



## Foreign direct investment and its role in alleviating poverty: A Tanzanian perspective

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### ABSTRACT

The impact of Foreign Direct Investment [FDI] and major macroeconomic variables such as government spending, unemployment, inflation, and exchange rate on poverty in Tanzania over the period 1993-2023 is investigated in this study. It is based on three structural theories: Production Cycle, where FDI grows with the life cycle of products, leading to technological development and product development, and results in poverty eradication via employment and market expansion; Internalisation, in which multinational corporations internalise the market to reduce transaction costs which leads to technology transfer and increases efficiency and poverty reduction; and Vernon's Production Cycle and Market Imperfection Theories, where firm-specific advantages in imperfect markets cause FDI to increase competition and employment and help to reduce poverty. The data used in this study were extracted from reliable sources, including the World Bank and the Tanzania National Bureau of Statistics, and they cover annual time series. The explanatory variables examined consist of poverty headcount ratio, FDI inflows, government spending, unemployment rate, CPI, and real exchange rate. The inclusion criteria provided reliable, consistent data over 30 years, while the exclusion criteria removed incomplete data sets, which could have been affected by differences in methodology. The ARDL model was employed to generate short-run and long-run relationship and dynamic analysis, which was validated in the model through the robust diagnostic tests such as CUSSUM test for stability, Breusch-pagan test for heteroskedasticity, and Breusch Godfrey statistic for autocorrelation. The results show that FDI has significant effects on reducing poverty in the short and long run. One percent increase in FDI is negatively and significantly related to poverty in the long run, with an impact of 0.437 per cent and a short-run impact of 0.034 per cent, suggesting that FDI promotes job creation, technology diffusion, and economic activities, particularly in agriculture. Inflation, on the other hand, has a twofold effect, increasing poverty in the long run as a result of weakening purchasing power (a 1% increase in inflation is associated with a 0.437% increase in poverty). Ironically, in the short term, inflation leads to a slight reduction in poverty, perhaps due to temporary gains in wages and specific sector dynamics. Government spending is not an effective tool for addressing poverty. The long-term impacts are weakly positive (coefficient=0.152) and the short-term are slightly negative (-0.087), which means that long-run efficiencies are questioned regarding the assignment of resources to education and health, which are more directly associated with poverty. Unemployment has a strange relationship with poverty, decreasing in significance in the long run (although it is still significant with a negative effect of -0.193), perhaps indicating difficulty in measuring the large unregistered labour market in Tanzania and its immediate impact is -0.045. Poverty is relatively insensitive to exchange rate adjustments, showing a long-run impact of -0.098, which is a small number. This marginal effectiveness might reflect the counteracting influences of export-led growth and more expensive imports. The study also reveals the persistent structural presence of poverty (long-term and short-term lagged poverty rates -0.612, and 0.387 as the coefficients) which provides evidence of deep-rooted economic poverty alleviation downward pressures. Policy implications include investing in human capital and increasing Tanzania's absorptive capacity for FDI by enhancing institutions and strengthening labour-intensive (e.g. agriculture, manufacturing, and textiles) sectors, managing monetary policy to reduce negative inflation, and enhancing the targeting and efficiency of public spending on social infrastructure, healthcare, and education.

**Keywords:** Autoregressive Distributed Lag, Foreign Direct Investment, Poverty, Tanzania

**JEL Classifications Codes:** F21, I32, O11, O55

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### I. INTRODUCTION

Foreign Direct Investment [FDI] refers to investments in an enterprise or project by a foreign investor or government, as opposed to investments within a country. This can be achieved through mergers and acquisitions, building new facilities, reinvesting earnings from foreign operations, and intra-company loans (Asajile, 2014). FDI has emerged as a major factor that transforms the economies of developing countries by helping poor nations come of age technologically, while creating employment and stimulating economic growth that lifts living standards (Ngowi, 2006; United Nations Conference on Trade and Development [UNCTAD], 2020). Some countries, including Tanzania, are seeking to establish a thriving FDI sector to meet the requirements for economic growth as well as broader developmental imperatives: FDI represents a key source of external finance to fill the gaps in domestic savings,



investment, foreign exchange, public revenue, skills, and resources (Jenkins & Thomas, 2002). For example, the Bank of Tanzania (BOT) (Annual Report, 2020) reported domestic revenue at 17.2% of Gross Domestic Product [GDP] in 2018, but with a fiscal deficit of 1.9% compared to 1.5% in 2016 and 2017, demonstrating the reliance on FDI to plug resource gaps and drive economic growth (BOT, 2020).

FDI trends have varied widely globally. The World Bank (2023) reveals that it is particularly high among CIS countries, and the country was even called "The Caucasian Tiger" due to its favourable investment climate and FEZs, which have loose regulations and offer tax holidays, and attracted \$1.4 billion FDI from 2007 to 2013. However, worldwide FDI inflows declined by 12 per cent to \$1.3 trillion in 2022, driven by international policy crises, the situation in Ukraine, high prices of food and energy, and debt-related problems, which had a particularly strong effect on international project finance and cross-border M&A (UNCTAD, 2023). Similarly, in Africa, governments have undertaken substantial reforms to attract FDI, including minimising regulatory constraints and easing the cost of entry (Hymer, 1960; AfDB, 2022). These efforts have generated an almost six-fold increase in FDI flows in the past decade; however, 15 countries account for 80% of these inflows, with a particularly strong focus on the natural resources, construction, and telecommunications sectors (Mitchell, 2023; UNCTAD, 2023).

Within Africa, the distribution of FDI was uneven. Among MENA countries, FDI inflows to Egypt surged to US\$11 billion in 2023, partly due to the increase in M&A deals, while FDI in Morocco following 6% to US\$2.1 billion. Negative FDI flows were -\$187 million for Nigeria based on equity withdrawal, on one hand, flat for Senegal at \$2.6 billion and down -39 % for Ghana at \$1.5 billion. Ethiopia's FDI in East Africa fell by 14% to \$3.7bn, while Uganda and Tanzania fared better, scoring 39% and 8% increases with \$1.5bn and \$1.1bn for 2018 respectively. Tanzania ranks in the top ten recipients of FDI in Africa (UNCTAD, 2023), and experienced an 8% increase in FDI to \$1.1 billion in 2023, following a 60% increase in announced greenfield projects and a rise in international project finance deals (UNCTAD, 2023). The FDI stock totals amounted to USD 18.6 billion, equivalent to about 24.2% of GDP, and were dominated by investments from countries such as China, India, Kenya, the United Kingdom, Canada, the United States, France, and Germany in manufacturing, mining, tourism, and infrastructure, among other sectors (Tanzania Investment Centre, 2023; UNCTAD, 2014).

