The Best FDI Inflows Can Do on Unemployment Rates in Tanzania: A Time Series Analysis

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Abstract
The paper explores the impact of Foreign Direct Investment (FDI) on unemployment rates in Tanzania, utilizing data spanning from 1992 to 2022. It is essential to recognize that many least-developed countries (LDCs) have strategically implemented measures to boost FDI acquisition, acknowledging its direct influence on national growth through increased employment opportunities. The study utilizes the Augmented Dickey-Fuller (ADF) test to examine the unit root and subsequently applies the Autoregressive Distributed Lag (ARDL) model. The findings indicate that FDI and GDP growth rates exhibit appropriate signs. Importantly, the paper establishes a negative relationship between the unemployment rate and FDI inflows in Tanzania. Therefore, to alleviate unemployment, it is crucial for the Tanzanian economy to actively attract more FDI. Achieving this objective requires leveraging policy instruments such as exchange rates, inflation management, political stability, human capital development, and optimizing legal and regulatory frameworks. Implementing these measures will create a conducive environment for increased FDI inflows into Tanzania.

Key Words: FDI inflow, unemployment rates, time series, Tanzania

Introduction

Addressing unemployment stands as the paramount macroeconomic challenge, prompting the government to implement a range of policy measures. Central to this approach is the creation of a favorable environment for foreign investment to flourish (Oloruntuyi, 2020). Given the country's growing population, unemployment naturally becomes a prevalent issue in the economy. Salami and Oyewale (2013) and Woldetensaye (2022) underscored the inarguable significance of achieving the macroeconomic objective of full employment. with exception to strictly regulated economies, FDI is among the key mechanisms of an open and competent global economic system. FDI involves an individual or company from one country that directly starts, expands, or acquires a business in another country. Furthermore, FDI allows for the establishment of direct, stable, and long-term links between economies (Alalawneh & Nessa, 2020). In the appropriate policy environment, it can serve as a crucial catalyst for local enterprise development, contributing to the enhancement of the competitive positions of both the recipient (host) and investing (home) economies (OECD, 2008). Many LDC governments have strategically outlined methods to increase FDI accretion, which has a direct development impact including employment growth.

Increasing FDI in Tanzania benefits in terms of capital formation, technology transfer, higher international trade, and stimulation of business competitiveness (Mohamed, 2018; Oloruntuyi, 2020). These advantages may then catalyze the country's growth-driving sectors, particularly

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mining, services, construction, manufacturing, and agriculture, which have high employment potential. As this is one of the most difficult issues for developing countries like Tanzania, FDI is crucial in reducing the time it takes to create jobs (Johnny et al., 2018). A notable surge in FDI flows occurred in the late 1990s, attributed to the government of Tanzania's successful implementation of investment policies. Foreign investors were influenced by Tanzania's commitment to liberalization and the nation's potential as a favorable host for FDI operations. From 1991 to 2020, Tanzania was appraised to have received cumulatively around USD 19 million of FDI inflows (Dinh et al., 2019) as illustrated in Figure 1.
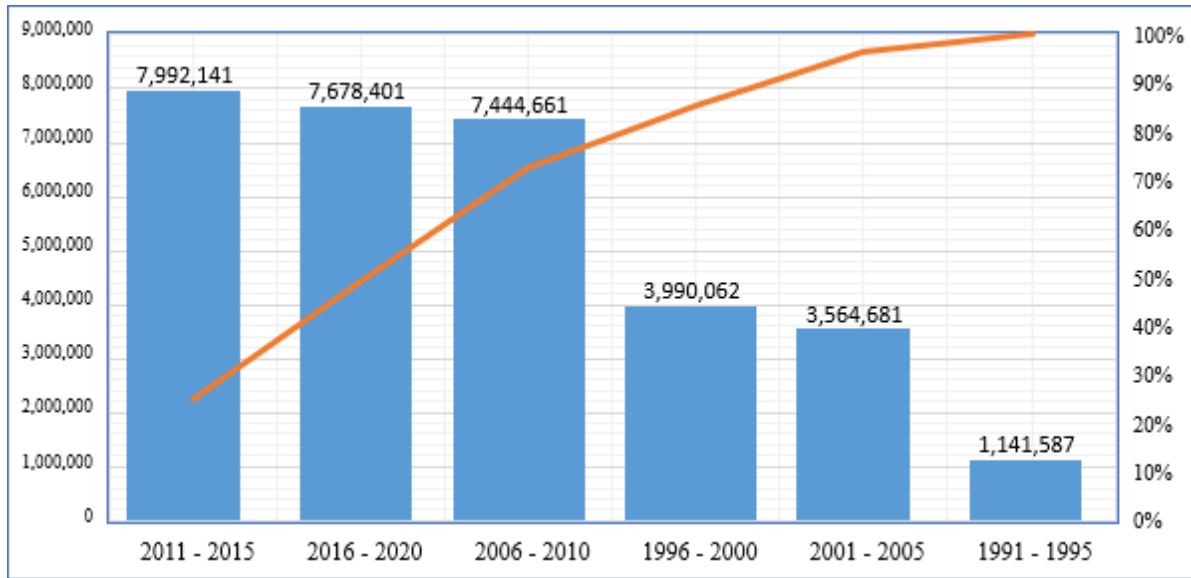

Figure 1: FDI Inward Flows (US dollars at current prices in USD millions)
Source: WDI Data (2023)

The aforementioned FDI performance is consistent with Tanzania's development objectives in the Tanzania Development Vision (TDV) 2025 (BoT, 2018). The vision serves as a 25-year roadmap for the country's socioeconomic development strategy through the year 2025. The development plan aims to convert Tanzania's economy into a middle-income country characterized by high livelihood standards, good governance, well-educated, and a competitive economy proficient in producing sustainable development and pooled benefits (Kadiša, 2021).

