

THE LINKAGE BETWEEN FOREIGN CAPITAL INFLOWS AND DOMESTIC SAVING IN TANZANIA

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ABSTRACT

This study examines whether money from outside the country (such as remittances, foreign direct investment, and foreign aid) adds to or replaces domestic savings in Tanzania. The research uses a 33-year time series dataset (1991-2023) and employs the Autoregressive Distributed Lag (ARDL) estimation approach. Findings show that, in the long run, remittances, foreign direct investment, and foreign aid have a negative and statistically significant effect on savings in Tanzania. This means that when Tanzania gets foreign aid, remittances, and investments from outside people will save less. However, the results depict that, in the short run, foreign direct investment and remittance inflows have a positive and statistically significant effect on savings in Tanzania. Therefore, the government of Tanzania needs to develop policies that ensure that, in the long run, foreign aid, foreign direct investment and remittance inflows contribute to savings rather than replace them. Specifically, the government needs to strengthen domestic capital formation rather than relying on foreign capital. This could strengthen domestic savings and lead to economic growth in Tanzania.

Keywords: Foreign Capital Inflows, ARDL, Tanzania

JEL: H27; H62; O11; O16

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Introduction

Savings mobilization is a vital requirement for the achievement of sustainable economic growth and development in Sub-Saharan Africa (SSA) countries. At the macroeconomic level, savings are a prerequisite for direct and indirect investment that would lead to the realization of high and sustainable economic development that would trigger more savings and investment (Ang & Sen, 2011; Aryeetey & Udry, 2000; Sellami et al., 2020). Cerda et al. (2020) also reveal that domestic saving is critical to the financing of domestic investment in externally financially constrained economies. Likewise, the higher the domestic savings, the greater the flexibility to implement homegrown policies to confront development challenges. Additionally, having

a high saving rate can protect a country from sudden changes in international capital flows, making it less vulnerable to economic shocks (Aryeetey & Udry, 2000).

Unfortunately, like most other Sub-Saharan Africa (SSA) countries, inadequate domestic savings in Tanzania have been among the constraints to economic growth and development. Consequently, external capital inflows in the form of either foreign aid, foreign direct investment and/or remittances have been a significant source of funds for bridging the savings gap in the country (Hossain, 2014; Nwachukwu & Odigie, 2011). However, the underlying assumption founded in development economics is that foreign savings would positively impact economic development by bridging this savings gap (Basnet, 2013; Jean, 2015; Ndikumana & Blankson, 2015; Drabo, 2021). As maintained, foreign capital inflows provide extra foreign exchange to supplement domestic savings and fill the emerging savings gap (Ndikumana & Blankson, 2015). In so doing, foreign capital is indispensable in SSA countries that are mostly starved of domestic savings to finance domestic investment and attain sustainable economic development that would short-circuit the vicious cycle of poverty (Aghevi & Boughton, 1990).

Nevertheless, there needs to be more concern over inadequate access to foreign financial resources for development; more specifically, to meet financial requirements to achieve Tanzania's Sustainable Development Goals (SDGs) and development plans. The global financial and economic crisis of 2008-2009, the COVID-19 pandemic, and the Russia-Ukraine crisis have demonstrated the need for the SSA countries to look inwardly to finance sustained economic growth. Likewise, heavy reliance on external resources other than broad-based domestic finance can be a disincentive to develop institutional capacity, improve accountability among citizens, and ultimately promote prosperity (Bhushan & Samy, 2020). According to Bhushan et al. (2013), countries that rely heavily on donors might respond more to their priorities than native ones.

The literature presents two main theoretical viewpoints regarding the linkage between foreign capital inflows and domestic savings. First, some scholars argue that external capital inflows supplement domestic savings, leading to increased economic growth (Chenery & Strout, 1966). Second, it is stressed that external capital inflows act as a substitute for the domestic savings of the recipient countries (Griffin & Enos, 1970). Empirical evidence consistently shows no consensus on the exact impact of external capital inflows on domestic savings as some studies have established and argued for the existence of a negative impact of external capital inflows on domestic savings (Balde, 2011; Serieux, 2011). On the other hand, other scholars have established a positive impact of foreign savings on domestic savings in less developed countries (Basnet, 2013; Hossain, 2014; Keino & Kariuki, 2016; Akter, 2018). This means that external capital inflows help to boost domestic savings by providing extra financial resources to fill saving gaps in developing countries (Anthony-Orji et al., 2021; Emako et al., 2023; Khan, 2024). The impact of external capital inflow on domestic savings is thus controversial. The open question is whether external capital inflow effectively supports economic development by promoting domestic saving in SSA countries. Therefore, the study aims to address the gaps in the existing literature regarding the relationship between external capital inflows and savings in Tanzania. Specifically, the study aims to determine whether external capital inflows complement or substitute domestic savings in Tanzania. It focuses on Foreign Direct Investment (FDI), Official Development Assistance (ODA), and remittance inflows as proxies for external capital inflows. It is imperative to examine this issue since it will help policymakers determine the differential impacts of external capital inflow on domestic savings and, consequently, put in place measures to enhance domestic resource mobilization in SSA.

The rest of the sections are structured as to include literature reviews in Section 2, while Section 3 describes the performance of external capital inflows and domestic savings in Tanzania. Section 4 provides data sources and methodology. Section 5 provides the findings, and Section 6 concludes and presents policy implications.

Literature Review

Theoretically, the effect of external capital inflows on domestic savings could be linked with the Harrod–Domar growth model and its extension of the two-gap model by [Channery & Strout \(1966\)](#). Specifically, the two-gap model promoted the external capital inflows to rise investment and boost growth in less developed countries. However, the essential of the Harrod-Domar growth model is that savings are the driver of economic growth. Accordingly, savings are induced by external capital. [Reisen \(1998\)](#) argues that external capital inflows add to the domestic savings of a recipient country.