While there was a surge in FDI flows into Tanzania following the move towards a liberalised economy in the late 1980s (Zhang, 2014), the potential impact of FDI on poverty reduction remains largely unexplored. FDI was found to positively impact growth in five of the eleven countries studied by Zhang (2001) and was the most significant determinant of growth in Tanzania's manufacturing sector. The importance of FDI in poverty reduction has been underlined by recent studies. According to Gohou and Soumaré (2012), FDI in extractive sectors has often been associated with weak poverty reduction as its linkages to local economies are weak ... while investment in manufacturing and services has the potential to create greater employment and income (Fowowe & Shuaibu, 2014). FDI in Tanzania agriculture and manufacturing FDI in Tanzanian agriculture and manufacturing has the potential of increasing household incomes, however, there are still challenges such as unequal regional distribution and little technology transfer (Msuya, 2007). Miku, et al, (2024) also emphasize that the age-long governance challenges and weak policy structures make it difficult for FDI to mitigate the plight of Tanzania's poor, which confirms the importance of well-targeted interventions. A study recently conducted by Dossou et al. (2023) argue that foreign direct investment (FDI) in renewable energy can bring jobs in Sub-Saharan Africa, even as the local content policy would have limited impact on poverty reduction. With these revelations, however, it is still unknown what exactly is the role of FDI in poverty reduction in Tanzania. This study aims to assess the effect of FDI on poverty reduction in Tanzania through empirical testing (quantitative analysis) and suggest policy recommendations, economic policy reforms, and transformations that could maximise the potential of FDI to reduce poverty and promote sustainable development.

## 1.1 Research Objectives

This study aimed to evaluate the influence of Foreign Direct Investment (FDI) on poverty alleviation in Tanzania from 1993 to 2023. Specifically, this study had the following objectives:

- i. To assess the impact of key macroeconomic factors, including government spending, unemployment, inflation, and exchange rates, on poverty levels in Tanzania.
- ii. To examine the short- and long-term dynamics of the relationship between FDI, macroeconomic factors, and poverty reduction.
- iii. To provide policy recommendations to maximise the potential of FDI in addressing poverty and promoting sustainable development in Tanzania.



## II. LITERATURE REVIEW

### 2.1 Theoretical Review

The concepts and theoretical perspectives on the role of Foreign Direct Investment (FDI) in poverty alleviation in Tanzania are grounded in various definitions, classifications, and theoretical perspectives which explain how FDI influences economic development and reduces poverty. Foreign direct investment (FDI) is a dimension of worldwide economic integration. Businesses invest in other countries to earn long-term profits in those markets. According to the International Monetary Fund (IMF, 1993), foreign direct investment (FDI) is an investment made by a resident of one country (the direct investor) in the business interests of a resident of another country (the direct investment enterprise) with the objective of establishing a lasting interest. The World Bank also defines FDI as an investment that one country makes in an entity in another country that (a) involves a long-term relationship with the foreign country that receives the investment, (b) includes control of the entity involved, and (c) provides the investor with a long-term interest in the entity. Typically, this involves purchasing a large amount of stock or extending investments into new areas, in contrast to just buying stock (World Bank, 2020). The World Trade Organisation (1996) also emphasises that FDI occurs when an investor purchases and operates holdings in a host country. In contrast, in the area of portfolio investments, the investor has control over the assets.

FDI is organised by typology, goal, and operating methods to follow its likely poverty-reducing impact. Horizontal FDI occurs when similar activities are relocated abroad to get around trade barriers and compete internationally, such as multinational firms that address export issues (Fukao & Wei 2008). Vertical FDI seeks to upgrade the quality of supply chains by investing in cheaper input source areas that are also location-specific in nature (Aizenman & Marion, 2004). This form of FDI is illustrated by the Virgin Group's failed investment in clothing retailing in France in the late 1980s (Ohlin, 1933). Lastly, with Platform FDI, production takes place in one country for sale in another, as in export processing zones in Bangladesh and Vietnam, where luxury goods are exported internationally (Ohlin, 1933).

Poverty is defined as a lack of financial resources and basic requirements for a minimum standard of living (Gordon & Townsend, 2000). It is economic and social in nature and permeates the world. The World Bank (2020) found that in 2019, 85 percent of the world's population lived on less than \$30 per day, two-thirds on less than \$10, and 10 percent on less than \$1.90, all in Purchasing Power Parity (PPP) dollars. There is absolute and relative poverty. However, there is no scientific consensus on the definition of poverty or its related phenomena. In general, when people are living in absolute/ extreme poverty, it is understood that the household is living below a certain income necessary to obtain enough food or basic needs, such as water or shelter, with the World Bank publishing updates of the poverty line since 1993 using \$1.08 with inflation to a level of \$1.90 in 2015 (World Bank, 2024). Relative poverty refers to circumstances under which an individual does not have the income to participate in the average standard of living (Dollar & Kraay, 2001; Supratikno, 2004).

The context within which foreign direct investment (FDI) occurs and whether it leads to poverty reduction is complex and varies according to the policies and economic context of the host country. FDI can help poverty reduction through direct and indirect technology transfer, employment creation, and resource distribution from the income of foreign companies' factories (Tambunan, 2004). However, the impacts of these contributions depend on the presence of a well-fitting policy, because with poor policies, their gains can be hindered (Obwona & Mutambi, 2004). One of the powerful FDI impacts is that economic growth, a direct result of FDI, will contribute to poverty reduction by raising income levels due to rising GDP. In particular, for those living below the poverty line, FDI can make a difference in income distribution (Dollar & Kraay, 2001). FDI is conducive to growth through the generation of jobs, diffusion of technology, and stimulation of competition, which enhances productivity and the level of investments. This increases the investment ratio and tends to reduce poverty. Various theories describe why FDI operates and how it can contribute to reducing poverty in the following ways:

#### 2.1.1 Production Cycle Theory

The Production Cycle Theory, first introduced by Vernon in 1966, describes foreign direct investment (FDI) as a result of the phases a product goes through during its production process (innovation, growth, maturity, and decline). The theory, invented to explain why American companies invested in Europe from 1950 to 1970, maintains that new products emerge based on advances in technology. This results in international trade that leads to foreign direct investment (FDI) as firms seek to retain their share in the market (Vernon, 1966). This theory is paramount for grasping how FDI adjusts in the face of varying technology and market sizes, which could enable Tanzania and other host countries to grow their economies and reduce their poverty levels.



