Pathways to Prosperity: Analysing the Dilemma of Choosing between Official Development Assistance and Foreign Direct Investment in Tanzania

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Abstract
This paper explores the complex-decision making process faced by policymakers in Tanzania when selecting between Official Development Assistance (ODA) and Foreign Direct Investment (FDI) for driving economic prosperity. It employs the Vector Error Correction Model (VECM) to capture dynamic interrelationship among long-run co-integrated variables. Analysing yearly time series data from 1980 to 2021, the study reveals that variables used in the analysis exhibit a co-integrating relationship and that they have a long-term equilibrium relationship. Official Development Assistance per capita lagged to one period is significantly and negatively related to the growth rate of Gross Domestic Product (GDP). Furthermore, ODA per capita lagged to two periods is significantly and negatively related to growth rate of GDP, and ODA lagged to three periods is negatively related to the growth rate of GDP. Additionally, FDI per capita lagged to one period is negatively related to GDP. The paper highlights the complexity of the decision-making process and recommends that policymakers assess financing strategies, explore factors hindering positive contributions of FDI and ODA and prioritize domestic investment to foster self-reliance and reduce dependence on external funding sources.

Keywords: *Foreign Direct Investment, Official Development Assistance, Vector Error Correction Model, Economic Growth*

1.0 BACKGROUND TO THE STUDY

Similar to other developing nations, Tanzania is confronted with the dilemma of selecting between Official Development Assistance (ODA) and Foreign Direct Investment (FDI) as pathways to its economic prosperity. While ODA provides support to technical assistance from donor nations, FDI involves the infusion of capital, technology and managerial expertise from foreign investors. As regards to the Official Development Assistance, the Rio Earth Summit held in 1992

marked a significant turning point in the global approach to development. This landmark event concluded with the formulation of Agenda 21 which is said to be a comprehensive blueprint which aimed at addressing the issue of sustainable development on a global scale. The summary of the agenda was such that all nations will have to embark on a new development paradigm that safeguards nature, the environment and resources for the benefit of present and future generations. However, it was recognized that all these transformative efforts which are said to have immense importance for the future well-being of humanity would require a substantial financial resource for their successful implementation. More so, for the case of Tanzania, it was found that economic challenges which confront the country would impact on the allocation of resources for such endeavour.

The overall benefits of FDI for developing countries are well documented. Given the appropriate host country policies and economic conditions and basic level of development, a number of studies show that foreign direct investment triggers technology spill-over, assists in the formation of human capita, enhances international trade, creates a more competitive business environment and hence economic growth and development (Alfaro and Chauvin, 2020). High economic growth which results from foreign direct investment is a crucial tool for poverty alleviation in developing countries particularly in Tanzania (Mwita 2022). More so, Kurtishi-Kastrati (2018) and Selma (2013) argue that foreign direct investment has another potential benefit beyond the economic benefit as it can contribute to improve environmental conditions of the host country mostly by transferring 'cleaner' technologies and leading to more socially responsible corporate policies.

On the other hand, the official development assistance which consists of disbursement of loans which are basically made on concessional terms and grants by some official agencies of the members of the Development Assistance Committee (DAC), multilateral institutions and by non-Development Assistance Committee members is made officially to improve the lives of the people by reducing the level of poverty (Nishio and Tata, 2021). Tanzania is one of the highest aids and official development assistance recipients amongst countries in sub-Saharan Africa. The bilateral and multilateral donors have been increasing aid amounts or proceeding with aid relief in Tanzania. This has been attributed by the country's stable macroeconomic growth and a transition to a market economy. The country has been experiencing an average economic growth rate of around 6-7% for more than a decade now and the rate of inflation has been declining since 2016 with some short-term upward trending due to increase in

domestic food prices and the lagged impact of the sharp depreciation of the Tanzanian Shilling. However, the Shilling has stabilized since the second half of 2015 with the real exchange rate now close to equilibrium level (World Bank, 2016). In addition to the aforementioned reasons, the current account has been improving and stands at around 8.7% of the GDP.

Turning to the gist of this paper, both foreign direct investment and official development assistance in Tanzania are said to be important for the economic prosperity of the country. However, policy and decision makers are still faced with the dilemma of choosing between ODA and FDI in terms of what exactly the country wants to achieve (Lee, 2015). To be more specific, the country could be facing this dilemma while choosing the financing strategy: prioritizing economic growth and infrastructure development or spearheading social welfare including poverty reduction and human development. Under these two scenarios, Foreign Direct Investment has been found to be more associated with economic growth and infrastructure development (Zardoub and Sboiu, 2023), while social welfare including poverty reduction and human development is often associated with official development assistance and aid (Mahembe and Odhiambo, 2019). This would mean that in general, ODA and aid reduces poverty irrespective of the type of poverty measures used. A democratically led government has the likelihood of enhancing the effectiveness of aid in aid targeted at pro-poor public expenditures such as agriculture, education, health and other social services which are effective sectors for reducing poverty.