Towards the realization of TDV 2025 goals, Tanzania is implementing the third five-year development plan 2021/22-2025/26 (FYDP III) whose subject is "Realizing Competitiveness and Industrialization for Human Development". This aligns with the Vision 25 objective of establishing a robust, competitive economy, achieving middle-income status, and developing a semi-industrialized economy capable of regional and international competition, all while prioritizing the enhancement of human development (BoT, 2021). It is crucial to optimize the legal and regulatory frameworks, along with business and macroeconomic conditions such as exchange rates, inflation, political stability, and human capital expertise (Ibid, 2018). The Tanzanian government has established the Export Processing Zones Authority (EPZA) to support providing a more efficient business environment for foreign and domestic capital, refining competitiveness, and increasing employment (Berberi, 2013).

Numerous studies have thoroughly examined and analyzed the outcomes of implemented strategies aimed at alleviating unemployment (Alalawneh & Nessa, 2020; Woldetensaye et al., 2022; Johnny et al., 2018; Mpanju, 2012). Mpanju (2012) delved into how FDI could serve as a potential solution to reducing unemployment and fostering economic growth. This has been illustrated to boost private investments, foster job creation, facilitate the transfer of knowledge and technological skills within the labor force, and overall, stimulate economic growth in developing countries transitioning towards manufacturing-based economies. Conversely, Alalawneh and Nessa (2020) investigated the influence of FDI on employment in six Middle Eastern and North African countries: Egypt, Jordan, Lebanon, Morocco, Tunisia, and Turkey. In a separate study, Woldetensaye et al. (2022) explored the relationship between FDI and employment, concluding that FDI tends to hurt unemployment. Similarly, Johnny et al. (2018) reached a similar conclusion while investigating the correlation between FDI and the unemployment rate in Nigeria for the period spanning from 1980 to 2015. Furthermore, Sabado et al. (2023) examined the correlation between FDI and the unemployment rate in the Philippines and concluded that the FDI outflow variable significantly impacts the unemployment rate, with p-values lower than the 5% significance level. These findings are of significant interest to policymakers for reshaping existing policies or designing new strategies to attract new capital through FDI. Additionally, they provide a framework for evaluating the outcomes and benefits brought to the local economy by existing FDI policies.

Several studies have delved into the intricate relationship between foreign direct investment and economic growth. Notably, Mounkaila (2017), Dritsakis and Stamatiou (2017), and Magai (2021) have all explored this connection. Mounkaila (2017) and Magai (2021) each noted a positive and statistically significant correlation between FDI and economic growth. However, in the case of Dritsakis and Stamatiou (2017), their study examined the interplay among FDI, exports, unemployment, and economic growth within thirteen new member countries of the European Union (EU) during the period from 1995 to 2013. They found evidence of a unidirectional long-term causal relationship between economic growth and unemployment. Despite these findings, there is a lack of consensus on the magnitude and relative impact (positive or negative) of FDI on economic growth, which may deter foreign investors from considering investments in the country. This uncertainty also poses challenges for policymakers in formulating effective policies to promote economic growth. Moreover, the limited influx of foreign direct investment and capital formation may contribute to reduced economic activity, potentially explaining the elevated unemployment rate in Tanzania. The aforementioned findings offer a comprehensive summary of several studies exploring the relationship between FDI, economic growth, and unemployment. These studies present diverse conclusions regarding the impact of FDI on unemployment, with some, like Woldetensaye et al. (2022), suggesting a negative effect. Importantly, these findings emphasize the need for policymakers to address the uncertainties surrounding FDI's influence on economic growth and to devise effective strategies for attracting foreign capital. Against this backdrop, this study assumes significance as it explores unexplored territory. While existing research has scrutinized the relationship between FDI and unemployment in other countries, no study of this nature has been conducted within the Tanzanian context. The paper employs the unemployment rate as a proxy for evaluating the macroeconomic stability of the economy and investigates the potential positive impact of FDI inflows on the Tanzanian economy.