### 2.1.2 Internalisation Theory

Here is roughly the sense in which the above proposition of internalisation holds: Buckley and Casson (1976) proposed the concept of Internalisation Theory which assesses how MNEs decide whether or not to internalise the market for intermediate goods and technology in the absence of perfect competition. Such firms seek to maximise profits and minimise transaction costs through the development of internal markets. This will help firms scale globally. This theory underlines the significance of MNEs strategic investments in supporting technology transfer and promoting economic growth in host countries, which, in an indirect way, contributes to poverty alleviation via enhanced productivity and job creation.

### 2.1.3 Market Imperfection Theory

According to Hymer's (1976) Market Imperfection Theory, firms which possess monopolistic or oligopolistic skills due to some unique capability, for example, technological skills, can compete in foreign markets with domestic firms. This theory highlights the role of firm-specific advantages in enabling FDI, but recognises that such advantages may be utilised through exporting or licencing, and hence diminish the need for direct investment. The theory matters because it tells us how competition operates and how costs are pushed lower, which can have implications for jobs and income in host countries. This theoretical framework provides a very sound foundation for examining the effect of foreign direct investment (FDI) on poverty alleviation in Tanzania, with the focus being on the interplay between economic growth, policy frameworks and strategies on development outcomes.

## 2.2 Empirical Literature

The relationship between Foreign Direct Investment (FDI) and poverty reduction has been gaining attention in developing countries such as Tanzania, where economic growth and poverty reduction are two key objectives of the policy. Empirical studies from a cross-section of places reveal the impact of FDI on poverty rates which is an important pointer in Tanzania's strategy. These studies are based on different methodologies and emphasise the importance of "accompanying" policies in maximising the benefits of FDI.

Magombeyi and Odhiambo (2016) analysed the relationship between FDI inflows and poverty levels in South Africa, adopting the autoregressive distributed lag (ARDL) model using data from 1980 to 2014. Using a trivariate Granger causality test and including GDP as a third variable, they find that FDI Granger causes poverty reduction in the long run. Their study suggests that FDI has the potential to foster poverty reduction, particularly in conjunction with policies that enhance infrastructure and the stability of institutions in the host country. This is crucial for a developing country such as Tanzania, if economic growth is to be promoted and that will improve the role of FDI in poverty reduction.

Similarly, the attractiveness of poor countries to foreign investors and the impacts of FDI on poverty alleviation were examined by Bharadwaj (2014) over a 35-countries sample of developing countries that included a number of African countries, for the period 1990 to 2004. The approach adopted was panel data regression where FDI was used as a variable measure of globalisation and poverty measured in head count ratio and poverty gap. Results also show negative association between foreign direct investment and the head count ratio, which means; FDI inflow is associated with decrease in poverty. However, the study argued that excessive trade liberalisation without accompanying measures, such as investment in human capital, may increase poverty. This underscores the need to combine FDI with strategic social investments to achieve inclusive economic growth in Tanzania.

Mahmood and Chaudhary (2012) investigated the impact of FDI on alleviation of poverty in Pakistan for the time period of 1973–2003 by taking poverty headcount ratio as a proxy measure of poverty. Using an ARDL approach with the variables FDI, government expenditure on health, government expenditure on education and GDP, it was found that FDI leads to poverty alleviation in the short-run, as well as in the long-run. This paper extends the beneficial effects of public expenditure on social services and argues that the potential effect of FDI in Tanzania can be maximised by investment increasing in the health and education sectors.

Zaman et al. (2012) analyzed the impact of FDI on poverty reduction in Pakistan by using annual poverty head count ratio data over the period of 1985-2011. Applying OLS, they obtained that a percentage point increase in FDI was responsible of reducing poverty by (urban = 0.47%, rural = 0.44%, overall = 0.46%). However, the research found that income inequality further increased poverty by 0.61% in cities, 0.72% in rural areas, and 0.59% overall. This suggests that foreign direct investment (FDI) could wipe out inequality advantage. This requires Tanzania to focus on dealing with the income distribution in order to make the most out of foreign direct investment (FDI) in poverty reduction.

Gohou and Soumaré (2012) offer some additional insights by examining foreign direct spending on poverty in 54 African countries (including Tanzania) from 1995 to 2008. In a panel data analysis based on the Human Development Index (HDI) and poverty headcount ratio, they find that Foreign Direct Investment (FDI) is a dominant source of poverty reduction, especially when good schools and institutions are in place in the country. The results show that it is possible



to increase the gains of FDI in Tanzania by focusing on reforms in education and governance, particularly in the agriculture and manufacturing sectors.

Fowowe and Shuaibu (2014) investigated the impact of foreign direct investment (FDI) on poverty in 34 African countries, including Tanzania, during the period 1980-2011. By estimating a dynamic panel data model with GMME, the authors found that FDI in labour-intensive sectors effectively decreases poverty to a large extent when macroeconomic stability and trade openness are considered. This conforms with the economic reforms currently carried out by the Tanzanian government, which aims to attract FDI. It also demonstrates the importance of concentrating on employment-creating sectors.

Uttama (2015) expanded on the study by focusing on the relationship between foreign direct investment (FDI) and poverty reduction in ASEAN countries by comparing them with African countries (including Tanzania) for the period 1995–2010. The study used a Spatial econometric model and concluded that the FDI has a significantly significant impact on poverty alleviation especially in regions that are effectively regionally integrated. From the viewpoint of Tanzania contributing to projects like the (East African Community [EAC]) may bolster the potential for foreign direct investment (FDI) to cut into poverty in the context of regional cooperation.