The country might also be faced with the problem of risk and dependence when it wants to choose a financing strategy for its economy. The country risk in FDI is related to breach of contract, deprivation of property rights, damage to assets or cessation of activities (Rodríguez, 2016). On the other hand, ODA is good in providing stability but may lead to long-term dependency (UNDP, 2018). A high degree of dependence on aid accentuates macroeconomic vulnerability and may be a reason in the overall sustainability of the so-called Millennium Development Goals (MDGs). A dependence on aid is like putting all eggs in one basket and exposes the country to sharp fluctuations at any time. In some cases, a country may not be especially dependent on aid, but certain sectors within the economy, such as health, may rely heavily on aid to function and hence the economy becomes vulnerable.

Financial sovereignty and control is yet another controversial dilemma encountered by policy makers when they choose between these two financing windows. Foreign direct investment typically involves foreign companies

investing in the domestic economy. The dilemma is therefore on whether or not to cede some control to these foreign investors in exchange for their resources and expertise while safeguarding national sovereignty. Moreover, some host country authorities perceive an increasing dependency on internationally operating enterprises as representing a loss of political sovereignty (Britanica, 2023). In this regard, experts consider foreign dependency as an extension of colonial trade patterns where stronger countries exercise significant control over the weaker countries economically and politically. When this happens, weaker countries might experience underdevelopment through adoption of policies tailored to the interests of a stronger country and hence inhibit the weaker country's domestic growth, speed up environmental destruction and creation of temporary growth which precludes sustainable development and economic independence.

The choice of financing the economy through the ODA and FDI is a complex and controversial phenomenon which requires policy makers to carefully navigate and strike a balance in order to foster sustainable economic growth and development in the country. Tanzania, just like other countries in sub-Saharan Africa, faces challenges and opportunities in attracting financing sources for its development agenda. More so, the dilemma of choosing financing sources for the country revolves around short-term development goals with long-term sustainability, managing risks, promoting economic diversification and ensuring that development is inclusive, socially responsible and aligns with national interests. Ultimately, finding a balanced approach that harnesses the strength of both financing sources while mitigating her respective challenges is crucial for the country's development journey and hence the intention of this paper.

2.0 EMPIRICAL LITERATURE REVIEW

In today's globalized economy, developing countries, emerging economies and countries in transition increasingly consider FDI and ODA as sources of economic development and modernization, income growth and employment. The significance of FDI and ODA in fostering sustainable economic development has attracted considerable attention from researchers, policy makers and international organizations. The empirical literature review endeavours to delve into the intricate relationship between FDI and ODA and their impact on economic growth. In this regard, a study by Sokang (2018) which examined the relationship between FDI and economic growth in Cambodia's economy found a favourable positive effect on economic growth. Furthermore, a study by Akinlo (2016) which applied a Vector Error Correction Model (VECM) in trying to capture the

impact of inward FDI in Nigeria between 1981 and 2014 found a significant positive relationship between FDI and Nigeria's GDP.

Joshua et al. (2020a) conducted a study on the influence of external factors on economic expansion in South Africa and confirmed that FDI inflows promote economic expansion. Consequently, the study recommended that there was a need for authorities to adopt policies that promote business environment (both political and economic) through stable exchange rates and other macroeconomic variables to boost the confidence of existing foreign firms and to woo new ones. In addition, Tsaurai (2018) found that Foreign Direct Investment promotes stock market improvements through its influence on human capital which induces economic expansion. More so, Joshua (2019) and Gungor and Katircioglu (2010) investigated the FDI-led growth nexus and validated the existence of the FDI-led growth hypothesis in Nigeria and Turkey.

On the other hand, Minoiu and Reddy (2010) studied the impact of the official development assistance on the growth of developing economies. In doing so, they applied an approach whereby they separated aid meant for development and aid specifically targeted at development. Their findings show that the developmental type of aid has a significant influence on the enhancement of long-term economic growth in developing countries. They further postulated that donors prioritize their donations to enhance development. Another study conducted by Das and Sethi (2019) evaluated the impact of external direct investment, official development assistance and remittance on the economic growth of Sri-Lanka and India. They applied a time series analysis for both countries for the period covering 1980-2016. Their findings revealed that foreign direct investment combined with remittances stimulated economic growth in India. However, for Sri-Lanka, economic growth derived from the combination of foreign aid and remittance inflow to the country.

Joshua et al. (2020b) revealed that external debt is a key determinant of global economic growth as it exhibits a positive and significant impact on economic growth. Similarly, Javaid (2017) examined the effect of external capital flows (i.e. remittances, FDI and ODA) on Pakistan's Gross Domestic Product over the period of 1973-2014. The results revealed that FDI and ODA had overall significant and positive impact on Pakistan's Gross Domestic Product in both short-term and long-term scales. However, it was found that remittances played no significant role in explaining the variations in Pakistan's economic growth, but rather, it had more to do with consumption variation and hence increased wellbeing rather than improving overall economic growth.