Trends in FDI and GDP in Tanzania

Figure 2 illustrates the trends in FDI and GDP in Tanzania from 1992 to 2022. In the initial years (1993-2000), FDI inflows were relatively low, gradually increasing from 0.91 million US$ to 4.63 million US$. A noteworthy upswing in FDI occurred between 2001 and 2005, reaching its peak at 3.30 million US$ in 2005, indicating substantial growth. From 2006 to 2008, FDI continued to rise, reaching 5.35 million US$ in 2007. However, in 2008, there was a slight dip to 3.81 million US$, potentially influenced by global economic factors, including the financial crisis. The subsequent years (2009-2012) exhibited relative stability in FDI, with occasional fluctuations, generally remaining within the range of 2.33 million US$ to 3.67 million US$. From 2013 to 2017, there was moderate growth in FDI, peaking at $3.56 million in 2015, maintaining a reasonably stable trend with some variations. However, starting in 2018 and extending through 2022, FDI inflows in Tanzania experienced a decline. In 2018, there was a significant drop to 1.18 million US$. Subsequent years showed mixed results, with FDI fluctuating but not returning to the higher levels seen in the mid-2000s. It is crucial to recognize that various factors, including economic conditions, government policies, global economic dynamics, and specific investment opportunities, can influence FDI trends in Tanzania.
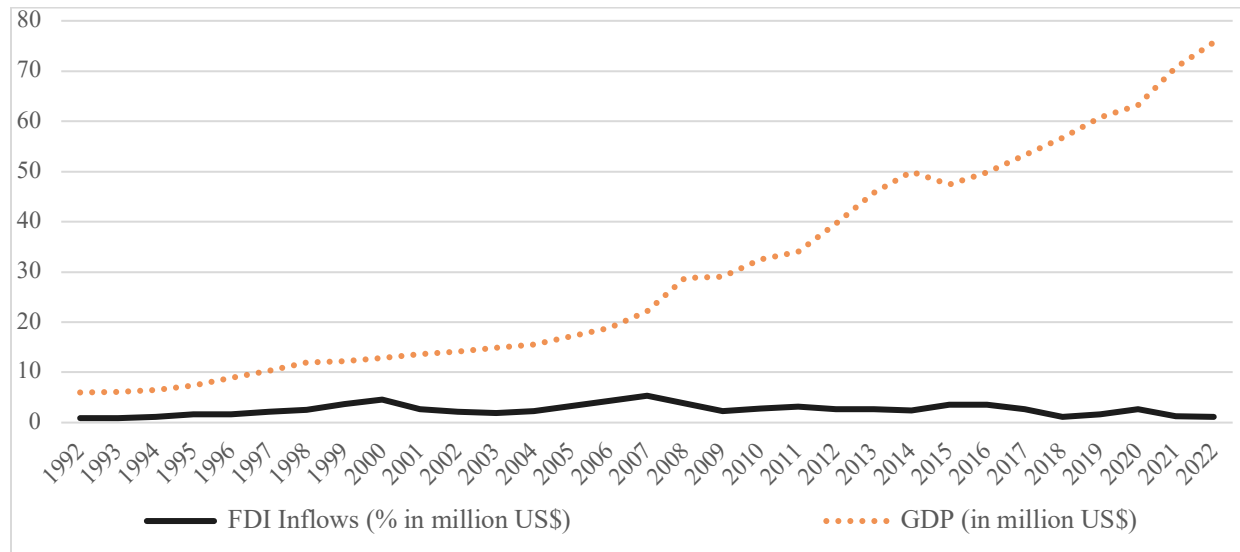
Figure 2: The evolution of FDI and GDP from 1992 to 2022
Source: WDI Data (2023)

Conversely, GDP in Tanzania has exhibited a consistent upward trajectory, increasing from 6.17 million US$ to 75.71 million US$ between 1993 and 2022. As depicted in Figure 2, the GDP figures from 1993 to 2007 demonstrated a gradual ascent from 6.17 million US$ to 18.88 million US$, contrasting with the period from 2008 to 2022, which witnessed a rapid surge from 22.12 million US$ to 75.71 million US$, respectively. This suggests that the growth in GDP has contributed to a reduction in the unemployment rate in Tanzania, a correlation supported by several studies (Stepanok, 2022; Kadisa, 2021; Magai, 2021; Dritsakis & Stamatiou, 2017; Tegep et al., 2019).

Literature Review and Theoretical Background

Foreign Direct Investment has been recognized as a pivotal driver of economic growth for developing countries (Kuliaviene & Solnyskiniene, 2014). The literature underscores the significance of macroeconomic stability and the state of the labor market in an economy, which foreign investors carefully scrutinize when considering a potential host country. Researchers also highlight a reciprocal effect, providing substantial evidence in support of the notion that FDI yields substantial benefits for the host nation. Consequently, it is imperative to investigate into the interplay between FDI inflows and unemployment rates, particularly for countries keen on attracting FDI (Strat et al., 2015). A lot of research endeavors have been undertaken to measure the extent to which FDI impacts economic growth and mitigates unemployment, and vice versa.

Alalawneh and Nessa (2020) conducted an examination of the impact of FDI on unemployment in Egypt, Jordan, Lebanon, Morocco, Tunisia, and Turkey, utilizing a dataset spanning from 1990 to 2018. The findings from fixed effects and random effects models indicate that FDI contributes to a reduction in the unemployment rate. Additionally, the study identifies a lack of a causal relationship in the short term between FDI and unemployment in its various forms, while revealing a bidirectional causal relationship between FDI and exports across the three economic models. In another study, Irpan et al. (2016) analyzed Malaysian data from 1998 to 2012, employing the autoregressive distributed lag (ARDL) model. Their results show that both FDI and GDP exert a significant influence in reducing the unemployment rate. Tegep et al. (2019) explored the limitations of FDI in explaining the unemployment rate in Indonesia, using path analysis on a panel of 36 provinces over 17 years. The study reveals that GDP and provincial minimum wage could directly mediate the relationship between FDI and the unemployment rate, suggesting that the effect of FDI is constrained by its impact on GDP and labor market variables (minimum wage). Furthermore, Tanaya and Suyanto (2023), in their examination of the impact of FDI on the youth unemployment rate in Indonesia, found that in the short run, FDI can lead to an increase in youth unemployment due to the reallocation of industries, necessitating workers' adjustment. However, over the long term, FDI significantly reduces youth unemployment. The study concludes that FDI in Indonesia has the potential to generate employment opportunities for young people.

Considering the aforementioned discussion, it is evident that the interdependencies between FDI and employment exhibit variability over time, across countries, diverse economic structures, and the types of FDI received. Moreover, numerous studies, including those by Hakim et al. (2023) and Dao et al. (2023), report no causal relation between these two phenomena. However, an argument posits that countries with higher unemployment rates possess two major advantages: a substantial available labor force and a heightened likelihood of low labor costs (Strat et al., 2015; Blanchard, 2011). Contrarily, alternative hypotheses suggest that a nation's excessively high unemployment rate may be perceived by foreign investors as a symptom of macroeconomic disequilibrium, leading to the nation being deemed an unsuitable host country for future investments (Brozen, 1958). In light of these perspectives, our research will be structured around two key hypotheses, as outlined below, summarizing these diverse viewpoints.