This argument is supported by previous studies which found a positive impact of external capital inflows on the domestic savings of the recipient countries ([Gupta, 1987](#); [Gruben & McLeod, 1998](#); [Brown & Ahlburg, 1999](#)). The argument is that external capital inflows in terms of remittance increase domestic savings in the recipient country ([Gani, 2016](#); [Connell & Conway, 2000](#)). Studies have also reported that remittances positively impact domestic savings since they stimulate a household's desire to save ([Iheke & Aniocha, 2017](#); [Maruf & Muzib, 2017](#); [Nkoobe, 2019](#)).

However, the idea was challenged by some earlier scholars who confirmed the negative impact of external capital on savings ([Chenery & Eckstein, 1970](#); [Griffin & Enos, 1970](#); [Papanek, 1973](#)). Similarly, some studies have reported that foreign capital inflows in terms of remittances may reduce domestic savings if used widely for consumption rather than for funding physical and human capital investments ([Ahamada & Coulibaly, 2013](#)). Likewise, [Mallick \(2012\)](#) and [Tung \(2018\)](#) portrayed that remittance inflows result in a dependency syndrome situation, which lowers domestic savings. In addition, [Griffin & Enos \(1970\)](#) and [Griffin \(1971\)](#) claimed that foreign capital inflows in terms of foreign aid displace savings as a more significant share of it is used for consumption other than saving in most less developed countries.

As a result, there are two main strands in the literature. First, those who claim that a positive relationship exists between external capital inflows and domestic saving. The second perspective highlights the potential negative effect of external capital inflows on savings in recipient countries. For empirical studies, several studies investigated the effects of external capital inflows on domestic savings at both country-specific and cross-country levels. The results of these studies vary broadly across methods and countries and generate mixed results.

Several studies suggest a complementary effect of external capital inflows on gross savings. For example, [Salahuddin et al. \(2010\)](#) and [Kapingura et al. \(2015\)](#) indicated a positive effect of FDI on domestic saving in Bangladesh and the SADC region, respectively. Likewise, [Balde \(2011\)](#) and [Bett \(2013\)](#) showed that remittance positively influenced domestic savings in SSA and Kenya, respectively. Similarly, [Gani \(2016\)](#) showed a positive linkage between remittance inflows and private savings in Asian countries, while [Akter \(2018\)](#) depicted a positive effect of remittances on Bangladesh and the Philippine's gross savings. However, [Nyanzi et al. \(2022\)](#) showed that remittance inflows by 1% lead to about a 0.10% increase in savings in Caribbean and Latin American countries. Meanwhile, other scholars showed that foreign aid inflow had a positive effect on savings of the recipient country. These include [Elakkad & Hussein \(2021\)](#) and [Okore & Nwadiubu \(2022\)](#) in Egypt and Nigeria, respectively.

On the contrary, other studies found a negative effect of external capital inflows on internal savings. For example, [Taslim & Weliwita \(2000\)](#) found that foreign aid hurt domestic savings in Bangladesh. Likewise, [Serieux \(2009\)](#) and [Basnet \(2013\)](#) indicated that foreign aid hurt domestic savings in SSA. In Ethiopia, the negative effect of foreign aid on domestic savings was also observed by [Tolessa \(2001\)](#), [Girma \(2017\)](#), and [Bakele \(2020\)](#). Concerning the effect of FDI on domestic savings, [Ahmad et al. \(2002\)](#) indicated that FDI inflows hurt domestic savings in Pakistan. However, [Shaheen et al. \(2013\)](#) found that remittance inflow was negatively related to domestic savings in Pakistan. Moreover, [Keino & Kariuki \(2016\)](#) conducted a study to analyze the influence of remittances on domestic savings in Uganda. They found that remittance inflows significantly negatively impacted gross domestic savings.

Furthermore, some studies found positive and negative results depending on the forms of foreign capital inflows. For instance, [Hossain \(2014\)](#) showed that foreign aid and remittance flows negatively impacted domestic savings in 63 developing countries. In contrast, [Hossain \(2014\)](#) found that FDI had a significant positive impact on domestic savings in developing countries. Moreover, [Akter \(2018\)](#) provided a positive effect of remittances and a negative effect of foreign aid on savings for Bangladesh and the Philippines. However, foreign aid significantly negatively affected domestic savings in the long run. [Idrees et al. \(2020\)](#) and [Batool et al. \(2023\)](#) exposed that remittances and FDI had a positive influence, while foreign aid hurt Pakistan's savings. Another study by [Pal \(2024\)](#) showed that remittance positively determines domestic savings in Latin America, the Caribbean, and South Asia. The author also depicted that FDI negatively impacted domestic savings for the most developed countries but positively affected the least developed countries.

In Tanzania, only a few scholars have studied the impact of external capital inflows on saving and growth ([Likwelile et al., 1994](#); [Mjema, 1994](#); [Rotarou & Ueta, 2009](#)). More so, [Mjema \(1994\)](#) used OLS and 2SLS estimation approaches to examine how foreign aid impacted domestic savings over the 1961-1990 period. [Rotarou & Ueta \(2009\)](#) examined the association between ODA, FDI, and economic growth and exposed that ODA and FDI positively and significantly affected Tanzanian growth. However, these studies are outdated since the last study was conducted in 2009. This evidence could not be informative since there have been substantial changes in overseas capital movements and internal changes in the Tanzanian economy. Therefore, the current study examines the effect of external capital flows on Tanzanian domestic savings using data from 1991 to 2023. This warrants a fresh insight into their nexus.

Similarly, remittance inflows have been critical to the development agenda of several countries. However, their effect on the receivers is highly debated in the literature. Studies in Tanzania have mainly focused on the effect of ODA and FDI on saving. The current study includes three forms of external monetary flows: remittances, ODA, and FDI, to explore further the role of these types of foreign capital inflows on Tanzanian domestic savings.

Moreover, most of the previous scholars used the ordinary least squares (OLS) estimation technique, which cannot account for a multicollinearity between independent variables. In order to ensure more information for policy making in Tanzania, this paper necessitated using the autoregressive distributed lag (ARDL) technique, which offers a more comprehensive and detailed outcome than OLS, making it a preferred choice for analysts and readers ([Sulaiman et al., 2019](#)). Additionally, its efficiency and convenience make it a reliable tool for establishing short- and long-term data relationships. Also, the ARDL model addresses the issue of collinearity by allowing the lags of the variables in the model. Consequently,

economists widely recommend ARDL for its ability to minimize mistakes and random errors arising from non-stationary data series (Sulaiman et al., 2019).