3.0 METHODOLOGY

In order to effectively analyse the dilemma of choosing between the official development assistance and foreign direct investment in Tanzania, the following Vector Autoregressive Model of order p was specified.

$$gdpg_{t,p} = c + \sum_{i=1}^{p} \pi_i gdpg_{t-i} + \sum_{i=1}^{p} \pi_i oda\_percap_{t-i} + \sum_{i=1}^{p} \pi_i fdi\_percap_{t-i} + \sum_{i=1}^{p} \pi_i open_{t-i} + \sum_{i=1}^{p} \pi_i open_{t-i} + \sum_{i=1}^{p} \pi_i infl_{t-i} + \sum_{i=1}^{p} \pi_i lbpt_{t-i} + CE_t + \varepsilon_t$$

Where$gdpg_{t,p}$ is growth rate of gross domestic product, oda_percap_t is official development assistance per capita, fdi_percap_t is foreign direct investment per capita, $open_t$ is an index for trade openness, $infl_t$ is rate of inflation, $lbpt_t$ is labor force participation rate into the economy,π_i are $(n * n)$ coefficient matrices and ε_t is $(n * 1)$ unobservable zero mean white noise vector process (serially uncorrelated or independent) and CE_t is the coefficient of the error correction term in the long-run relationship equation. The VAR model offers a valuable tool for exploring complex interactions in time series data making predictions and gaining insights into the underlying dynamics while selecting an appropriate lag order to ensure reliability of results (Lütkepohl, 2013).

Table 1 below provides a concise overview of the key variables used in this analysis. Each variable is defined and described to offer a clear understanding of their roles in the context of this paper.

Table 3: Variable Definition

Variable Name	Variable Description	Role of Variable	Variable Measurement
$gdpg_t$	Growth rate of Gross Domestic Product	Dependent Variable	Continuous
oda_percap_t	Official Development Assistance Per-capita	Independent variable	Continuous
fdi_percap_t	Foreign Direct Investment Per-capita	Independent variable	Continuous
$open_t$	Trade openness Index calculated as the ratio of the country's trade to Gross Domestic Product	Independent variable	Continuous
$inlf_t$	Inflation Rate	Independent Variable	Continuous
$lbpt_t$	Labour force participation rate	Independent Variable	Continuous

4.0 PRESENTATION OF RESULTS AND DISCUSSION

4.1 Descriptive Analysis

Table 2 presents a summary of descriptive statistics for the variables used in the analysis covering the period from 1980 to 2021 with a total of 42 observations except for one variable, the labour force participation rate, which has 32 observations. The inflation rate varies from 3.3% to 36.1% with a mean value of 16.27 and relatively high deviation from the mean of 11.70. The labour force participation rate, a key measure of the proportion of the working population that is either employed or actively seeking employment, varies from 80.39% to 88.35%. It has a mean value of 85.81 and a dispersion from the mean of 1.80. Trade openness which measures the degree to which a country participates in international trade ranges from 0.003 to 0.70 with a mean value of 0.248 and a standard deviation of 0.22. The FDI per capita, a measure of the level of FDI relative to the size of population, ranges from minus 0.38 to 42.37 with a mean of 11.89 and a relatively high deviation from the mean of 12.28. In addition, the official development assistance per capita, a measure of the level of foreign aid received on average by each individual in the recipient country, ranges from 21.14 to 71.14 with a mean of 41.12 and a relatively high deviation from mean of 12.37 while the growth rate of GDP ranges from minus 2.4% to 7.7% with a mean value of 4.51 and a deviation from a mean of 2.40. In a nutshell, this descriptive statistics analysis provides insights into the characteristics of the dataset and helps identify potential issues and anomalies of our data.

Table 4: Descriptive Statistics Analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
$year$	42	2000.5	12.26784	1980	2021
$gdpg_t$	42	4.512	2.408	-2.4	7.7
oda_percap_t	42	41.12	12.372	21.143	71.141
fdi_percap_t	42	11.894	12.288	-.385	42.378
$open_t$	42	.248	.222	.003	.709
$inlf_t$	42	16.276	11.705	3.3	36.1
$lbpt_t$	32	85.81	1.802	80.39	88.35

4.2 Determination of Optimal Number of Lags

Before proceeding further with our analysis, we had to determine the optimal lags. The determination of optimal number lags in a time series is very critical and essential to accurately establish relationship, modelling and forecasting. This process of selecting the appropriate number of lags which is referred as lag order selection helps to capture the underlying patterns and relationship in our data while trying to avoid over fitting (Wooldridge, 2015; Bozdogan and Bearse, 2003). In this paper, we carefully considered the number of lags to include in the

model to avoid several issues namely overloading the model with too much lags as it may result to a loss of degrees of freedom and hence increase the risk of multicollinearity which may further impact the accuracy of our findings, leading to less precise coefficient estimates. On the other hand, including too few lags could bias our estimates as it could result to specification errors in our analysis. To address this concern, the Akaike Information Criteria (AIC) was employed and provided the suitable lag selection for each variable as presented in Table 3 below.