The literature also presents supporting evidence for the theory of the endogenous growth model, a foundational theoretical framework endorsed by various scholars (Magai, 2021). Endogenous

growth theories anticipate increasing technological returns to scale, fostering long-term knowledge-based growth (Cortright, 2001). These theories allow policy and institutional factors to influence economic growth by departing from Solow's (1956) hypothesis of exogenous savings and capital formation (Bassanini & Scarpetta, 2001). The model elucidates how sustained economic growth can be achieved in the long run through scale effects of ideas, spillovers, and research within the economy (Onyimadu, 2017). Grinols (1991) contributes to this perspective by constructing models with various assumptions that influence the relative opportunity costs of domestic labor, evaluating the significance of increased foreign capital for an economy with unemployment. His models assert that, in the case of an economy with unemployment, foreign capital can bring about substantial welfare gains if the opportunity costs of labor are adequately low in comparison to the wages earned by laborers hired by new foreign capital. Therefore, the study hypothesizes: -

H1: The FDI inflows influence the unemployment rate in a country.
H2: The unemployment rate influences FDI inflows attracted by a country.

Summarizing this section, it can be asserted that the relationships between FDI and unemployment remain not entirely elucidated. While there is compelling evidence indicating a positive impact of FDI on employment rates (Dao et al. 2023 and Hakim et al. 2023), it is crucial to acknowledge that these connections depend on factors such as the specific country under study, the type of FDI being examined, and the periods analyzed.

Methodology, Analysis and Findings
Data and Model
The study relies on data sourced from the World Development Indicators (WDI), encompassing a 30-year aggregate annual time series spanning from 1992 to 2022. The data is adjusted for inflation and expressed in million USD for both total net FDI inflows and the GDP trend. Additionally, the unemployment rate (UErt) data was obtained from the same database. The analysis was conducted using STATA software version 14.2. The empirical regression model utilized a linear form and is represented by the following equation:

$$UErt = \alpha 0 + \alpha 1 xt + et \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (1)$$

Where X is a set of independent variables that affect UErt and captures the time dimension (1992 - 2022). In the empirical section, the addition of other variables will be considered, the equation will be estimated as follows:

$$UErt = \alpha 0 + \alpha 1 FDIt + \alpha 2 GDPt + et \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (2)$$
Where;
UEr = Unemployment Rate
FDI = Foreign Direct Investment
GDP = Gross Domestic Product
α = Unknown Coefficient
e = Error Term
t = Time Dimension

Descriptive Statistics
The findings from Table 1 show that the average unemployment rate is 2.937% with a minimum low value of 1.96% and a maximum value of 3.6% under the study period. The average unemployment rate of 2.937% implies that, on average, a relatively small percentage of the workforce was unemployed during the study period. This suggests a stable job market with a relatively low level of joblessness. Additionally, the minimum and maximum values demonstrate fluctuations in the unemployment rate over the same period. This indicates that there were periods of both lower and higher unemployment within that timeframe. FDI inflows in Tanzania during the entire study period are recorded to have an average of 2.515% of GDP with a maximum value of 5.35% of GDP. It is further observed that the average GDP is 26.121 USD million with the lowest and highest values of 5.17 and 63.24 USD million respectively. The GDP is recorded to experience an uprising trend over the years. Standard deviation showed that the unemployment and real GDP growth values have been concentrating more on their mean. That is, there was a low variation between the unemployment rate and real GDP growth rate during the study period.

Table 1: Descriptive statistics summary

Variable	Obs.	Mean	Std. Dev	Min	Max
Unemployment rate %	30	2.9376	.5530	1.96	3.6
FDI inflows (% of GDP).	30	2.5156	1.1777	.74	5.35
GDP (in million USD).	30	26.121	19.0839	5.17	63.24

Source: STATA Output (2023)

Unit Root Test
The study employed the Augmented Dickey-Fuller (ADF) unit root testing procedure to assess the stationarity of the data. Given the potentially unpredictable nature of the results, the ADF test was chosen over the standard Dickey-Fuller test. The ADF test accommodates more complex models and is considered to be more statistically powerful (Dickey & Fuller, 1979). This constitutes the initial phase in analyzing the time-series characteristics of the data, focusing on identifying underlying patterns and trends. However, the primary interest in ADF tests lies around the determination of the coefficient β, as outlined in equation (3).

$$\Delta Y_t = \alpha + \beta K_{t-1} + \sum_{j=1}^{n} \delta_i \Delta K_{t-1} + \mu_t + \varepsilon_t ....(3)$$

The standard Dickey-Fuller model has been augmented by ΔKt-i, where Yt represents a linear time trend, Δ is the first difference operator, while β, δ, and μ are parameters to be estimated. Based on the VAR Lag Order selection criteria method, the lag length 1 was chosen to avoid autocorrelation in the residual. A time series is considered stationary when variations in time do not lead to a change in the distribution's form. However, the objective here was to ascertain the nonstationary nature of each variable. It's important to note that unit root and stationarity test statistics exhibit unconventional and non-normal asymptotic distributions under their respective null hypotheses. The inclusion of deterministic terms in the test regressions can impact the limiting distributions of the test data.

Table 2 displays the results of the unit root test for stationarity. The results indicate that FDI inflows exhibit stationarity at order zero (I(0)), whereas the unemployment rate and GDP variables attain stationarity at the first difference (I(1)). Given these findings, the ARDL approach emerges as the most suitable method for co-integration analysis, as it meets two key criteria. Firstly, it does not necessitate that all variables be integrated in the same order (Pesaran & Pesaran, 1997). Secondly, it requires that no variables be integrated at order two (I(2)). Thus, the ARDL Model is well-suited for this paper. According to Pesaran et al. (2001), the applicability of ARDL hinges on the presence of some variables being purely I(0) or purely I(1), or mutually integrated. In light of this, the utilization of the ARDL Model for co-integration analysis is justified in this paper.