Pattern of Foreign Capital Inflow and Domestic Savings in Tanzania

Figure 1 shows the pattern of external capital inflows and gross domestic savings in Tanzania from 1995 to 2022. During the study period, the rate of Tanzania's domestic savings consistently increased despite significant fluctuations over time (see Figure 1). Generally, Tanzanian gross domestic savings (% of GDP) was highest (34.3 %) in 2021. This increase could be attributed to the interest rate liberalization that commenced in the early 1990s. Moreover, it could be due to stable inflation and the highest and most stable economic growth experienced in Tanzania over the last decade.

Moreover, as shown in Figure 1, the foreign aid received by the country consistently decreased during the studied period, despite contributing the largest percentage of GDP in 1995. After that, the contributions dropped until the 2000s, when irregular patterns formed and continuous trends were realized. Over the recent years, foreign aid flowing to Tanzania has stayed within 6% of GDP, a lower contribution than in the late 1990s and early 2000s. This reflects the remarkable progress in Tanzania in the last twenty years, particularly since 1995. This may suggest that the country's macroeconomic policies implemented during this period are now yielding positive results, contributing significantly to national development (Rotarou & Ueta, 2009).

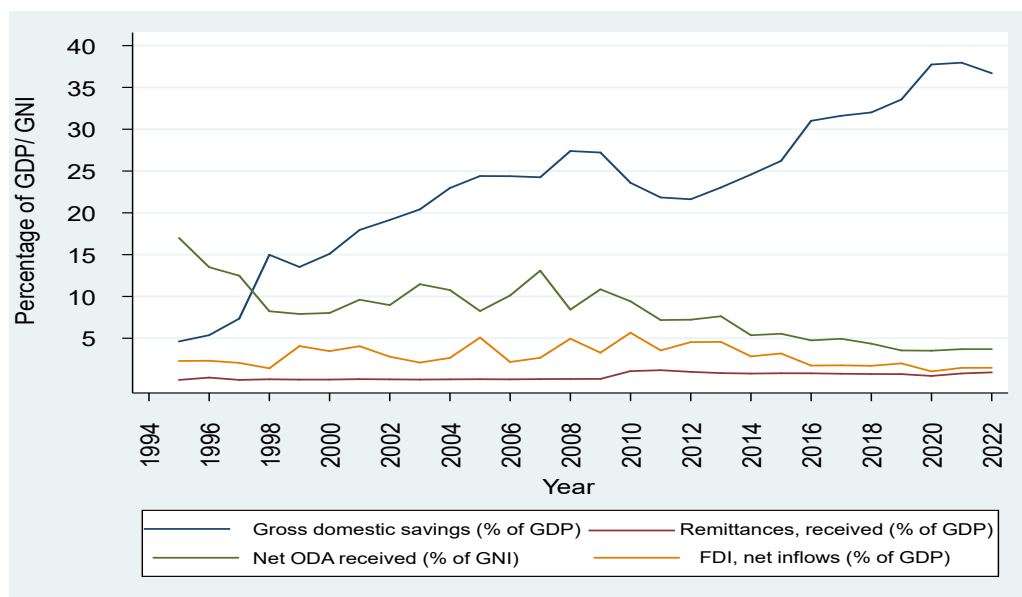


Figure 1: Trends of Gross Domestic Savings and External Capital Inflows in Tanzania, 1995-2022

Meanwhile, the data show an inverse association between foreign aid and domestic savings in Tanzania, as illustrated in Figure 1. This idea has also been supported by studies by Likwelile et al. (1994) and Mjema (1994). It is also evident that foreign direct investment (FDI) inflows into Tanzania have slightly increased over the past two decades. This was attributed mainly to financial reforms and privatization programmes adopted by the government of Tanzania in the early 1990s (Rotarou & Ueta, 2009). Moreover, this good performance in FDI inflows indicates investors' confidence in political and economic stability in the country.

In addition, even though remittances as an essential source of external development funds for most SSA countries have increased recently, the trends of remittance flows to Tanzania have remained insignificant (less than 1.5% of GDP) over the study period (see Figure 1). This is because a significant amount of capital may be transferred through unofficial channels, such as family and friends. As a result, these transactions may not be reflected in official data. Additionally, the country does not fully benefit from remittances because the number of skilled professionals in the diaspora is limited (Rotarou & Ueta, 2009).

Data and Research Methods

Data Sources

The paper utilized secondary annual data covering the period from 1991 to 2023. The information for the variables utilised was extracted from the database of World Development Indicators (WDI) and national sources, specifically the Bank of Tanzania (BOT) and the Tanzania National Bureau of Statistics (NBS). Table 1 displays the variables used in estimation, their definition and expected relationship with the explained variable.

Table 1: Variables Used in Analysis

Variables	Symbols	Definition/Measurements	Expected signs
Dependent variable			
Gross domestic saving	GDS	Gross savings, % GDP	NA
Independent variables			
Foreign aid	FAID	Official Development Assistance (% of GDP)	+/-
Foreign direct investment	FDI	Gross Fixed Capital Formation (% of GDP)	+/-
Remittances inflows	REM	Migrant remittances (% GDP)	+/-
Control variables			
Economic growth	PCY	Real GDP, annual % growth	+
Money supply	MS	Broad money supply (M2), (% GDP)	+
Credit to the private sector	DCPS	Domestic credit to private sector (% of GDP)	+
Deposit interest rate	DIR	Deposit interest rate	+/-

In order to capture the variables of the interest, including the disaggregated foreign capital inflows (FDI, foreign aid and remittance inflow), along with other important factors that influence domestic savings, we extended the typical lifecycle model (LCM) by Ando & Modigliani (1963). Theories and existing studies depict that foreign capital inflows can have either positive or negative impacts on savings.

Moreover, from the Keynesian perspective, among other things, savings are related to income levels. Likewise, the LCM theory shows a positive effect of economic growth on savings. This relationship is also established by several studies (Ndikumana & Verick, 2007; Athukorala & Sen, 2004; Hossain, 2014; Idrees et al., 2020).