Table 5: Determination of Optimal Lag (AIC)

Variable	lag	LL	LR	df	p-value	FPE	AIC
$gdpg_t$	0	-78.6018				3.864	4.18957
	1	-70.9726	15.258*	1	0.000	2.72613*	3.84066*
	2	-70.3211	1.3031	1	0.254	2.77724	3.859
	3	-69.509	1.6241	1	0.203	2.80612	3.8689
	4	-68.4804	2.0574	1	0.151	2.80399	3.86739
oda_percap_t	0	-149.875				164.503	7.94079
	1	-131.869	36.012*	1	0.000	67.2198*	7.04575*
	2	-131.174	1.3907	1	0.238	68.3221	7.06178
	3	-131.026	.29651	1	0.586	71.487	7.10661
	4	-130.532	.98774	1	0.320	73.4721	7.13325
fdi_percap_t	0	-148.851				155.87	7.88689
	1	-128.169	41.363	1	0.000	55.3261	6.85102
	2	-123.948	8.4435*	1	0.004	46.7078*	6.68146*
	3	-123.871	.15351	1	0.695	49.0557	6.73005
	4	-122.86	2.0228	1	0.155	49.0631	6.72945
$open_t$	0	4.47517				.048764	-.182903
	1	46.3032	83.656*	1	0.000	.005687*	-2.33175*
	2	46.976	1.3457	1	0.246	.005787	-2.31453
	3	47.6942	1.4363	1	0.231	.005877	-2.29969
	4	47.7394	.09047	1	0.764	.006184	-2.24944
$inlf_t$	0	-146.564				138.195	7.76653
	1	-107.963	77.202*	1	0.000	19.1013*	5.78754*
	2	-107.959	.0091	1	0.924	20.1334	5.83993
	3	-107.196	1.5246	1	0.217	20.3961	5.85244
	4	-106.982	.4283	1	0.513	21.2734	5.8938
$lbpt_t$	0	-57.2484				3.75373	4.1606
	1	-32.0632	50.37*	1	0.000	.66728	2.43309
	2	-30.8757	2.3751	1	0.123	.658783	2.41969
	3	-29.69	2.3713	1	0.124	.650849*	2.40643*
	4	-29.2375	.90515	1	0.341	.678091	2.44553

4.3 Unit Root Test with Optimal Number of Lags

A unit root test on the series of observations for each variable was conducted. The purpose of this test was to determine whether the variables exhibit a unit root, indicating non-stationarity or if they are stationary. In doing so, we utilized the Augmented Dickey Fuller (ADF) test while considering the number of lags drawn from Table 3. The results of the unit root test are presented in Table 4. The null hypothesis for this test is such that the series exhibit a unit root implying non-stationarity. Upon analysing the results, we found that we did not have enough evidence to reject the null hypothesis for any of the variables used in the analysis. The implications of this outcome are significant for our analysis as non-stationary time series data can lead to spurious regression results and incorrect inferences (Chen and Tu, 2019).

Table 6: Unit Root Test

Variable	No. of Obs	No. of lags	Test Statistics	Dickey-Fuller critical value 1%	5%	10%	P-value
$gdpg_t$	40	1	-2.408	-3.648	-2.958	-2.612	0.1394
oda_percap_t	40	1	-1.681	-3.648	-2.958	-2.612	0.4410
fdi_percap_t	39	2	-1.229	-3.655	-2.961	-2.613	0.6609
$open_t$	40	1	-1.467	-3.648	-2.958	-2.612	0.5500
$inlf_t$	40	1	-0.963	-3.648	-2.958	-2.612	1.7666
$lbpt_t$	28	3	0.904	-3.730	-2.992	-2.992	0.9931

4.4 First Difference Optimal Lag Selection

In time series analysis, optimal lag selection is an essential step when dealing with autoregressive models. The first difference is a common technique used to transform a time series to make it stationary. Additionally, stationarity is a crucial assumption for many time series models as it ensures that the statistical properties of the series do not change over time. The first difference of a time series is calculated by taking the difference between consecutive observations. To ensure model complexity is reduced and improve forecast accuracy while addressing for multicollinearity and autocorrelation, we had to opt for optimal lag selection for each differenced variable used in the analysis. There are different model selection criteria, but for our case we opted for the Akaike Information Criteria (AIC) as it strikes a balance between model goodness-of-fit and model complexity. Moreover, it penalizes models with more parameters while favouring simpler models that explain the data well without drifting. Table 5 provides a summary of first difference optimal lag selection of the variables used in the analysis.

