respectively.

Source: *Authors' computation via EViews® 12*

4.2 *Short-run dynamics*

Table 7 shows positive short-term dynamics of inbound foreign direct investment, with other variables showing positive coefficients except capital formation.

Table 7 shows the short-run dynamics.

Dependent variable: GDP Independent variables	Coefficient	t-statistic	*p-value*
D(FDI(-1))	0.423425***	1.932599	0.0712

D(FDI(-2))	0.121204	0.617618	0.5455
D(FD(-1))	0.057008	0.285767	0.7787
D(FD(-2))	0.207002	1.378093	0.1871
D(L(-1))	0.301906	0.483009	0.6356
D(L(-2))	1.142610	1.337321	0.1998
D(CF(-1))	-0.130995	-1.515237	0.1492
D(CF(-2))	-0.039743	-0.440510	0.6655

Notes: GDP stands for gross domestic product; FDI stands for foreign direct investment; FD stands for financial development; L stands for labor inputs; CF stands for capital formation; and ECT stands for error correction term. *, **, and *** represent the level of significance at 1%, 5%, and 10%, respectively.

Source: *Authors' computation via EViews® 12*

4.3 *Results of diagnostic and stability tests*

Tables 8–10 provide the results of the diagnostic tests. Figures 2–4 show the cumulative sum and cumulative sum of squares. The findings show that the study models are reliable and stable.

Table 8: Results of diagnostics test (Equation 6)

When GDP is a dependent variable (Equation 8)	F-Statistics	Obs. R-squared	Scaled Explained SS	Other results
Heteroscedasticity Test Breusch-Pagan-Godfrey	0.480289 (0.8895)	6.950508 (0.8031)	1.918055 (0.9988)	
Serial Correlation test Breusch-Godfrey LM Test	3.183691 (0.0725)	8.753539 (0.0126)		
Normality Test Jarque-Bera Test				0.762718 (0.682933)

CUSUM test				Stable
CUSUM Squares test				Stable

Note: The figures in parenthesis represent the *p-values* of the respective statistics.

Source: *Authors' computation via EViews® 12*

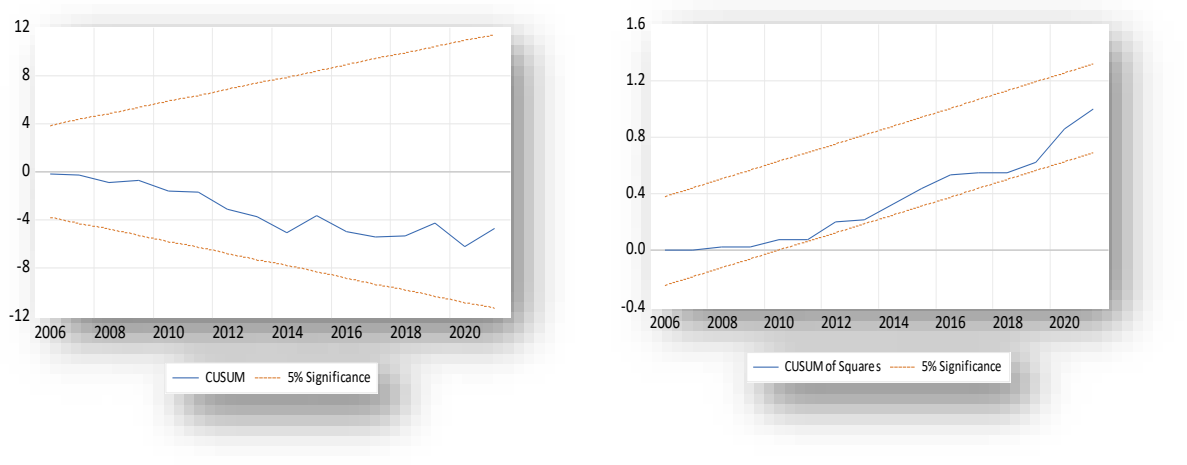

Figure-2. Cumulative sum and cumulative sum of squares test (Equation 6)

Source: *Based on authors' computation via EViews® 12*

Table 9: Results of diagnostics test (Equation 7)

When FDI is a dependent variable (Equation 9)	F-Statistics	Obs. R-squared	Scaled Explained SS	Other results
Heteroscedasticity Test Breusch-Pagan-Godfrey	0.188443 (0.9961)	3.211472 (0.9876)	1.040990 (0.9999)	
Serial Correlation test Breusch-Godfrey LM Test	0.480516 (0.6283)	1.798598 (0.4069)		
Normality Test Jarque-Bera Test				0.931302 (0.627726)

CUSUM test				Stable
CUSUM Squares test				Stable

Note: The figures in parenthesis represent the *p-values* of the respective statistics.