Real interest rate is another critical factor determining savings, as suggested by the LCM. Accordingly, the rise in interest rate has both substitution and income effects on savings. Specifically, there is a substitution effect in the sense that when real interest rates increase, the cost of current consumption rises relative to future consumption, incentivizing individuals to save more. An income effect occurs when an increase in interest rates leads to reduced saving, as individuals can save less while still receiving the same amount in the next period. Therefore, the theoretical overall impact of an increase in interest rates on savings is uncertain

(Kapingura et al., 2015; Pal, 2024). The overall impact depends on whether the consumer is a borrower or a lender, as well as whether the interest rate in question is a lending rate or a deposit rate. If the positive substitution effect outweighs the negative income effect of an increase in the deposit interest rate, then savings will increase (Dash & Kumar, 2018).

Additionally, in the development of the financial sector, access to financial services is crucial for promoting savings. For example, access to bank services will expand saving and investment opportunities and contribute positively to a rise in domestic savings (Dash & Kumar, 2018). Therefore, a positive sign of the effect of financial development on saving is expected. The downside of greater financial penetration is the potential replacement of household financial and physical assets. Therefore, the overall effect of financial development on saving is unclear. Thus, two alternative measures of financial development, the ratio of credit to the private sector to GDP and the ratio of broad money supply (M2) to GDP are utilised.

Research Methods

Conceptual Framework

The framework for this study is derived from the two-gap model, which explains the difference between a country's resource supply and its absorption capacity. This difference leads to two gaps, namely the saving gap and the foreign exchange gap. The nation's ability to create capital and invest is limited by the more restrictive gap. The two-gap model occurs where a country's domestic resources are not enough to support its development needs, and thus requires external funding to fill the gaps. The assumption is that most Sub-Saharan African (SSA) nations either have little savings to support investment projections or are inhibited by the requirements of foreign exchange to finance capital goods (Awino & Kioko, 2022).

Specifically, the framework in this paper lies on the macroeconomic identity, that equates aggregate expenditure to aggregate output. Thus,

$$Y=C+I+NX \quad (1)$$

where Y stands for aggregate output, C is consumption, I is investment, and NX is net export representing exports (X) minus imports (M).

In order to ensure a balance in resource utilization, it is important that expenditure targets align well with the resources employed in the country. Thus, eq (1) will be read as:

$$Y+M=C+I+X \quad (2)$$

Subtracting C from both sides of eq (2) yields:

$$Y-C+M=I+X \quad (3)$$

Then,

$$Y-C=S \quad (4)$$

where; S represents the level of savings made by individuals within a country.

When we substitute eq (4) into eq (3), it leads to the eq (5).

$$S+M=I+X \quad (5)$$

Withdrawals are represented by (S+M), while injections are represented by (I+X).

Eq (5) is expressed in a more detailed form as:

$$M-X=I-S \quad (6)$$

In eq (6), the term (M-X) represents the gap in foreign exchange and (I-S) represents the savings gap.

Two distinct constraints contribute to the gaps, and reducing one of them does not eliminate the other. Eq (6) explains how the gap can arise; if a country does not have sufficient savings (S), it may not be able to invest as much (I) as it would like to. This creates a gap in savings. Similarly, if a country lacks the necessary foreign exchange (X), it may be unable to hire the labour (M) needed to utilize all of its resources, resulting in a foreign exchange gap. Although both gaps are unique, they can be filled through transfers in the international market. The approach proposes that the most effective way to address these gaps is through external capital inflows such as foreign aid, FDI, and remittance inflows (Awino & Kioko, 2022). The expression assumes that domestic investment can be funded by both domestic savings and foreign capital inflows. These flows cause imports to exceed exports, thereby increasing investment beyond domestic savings. Besides, an increase in inflows of foreign capital raises savings and subsequently economic growth.

However, Herzer and Morrissey (2013) and Tefera and Odhiambo (2024) claimed that the identification of the foreign capital inflow–domestic saving linkage could be puzzled by omitted variable bias. As a result, this study uses a multivariate analysis that incorporates the control variables that correctly depict the effect of foreign capital inflows on Tanzania's savings.

Model Specification and Estimation Strategy

Looking into whether foreign capital inflows supplement or substitute domestic savings, we estimated the following equation:

$$\ln GDS_t = \beta_0 + \beta_1 \ln FDI_t + \beta_2 \ln FAID_t + \beta_3 \ln REM_t + \beta_4 \ln GY_t + \beta_5 \ln DIR_t + \beta_5 \ln FD_t + \varepsilon_t \dots \quad (7)$$

where $\ln GDS_t$ is the logarithm of gross domestic savings; $\ln FDI_t$, $\ln FAID_t$, $\ln REM_t$ represent the logarithms of foreign direct investment (FDI), foreign aid, remittances, respectively. Other variables $\ln GY_t$, $\ln DIR_t$ and $\ln FD_t$ represent logarithms real GDP growth, deposit interest rate, and financial depth (money supply and credit to the private sector are used interchangeably), respectively. Moreover, t represents the time dimension and ε_t is the error term.

This paper adopts a powerful statistical tool called the Autoregressive Distributed Lag (ARDL) technique advanced by Pesaran and Shin (1999) to produce efficient and unbiased estimates of asymptotic long-run parameters, even if the variables are integrated differently or in the same order (Latif et al., 2015; Sam et al., 2019). The ARDL model offers the advantage of dealing with endogenous explanatory variables. It also simultaneously calculates the model's short-run and long-run estimates while correcting endogeneity and residual correlation by selecting optimal lag structures (Nkoro & Uko, 2016; Sam et al., 2019). The ARDL has proven relevant in this study since the data used were a small sample, alleviating the difficulties related to autocorrelations and omitted variable bias (Latif et al., 2015; Sam et al., 2019). The results of this paper can offer valuable insights for policymakers to make knowledgeable decisions.