Table 7: First Difference Optimal Lag Selection

Variable	lag	LL	LR	df	p-value	FPE	AIC
$d.gdpg_t$	0	-72.7763				3.15834	3.98791
	1	-71.0067	3.5392	1	0.060	3.02993	3.94631
	2	-69.2419	3.5296	1	0.060	2.90795	3.90497
	3	-67.6984	3.0871	1	0.079	2.82515	3.87559
	4	-64.5934	6.21*	1	0.013	2.52336*	3.7618*
$d.oda\_percap_t$	0	-131.266				74.5635	7.14951
	1	-129.641	3.2501	1	0.071	72.093*	7.11573*
	2	-129.138	1.0064	1	0.316	74.0738	7.14258
	3	-128.987	.30183	1	0.583	77.5909	7.18848
	4	-128.749	.47534	1	0.491	80.9209	7.22969
$d.fdi\_percap_t$	0	-127.358				60.3656	6.93828
	1	-122.098	10.521*	1	0.001	47.9523*	6.70798*
	2	-121.925	.345	1	0.557	50.1585	6.75271
	3	-121.233	1.3847	1	0.239	51.0247	6.76934
	4	-121.009	.44763	1	0.503	53.2544	6.81129
$d.open_t$	0	43.6307				.005845*	-2.30436*
	1	44.0802	.89894	1	0.343	.006022	-2.27461
	2	44.4832	.80587	1	0.369	.006221	-2.24233
	3	44.6678	.36929	1	0.543	.006504	-2.19826
	4	46.193	3.0504	1	0.081	.006327	-2.22665
$d.inlf_t$	0	-103.461				16.5879*	5.64653*
	1	-103.438	.04498	1	0.832	17.4895	5.69937
	2	-101.614	3.6496	1	0.056	16.7311	5.65479
	3	-101.548	.13034	1	0.718	17.6069	5.70532
	4	-100.826	1.4455	1	0.229	17.8874	5.72031
$d.lbpt_t$	0	-31.3933				.645105	2.3995
	1	-30.6784	1.4297	1	0.232	.659034	2.42062
	2	-29.2672	2.8225	1	0.093	.639674*	2.39016*
	3	-29.1281	.27821	1	0.598	.682665	2.45393
	4	-28.9463	.36354	1	0.547	.726865	2.51454

4.5 First Difference Unit Root Test with Optimal Lag Selection

The unit root test works by examining whether detrending a series of variables is enough to make it stationary. In applied econometrics, it is well known that detrending a series does not necessarily make it stationary. This will necessarily

require additional mechanism such as series transformation by way of differencing and then subjecting the transformed series into a unit root test to confirm its stationarity condition. As it can be recalled, in Part 4.3 of this paper we conducted a unit root test for our variables. However, none of the variables had a unit root. In this particular section, when the differenced series were subjected for a unit root test, we were able to reject the null hypothesis of the presence of a unit root for all the variables used in the analysis. The importance of a stationary series is such that the presence of unit root into a series would result into spurious regression. The results of the first difference unit root test are shown in Table 6 below.

Table 8: First Difference Unit Root Test with Optimal Lag Selection

Variable	No. of Obs	No. of lags	Test Statistics	Dickey-Fuller critical value 1%	5%	10%	P-value
$gdpg_t$	36	4	-3.414	-3.675	-2.969	-2.617	0.0105
oda_percap_t	39	1	-5.579	-3.655	-2.961	-2.613	0.0000
fdi_percap_t	39	1	-5.656	-3.655	-2.961	-2.613	0.0000
$open_t$	40	0	-5.267	-3.648	-2.958	-2.612	0.0000
$inlf_t$	40	0	-6.747	-3.648	-2.958	-2.612	1.0000
$lbpt_t$	28	2	-5.679	-3.709	-2.983	-2.623	0.0000

4.6 The Johansen Cointegration

Since our model aimed at establishing both the short-run (Vector Autoregressive) and long run relationship (Vector Error Correction Model) of the variables used in our analysis, we were obliged to again determine the optimal number of lags for us to be able to use the number of lags to determine the Johansen Cointegration. In order to be able to establish the long-run relationship, we had to firstly run the Vector Autoregression Model and then establish the optimal number of lags for the Johansen cointegration. Table 7 provides the optimal number of lags which is equal to four (4) for us to be able to run the cointegration test.

Table 9: Optimal Lags for Cointegration Test

Lag	LL	LR	df	p	FPE	AIC
0	-579.35				965811	30.8079
1	-425.064	308.57	36	0.0000	1959.76	24.5823
2	-371.88	106.37	36	0.0000	918.79	23.6779
3	-323.963	95.834	36	0.0000	746.275	23.0507
4	-230.312	187.3*	36	0.0000	95.9196*	20.0164*

The Johansen cointegration is a statistical method applicable to test for the presence of cointegration (long-run relationship) amongst combined multiple time series variables. In the simplest language, cointegration indicates that even though individual time series may have trends or stochastic trends, there exists a stable relationship between them in the log-run (Dwyer, 2015). Table 8 presents the results for the Johansen test for cointegration. The results show that there is cointegration or rather a long-run relationship among the variables used in the study up to lag three (3), where the we found that the trace statistic is greater than the critical value. In this case, we therefore reject the null hypothesis of no cointegration at 5% level of significance. This indicates that there are cointegrating relationships among the variables and the rank of cointegrations is equal to or less than the number of Eigen values larger than zero. Cointegration would mean that when individual time series may have their own distinct trends or random fluctuations, they are bound together in the long-run by a stable relationship (Neal, 2014).