Updating the data using a sample of 29 African countries (including Tanzania) from 1990 to 2013, Soumaré (2016) examines the impact of foreign direct investment (FDI) on poverty. Using a pooled fixed-effects panel regression model, the study established that foreign direct investment (FDI) in key sectors, such as mining and agriculture, which are crucial for Tanzania's poverty, has a significant effect on poverty reduction. Nevertheless, the paper highlights the necessity of local absorptive capacity, comprising the availability of skills and infrastructure, to capture the benefits of foreign direct investment (FDI).

These studies demonstrate that FDI is an important means of alleviating poverty in Tanzania. However, for this to work, it must concentrate on some sectors, on the kind of helpful policies that would lift up industry as a whole, and despite all the backlash this idea has generated, it must contend with income inequality. Tanzania has control over the extent to which these inflows can be converted to substantial poverty reduction programs when it moves towards labour-intensive sectors, better quality education and infrastructure, and regional integration.

### III. METHODOLOGY

#### 3.1 Model Specification

Since the study involves time series data, the autoregressive distributed lag (ARDL) model developed by Pesaran et al. (2001) is used. The model is specified as follows: -

$$\Delta PR_t = \beta_0 + \beta_1 \Delta PR_{t-1} + \beta_2 \Delta FDI_{t-1} + \beta_3 \Delta EXR_{t-1} + \beta_4 \Delta UNEMP_{t-1} + \beta_5 \Delta INFL_{t-1} + \beta_6 \Delta G_{t-1} + \lambda_1 PR_{t-1} + \lambda_2 FDI_{t-1} + \lambda_3 EXR_{t-1} + \lambda_4 UNEMP_{t-1} + \lambda_5 INFL_{t-1} + \lambda_6 GSP_{t-1} + \varepsilon_t$$

Whereby  $\Delta$  is the first difference operator,  $PR_t$  is the Poverty Rate at time  $t$ ,  $INF_t$  is the Inflation Rate at time  $t$ ,  $G_t$  is Government Spending at time  $t$ ,  $UNEMP_t$  is the Unemployment Rate at time  $t$ ,  $EXR_t$  is the Exchange Rate at time  $t$ ,  $FDI_t$  is Foreign Direct Investment at time  $t$  and  $\varepsilon_t$  is the white noise error term.

The short-run effects are captured by the first-differenced terms ( $\Delta$  variables), while the long-run relationship is captured by the lagged level terms (without  $\Delta$ ).  $\beta$ 's are parameters that show the short-run effects (relationship) after being captured by the first differences, respectively, for each specific variable.  $\lambda$ 's are parameters that show the long-run effects (relationship) of the variables after being captured by lagged level terms, respectively, for each variable.

#### 3.2 Data and Sources

This study uses secondary data from reliable local and external sources to examine the impact of FDI on poverty reduction in Tanzania. The dataset of international investment flows in Tanzania is based on inward foreign Direct Investment data retrieved from the World Bank archive, which contains comprehensive, trustworthy, and comparative time-series data on investment inflows in Tanzania. The World Bank set was established for its precision and regularity. In addition, we are liable to conduct robust research on FDI time trends. The National Bureau of Statistics (NBS) and the Bank of Tanzania (BOT) have issued several reports containing statistics on poverty incidence. Such consideration provides assurance on the reliability and relevance of the empirical analysis of this study, since the FDI data from the World Bank is used in conjunction with poverty data from the NBS and BOT. These sources allowed for a rigorous examination of the association between FDI inflows and poverty alleviation in Tanzania, including up-to-date information. The data sources used in this study are listed in Table 1.

**Table 1***Data and Data Sources*

Data	Source
Poverty Rate	National Bureau of Statistics and Bank of Tanzania Reports
Foreign Direct Investment	World Bank Repository
Exchange Rate	Bank of Tanzania Reports
Unemployment	National Bureaus of Statistics
Inflation	Bank of Tanzania Reports
Government Spending	Bank of Tanzania Reports

**3.3 Variables and Measurement**

Variables and their measurements are critical for analysing and understanding socio-economic dynamics, as shown in Table 2.

**Table 2***Variables and Measurement*

Variable	Name	Measurement
PVR	Poverty Rate	Annual Poverty Rate in %.
FDI	Foreign Direct Investment	FDI net inflow as a % of GDP.
EXR	Exchange Rate	Exchange Rate of the Tanzanian Shilling against the US Dollar.
UNEMP	Unemployment	National Bureaus of Statistics.
INF	Inflation	Annual Inflation Rate.
G	Government Expenditure	Govt Expenditure as a % of GDP.

The Poverty Rate (PVR) is the annual percentage of people living below the poverty line. The net inflow percentage of GDP shows how much foreign investment there is compared to the size of the economy. The variable EXR is the exchange rate between the Tanzanian shilling and the US dollar. Unemployment (UNEMP) was supplied by the National Bureau of Statistics and represents a traditional measure of the unemployed labor force. The annual inflation rate is a measure of how the price level of items in an economy rises (or falls) over time (INF). Lastly, we have the Government Expenditure (G), stated as a fraction of GDP, which indicates how much money the government spends relative to the economy. These measures offer an overall rubric for assessing this study's concerns and the impact of Tanzanian policy.

**IV. FINDINGS & DISCUSSION****4.1 Descriptive Statistics**

The descriptive statistics primarily focused on the mean, maximum, minimum, standard deviation, skewness, kurtosis, range, and count of observations related to the variables being investigated. Table 3 below shows the descriptive statistics: -

**Table 3***Descriptive Statistics*

Variables	PVR	FDI	G	UNEMP	INF	EXR
Mean	36.54	2.44	9.86	3.01	11.35	1300.32
Max	55	5.66	13.52	3.85	35.83	2481.76
Min	22.9	0.0001	5.704	2.13	3.29	195.05
Range	32.1	5.6638	7.816	1.72	32.54	2286.71
SD	10.62	1.49	2.03	0.475	9.41	713.98
Variance	112.8	2.23	4.15	0.225	88.64	509.7654
Skewness	0.38	0.34	0.23	-0.19	1.31	0.1897
Kurtosis	1.66	2.41	2.03	2.19	3.49	1.7716
Obs	34	34	34	34	34	34

Table 3 presents descriptive statistics of PVR, FDI, G, UNEMP, INF and EXR for 34 observations indicating the of the variables in the sample. The average of PVR was 36.54 and its range was moderate (32.1±10.62, min:22.9, max:55), indicating that there were not many differences between them. The mean FDI was 2.44 (range 0.0001–5.66)



with SD 1.49 indicating wide variation. *s* and *r* ranged in values of 7.816 (s.d. of 2.03). This verified that there was a "quite acceptable" range of values. UNEMP were very close to its average of 3.01, a narrow dispersion of 1.72 and relatively low s.d. (0.475) meaning stability. However, INF and EXR exhibited the most diversity. Their means were 11.35 and 1300.32, their ranges were 32.54 and 2286.71, and their standard deviations were 9.41 and 713.98 which demonstrate instability.