Meanwhile, the specified ARDL for performing the bound test approach of eq (7) is as follows:

$$\begin{aligned}
 \ln GDS_t = & \beta_0 + \beta_1 \ln GDS_{t-1} + \beta_2 \ln FDI_{t-1} + \beta_3 \ln FAID_{t-1} + \beta_4 \ln REM_{t-1} \\
 & + \beta_5 \ln GY_{t-1} + \beta_6 \ln DIR_{t-1} + \beta_7 \ln FD_{t-1} + \sum_{i=1}^m \alpha_{1i} \Delta \ln GDS_{t-i} \\
 & + \sum_{i=1}^n \alpha_{2i} \Delta \ln FDI_{t-i} + \sum_{i=1}^o \alpha_{3i} \Delta \ln FAID_{t-i} + \sum_{i=1}^p \alpha_{4i} \Delta \ln REM_{t-i} \\
 & + \sum_{i=1}^q \alpha_{5i} \Delta \ln GY_{t-i} + \sum_{i=1}^r \alpha_{6i} \Delta \ln GY_{t-i} + \sum_{i=1}^s \alpha_{7i} \Delta \ln FD_{t-i} \\
 & + \theta ECT_{t-1} + \varepsilon_t \dots
 \end{aligned} \tag{8}$$

where Δ represent the first difference operator and the optimal lag length in the model are displayed by letters m, n, o, p, q, r and s. However, β and α represent the coefficients of long-run and short-run estimates, respectively. The symbol θ represents the coefficient of the error correction term (ECT) that is used to estimate the speed of adjustment to equilibrium (θ should be negative and between 0 and -1), and ε_t represents the residual term, which is supposed to be well-behaved (serially independent, homoscedastic and normally distributed).

Moreover, we utilized the Augmented Dickey-Fuller (ADF) unit root test to determine the presence of unit root in the series and hence help in understanding the level of stationarity among variables. It is always advised to evaluate the variables to guarantee if they are stationary on I (0) and I (1) and not otherwise before devoting them to the application of the ARDL method (Kripfganz & Schneider, 2023).

After the stationarity test, we used the ARDL method, which requires two steps to estimate the long-run effect (Pesaran et al., 2001). The first step is to analyze the existence of cointegration among the variables used in the estimation. So, we calculated the F-statistic, where the null hypothesis was that there is no cointegration and the alternative hypothesis stated that there is a cointegration in the estimated model. The second step is to estimate the short-run and long-run coefficients of the ARDL model, after discovering the existence of cointegration in the first step (Pesaran et al., 2001).

Moreover, to check for the suitability of the models, we applied several diagnostic tests for normality, serial correlation, heteroscedasticity, and stability. Specifically, the Ramsey Regression Specification Error Test (RESET) for functional form, the Breusch-Godfrey test for serial correlation and the Jarque-Bera test for normality are applied. Likewise, the study uses coefficients CUSUM and CUSUMSQ tests suggested by Brown et al. (1975) to assess the stability of the estimated coefficients.

Results and Discussion

Descriptive Analysis

In Table 2 the basic statistics related to the mean, maximum, minimum, standard deviation, skewness, kurtosis and Jarque-Bera tests are presented. The comparatively small values of standard deviation suggest they are not significantly detached from their mean values. Gross domestic saving has a minimum value of 13.5% of GDP and a maximum value of 38.03% of GDP, with the highest standard deviation (7.1). The values of other variables are as shown in Table 2.

Meanwhile, the normality tests show that saving, economic growth, money supply and credit to the private sector have negative skewness, whereas other variables have positive skewness. However, only two variables (Foreign aid and real deposit rate) have a kurtosis value which is greater than 3. This indicates that the distribution of these variables has heavier tails than that of a normal distribution due to the presence of outliers. In terms of the normality test, the null hypothesis for the Jarque–Bera tests is not rejected for most variables, thus demonstrate that all other variables except foreign aid and real deposit rate seemed to have been normally distributed.

Table 2: Results for Descriptive Analysis

Variables	N	Mean	Std. Dev	Min	Max	Skew	Kurt	JB-Test	
								Chi 2	pro>Chi2
Domestic saving	33	27.13	7.06	13.50	38.03	-0.16	2.13	1.16	0.56
Foreign direct investment	33	2.50	1.46	0.00	5.66	0.40	2.40	1.38	0.50
Foreign aid	33	8.47	3.99	3.51	20.54	1.01	4.04	7.10	0.03
Remittances inflows	33	0.39	0.38	0.01	1.18	0.60	1.73	4.16	0.13
Economic growth	33	5.10	1.94	0.58	7.67	-0.77	2.66	3.41	0.18
Deposit rate	33	10.47	4.51	5.32	24.63	1.62	5.14	20.64	0.00
Money supply	33	19.24	3.74	12.69	24.65	-0.37	1.81	2.72	0.26
Credit to private sector	33	9.24	4.25	2.13	16.28	-0.28	1.71	2.70	0.26

Furthermore, Table 3 provides the correlation matrix of the estimation model variables. It indicates a positive association between savings and remittance inflows, GDP per capita growth, and credit to the private sector. However, it shows a negative association with foreign aid, inflation, and deposit interest rates. As noted in Table 3, all the variables have been linearized using natural logarithms for easy interpretation of elasticities.

Table 3: Correlation Analysis

	LogGDS	logFDI	logFAID	logREM	logGY	logDIR	logDCPS	logM2
logGDS	1							
logFDI	-0.259	1						
logFAID	-0.319	-0.362	1					
logREM	0.211	0.213	-0.668	1				
Logy	-0.271	0.547	-0.446	0.314	1			
logDIR	0.369	-0.456	0.351	-0.129	-0.625	1		
logDCPS	0.421	-0.005	-0.498	0.737	0.168	0.024	1	
logM2	0.331	0.391	-0.472	0.695	0.440	-0.136	0.853	1

Notes: lnGDS is a log of domestic savings, lnFAID is a log of foreign aid, lnREM denotes log of remittances inflow, lnDCPS is a log of domestic credit to the private sector, lnGY represents the log of annual GDP growth, lnDIR is a log of real deposit interest rate, lnFDI represents the log of foreign direct investment, and lnM2 is a log of money supply.

