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*The Relationship between Corporate Tax Revenue
Generation and Private Domestic Investment in
Tanzania*

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The Relationship between Corporate Tax Revenue and private Domestic Investment in Tanzania

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Abstract

Finding the right balance between a tax system and local private investment while fostering an environment that fosters the growth of global trade and commercial investment is one of the challenges that African nations must overcome. In Tanzania, the corporate tax revenue generation is not well archived that cause the private domestic investment rate to decrease. This study aims to investigate the connection between corporation tax income generation and domestic private investment in Tanzania. Tanzania is the only country being studied in this case study, which used a time series research design. From 1998 through 2020, annual time series data was used in the study. The World Bank provides information on private domestic investment as gross fixed capital formation of the private sector as a percentage of GDP, while the Tanzania Revenue Authority website provides information on tax revenue (corporate income tax). Performing the early tests for the lag length selection, co-integrating vectors, multi-collinearity, heteroscedasticity, and test of unit roots. The Error Correction Model was then used to capture the long run and short-run relationships. The findings showed that over the long term, private domestic investment was positive and statistically significantly influenced by corporate income tax. The analysis suggests that Tanzania's government redesign an effective corporate income tax strategy.

Keywords: *Tax Revenue, Corporate Tax, Private Domestic Investment*

Introduction

One of the issues facing African countries is finding the appropriate balance between a tax system and local private investment while cultivating an atmosphere that supports the expansion of international commerce and commercial investment. This is the rationale behind efforts by African countries to alter their tax regimes in an effort to boost and draw in both domestic and foreign investment.

Taxation, which has immense potential for economic development, is currently high on the agenda for economic development in developing economies. For instance, 40% of Tanzania's yearly spending budget is derived from tax revenue from several sources, such as Value Added Tax, Company Tax, Customs, and Excise Duty. Tanzania has adopted financial reforms, many of which place a strong emphasis on taxation in an effort to boost tax revenue and promote economic growth, joining the majority of developing countries in doing so. Tanzania has made major economic reform initiatives over the past three decades, culminating in the enactment of the Economic Recovery Plan in 1986. In the middle of the 1990s, when the economy began to show signs of steady progress, this gave a good indicator.

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The implementation of important tax reforms that began in the 1970s helped Tanzania's tax system, which had trouble raising enough money. For instance, the implementation of a new sales tax in 1969 was motivated by the decline in import duty collection brought on by the expansion of import substitution sectors. The Economic Recovery Programs (ERPs) were initially implemented in Africa in the 1980s to stimulate the economy and private investment. By eliminating regulatory restrictions, which climbed from 22% in 1984 to roughly 43% in 1991, they were able to do so. The main tax reform from 1970 to 1986 was the implementation of a progressive income tax in 1973. Tanzania Revenue Authority was founded by Parliament Act No. 11 of 1995, which came into effect on July 1, to ensure effective and successful tax revenue collection. In an effort to encourage local investment and entice international investment, the Parliament approved the Investment Promotion Act in 1990, creating the IPC and lowering personal income tax rates from 10% to 50% to 7.5% to 35% in 1992. This law served as the foundation for the Investment Act of 1997, which was passed to encourage investment and foster a positive business climate.

The primary arguments addressing how tax income generation effects domestic private investment have led to contradictory results, according to a number of scholars who have conducted extensive empirical studies. Several authors, including Akinleye et al. (2019), Adejare and Akande (2018), and Nkem and Sunday (2019), have claimed that corporate income tax makes a greater contribution to macroeconomic private domestic investment. Value-added tax and private investment were shown to be significantly correlated by Nkem and Sunday (2019); import-dutiable investment was discovered to be significantly correlated by Njuru et al. (2013). In Tanzania there is no studies done on corporate tax and domestic private investment the studies which already done is to investigate the connection between Value Added Tax and domestic private investment.

Objective of the Study

The study intends to examine the relationship between corporate tax revenue generation and private domestic investment in Tanzania.