Source: *Authors' computation via EViews® 12*

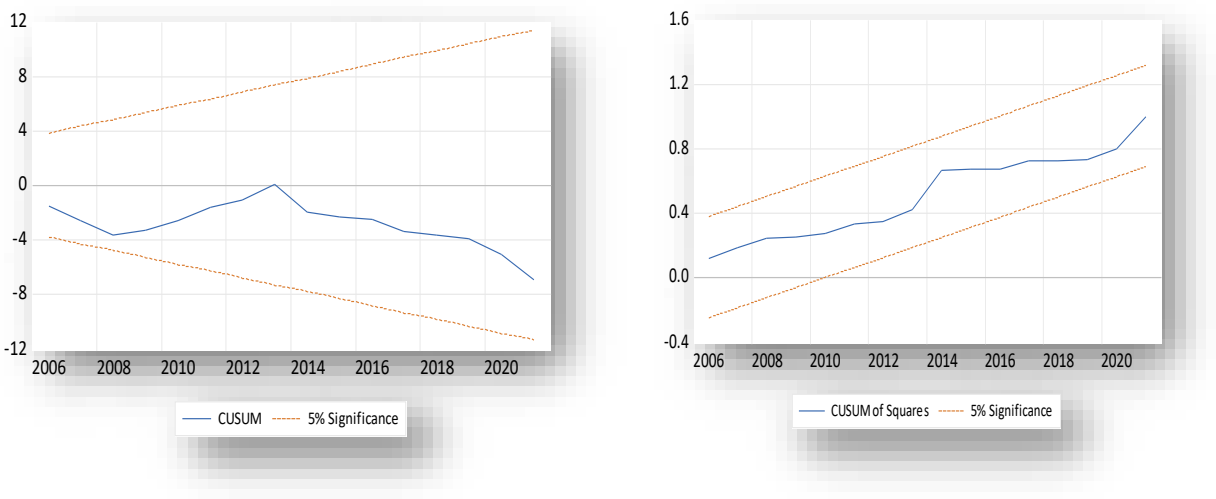

Figure-3. Cumulative sum and cumulative sum of squares test (Equation 7)

Source: *Based on authors' computation via EViews® 12*

Table 10: Results of diagnostics test (Equation 9)

When CF is a dependent variable (Equation 9)	F-Statistics	Obs. R-squared	Scaled Explained SS	Other results
Heteroscedasticity Test Breusch-Pagan-Godfrey	0.365136 (0.8931)	2.626353 (0.8541)	2.813095 (0.8319)	
Serial Correlation test Breusch-Godfrey LM Test	0.362618 (0.5535)	0.492258 (0.4829)		
Normality Test Jarque-Bera Test				3.788346 (0.150443)

CUSUM test				Stable
CUSUM Squares test				Stable

Note: The figures in parenthesis represent the *p-values* of the respective statistics.

Source: *Authors' computation via EViews® 12*

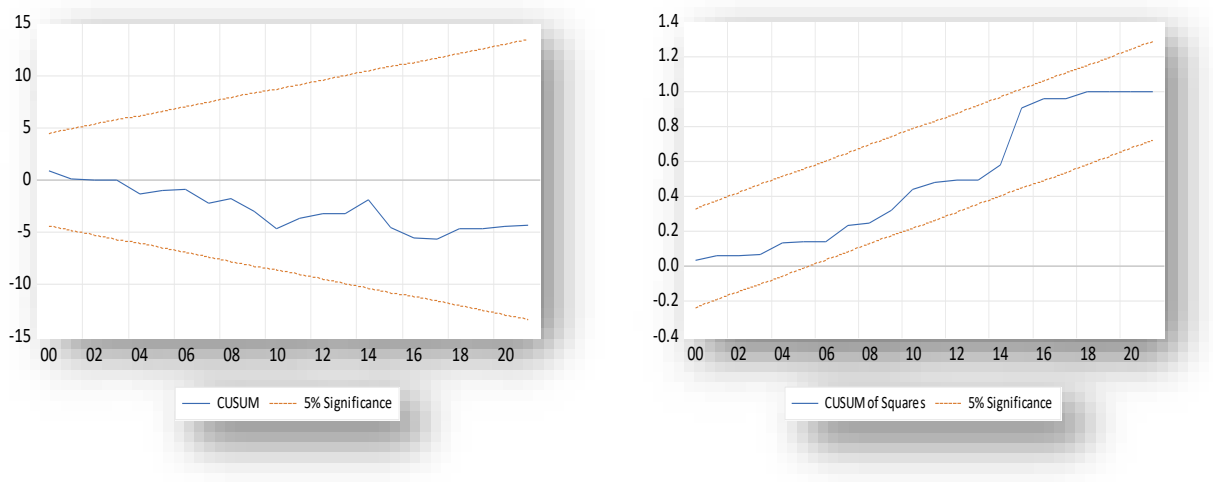

Figure-4. Cumulative sum (CUSUM) test (Equation 9)