Table 10: Johansen Tests for Cointegration

Maximum Rank	Params	LL	Eigenvalue	Trace Statistic	Critical Value 5%
0	114	-362.56806	-	264.5130	94.15
1	125	-317.96183	0.90441	175.3005	68.52
2	134	-281.59755	0.85250	102.5720	47.21
3	141	-254.22489	0.76323	47.8267	29.68
4	146	-235.69065	0.62299	10.7582*	15.41
5	149	-230.38015	0.24384	0.1372	3.76
6	150	-230.31156	0.00360		

4.6.1 Estimation of the Long-Run Relationships (Vector Error Correction Model)

The variables used in the analysis have shown the property of cointegration and by implication if the variables exhibit a cointegrating relationship, there is a long-term equilibrium relationship. These variables share a common stochastic trend. As a result, deviation from this common trend is only temporary and the variables will eventually cover back to the cointegrating relationship in the long run. The presence of cointegration among variables offers an opportunity to estimate both short-run and long-run models to analyse their dynamics. However, we present the long-run relationship of our model without considering the short-run dynamics explicitly. The long-run model shows how the cointegrated variables are related to each other in the long-term, considering their stable equilibrium relationship. Table 9 shows the results of the long-run relationship of the variables used in our paper. It can be seen that in the context of the Vector Error

Correction term, in the long-run we must obtain the variable $-CE$ which captures the adjustment process that brings the cointegrated variable back to their long-run equilibrium after a short-term deviation. This is a crucial component of our Vector Error Correction Model as it ensures that our model is consistent with the cointegrating relationship. Since the coefficient of $-CE$ is negative, it indicates that the cointegrated variables tend to correct deviations from the long-run equilibrium negatively. To be specific, the $-CE$ tells us that after experiencing a positive deviation from the equilibrium in the previous period, the cointegrated variables will adjust by moving in the opposite direction trying to bring back the system in the long-run equilibrium. The coefficient of $-CE$ is statistically significant at 1% level of significance.

Further analysis of our paper shows that the lagged values of official development assistance lagged up to three periods is statistically significant and negatively affects the growth rate of GDP. To be specific, when the official development assistance per capita lagged to one period is increased by one unit, it causes the growth rate of GDP to fall by 15.3% at 1% level of significance. Furthermore, when the official development assistance per capita lagged to two periods is increased by one unit, it causes the growth rate of GDP to fall by 9.83% at 5% level of significance and when the official development assistance per capita lagged to three periods is increased by one unit, it causes the growth rate of GDP to fall by 7.48% at 5% level of significance. Our analysis shows also that the FDI per capita is statistically significant and negatively affecting the growth rate of GDP. Specifically, our analysis discovered that when per capita Foreign Direct Investment lagged to one period is increased by one unit, it causes the growth rate of GDP to drop by 10.34% at 5% level of significance.

The negative relationship observed between per capita Foreign Direct Investment and the growth rate of GDP can be explained in a number of ways. One of the reasons could be attributed to the crowding-out effect whereby when there is a large inflow of FDI to certain sectors, domestic investors might face increased competition for resources such as capital and labour leading to reduced investment in other sectors of the economy. The crowding-out effect can hinder domestic firms' growth and innovation, ultimately negatively impacting overall economic growth. The other reason which can be linked to the negative relationship between per capita FDI and the growth rate of GDP is the so called "Dutch disease". This happens when in a certain situation there is a significant inflow of FDI into specific sectors only such as natural resources, which can lead to the appreciation of the domestic currency. The appreciation of currency can make other sectors less competitive in the international market resulting in

reduced growth in non-resource sectors and hence lowering the growth rate of GDP.

As regards to the negative relationship between official development assistance per capita and the growth rate of GDP, this might be caused by heavy dependency and aid effectiveness. Heavy dependency on foreign aid might create dependency and reduce the recipient country's incentives to mobilize its domestic resources and implement necessary economic reforms. In some cases, it might happen that aid might not be used effectively or efficiently, leading to sub-optimal outcomes in terms of economic growth. Moreover, if the country's absorptive capacity and utilizing of foreign aid is weak coupled with weak governance, corruption and inefficiencies in the public sector, proper allocation and utilization of aid funds will be impossible, leading to limited positive impact on economic growth.