Literature Review

According to Jackson (2020), there is a considerable correlation between parastatals income, individual income tax, corporate income tax, and economic growth. According to the study, direct taxation and economic growth are positively correlated, so an increase in direct taxes led to an increase in economic growth. (Akinleye et al. (2019) assessed how corporation taxation impacted the investment strategy of

Nigerian manufacturing enterprises. The results of the study demonstrated a positive association between corporation income tax and the listed manufacturing company's decision to invest, which supports quoted manufacturing firm investment in Nigeria. A statistically significant association between the stated manufacturing company's investment in Nigeria and corporate income tax was indicated by the likelihood value. This implies that there is a link between increased corporate income taxes and decreased investment. In their study from 2008, Arnold and Schwellnus examined the effects of corporate income taxes on two of the key variables affecting company growth, productivity, and investment in the European EDC member countries between 1996 and 2004. The results demonstrated a negative relationship between corporate income tax and investment. This suggests that corporate income tax deters investment by increasing the cost of capital for end users. If technical advancement is incorporated into new capital goods, this may assist to partially explain the detrimental effects of corporate income taxes on productivity. In Nigeria from 1980 to 2010, Edame and Okoi (2014) assessed the impact of taxes on investment and economic growth. They conducted a multivariate regression analysis using the ordinary least square method and found that both the PIT and the CIT exhibit negative signals.

The study conducted by Simeon et al. (2010) examined the influence of company taxation on investment and entrepreneurship in 2004, a survey of 85 nations from all continents was undertaken. The findings revealed that the relationship between corporate tax rates and company investment is statistically significant. Raza et al. (2012) used annual panel financial data to evaluate the impact of corporate income tax and firm size on capital investment in tangible assets by manufacturing firms at the Karachi Stock Exchange. The research discovered a negative relationship between corporate income tax and investment. Senzu (2019) examined the impact corporate tax on private investment using the country Ghana as a case study, not excluding controllable variables like real GDP, Inflation, which is estimated under consumer price index, exchange rate measured nominally, government expenditure and finally domestic credits as a vector indicator using Johansen approach to co-integration. The results revealed that, real GDP, public investment, money supply, all have positive effects on private investments, with the greatest impacts observed from real GDP both in long-run and short-run. Corporate tax, interest rate, real exchange rate and price level on the other hand, had a negative effect on private investments.

The empirical relationship between the tax reform and Chile's investment performance following the reform was examined by Vergara (2004). The claim that the tax adjustment had a favorable effect on investment

is supported by the microeconomic statistics. Whether using the statutory tax rate or taxes that businesses actually paid, we found that lower taxes led to a higher private investment ratio. In 85 nations in the South West Zone, Djankov et al. (2010) looked into the effects of business taxation on investment and entrepreneurship. The findings showed that company investment and entrepreneurship were significantly and negatively impacted by effective corporation tax rates. A growth in the unofficial economy, a drop in industrial investment, and a preference for debt financing over equity financing were also linked to an appropriate corporate income tax.

Between 1982 and 2017, Tsehayu (2020) studied the effect of tax incentives on private domestic investment. Inferential statistics are used to analyze time series data. The autoregressive distribution lag technique to cointegration and error correction model is used to analyze the long-run and short-run correlations between the dependent variable (domestic investment) and the explanatory variables. The results demonstrated that the implementation of tax incentives led to an increase in domestic investment during the study period, but not consistently. The evidence demonstrates that tax incentives have encouraged domestic investment along with steady economic growth, necessary infrastructure, and social costs. Data from 1980 to 2010 were analyzed by Ekpung & Wilfred (2014) to assess the effect of taxation on investment and economic growth in Nigeria.

Investment theory states that a policy's ability to draw or deter investment depends on how it is developed and implemented. Investment theory states that higher taxes decrease the marginal propensity to save and lead to less investment. As individual income or payroll tax rates rise, individual saving decreases. Government cannot sustain above-optimal levels of growth by providing enough benefits to counteract the negative effects of rising taxation on investment, saving, and employment. With this, the government uses taxes as a tool to both promote and discourage investment in the nation. To boost investment in the nation, the government lowers tax rates. The Swiss philosopher Jean-Jacques Rousseau advanced the ability-to-pay argument in the sixteenth century.

Research Methodology

Tanzania is the only country being studied in this case study, which used a time series research design. From 1998 through 2020, annual time series data were used in the study. The World Bank provides information on private domestic investment as gross fixed capital formation of the private sector as a percentage of GDP, while the Tanzania

Revenue Authority website provides information on tax revenue (corporate income tax). Performing the early tests for the lag length selection, co-integrating vectors, multi-collinearity, heteroscedasticity, and test of unit roots. All of the data gathered for the study was carefully scrutinized and examined to ensure its accuracy. This study's model is a multivariate time series model.

$$PDI = f(CIT \& PU) \dots\dots\dots (1)$$

Transformed to

$$PDI_t = \beta_0 + \beta_1CIT_t + \beta_2PU_t + \mu \dots\dots\dots (2)$$

All variables in the model were transformed into ratio form to stabilize their mean and variances.