Stationarity Test Results

The Autoregressive Distributed Lag (ARDL) method does not mandate to test for stationarity of the data series. However, we tested the stationarity of variables for the sake

of ascertaining whether the data series were $I(0)$, $I(1)$ or both. The pre-testing of the order of integration $I(d)$ for each variable was undertaken using the Augmented Dickey-Fuller (ADF) test. The results are as presented in Table 4.

Table 4: Results of Augmented Dickey-Fuller Test

Variables	Level		1st difference		Conclusion
	Constant, no trend	Constant, trend	Constant, no trend	Constant, trend	
LnGDS	-1.986	-2.391	-3.893***	-3.968**	$I(1)$
LnREM	-0.911	-2.170	-5.613***	-5.496***	$I(1)$
LnDIR	-2.532	-2.420	-4.270***	-4.325***	$I(1)$
LnFAID	-1.373	-2.272	-5.508 ***	-5.417***	$I(1)$
LnFDI	-4.299***				$I(0)$
LnGY	-4.046 ***				$I(0)$
LnM2	-1.340	-2.240	-3.250**	-3.132*	$I(1)$
LnDCPS	-1.001	-2.336	-3.262**	-3.376*	$I(1)$

The null hypothesis of the ADF test is that the time series is non-stationary or contains a unit root. The test rejects the null hypothesis based on Mackinnon critical values at 10%, 5%, and 1% levels.

In Table 4, the ADF results show that the variables LnFDI and LnGY are stationary in level, that is, $I(0)$. Other variables became stationary at the first difference, that is ($I(1)$). Meanwhile, ARDL modelling is required to determine the optimal lag length for the cointegration equation based on the assumptions of no serial correlation among residuals. In most cases, the ARDL automatically selects the maximum lag order using the Akaike information criterion (AIC) or Bayesian (Schwarz) information criterion (BIC). However, [Pesaran et al. \(2001\)](#) recommend SBC to be the best criterion since it is more consistent and parsimonious. On the contrary, [Al-Jammal \(2010\)](#) proposes the AIC to be used since it tends to produce robust results. Thus, in this study, we opted to use AIC.

Cointegration Test Results

After confirming the variables were stationary, a bounds test for cointegration was conducted to assess whether they had a significant long-term relationship. This test is crucial in evaluating whether a model has meaningful long-run relationships. The F-statistic (Wald test) was used. The results in Table 5, display that the F-statistics (4.45, 8.72) for both models are larger than critical values at 1% levels ($p < 0.01$). As a result, we conclude that a long-term relationship exists between the variables in the models being analyzed.

Table 5: Pesaran/Shin/Smith (2001) ARDL Bounds Test Results

	F-Statistic	10%		5%		1%	
		$I(0)$	$I(1)$	$I(0)$	$I(1)$	$I(0)$	$I(1)$
Model 1	4.455	2.12	3.23	2.45	3.61	3.61	4.43
Model 2	8.718	2.12	3.23	2.45	3.61	3.61	4.43

H0: no levels relationship. We accept if $F < \text{critical value for } I(0) \text{ regressors}$ and reject if $F > \text{critical value for } I(1) \text{ regressors}$.

Results of the Autoregressive Distributed Lag (ARDL) Analysis

Based on the cointegration results, we proceeded to estimate the long-run model, which enabled us to gain a deeper understanding of the relationships among the variables. The findings are presented in Table 6. The error correction terms (ECTs) exhibit a negative value and are statistically significant at the 1% level. Moreover, in absolute terms, the coefficients for ECTs are all less than one. This observation suggests that over the long term, the variables will gradually align with one another, indicating a sustained relationship among them within each specified model.

In contrast to the findings by [Karamuriro et al. \(2020\)](#) and [Nagawa et al. \(2020\)](#), this study indicates a statistically significant negative effect of FDI on domestic savings. The variable has an elasticity coefficient of 0.12, signifying that a 1% increase in FDI is related to a 0.12% decline in Tanzanian domestic savings. These results align with that of [Ahmad et al. \(2002\)](#). This may be due to the fact that FDI inflow providing more resources, which lessens pressure on development initiatives to achieve the highest feasible rate of savings ([Angmortey et al., 2014](#)). Moreover, the results could display that FDI operating in an intensively competitive sector may create disincentive effects for domestic investment and cause capital stock and domestic saving to decrease. Also, it could be due to different treatments provided to foreign investors that do not allow domestic firms to compete favorably with their counterparts.

Table 6: The Long-Run Estimated Result for ARDL Analysis

	(1)	(2)
Variables	ARDL(2,1,2,2,2,2,1)	ARDL(2,2,0,2,2,2,2)
ECT	-0.971***	-0.891***
	(0.187)	(0.128)
Foreign direct investment	-0.262***	-0.223***
	(0.068)	(0.057)
Foreign aid	-0.438***	-0.184**
	(0.095)	(0.071)
Remittances	-0.109**	-0.115***
	(0.043)	(0.036)
Real GDP growth	-0.108	-0.115
	(0.110)	(0.083)
Deposit interest rate	-0.128	-0.398**
	(0.165)	(0.130)
Broad money supply	0.890***	
	(0.221)	
Credit to the private sector		0.457***
		(0.081)
Observations	31	31
R-squared	0.895	0.947

Standard errors are in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Note: All variables are in logarithms form.

Concerning the effect of foreign aid on Tanzanian domestic savings, the estimated results demonstrate that foreign aid negatively influences gross domestic savings since the coefficient is negative and statistically significant at a 1% level. This infers that every dollar of aid coming into the country has depressed domestic savings by about 0.44%. The findings of the study align with those reported by [Serieux \(2011\)](#), [Basnet \(2013\)](#) and [Nafuna \(2022\)](#). This indicates that foreign aid acts as a substitute for domestic savings in Tanzania since it reduces the country's domestic resource mobilization ability. Thus, it justifies that the government tends to relax, putting more effort into saving and encouraging more consumption as it receives foreign resources, impeding public and private savings. However, this result contradicts that of [Eregba and Irugbe \(2009\)](#), who reported that foreign aid contributes to the growth of Nigerian domestic savings.