Table 2: Unit root test before and at first difference

Variables	ADF Stats	5% Critical value	Order of Integration	Remarks
FDI Inflows	-2.38	-1.70	I (0)	Stationary
Unemployment rate	-0.83	-1.70	I (0)	Non-Stationary
GDP	2.68	-1.70	I (0)	Non-Stationary
Unemployment rate	-1.82	-1.71	I (1)	Stationary
GDP	-1.73	-1.71	I (1)	Stationary

Source: STATA Output, (2023)

Stability Test

The paper commenced with a heteroscedasticity test based on the approach proposed by Breusch and Pagan (1979), as well as Cook and Weisberg (1983), which assumes that the regression disturbances follow a normal distribution (Breusch & Pagan, 1979). This test was applied to the explanatory variables in the fitted regression model as referred by Cook and Weisberg-(1983), and the obtained results are subsequently presented.

Ho: There is no evidence of heteroscedasticity for constant variance
Variables: Fitted values of the unemployment rate
Chi2 (1)   = 5.17
Prob. > chi2 = 0.0754

The results of the Breusch-Pagan test reveal an insignificant p-value of 0.0754, exceeding the 0.05 threshold. Consequently, the paper does not reject the null hypothesis of constant variance, indicating no evidence of heteroscedasticity. Additionally, the paper employed the Ramsey RESET test to assess potential model misspecification based on the characteristics of the fitted values of the dependent variable (unemployment rate). Below, you will find the results of the model misspecification test obtained from the Ramsey test.

Ho: The model has no omitted variables
F (2, 27)   = 0.68
Prob. > F   = 0.7656

The results indicate a p-value of 0.7656, which exceeds the 0.05 confidence level threshold. As a result, the paper does not reject the null hypothesis, suggesting that the model does not have

omitted variables and is well-specified. This allows for confidence in proceeding with further analysis.

Autoregressive Distributed Lag (ARDL)
The ARDL technique was chosen for its versatility, as it applies to both non-stationary time series and time series with mixed orders of integration (Pesaran et al., 2001). The results obtained provide insights into the short-run and long-run dynamics of the model for the variables under consideration (equation 4). According to Johansen and Juselius (1990), the ARDL method facilitates the identification of co-integration vectors, where each fundamental variable represents a distinct long-run relationship equation. When a single co-integration vector (i.e., the underlying equation) is identified, the ARDL model of the co-integration vector is reparametrized into the error correction model (ECM). This reparametrized outcome offers insights into both the short-run dynamics (akin to traditional ARDL) and the long-run relationships of the variables within a single model. Moreover, it can be adapted for data with small sample sizes and variables with different optimal lag lengths. An ARDL equation is represented as follows:

$$\Delta UEr_t = \beta_1 UEr_{t-1} + \beta_2 FDI_{t-1} + \beta_3 GDP_{t-1} + \alpha_0 + \sum \alpha_{1i} \Delta UEr_{t-1} + \sum \alpha_{2i} \Delta FDI_{t-1} + \sum \alpha_{3i} \Delta GDP_{t-1} + e_t \dots \dots (4)$$

Whereby, β_1 to β_3 correspond to the long-run relationship, while α_1 to α_3 correspond to short-run dynamics of the model; the subscripts t and $t-1$ represent periods; the customary white noise residuals are represented by e_t; while α_0 is the drift factor.

The re-parametrization is plausible as the ARDL operates as a dynamic single-model equation, akin to the ECM system. The Distributed Lag Model involves incorporating unrestricted lags of the regressors into the regression function. The long-run elasticities' outcomes, based on their respective coefficients, are all derived from the unrestricted ECM. Therefore, equation (4) in the ARDL form of the ECM can be expressed as equation (5). In the event of co-integration, the model incorporates the error correction component to quantify the degree of equilibrium. The error correction term (EC_{t-1}) represents the error in the linear regression among the variables in the study. It indicates the speed of coefficient adjustment or feedback effect derived from the assessed co-integration model in equation (5). The error correction version of the ARDL model, relating to the variables, is presented in equation (5).

$$\Delta UEr_t = \alpha_0 + \sum \alpha_{1i} \Delta UEr_{t-1} + \sum \alpha_{2i} \Delta FDI_{t-1} + \sum \alpha_{3i} \Delta GDP_{t-1} + \lambda EC_{t-1} + e_t \dots \dots (5)$$

The ECM expresses that the change in unemployment is allied to the variation in other variables, as well as the gap amid the variables in the preceding period. Using the ARDL test, the paper calculated the F-value and then linked it to the perilous value or level of importance, if the F-value is larger than the critical F-value at a selected level of importance, the null hypothesis is rejected, otherwise accepted. In running ordinary least squares, the paper assumes the hypothesis that there is no association between the unemployment rate, foreign direct investment, and gross domestic product.

The ECM posits that changes in unemployment are linked to variations in other variables, along with the lagged differences between the variables. Employing the ARDL test, the paper computed the F-value and compared it to the critical value or level of significance. If the F-value exceeds the critical F-value at a chosen level of significance, the null hypothesis is rejected; otherwise, it is accepted. In conducting ordinary least squares (OLS) analysis, the paper proceeds under the assumption that there is no significant relationship between the unemployment rate, foreign direct investment, and gross domestic product.