Where:

PDI= Private domestic investment as GFCF private sector as % of GDP

CIT = Corporation tax revenue as a ratio of total tax revenue

PU= Public investment (control variable)

β_0 - β_2 = the relevant coefficients for the relevant variables and μ = the random error term

Results and Discussions

Table 4.1 below describes the nature of the variable utilized in the study and provide a statistical summary of it. It offers details on the measures of central tendencies, such as mean, median, and mode, as well as measures of dispersion (how data are dispersed), such as range variance and standard deviation. It also offers details on measures of normality, such as kurtosis, which gauges the degree of sharpness, and skewness, which gauges the degree of asymmetry. The Kurtosis and Skewness were used to determine whether or not the study's variables were normally distributed. The additional statistics were minima and maxima values, as indicated in Table 4.1 below.

Table 4.1: Descriptive Statistics

Stats	PDI	CIT	PU
Mean	20.93029	10.62933	4.542646
Max	27.16179	16.96006	6.496507
Min	4.112134	5.586508	1.442136
Sd	6.599545	2.793492	1.458401
variance	43.554	7.803599	2.126934
Kurtosis	3.990117	3.10728	2.164027
Skewness	-1.360296	.3744207	-.581627
Range	23.04966	11.37355	5.054371
N	23	23	23

Note: PDI: Private domestic investment as GFCF of private sector as % of GDP; CIT: Corporation tax revenue; max: maximum; min: minimum; s.d: standard deviation and N: Number of observation.

Table 4.1 provide statistical summary of variable used in analysis. It consists 23 observation covering the period from 1998 to 2020. Private domestic investment indicates the highest mean of 20.93029 with maximum of 27.16179 and minimum of 4.112134 while PU indicates the lowest mean of 4.542646, minimum of 1.442136 and maximum of 6.496507. Private domestic investment indicates a larger standard deviation (sd) coefficient for all variables, which recommends a significant change in its value. Also, the variables' standard deviations are not very high which supports the reliability of the data used. The descriptive statistics suggest that corporate income tax is approximately normally distributed because the respective skewness is either not above 0.5 in absolute values while, private domestic investment is not normally distributed because their respective skewness is above 0.5 in absolute values.

Variable's trend from 1998 to 2020

The following section explains the trend of the variables Using both words and graphics. It is advised that time series data be plotted before estimation to be able to capture the many properties of time series data, such as seasonality, trend, stationary, and so forth (Wagofya, 2019).