Our findings on the negative relationship between official development assistance per capita and economic growth are consistent with those obtained by Eregha (2012) who conducted a study to examine the relationship between official development assistance, investment and growth in ten ECOWAS countries. The study utilized a pooled panel regression method to investigate the impact of uncertainty on this link. The results revealed that official development assistance negatively affected growth regardless of the presence of uncertainty although the uncertainty itself did not have statistically significant effect. Similarly, Mallik (2008) analysed the relationship between economic growth and foreign aid provided to the countries of Nigeria, Malawi, Mali, Sierra Leone, Central African Republic and Togo between 1965 and 2005 using the cointegration test and concluded that the impact of long-term foreign aid on economic growth was negative for most of these countries.

Furthermore, our findings on the negative relationship between FDI per capita and economic growth are compatible with those of Markusen and Venables (1999) who asserted that FDI might negatively impact the host country's economy through a reduced balance of payments, a lack of positive links with local enterprises, a negative impact on the environment and the displacement of domestic investments. In addition, a paper by Lyroudi and Papanastasiou (2004) which examined the case of 17 transition economies over the period of 1995-1998 concluded that FDI and economic growth have no meaningful association.

Further analysis regarding our control variables in Table 9 shows that trade openness lagged to two and three periods positively and statistically significant affects economic growth. More so, the labour force participation rate lagged to

three periods is statistically significant and positively affects economic growth in Tanzania.

Table 11: Long-Run Relationship (VEC) Results

	Coefficient	Std. err	z	p>|z|	[95% conf.	interval]
D_gdp_g _ce1L1.	-2.808094	.7429373	-3.78	0.000	-4.264224	-1.351964
gdp_g	1.523695	.5370121	2.84	0.005	.4711701	2.576219
LD.	1.108325	.3629459	3.05	0.002	.3969641	1.819686
L2D.	.817742	.3210464	2.55	0.011	.1885025	1.446981
L3D.						
oda_percap	-.1534342	.0598482	-2.56	0.010	-.2707344	-.0361339
LD.						
L2D.	-.0983795	.0448776	-2.19	0.028	-.186338	-.010421
L3D.	-.0748321	.0382457	-1.96	0.050	-.1497922	.000128
fdi_percap	-.1034175	.0501936	-2.06	0.039	-.2017952	-.0050399
LD.	-.0649181	.0487112	-1.33	0.183	-.1603903	.0305541
L2D.	.0050729	.0385563	0.13	0.895	-.0704962	.0806419
L3D.						
open |						
LD.	-3.726238	3.260657	-1.14	0.253	-10.11701	2.664533
L2D.	7.236419	3.048717	2.37	0.018	1.261044	13.21179
L3D.	11.35677	4.157854	2.37	0.006	3.207523	19.50601
infl	.1765487	.1026775	1.72	0.086	-.0246955	.3777929
LD.	.1034659	.0637393	1.62	0.105	-.0214609	.2283927
L2D.	.0260248	.0805374	0.32	0.747	-.1318256	.1838751
L3D.						
lbpt	-.2944704	.6273208	-0.47	0.639	-1.523997	.9350557
LD.	-.2393552	1.545876	-0.15	0.877	-3.269216	2.790505
L2D.	3.126014	1.819277	1.72	0.086	-.439704	6.691732
L3D.						
_cons	.7750687	.3733991	2.08	0.038	.0432199	1.506918

4.6.2 Serial Correlation Test

During the analysis of data for this paper, we had concerns regarding the presence of serial correlation or long memory in the time series data used in the analysis. Serial correlation in time series data happen when there is correlation between variables and its lagged (previous) values. The presence of serial correlation in time series observations can be problematic as it may lead to biased estimates (estimated sample coefficients will not converge to true population parameters), inflated standard errors leading to incorrect inferences and associated unreliable hypothesis testing. To ensure that there is absence of serial correlation, we had to

conduct a serial correlation test using the Newey-West test which corrects standard errors in the presence of serial correlation and heteroscedasticity in time series data. Results from the Newey-West test which are presented in Table 10 suggest that we cannot reject the null hypothesis of no serial correlation since the p-value is not statistically significant at 5% level of significance.

Table 12: Serial Correlation Test

Residuals	Coefficient	Newey-West Std. Err.	t	p>|t|	[95% conf. interval]	
_cons	3.53e-09	.1704974	0.00	1.0000	-.3454605	.3454605

4.6.3 White Noise Test of the Residuals (Portmanteau Test for White Noise)

The paper considered the white noise test (i.e. the Portmanteau Test of the residuals) to ensure the appropriateness and reliability of the chosen model. The test helps to validate assumptions, assess the model adequacy and improve the accuracy of predictions and inference. A white noise property is a specific characteristic of a time series where the series of observations behave like a sequence of uncorrelated and identically distributed random variable with zero mean and constant variance or in other words, a time series is said to exhibit no systematic patterns, trends or correlation between its individual data points. Since the p-value is greater than our chosen level of significance of 5% as it can be seen in Table 11, then we fail to reject the null hypothesis indicating that residuals are consistent with being white noise.