Results for ARDL

The probability value (prob. > F) of 0.000 (0%) indicates the model's significance, as it falls below the 5% threshold for p-value. The R-squared and adjusted R-squared values of 0.811 and 0.796, respectively, signify the proportion of variation in the dependent variable explained by the independent variables. Regarding the t-tests, the probability value (p > |t|) for FDI was 0.063 (0.06%), which exceeds the 5% threshold, rendering the FDI variable insignificant. Conversely, the probability value for GDP was 0.000 (0%), below the 5% threshold, indicating the significance of the GDP variable. However, in the long run, both FDI and GDP were deemed insignificant, as their respective t-statistics of -1.94 were below an absolute value of 2. Consequently, it can be concluded that an increase in FDI and GDP by $1 Million will decrease the unemployment rate by 0.077% and 0.025%, respectively. In contrast, in the short run, both FDI and GDP were found to be significant, with probability values of 0.000 (0%) and t-statistics of 32.05 and above 2 in absolute value, respectively. This implies that an increase of one million US dollars in FDI and GDP will lead to an increase in the unemployment rate by 37.5%, as observed in Table 4.

Table 4: Estimated autoregressive distributed lag (ARDL)

UEr		Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
	FDI						
LR	L1.	-.0773	.0398	-1.94	0.063	-.1593	.0045
	GDP						
	L1.	-.0258	.0026	-9.76	0.000	-.0312	-.0203
SR	_cons	3.749	.1169	32.05	0.000	3.5094	3.9904

Source: STATA Output (2023)
Number of obs. = 30, F (2, 26) = 55.89, Prob > F= 0.0000, R-squared = 0.8113,
Adj. R-squared = 0.7968, Root MSE = .24717

Co-integration

According to Rao (2007), co-integration tests are employed to analyze procedures involving non-stationary time series with varying variances over time. This enables the assessment of long-run parameters or equilibrium in methods with unit root variables. Co-integration tests aim to identify stable, long-term relationships among sets of variables. It's important to note that if a test fails to identify such an association, it indicates the absence of evidence for one, rather than conclusively proving its non-existence. Formally, co-integration is defined as the situation where two I(1) time series, denoted as xt and yt, can be described by a stationary process.

Ut = yt – αxt … … … …. … … … … … ... … … … … … … ……………. (6)

The paper employed the Johansen test, an advancement of the Engle-Granger test, which focuses on constructing residuals (i.e., errors) based on a static regression. These residuals are then examined for the presence of unit roots using tests like the ADF test or similar examinations. If the time series are co-integrated, the residuals will exhibit near stationarity. A significant concern with the Engle-Granger technique is the selection of the dependent variable, which can lead to different conclusions (Bui & Ślepaczuk, 2022). In contrast, Johansen's test is preferred as it bypasses the issue of selecting a dependent variable and avoids complications arising when errors are carried from one step to the next. Consequently, the test is capable of identifying multiple co-integrating vectors.

Results for Co-integration

The co-integration test was conducted to assess the degree of relationship between the variables, specifically whether a long-term association exists. The results from Table 5 indicate that at the maximum rank of 1, the trace statistic of 19.033 exceeds its critical value of 15.41 percent. This suggests that there is no long-term connection among the variables in question.

Table 5: Co-integration test results

Maximum Rank	Parms	LL	Eigen Value	Trace Statistic	Critical Value
0	12	-84.1786		35.4785	29.68
1	17	-75.9559	0.4220	19.0331*	15.41
2	20	-68.8329	0.3780	4.7871	3.76
3	21	-66.4393	0.1474		

Source: STATA Output (2023)

Factors Influencing the Unemployment Rate

Additionally, linear regression models were employed to assess the factors influencing the dependent variable (unemployment), utilizing the independent variables (FDI and GDP). The resulting R Square value was 0.7772, indicating that 77.72% of the variation in the unemployment rate in Tanzania can be accounted for by the independent variables. The outcomes, as presented in Table 6, unveil a negative correlation between FDI inflows and the long-term unemployment rate. This suggests that higher levels of foreign direct investment may contribute to a reduction in unemployment. Furthermore, our findings indicate that economic growth has a negative impact on the unemployment rate in Tanzania, reaching statistical significance at the $p<0.05$ level. Specifically, we observe that a one million USD increase in FDI inflows results in an 11.62% decrease in the unemployment rate in the long run.

The coefficient for GDP is -0.0307 and is statistically significant at the $p<0.05$ level. This negative coefficient implies that as GDP increases, the unemployment rate tends to decrease. A growing economy, indicated by a higher GDP, is often associated with lower unemployment rates. The coefficient for the lagged unemployment rate is 0.2705 and is statistically significant at the $p<0.05$ level. This positive coefficient suggests that past unemployment rates have a positive impact on the current unemployment rate. In summary, the regression analysis underscores the significance of FDI and GDP as influential factors in determining the unemployment rate. An increase in FDI and a rise in GDP tend to have a negative impact on the unemployment rate.

Table 6: Factors Influencing Unemployment Rate

Variables	Unemployment
Adjustment	0.7607**
FDI	-0.1162** (0.0626)
GDP	-0.0307** (-0.0196)
Unemployment rate	0.27057**
Constant	3.4007** (3.9239)
Observations	30
R-squared	0.7772
Standard errors	0.0436** (0.0027)

Significance level: **p<.05
Source: STATA Output (2023)

The results indicate that an increase in the previous year's FDI inflows corresponds to a 30.7% increase in the short-run unemployment rate. These findings suggest that FDI inflows in the country facilitate the implementation of various economic projects, creating employment opportunities and subsequently reducing the unemployment rate. Therefore, this study confirms the null hypothesis, demonstrating an inverse relationship between independent and dependent variables. This implies that an increase in FDI and GDP leads to a decrease in the unemployment rate in Tanzania. Furthermore, it is noteworthy that the impact of the previous year's FDI inflows on the unemployment rate in Tanzania is statistically significant.