4.2.1 Corporate Income Tax

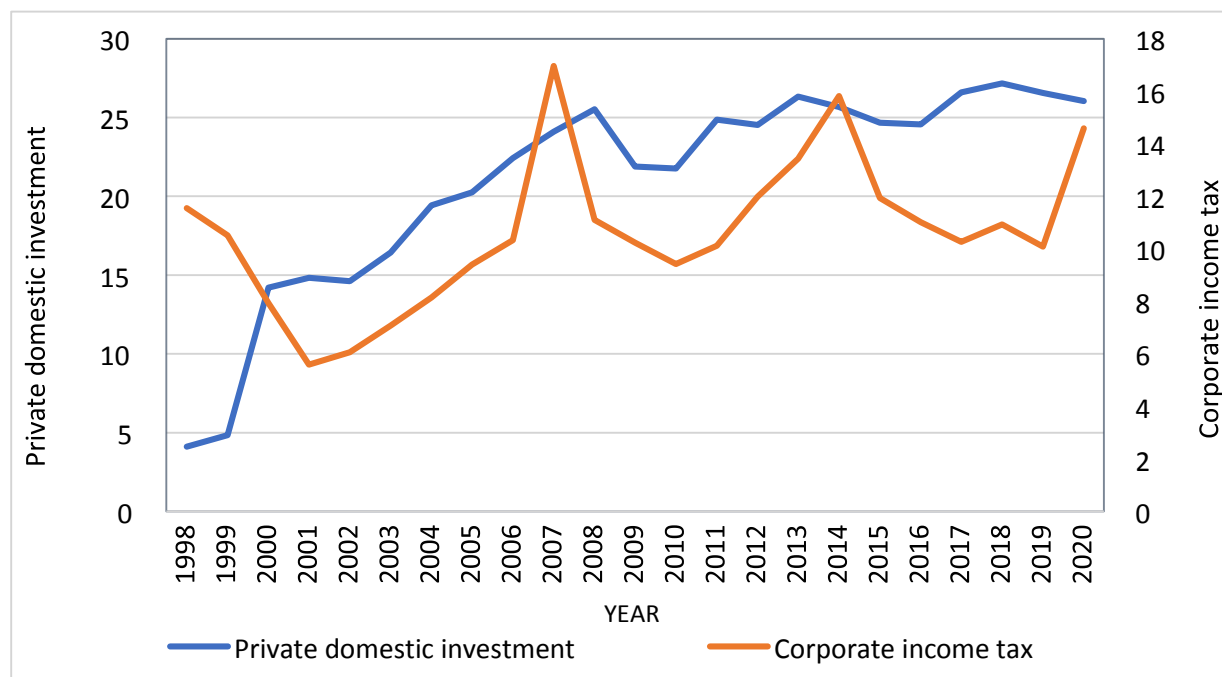


Figure 4.1 Trends of Corporate Income Tax versus Private Domestic Investment

The PDI graph shows an upward trend from 1998 to 2002 means the amount of Gross fixed capital formation (% GDP) increased slowly due to debt burden but later in mid 2000s private investment stabilized probably due to cancellation of debts from some of the creditors while, from 1998 to 2001 corporate income tax turned down, with some years showing slight deviations. From 2001 corporate income tax was on increasing trend where the graph reached a pick of 16.96% in 2007. From 2008 dropped to 11.1% in 2010 rose from 10.1% in 2011 to 26.3% in 2013. It started dropping from 2014 to 2019 thereafter at 2020 started rising. From 2000 to 2008 Gross fixed capital formation (% GDP) has on increasing trend. At 2008, the government launched a national blue regulatory reforms which provide detailed business environment challenges and coordinate in creating a conducive investment environment, the Gross fixed capital formation (% GDP) rose to 25.53%. In 2018, Gross fixed capital formation (% GDP) value was 27.16% while, in 2019 value declined from 26.55% to 26.04% in 2020 reflecting negative consequences of the COVID-19 pandemic.

Table 4. 2: Cameron and Trivedi’s Decomposition of IM-Test)

chi2(19) = 20.00, Prob > chi2 = 0.3946

Source	chi2	df	P
Heteroscedasticity	20.00	19	0.3946
Skewness	11.64	15	0.7062
Kurtosis	0.36	1	0.5500
Total	31.99	35	0.6140

Source: Researcher Estimation Results, 2022

The results revealed that the model is free with heteroscedasticity. Considering that the calculated p-value was 0.3946 (39.46%), which is higher than the 5% significant implying that the model has constant variance, we accept the null hypothesis. It can be concluded that as p-value for skewness (0.7062) and Kurtosis (0.5500) is greater than 5% probability level, it means residual are normally distributed.

Heteroscedasticity test

Heteroscedasticity refers to situation where the variance of the residuals or error term is unequal over a range of measured value. Homoscedasticity means equal spread and heteroscedasticity means unequal spread normally spread of variance. Heteroscedasticity is a problem because regression assumes that all residual are drawn from a population that has a constant variance (Wooldridge, 2015). To satisfy the

regression assumptions and to provide reliable results, the residual should have a constant variance. If the computed value exceeds 5% significant value, heteroscedasticity was found to be non-existent in the analysis hence we accept null hypothesis (H_0). While if the computed value is lower than 5% significant value, then heteroscedasticity exist in the analysis hence we reject null hypothesis (H_0) and accept the alternative hypothesis (H_1).

Hypothesis

H_0 : There is no Heteroscedasticity

H_1 : There is Heteroscedasticity

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Normality Test

The normality test was carried out to make sure that the distribution of all the variables utilized in the analysis was normal. The normality assumption assumes that disturbances or error terms of the model are normally distributed, it is essential that the impact of these omitted variables is minimized and at best random (Jarque-Bera, 1987). If the variables are normally distributed imply that variable have not materially changed and findings have not significantly changed as a result of the several shocks or reforms that occurred throughout the study period like wars, natural catastrophes, institutional, and policy reforms. If the assumption does not hold it leads to inaccurate results and draw misleading interpretations.

Hypothesis

H_0 : Residuals are not normally distributed

H_1 : Residuals are normally distributed

Table 4.3: Jarque- Bera Test for Normality Distribution of Residual

Variable	Ch2(2)	Prob>chi2
Residuals	1.036	0.5957

The normality test results by Jarque- Bera normality test revealed the normally distribution of residuals which is evidenced by p-value (0.5957) which is higher than 5% level of significance.

Autocorrelation Test

The study adopted Breusch-Godfrey LM test for autocorrelation. The decision criterion for the hypothesis are; if calculated value exceeds 5% null hypothesis was accepted, implying no autocorrelation and the null hypothesis rejected when the p-value is less than 5% level of significant.

Hypothesis

H_0 : No serial correlation

H_1 : Residue are serial correlated

Table 4.4: Breusch -Godfrey Lagrange Multiplier Test

lags(p)	chi2	df	Prob > chi2
1	2.494	1	0.1143

The test found no evidence of serial correlation among residuals was proved where the P-Value (0.1143) is higher than 5% levels of Significance. This implies that the models do not suffer from miss-specification problem.