Skewness and kurtosis provide additional indication about variables' distributional properties. The majority of PVR (0.38), FDI (0.34), GSP (0.23) and EXR (0.1897) variables/ values displayed a slight positive skewness indicating a slight preference for higher values. The negative skewness is consistent with the return on UNEMP (-0.19) that suggests UNEMP is low. INF is also characterized by a heavy positive skewness of 1.31, which suggests a long right-hand tail of extreme observations. As far as kurtosis is concerned, a measure equal to 3.49 for INF indicates a leptokurtic distribution with a peak greater than that of the normal distribution and heavy tails, suggesting the presence of extreme values. All other variables displayed kurtosis values below 3, indicating flatter, platykurtic distributions with less extreme responses (PVR: 1.66, FDI: 2.41, G: 2.03, UNEMP: 2.19, EXR: 1.7716).

### 4.2 Stationarity Tests

An Augmented Stationarity Test was conducted to ensure data stationarity. The results are presented in Table 4.

**Table 4**

*Augmented Dickey Fuller (ADF) Stationarity Test*

Variables	At Level Test Statistics	Critical Values			After 1 <sup>st</sup> Difference Test Statistics	Critical Values		
		1%	5%	10%		1%	5%	10%
PVR	-1.306	-3.696	-2.978	-2.620	-9.351***	-3.702	-2.980	-2.622
FDI	-2.929	-3.696	-2.978	-2.620	-5.511***	-3.702	-2.980	-2.622
G	-1.894	-3.696	-2.978	-2.620	-6.381***	-3.702	-2.980	-2.622
UNEMP	-1.417	-3.696	-2.978	-2.620	-4.284***	-3.702	-2.980	-2.622
INF	-2.748	-3.696	-2.978	-2.620	-3.442**	-3.702	-2.980	-2.622
EXR	-0.154	-3.696	-2.978	-2.620	-5.489***	-3.702	-2.980	-2.622

The conclusion from the ADF tests is that at level all variables have their test statistic values well above the critical values at the 1%, 5% and 10% level of significance, meaning that they are all non-stationary with a unit root. However, all the variables become stationary at the first difference, with their test statistics falling below the 1% (at level) critical values for PVR, FDI, G, UNEMP, and EXR, while at the 5% (at level) significant level for the inflation regime. This also implies that all the variables in this study are I(1).

### 4.3 Selection of the Optimal Lag Length

Regarding the time series model, Table is an essential step to determine the optimal lag length and log-likelihood (LL), Likelihood Ratio (LR), degrees of freedom (df), p-value, Final Prediction Error (FPE), Akaike Information Criterion (AIC), Hannan-Quinn Information Criterion (HQIC), and Schwarz Bayesian Information Criterion (SBIC). We find that they all select a lag order of three. The maximum value of LR statistics (4.4017) and the associated statistically significant p-value of 0.036 indicate that the model at this lag has a better fit with the true data dynamics. Furthermore, the FPE, AIC, HQIC, and SBIC all minimise on lag three; thus, we prefer this lag. Therefore, a lag of three was selected for this model.

**Table 5**

*Optimal Lag Order Selection Criteria*

Lags	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	59.4205	0.001672	1	-3.56137	-3.47172	-3.28113		
1	60.1489	1.4569	1	0.227	0.001708	-3.54326	3.43867	-3.2163
2	61.265	2.2321	1	0.135	0.001702	-3.551	-3.43146	-3.1774
3	63.4658	4.4017*	1	0.036	0.001581*	-3.63106*	-3.49658*	-3.2107*
4	63.9031	0.87459	1	0.350	0.001653	-3.59354	-3.4412	-3.1265

### 4.4 Co-integration Analysis

A cointegration test in time series analysis determines whether two or more non-stationary time series have a long-run equilibrium relationship, even if they fluctuate independently in the short term. This study employed the Autoregressive Distributed Lag (ARDL) bounds cointegration test, which involves the use of *t* and *F*-tests on the lagged levels of the independent variable(s) in the ARDL equation. The results are presented in the following Table 6: -



**Table 6**  
*ARDL Bounds Cointegration Test Results*

$H_0$ : no level relationship								$F = 5.837$ $t = -4.92$
	10%		5%		2.5%		1%	
	$I(0)$	$I(1)$	$I(0)$	$I(1)$	$I(0)$	$I(1)$	$I(0)$	$I(1)$
$F$	2.26	3.35	2.62	3.79	2.96	4.18	3.41	4.68
$t$	-2.57	-3.86	-2.86	-4.19	-3.13	-4.46	-3.43	-4.79

The ARDL bounds cointegration test results suggest a long-run relationship between the variables. The F-statistic is 5.837 which is greater than the critical values of for I(1) for all levels of significance; hence, we fail to reject the null and confirm cointegration. Likewise, the t-statistic of -4.92 is more negative than all the I(1) critical values, lending more evidence in favour of a stable long-run relationship.

**4.5 ARDL Error Correction Model**

Table 7 displays the findings from the ARDL error correction model, which investigates how FDI contributes to poverty reduction. Given that the ARDL bounds co-integration tests indicated co-integration, both short- and long-term outcomes, along with the adjustment (error correction) terms, are included. The results from the Autoregressive Distributed Lag (ARDL) model assess the influence of Foreign Direct Investment (FDI) and other macroeconomic factors, such as government spending, unemployment, inflation, and exchange rate, on Tanzania's poverty rate from 1993 to 2023. With an R-squared of 0.8863 and an adjusted R-squared of 0.7725, the model demonstrates a strong fit, explaining a substantial portion of the variation in the poverty rates. The error correction term shows a significant negative coefficient, indicating a robust error correction mechanism, which means that deviations from the long-term equilibrium are corrected at an annual rate of 87.3 %. This implies that the poverty rate responds relatively swiftly to changes in FDI and other variables.