Discussion, implications and conclusion
Based on the findings, the unemployment rate exhibits a mean of 2.937%, with a slight variability of 0.553% over the 30 years analyzed in this study. This suggests that the unemployment rate remains relatively stable, given the low level of variability. Additionally, this stability in the inflation rate in Tanzania over the study period has been conducive to encouraging both domestic investment and FDI, consequently fostering increased production within the country. Both FDI and unemployment rates were observed to have symmetrical distributions, indicating a sustainable inflow of FDI and a low level of unemployment. This dynamic has contributed to an upswing in GDP, reaching a peak value of 63.24 USD million (see Table 1). In the long run, economic growth was hypothesized to have a negative impact on the unemployment rate in Tanzania; however, this impact did not reach statistical significance. This outcome aligns with Okun's law (1962), which posits an inverse relationship between economic growth and unemployment. Therefore, the result suggests that the null hypothesis cannot be rejected, implying that there is no statistical evidence to suggest that the differences observed in the data groups are not due to chance. A parallel study by Hjazeen et al. (2021) suggests a similar negative and statistically significant impact of economic growth on the unemployment rate in Jordan in the long run, with a 10% significance level. Specifically, an increase in the growth rate by 1% is estimated to lead to a decrease in the unemployment rate by approximately 0.32%. Overall, the results indicate that the null hypothesis holds, suggesting that residuals exhibit a normal distribution.

In the long run, it is also observed that a decrease in FDI inflows by one million USD resulted in a 27% increase in the unemployment rate (refer to Table 6). Therefore, in this study, we

affirm the null hypothesis, demonstrating an inverse relationship between independent and dependent variables. This implies that an increase in FDI, as well as GDP, led to a decrease in the unemployment rate in Tanzania. This finding indicates that FDI inflows in the country facilitate the implementation of various economic projects that generate employment opportunities. These opportunities span across the industrial, tourism, and infrastructure sectors, leading to increased employment rates and higher GDP levels. These results align with those of Balcerzak and Żurek (2011), who conducted a practical examination based on aggregate data and VAR methodology for the period from 1995-2009, demonstrating interdependencies between FDI and unemployment.

According to Irpan et al. (2016), the presence of foreign workers and the GDP significantly influences the unemployment rate in Malaysia. This implies that although FDI might initially contribute to a rise in unemployment, the government should still pursue policies that attract investments aligning with the specified criteria. This approach is likely to yield positive long-term effects of foreign capital inflow. Conversely, a reduction in GDP corresponds to a decrease in the unemployment rate. The findings of this study affirm a relationship between the unemployment rate and FDI inflows in Tanzania. An increase in FDI inflows signifies an expansion in the host country's economy, thereby creating more jobs and reducing income disparities. Consequently, the Tanzanian economy should actively seek to attract more FDI inflows to alleviate unemployment.

The Tanzanian government should formulate strategies and plans to enhance job opportunities and address the existing unemployment rate. Priority should be given to creating a conducive environment for the private sector to generate additional employment opportunities. Moreover, concerted efforts should be made to attract foreign investors who can play a role in enhancing the country's economic landscape. In line with the research findings, it is also advisable for the government to streamline the entry of firms into the business sector and offer support to entrepreneurs. Policymakers should prioritize and enact policies focused on fostering entrepreneurship.

References
Alalawneh, M. & Nessa, A. (2020). The Impact of Foreign Direct Investment on Unemployment: Panel Data Approach. *Emerging Science Journal, 4*(4), 228-242. http://dx.doi.org/10.28991/esj-2020-01226.

Balcerzak, A. P., & Zurek, M. (2011). Foreign Direct Investment and Unemployment: VAR Analysis for Poland in the Years 1995-2009. *European Research Studies, XIV*(1), 1-14.

Bassanini, A., & Scarpetta, S. (2001). The Driving Forces of Economic Growth: Panel Data Evidence for the OECD Countries. *OECD Economic Studies, 33*(11), 9-56. https://www.oecd.org/economy/growth/18450995.pdf

Berberi, A. (2013). The Role of Foreign Direct Investments (FDI) as a Promoter of Growth – Attractiveness of Albania for FDI. *European Scientific Journal, 9*(22), 345-356.

Blanchard, O. (2011). Macroeconomics, Boston, Mass., Pearson Prentice Hall.

BoT (2018). Tanzania Investment Report 2018: Foreign Private Investments. Bank of Tanzania. Dar es Salaam, Tanzania.

Breusch, T. S., & Pagan, A. R. (1979). A Simple Test for Heteroscedasticity and Random Coefficient Variation. *Econometrica*, *47*(5), 1287-1294.

Brozen, Y. (1958). Means for Maintaining Economic Stability. *Journal of Farm Economics*, *40*(5), 1069-1078.

Bui, Q., & Ślepaczuk, R. (2022). Applying Hurst Exponent in Pair Trading Strategies on Nasdaq 100 Index. *Physica A, 592*(39), 1-19. https://doi.org/10.1016/j.physa.2021.126784.

Cook, R. D., & Weisberg, S. (1983). Diagnostics for heteroscedasticity in regression. *Biometrika, 70*(1), 1-10.

Cortright, J. (2001). New Growth Theory, Technology and Learning: A Practitioner's Guide. Reviews of Economic Development Literature and Practice. No. 4 Impresa, Inc.

Dickey, D, A., & Fuller, W, A. (1979). Distribution of the Estimators for Autoregressive Time Eeries with a Unit Root. *Journal of the American Statistical Association, 74*(366a), 427-431. https://doi.org/10.1080/01621459.1979.10482531

Dinh, T. T. H., Vo, D. H., Vo, A., & Nguyen, T. C. (2019). Foreign Direct Investment and Economic Growth in the Short Run and Long Run: Empirical Evidence from Developing Countries. *Journal of Risk and Financial Management*, *12*(4), 1-11.

Dao, T. B. T, Khuc, V. Q, Dong, M. C and Cao, T. L. (2023). How Does Foreign Direct Investment Drive Employment Growth in Vietnam's Formal Economy? *Economies, 11*(11), 1-25. https://doi.org/10.3390/economies11110266.