Meanwhile, the coefficient of remittance inflow is negative and statistically significant at the 5% level. This indicates that a 1% increase in remittances is related to a decline in savings by 0.12%. This is consistent with a study by Hossain (2014) but contrary to the studies by [Haque et al. \(2021\)](#) and [Nnyanzi et al. \(2022\)](#) who found a positive impact of remittances on saving in Bangladesh and Latin America and the Caribbean countries, respectively. This negative sign indicates that in Tanzania, remittances are mostly utilized for consumption rather than funding human and physical capital investments that will generate more savings for the economy ([Ahamada & Coulibaly, 2013](#)). Likewise, it implies that remittance inflows to Tanzania create a moral hazard problem, where households tend to reduce labour supply, developing a conspicuous consumption pattern, and they may tend to develop a habit of reducing savings ([Mallick, 2012](#); [Tung, 2018](#)).

For the other variables, the findings show that economic growth corresponded to a decrease in domestic saving. However, the coefficient is statistically insignificant. Additionally, a 1% increase in deposit interest rate is significantly associated with a 0.4% decrease in domestic savings. This result is also similar to those of [Munir et al. \(2011\)](#) in Pakistan and [Ogwumike and Ofoegbu \(2012\)](#) in Nigeria. The studies indicated that interest rates have a significant negative impact on savings. That is the deposit interest rate discourages savings mobilization which in turn affects the capital formation and investment in the economy.

Moreover, the analysis reveals a positive and statistically significant impact of the financial sector deepening on savings in Tanzania. Specifically, a 1% increase in private sector credit can result in a 0.46% rise in domestic savings. Similarly, a 1% increase in the money supply leads to a 0.89% rise in domestic savings. Hence, it suggests that financial deepening has positively contributed to Tanzania's savings accumulation. This aligns with the findings that were obtained by [Kapingura et al. \(2015\)](#). This suggests that the government of Tanzania needs to pursue policies that strengthen the financial system and expand community access to financial services.

Furthermore, Table 7 provides results for short-run dynamics of the impact of capital inflows and other covariates on Tanzanian domestic savings. Contrary to long-run estimates, the short-run estimates for model 1 indicate that foreign direct investment and remittance inflows exert a positive and significant influence on Tanzanian domestic savings. Likewise, the deposit rate has a positive significant impact on savings with an elasticity of 0.38, while the money supply negatively affect savings. In ARDL model 2, like to [Munir \(2023\)](#), the results show a negative effect of FDI and credit to the private sector on domestic savings. However, the real deposit rate positively and significantly impacts gross domestic savings.

Table 7: Results of Short-Run Estimate for ARDL Analysis

	(1)	(2)
Variables	ARDL(2,1,2,2,2,2,1)	ARDL(2,2,0,2,2,2,2)
Gross domestic saving = L1,	0.735*** (0.179)	0.395*** (0.123)
Foreign direct investment= D,	0.193** (0.070)	0.076 (0.046)
Foreign direct investment = L1,		-0.044* (0.020)
Foreign aid= D,	0.027 (0.160)	
Foreign aid = L1,	-0.244 (0.162)	
Remittances= D,	0.061 (0.053)	0.019 (0.039)
Remittances = L1,	0.127** (0.045)	0.064 (0.036)
Real GDP growth = D,	0.148 (0.105)	0.095 (0.071)
Real GDP growth= L1,	0.052 (0.057)	0.074 (0.053)
Deposit interest rate = D,	-0.159 (0.136)	0.085 (0.119)
Deposit interest rate = L1,	0.385** (0.161)	0.211* (0.104)
Broad money supply = D,	-1.410** (0.476)	
Credit to the private sector = D,		-0.780*** (0.138)
Credit to the private sector = L1,		-0.566** (0.198)
Constant	1.916** (0.730)	3.370*** (0.469)
Observations	31	31
R-squared	0.895	0.947

Standard errors are in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Note: All variables are in logarithms form.

Diagnostic Check

It is helpful to conduct post-estimation tests to assess how well a model performs and if the specifications are met. In time-series analysis, there is often a risk of the model specified to exhibit issues of heteroscedasticity, serial correlation, and non-normality. The results from an autoregressive distributed lag (ARDL) method satisfy the common diagnostic tests, as shown in Table 8. The normality of the data was evaluated using the Jarque-Bera test. The results indicated that the residual variables follow a normal distribution, as their

test statistic exceeded the value of 2. In addition, the Breusch-Godfrey (BG) test for a serial correlation displays that the probability value of F-statistics exceeds the 5% significance level. This means that there is no serial correlation exists in the specified models. However, the null hypothesis for White's homoscedasticity test could not be rejected, that is the data series is homoscedastic.

Moreover, the Ramsey RESET test is employed to evaluate the accuracy of the specified functional form. The results for model 2 displayed in Table 8 reveal that the probability value of the F-statistic is not significant at 5%, so we could conclude the specified model. Likewise, we failed to reject the null hypothesis at a 5% significant level for the LM test for ARCH, and we conclude that there is no ARCH effect in the estimated models. Moreover, results from the stability test displayed in Figures A1 and A2 in the appendix show the relative stability of the estimated ARDL models at a 5% significance level.

Table 8: ARDL Post-Estimation Test Results

Test	Model 1		Model 2	
	Chi 2	Prob	Chi 2	Prob
Durbin-Watson test (19, 31)	2.13		2.28	
Breusch-Godfrey (BG) test for autocorrelation (L=2)	1.96	0.38	3.37	0.16
White's test for Ho: homoscedasticity	31.00	0.41	31.00	0.42
LM test for autoregressive conditional heteroscedasticity	2.369	0.12	2.011	0.16
Durbin's alternative test for autocorrelation	0.10	0.75	0.44	0.51
Ramsey RESET test	20.98	0.00	2.70	0.11

Conclusion

This study explores how foreign capital inflows have influenced domestic savings in Tanzania from 1991 to 2023. Results from an autoregressive distributed lag (ARDL) model indicated that foreign capital inflows, including foreign aid, foreign direct investment, and remittances, tend to decrease domestic savings over the long run. This highlights that, over time, foreign capital inflows can decrease domestic savings in Tanzania. One important takeaway is that Tanzania should be careful about relying too much on foreign capital, as it can decrease domestic savings. The government should thus figure out how aid affects productivity and efficiency and work on ways to translate savings into investment. However, remittances and foreign direct investment inflows positively affect domestic savings in the short term.