**Table 7**  
*Autoregressive Distributive Lag (ARDL) Error Correction Model*

ARDL (3,1,1,1,3,1)							Number of obs = 31
Sample 1993 – 2023							R-Square = 0.8863
Adj R-Square = 0.7725							
Log likelihood = 82.400962							
Root MSE = 0.0244							
	<b><i>D. lnPVR</i></b>	<b>Coef</b>	<b>Std Err</b>	<b>t</b>	<b>P&gt;t</b>	<b>[95% Conf. Interval]</b>	
<b>ADJ</b>	<b><i>lnPVR<sub>t-1</sub></i></b>	-0.873	0.170	-5.135	0.033	-1.2062	-0.53
<b>LR</b>	<b><i>lnFDI<sub>t</sub></i></b>	-0.437	0.1002	-4.440	0.069	-0.6333	-0.2406
	<b><i>lnG<sub>t</sub></i></b>	1.398	3.178	0.440	0.666	-5.376	8.173
	<b><i>lnUNEMP<sub>t</sub></i></b>	0.839	1.644	-3.510	0.017	-4.343	-2.665
	<b><i>lnINF<sub>t</sub></i></b>	0.437	0.149	2.932	0.006	0.14496	0.72904
	<b><i>lnEXR<sub>t</sub></i></b>	-0.123	1.080	-0.110	0.911	-2.424	2.179
<b>SR</b>	<b><i>D. lnPVR<sub>t-1</sub></i></b>	-0.729	0.176	-4.150	0.001	-1.103	-0.354
	<b><i>D. lnPVR<sub>t-2</sub></i></b>	-0.494	0.138	-3.570	0.003	-0.788	-0.199
	<b><i>DlnFDI<sub>t</sub></i></b>	-0.034	0.014	-2.485	0.026	-0.06144	-0.0065
	<b><i>D. lnG<sub>t</sub></i></b>	-0.074	0.044	-1.680	0.114	-0.168	0.020
	<b><i>D. lnUNEMP<sub>t</sub></i></b>	-0.101	0.093	-1.090	0.293	-0.299	0.097
	<b><i>D. lnINF<sub>t</sub></i></b>	-0.109	0.027	-4.030	0.001	-0.16	-0.051
	<b><i>D. lnINF<sub>t-1</sub></i></b>	-0.067	0.023	-2.900	0.011	-0.116	-0.018
	<b><i>D. lnINF<sub>t-2</sub></i></b>	-0.054	0.025	-2.140	0.049	-0.108	-0.000

The coefficient of Foreign Direct Investment (FDI) is negative in the long run, inferring that an increase in the flow of FDI is associated with a reduction in the poverty rate, with a p-value below 0.05, suggesting that a not very significant relationship exists. The reduction in the poverty rate associated with a 1% increase in FDI is close to 0.437%. This finding supports the proposition that FDI may have the potential to contribute to poverty reduction through employment creation, technology transfer and economic growth. This result supports the findings of Epaphra and Mwakalasya (2017) and Do et al. (2021), suggesting that foreign direct investment (FDI) reduces poverty directly and indirectly by advancing human capital, increasing employment, and increasing economic growth. A study of 29 Sub-Saharan Africa countries over the period of 1990-2017, found that foreign direct investment (FDI) has a negative impact



on poverty reduction, suggesting by extension that the magnitude of FDI flow into SSA may be insufficient or even misappropriate to effectively reduce poverty (Anetor et al., 2020). The greater poverty alleviation effects in Tanzania might be attributed to the increase in FDI inflows after the 1990s, which was brought about by the influence of trade openness and investment policy.

In addition, the estimated coefficient of government expenditure is positive, suggesting that a higher level of government spending leads to a higher poverty rate, although this finding is not significant. This implies that, for the period considered, government spending in Tanzania might have been misallocated across poverty-reducing sectors such as education, health services, or rural development. This finding contradicts the belief that government expenditure on social programs reduces poverty. Gohou and Soumaré (2012) note that efficient public spending can supplement FDI to alleviate the poverty. Tanzania is well-positioned to reduce poverty through a direct reduction in inequality, but this is unlikely to be through public spending (which is perceived to be inefficient and too focused on infrastructure rather than programs).

There was also an unexpected coefficient sign for unemployment, which was found to be negative and significant, meaning that the long-run relationship between poverty and unemployment is negative. This unexpected result could be due to other data limitations or measurement issues (e.g. using proxies for the poverty rate and informal employment not indicated as unemployed) or structural features of Tanzania's economy (e.g. a high proportion of the informal sector where unemployment does not necessarily translate into poverty). This finding contradicts much of the literature, which broadly connects higher unemployment and higher poverty. Indeed, studies conducted in Latin America have shown that labour market conditions, including unemployment, are essential for reaching poverty (Fields, 2015). The results in Tanzania may require more investigation into the measurement of unemployment or casual employment's impact on poverty dynamics.

The coefficient of inflation is positive and significant, implying that inflation has a significantly positive effect on poverty over time. The poverty rate increases by 0.437% when inflation increases by 1%. This is because low-income households are losing purchasing power, and since they spend much of their income on basic needs, poverty worsens. This also resonates with earlier research, such as Siami-Namini and Hudson (2019), which shows that the poor suffer more than the rich from inflation in developing countries, which have weak or non-existent social insurance coverage. Tanzania, with 43% of its population living below the poverty line (World Bank, 2024), must control inflation to protect poor communities and prevent poor coping strategies for inflation to poverty.