Dritsakis, N. and Stamatiou, P. (2017). The Impact of Foreign Direct Investment on the Unemployment Rate and Economic Growth in Greece: A Time Series Analysis. *International economics, 70*(4), 443 – 468.

Grinols, E. (1991). Unemployment and Foreign Capital: The Relative Opportunity Costs of Domestic Labour and Welfare. *Economica*, *58*(229), 107-121.

Hakim, D. R, Ahman, E. and Kusnendi, K. (2023). The Effect of FDI on the Host Countries' Employment: A Meta-Regression Analysis. *Russian Journal of Economics, 9*(2), 158-182. DOI 10.32609/j.ruje.9.98252.

Hjazeen, H., Seraj, M., & Ozdeser, H. (2021). The Nexus between the Economic Growth and Unemployment in Jordan. *Future Business Journal*, *7*(1), 1–8. https://doi.org/10.1186/ s43093-021-00088-3.

Irpan, H. M, Mat Saad, R., Shaari Md Nor, A. H., Md Noor, A. H., & Ibrahim, N. (2016). Impact of Foreign Direct Investment on the Unemployment Rate in Malaysia. *Journal of Physics: Conference Series*, *710*, 012028. https://doi.org/10.1088/1742-6596/710/1/012028.

Johansen, S., & Juselius, K. (1990). Likelihood Estimation and Inference on Cointegration-with Applications to the Demand for Money. *Oxford Bulletin of Economics and Statistics*, *52*(2), 169-210.

Johnny, N., Timipere, E. T., & Krokeme, O. (2018). Impact of Foreign Direct Investment on Unemployment Rate in Nigeria (1980-2015). *International Journal of Academic Research in Business and Social Sciences, 8*(3), 56–68. https://doi.org/10.6007/IJARBSS/ v8-i3/3905.

Kadiša, T. (2021). Effect of Foreign Direct Investment on Growth-Unemployment Nexus. *Socialiniai Tyrimai, 44*(2), 139–152.

Kuliaviene, A., Solnyskiniene, J. (2014), The Evaluation of the Impact of Foreign Direct Investment on Lithuanian Economy Using. *International Journal of Humanities and Social Science*, *19*(1), 16-25.

Magai, P. S. (2021): Trade and Foreign Direct Investment in Tanzania: Do They Matter for

Economic Growth? *Tanzanian Economic Review*, *11*(2), 22–40.

Mohamed, O. A. S. (2018). Vector Autoregressive Analysis -VAR Foreign Direct Investment and Unemployment: Sudan, 1990-2016. *Global Journal of Economics and Business, 4*(2), 224 - 235.

Mounkaila, N. K. (2017). Impact of Foreign Direct Investment on Economic Growth in Niger. *IOSR Journal of Economics and Finance*, *8*(2), 28-33.

Mpanju, A. K. (2012). The Impact of Foreign Direct Investment on Employment Creation in Tanzania. *International Journal of Business Economics & Management Research*, *2*(1), 126-139.

OECD. (2008). Benchmark Definition of Foreign Direct Investment. Fourth Edition.

Okun A. (1962) Potential GNP: Its Measurement and Significance', in The 1962 Proceedings of Business and Economic Statistics Section. In American Statistical Association.

Oloruntuyi, A. O. (2020). The Impact of Foreign Direct Investment on Unemployment Rate in Nigeria (1986-2018). *International Journal of Economics, Business and Management Research, 4*(6), 266-278.

Onyimadu, C. (2017). Macroeconomic Volatility and Economic Growth: Evidence from Selected African Countries (MPRA Paper no. 7700). https://mpra.ub.uni-muenchen. de/77200/.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bound Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Economics, 16*(3), 289-326. https://www.jstor.org/stable/2678547.

Pesaran, MH & Pesaran, B. (1997). Working with Microfit 4.0: Interactive Econometric Analysis. Oxford University Press, Oxford.

Rao B. B. (2007). Cointegration for the Applied Economist (2nd Edition). ISBN-13: 978-1403996145, ISBN-10: 1403996148.

Sabado, J. R. F, Millan, K. A. and Asoy, D. M. (2023). The Relationship of Foreign Direct Investment and Unemployment Rate in the Philippines. *Journal of Asian development*, *9*(1), 32-52. https://doi.org/10.52941/jad.v9i1.44.

Salami, A. O. and Oyewale, I. O. (2013). Impact of Foreign Direct Investment on Employment Generation in Nigeria. *International Journal of Economic Development Research and Investment*, *4*(1), 64-75.

Stepanok, I. (2022). FDI and Unemployment, a Growth Perspective. *Review of International Economics, 31*(2), 761–783. DOI: 10.1111/roie.12643

Strat, V. S., Davidescu, A., & Paul, A. (2015). FDI and the Unemployment: A Cusality Analysis for the Latest EU Members. *Procedia Economics and Finance, 23*, 635-643.

Tegep, J. Suratman, E and Sukma I. S. (2019). The Failure of Foreign Direct Investment to Explain Unemployment Rate and the Mediating Role of Economic Growth and Minimum Wage. *International Journal of Economics and Financial issues*, *9*(2), 154-161.

Tanaya, O and Suyanto. (2023). Investigating the Role of Foreign Direct Investment on Youth Unemployment Rate in Indonesia. *Binus Business Review, 14*(2), 121−131.

Woldetensaye, W. A, Sirah, E. S & Shiferaw, A. (2022). Foreign Direct Investments Nexus Unemployment in East African IGAD Member Countries a Panel Data Approach. *Cogent economics & finance*, *10*(1), 1-18. DOI: 10.1080/23322039.2022.2146630.