Source: *Based on authors' computation via EViews® 12*

4.4 *Granger causality*

The ECM Granger causality test, developed by Engle and Granger (1987), validated the causal relationship between the underlying variables. The causality results are shown in Table 11.

Table 11: The results of Granger causality

Variable	Short run causality (*F-statistics*) – Wald test					Long-run causality ECT(-1)
	D(GDP)	*D*(FDI)	*D*(FD)	*D*(L)	*D*(CF)	

D(GDP)	-	6.301802* (0.0038)	2.139190 (0.1452)	7.751891* (0.0035)	0.547101 (0.4685)	-1.421752* (0.0008)
D(FDI)	12.68267* (0.0018)	-	0.063685 (0.8032)	5.609871* (0.0055)	1.376090 (0.2539)	-1.601470* (0.0053)
D(FD)	1.779400 (0.1972)	3.070994** (0.0513)	-	2.124219 (0.1457)	8.424871* (0.0088)	-
D(L)	11.64124* (0.0028)	4.730020** (0.0119)	1767375 (0.1964)	-	0.322424 (0.5765)	-0.912642** (0.0413)
D(CF)	6.058394* (0.0045)	4.698938** (0.0431)	1.281537 (0.2717)	4.441589** (0.0159)	-	-1.756616* (0.0016)

Note**s:** Figures in parenthesis represent the statistics' *P-value*. *, ** denotes rejection of the null hypothesis at 1% and 5% level of significance, respectively.

Source: *Authors' computation via EViews® 1*2

5. Discussion of the findings

The study found that inbound FDI and labor input significantly predict Tanzanian economic growth. An increase in FDI boosts economic growth by 1.7%, while an increase in labor input increases economic growth by 3.3%. The long-run relationship between FDI inflows, financial development, labor input, and capital formation is strong, and the short-run estimates converge towards equilibrium in the long run, with error correction terms adjusting at a speed of more than 100% except for labor input, whose speed of adjustment is 91%. Validation of estimation robustness was done through diagnostic and stability testing. The findings coincide with the study's assumption of a positive association between foreign direct investment, financial development, labor inputs, capital formation, and economic growth in Tanzania. As a result, the theoretical assumptions of the neoclassical and endogenous growth theories are supported.

The findings highlight the importance of internal factors like the financial sector and labor inputs in linking FDI and economic growth in Tanzania, urging policymakers to enhance these aspects.

6. Conclusion and policy suggestions

We used autoregressive distributed lag and Granger causality to study the relationship between FDI inflows and Tanzania's economic growth from 1991 to 2021. We also included financial development, labor inputs, and capital formation as key variables that affect the growth of the economy in both the short and long run. The empirical results indicate a strong long-run relationship between inbound FDI, financial development, labor input, capital formation, and economic growth. A unidirectional and bidirectional causal relationship was found, with FDI inflows and labor input having a favorable impact on economic growth. Financial development and capital formation also had a positive impact on economic growth but were not significant. The study's robustness was validated through diagnostic and stability tests.

The findings support the premise and the neoclassical and endogenous growth theories. In both the short and long run, the data reveal unidirectional causality from FDI inflows and labor input to economic growth. Similarly, in the short run, there is a one-way cause-and-effect relationship from capital formation and FDI inflow to financial development. However, inward FDI and labor inputs are the two most important drivers of Tanzania's economic growth. These discoveries have major policy consequences. To achieve Tanzania's economic goals, the government should prioritize smart macroeconomic policies that boost FDI, labor inputs, and financial sector reform.

Nonetheless, the study's conclusions are limited to Tanzania, one of many developing countries in Sub-Saharan Africa. Thus, future scholars can expand the study to other countries, particularly those in Sub-Saharan Africa, where research like this is scarce. In addition, the influence of some other conditional variables, such as human capital and institutional quality, on the FDI-growth relationship can be examined. Finally, future studies should consider employing a larger sample size in accordance with different measures of variables based on data availability.

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