Table 13: White Noise Test (Portmanteau Test)

Portmanteau (Q) statistic = 19.0065
Prob > chi2 (17) = 0.3282

Variable	Obs	Mean	Std. dev.	Min.	Max.
Residuals	38	3.53e-09	1.02986	-2.213432	2.237025

In the same talk, Figure 1 plots the residuals around the mean value to help visualize and assess whether the residuals of our statistical model exhibit any systematic pattern or trends. The graph plots the residuals as a function of time and show how they fluctuate around the mean value which is equal to 3.53e-09. The horizontal line in the figure represents the mean value of the residuals. The line serves as the central reference point around which the residuals are expected to fluctuate.

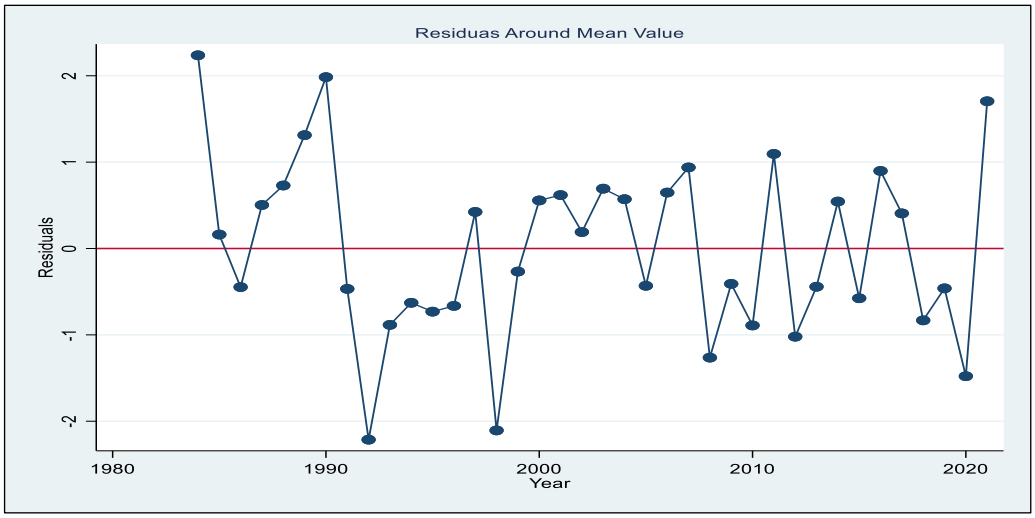

Figure 1: Residuals around Mean Value

5.0 CONCLUSION, POLICY IMPLICATION AND RECOMMENDATIONS

Conclusively, this paper aimed at analysing the dilemma faced by policy makers in choosing between the official development assistance and foreign direct investment in spearheading economic growth in Tanzania. The paper applied the Vector Error Correction Model approach, a suitable model in capturing the long-run interrelationship among time series variables. The findings of our paper are such that variables used in the analysis exhibit a cointegrating relationship and they have a long-term equilibrium relationship. Any deviation from this common trend is only temporary and the variables will eventually converge back to the cointegrating relationship in the long-run. Furthermore, our findings have shown that the lagged values of official development assistance per capita lagged to one, two and three periods are statistically significant and negatively affect the growth rate of GDP. Additionally, our empirical results have suggested that the FDI per capita is statistically significant and negatively affects the growth rate of GDP.

The findings of this paper have an important policy implication. Since it has been discovered that the lagged values of official development assistance per capita lagged to one, two and three periods are statistically significant and negatively affect the growth rate of Gross Domestic Product in Tanzania and that the foreign direct investment per capita is statistically significant and negatively affects the growth rate of the GDP, the negative impact between per capita FDI and ODA per capita on economic growth in Tanzania imply that historical patterns of utilizing these funding sources may not have been optimal and effective in

promoting economic growth in the country. This might add to the complexity to policy and decision makers in choosing between financing the economy through FDI or ODA. Consequently, the paper puts forth a number of recommendations.

Firstly, policy makers in Tanzania need to assess their financing strategies and consider alternative approaches that can better support sustainable and robust economic growth. Secondly, by understanding the negative impact of both FDI and ODA on GDP growth, the paper recommends an understanding of the limitations associated with each funding mechanism such as the need to explore factors that might be hindering the positive contribution of FDI and ODA to the economy such as issues of inadequate absorptive capacity, structural inefficiencies and mismatch between investment priorities. Lastly, given the negative impact of FDI and ODA on GDP growth, the paper recommends the importance of prioritizing domestic investment as an engine of economic growth. By encouraging and supporting domestic businesses and industries, the country can foster economic self-reliance and hence reduce reliance on external funding sources.

6.0 SUGGESTED AREAS FOR FURTHER STUDIES

The paper suggests that a sectoral analysis of this study be undertaken to understand the impact of FDI and ODA in specific industries and sectors in the Tanzanian economy. This proposed study will provide an opportunity to identify sectors that have attracted significant investments and those that are lagging behind.

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