Equally important, the policy should be structured to ensure that capital inflows from outside Tanzania effectively enhance domestic savings. Among the suggestions is to design an effective and efficient mechanism for regulating and managing the allocation of the foreign capital that flows into the country. It is also a good idea for the Tanzanian government to make remittance channels more accessible and affordable to encourage the use of formal channels for receiving remittances. This will act as an incentive for the households to save and invest. However, a future study could examine the impact of foreign capital on the consumption or expenditure of developing countries. Furthermore, there is a pressing need for more empirical analysis to vividly illustrate the profound effect of capital inflows on several indicators of economic development by utilizing microdata. Though the lack of reliable data restricted the extent of the analysis (1991-2023), data availability beyond 1991 could expand the sample size and possibly provide more meaningful results.

Declaration

I would like to declare that this paper has not been sponsored by any organization, and I have no conflicts of interest to disclose. I can provide data and research materials upon request. I would also like to extend my sincere thanks to the editor and reviewers for their valuable time in reviewing this paper.

Conflict of Interest

The author declares that there is no significant competing financial, professional, or personal interests that might have affected the performance.

Availability of Data and Materials

Data and material searches can be provided upon request, although all materials used are publicly accessible from the official websites of the Bank of Tanzania and the World Bank. Data sharing is not applicable to this article as no new data were created or analyzed in this study.

Authors' Contribution

Cornel Joseph conceptualized the study, developed methodology, and wrote, reviewed, and edited the manuscript; Cornel Joseph also composed the original draft.

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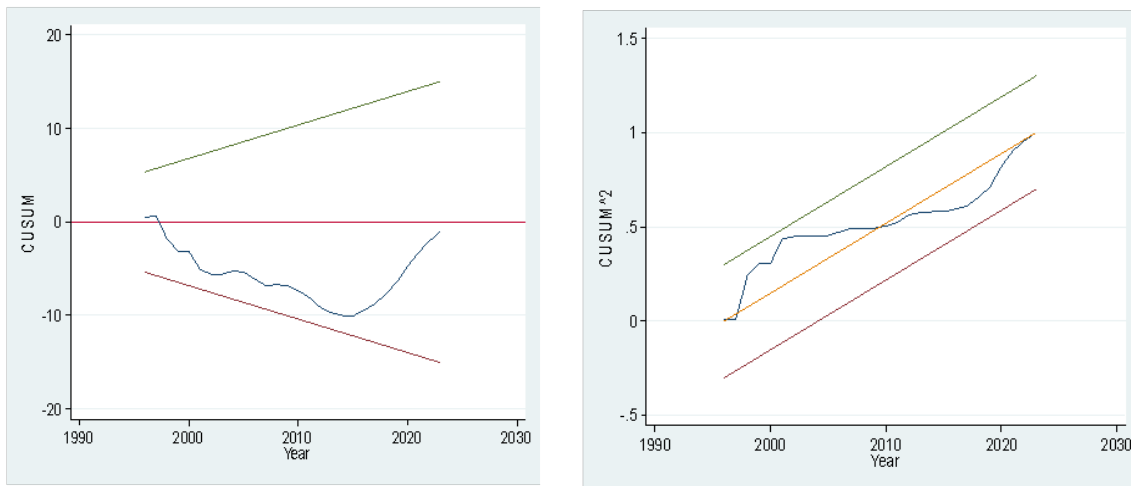
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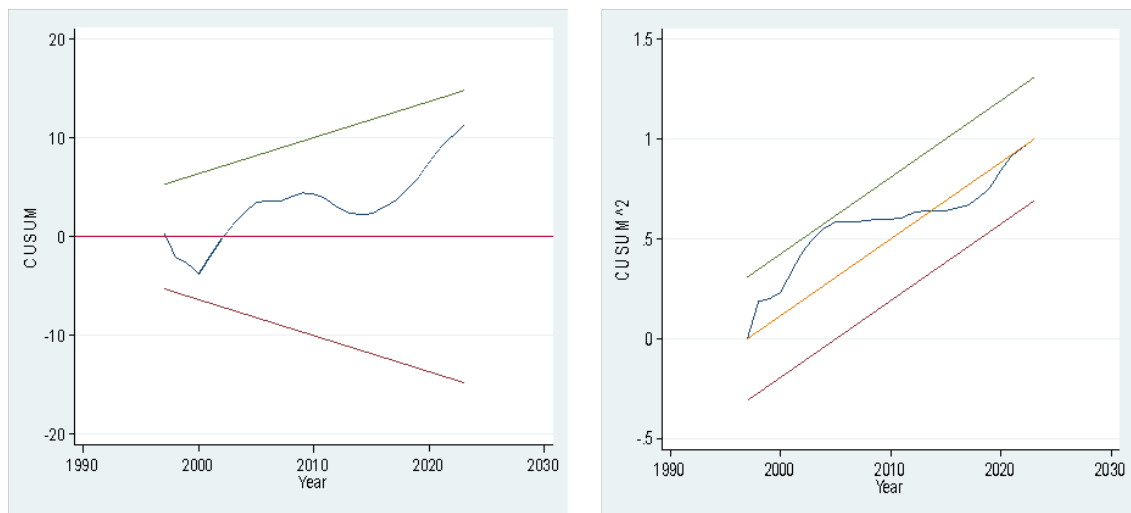
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Appendix



Note: The straight line shows the critical bounds at 5% of the significance level

Figure A1: Plot of CUSUM and CUSUMSQ (Stability Test) Plot of Cumulative Sum of Recursive Residuals in Model 1



Note: The straight line shows the critical bounds at 5% of the significance level

Figure A2: Plot of CUSUM and CUSUMSQ (Stability Test) Plot of Cumulative Sum of Recursive Residuals in Model 2