However, the exchange rate has a negative coefficient, suggesting that a reduction in the exchange rate would decrease poverty, but the estimate is not statistically significant. The negative coefficient implies that poverty can be alleviated through export-led growth, which can generate jobs and lift incomes. However, depreciation also makes imports more expensive, raising the costs of basic goods and services and potentially cancelling out some of the benefits. The evidence indicates the mixed implications of exchange rate variability on poverty, confirming the mixed results found in the previous literature. Dada and Akinlo (2021) noted that exchange rates impact foreign direct investment inflows, but their relationship with poverty alleviation is ambiguous due to contradicting economic variables. These dynamics illustrate the challenges of using exchange rate policies as a source of long-run poverty alleviation in Tanzania.

In the short run, FDI has a negative coefficient and is statistically significant, meaning that a 1% increase in FDI reduces the poverty rate by 0.034%. This modest but significant effect indicates that FDI has an instantaneous effect on poverty reduction, most likely through job creation and income generation in certain sectors. This result corroborates Msuya (2007), who asserted that FDI in Tanzania's agricultural industry enhances productivity and reduces poverty, particularly for smallholder farmers involved in integrated producer schemes. The small coefficient could alternatively also indicate that Tanzania is not able to retain much FDI as it receives, that FDI is more likely to be attracted towards capital-intensive sectors (such as mining) vis-a-vis the labour-intensive sectors (such as agriculture).

The regression of the lagged poverty rate terms revealed substantial negative coefficients, suggesting the presence of long-term poverty dynamics, which have become a structural feature of the country's poverty. These results imply that the poverty level in the past is an important determinant of the current rate, which implies slow adjustments, possibly due to structural restraints. This persistence is also consistent with findings in Sub-Saharan Africa, where poverty remains persistent because of a lack of human capital and weak institutional structures (Gohou & Soumaré, 2012). The fact that both coefficients are negative suggests that any shock to a country's poverty rate takes time to dissipate, underscoring the need to continue to see policy changes to break the cycle.

In the short run, changes in the rate of inflation are associated with negative and significant coefficients, implying that any unexpected surge in inflation rates may reduce the poverty rate. This counterintuitive result could be caused by short-term fluctuations in the economy, such as wage gains in some sectors caused by inflation or more economic activity. However, this finding also contradicts longer-term studies that suggest that inflation makes poverty worse, which simply serves to show how nuanced this relationship is. Most studies, such as Siami-Namini and Hudson (2019), focus on the impact of inflation on poverty levels through declining purchasing power. Tanzania's short-term results may be context-specific and associated with the stages of growth-induced inflation.



The short-run effects of government spending and unemployment on poverty are negative but insignificant, indicating that there are insignificant short-run effects on poverty reduction. The non-effect of government spending is also in line with evidence that government expenditure in sub-Saharan Africa does not contribute to poverty reduction (Gohou & Soumaré, 2012). The weak effect of unemployment could be due to the challenge of measuring informal employment which is common in Tanzania's labour market.

#### 4.6 ARDL Post-Estimation Diagnostic Tests

This section of the ARDL post-estimation diagnostics tests the robustness and validity of the Autoregressive Distributed Lag (ARDL) model results. These diagnostics are important because they help show that the model satisfies key statistical assumptions and aids in confidence in the estimates and conclusions. In this study, the post-estimation test used included the tests of heteroskedasticity, autocorrelation, normality, and stability. The ARDL heteroskedasticity post-estimation test determines whether the model's residual variance is constant across all observations. This test is a requirement to ensure that the model estimates are reliable and not biased due to heteroskedasticity. The test results are shown in Table 8.

**Table 8**

*Autocorrelation and Heteroskedasticity Test for ARDL Model*

<b>Cameron and Trivedi's decomposition of the IM-test for Heteroskedasticity</b>			
Source	Chi2	df	p
Heteroskedasticity	30	31	0.4154
<b>Breusch-Godfrey LM Test for Autocorrelation</b>			
Lags(p)	Chi2	df	Prob>chi2
1	1.905	1	0.168

The Cameron and Trivedi IM test for heteroskedasticity finds no evidence of heteroskedasticity, with a p-value of 0.4154, which is much higher than the benchmark of 0.05. This suggests that the residual variance is likely to be constant over the observations. The Breusch-Godfrey LM test for autocorrelation also reveals that no significant autocorrelation is present, as evidenced by a p-value of 0.168, which is greater than the significance level of 0.05. This suggests that the residuals are not serially correlated. Overall, these findings established the ARDL model as influential, as both the homoskedasticity and no autocorrelation assumptions were upheld. This renders the estimated model to be more reliable and effective. The additional tests carried out in the study for normality were the Skewness/Kurtosis and Jarque-Bera normality tests. The results are presented in Table 9.

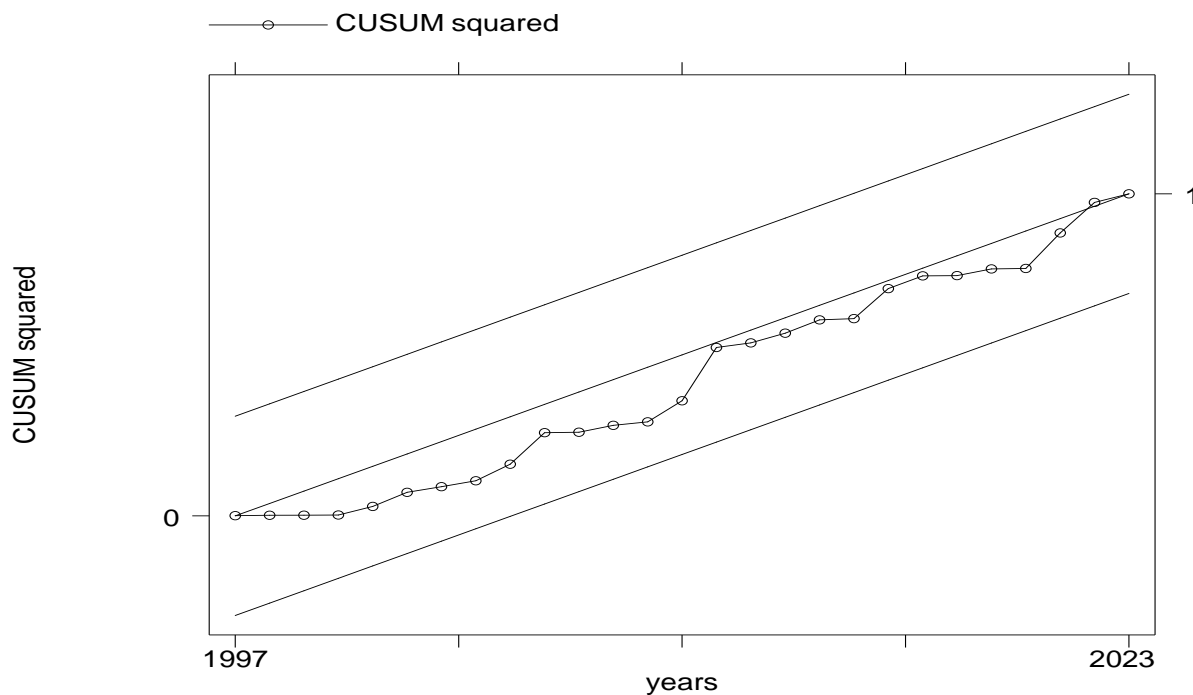
**Table 9**

*Normality Tests*

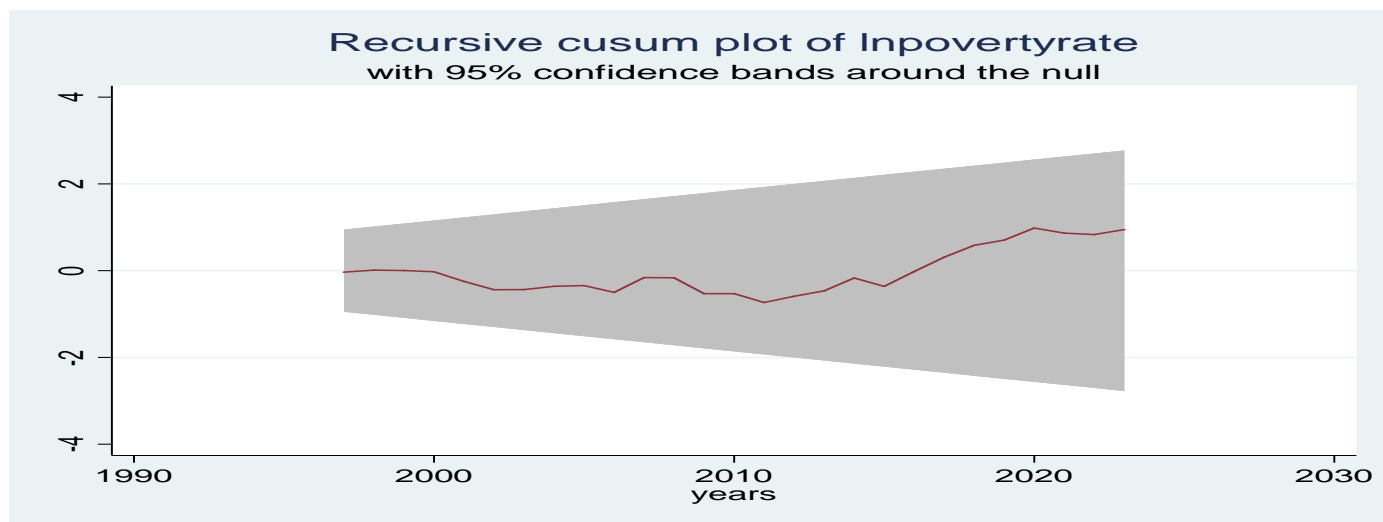
<b>Skewness/Kurtosis tests for Normality</b>					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	Adj_ch2	Prob>chi2
Resid	34	0.638	0.990	0.220	0.895
<b>Jarque-Bera normality test 0.3276 Chi(2) = 0.7854</b>					
<b>H<sub>0</sub>: Normality</b>					

The results of the skewness/kurtosis normality tests and the Jarque-Bera normality test demonstrate that the residuals of the ARDL model are normally distributed. The skewness/kurtosis test also did not reject normality with p-values of 0.638 and 0.990 for skewness and kurtosis, and an adjusted chi-square value of 0.220 and p=0.895 (considerably above the 0.05 test of significance). Likewise, the chi-squared statistic is 0.3276 and p-value is 0.7854 for Jarque-Bera test which also does not reject the null hypothesis of normality. Hence the residuals are normally distributed so the use of the ARDL estimates is justified.

Moreover, a rolling coefficient test was performed to test the parameter stability of the model. This was a test performed to check whether the model was stable, as opposed to being explosive. Two approaches were used: the cumulative sum (CUSUM) square test and the recursive CUSUM test. The results are shown in Figs. 1 and 2, respectively.



**Figure 1**  
*CUSUM- Square Stability Test for ARDL Model*



**Figure 2**  
*CUSUM Stability Test for ARDL Model*

The plots for both the CUSUM square and recursive CUSUM tests fall within the 5 percent significance level boundaries, indicating that the model demonstrates complete stability based on these findings. Thus, the ARDL error correction model can be relied upon to draw useful conclusions from the results.

## V. CONCLUSION & RECOMMENDATION

### 5.1 Conclusion

Using the Autoregressive Distributed Lag (ARDL) model, this study analyses the effects of foreign direct investment (FDI) and other macroeconomic determinants, employed as control variables, on the poverty level in Tanzania for the period from 1993 to 2023. The findings confirm that among the additionality of FDI, it is an effective vehicle to reduce poverty in the long and short terms, since poverty reduction is associated with job creation and economic growth. On the other hand, inflation does aggravate poverty in the long run but surprisingly has a negative short-run impact which may be attributed to some unique economic conditions. Public spending and unemployment have little short-term impact which might imply wasteful public spending.



## 5.2 Recommendations

To make better use of FDI in reducing poverty in Tanzania, a holistic approach to policymaking supported by empirical facts is required. Strengthening FDI absorption via human capital and institutional quality is important because research in sub-Saharan Africa indicates that strong institutions and a qualified labour force enhance the economic returns of FDI. Furthermore, FDI inflow to labour-absorbing sectors like agriculture and industry, for example, can directly create jobs and reduce poverty, as we can learn from the success story of agriculture in Tanzania. In addition, inflation management is crucial because of its negative implications for poverty in the long run. Third, there should be strategic targeting of public spending on social services and infrastructure that directly serve the poor, cutting wasteful spending to reduce administrative bloat in the pursuit of poverty reduction.

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