Test for Multi-collinearity

The multi - collinearity problem occurs when two or more of the explanatory variables are correlated with each other. It is caused by inter-correlation between the explanatory variables in a multivariate regression equation most common in time series data (Wooldridge, 2015). The existence of multi-co linearity may result in smaller t-value, the estimated regression coefficient to have wrong sign and high R square value. Moreover, it may cause large variance and standard error with wider confidence interval deviation and the coefficients cannot be predicted with great precision or accuracy (Gujarati, 2004). In this study, to detect the existence of multi-collinearity among the explanatory variables, variance inflation factors (VIF) technique was employed. According to the rule of thumb if the continuous variables values of VIF is greater than 10 are taken as a signal for the existence of multi-co linearity in the model.

Hypothesis

H_0 : There is Multi-collinearity.

H_1 : There is no Multi-collinearity.

Table 4.5: Variance Inflation Factor (VIF) test results

Variable	VIF	1/VIF
PU	3.60	0.278009
MT	2.81	0.355354
CIT	1.69	0.591117
ED	1.61	0.622813
VAT	1.46	0.687132
Mean VIF	2.23	

Results as observed in Table 4.7 indicate that Variance Inflation Factor (VIF) is 2.23 falls below 10, shows that the variables are not subjected to multi-collinearity. So, the model is unconstrained and equipped to carry out the regression analysis.

Correlation Analysis

Correlation Matrix test was employed to check the relationship between dependent variable and explanatory variables and among the explanatory variables. The correlation matrix test was run to see whether the variables were collinear. Correlation matrix measures multi-collinearity between independent variables, if the variables have a multi-collinearity problem and are regarded extremely collinear, it can produce false findings. Essentially, variance inflation factors (VIF) was conducted in order to see whether there might be multi-collinearity among the variables by determining correlations among all of the variables. When variables exceed 0.8, they are considered to be highly collinear and results in multi-collinearity problem. The variable obtained is 0.70 and higher (in absolute terms) considered strong and thus indicate normality; if the variable falls within 0.35 and 0.70 fair and less than 0.35 considered weak association. A positive value indicates a direct association and an inverse association is depicted as negative values.

Table 4.6: Correlation Matrix of All Variable

Variable	PDI	CIT	PU
PDI	1.000		
CIT	0.4219*	1.0000	
P-Value	0.0449		
PU	0.8610*	0.4359*	1.000
P-Value	0.0000	0.0376	

NOTE: PDI: Private domestic investment as GFCF of private sector as % of GDP; CIT: Corporation tax revenue; and PU: Public investment.

The correlation Matrix results revealed that corporate income tax and private domestic investment are positive correlated and are statistically significant at 5% because $(0.0449 < 0.05)$. These findings are in line with Akinleye et al. (2019) who postulates that corporate income tax has a positive impact on manufacturing companies' investment strategy. Also these findings are contrary to Edame and Okoi (2014) who found that corporate income tax is negatively correlated to output of products and services and investment.

The corporate income tax (0.0168) has positive correlation and both not statistically significant at 5% because $(0.9392 > 0.05)$. The public investment is positively correlated and statistically significant with private domestic investment and corporate income tax but negatively correlated statistically with import duty. Lastly, Public investment and private domestic investment is high and above 0.8 indicating that there is a possibility of multi-collinearity amongst the variables.

Lag Length Selection

The implication of the lag length selected explains the effect of the outcome of previous year on the current year. The optimal lag length included in the co-integration test was determined by Akaike Information Criteria (AIC), Hannan- Quin Information Criteria (HQIC), Final Prediction Error (FPE) and Schwarz Bayesian Information Criteria (SBIC) were used to determine optimum lag order. This is due to the fact that AIC is significant in a sample size of no more than 60 observations (Liew, 2004).

Table 4.7: Lag Length Selection

Selection-order criteria

Sample: 1998 - 2020					Number of observations = 23				
Lag	LL	LR	DF	P	FPE	AIC	HQIC	SBIC	
0	-247.27				992.523	26.7647	26.8236	27.1127	
1	-137.99	218.55	49	0.00	2.57486	20.4201	20.8912	23.2037	
2	961.006	2198	49	0.000	8.8e-5*	-90.1059	-89.223	-84.8866	
3	4041.27.	6160.5	49	0.000		-411.397	-410.28	-404.786	
4	4077.77	72.997*	49	0.015		-415.24*	-414.1*	-408.63*	

The results showed that, the AIC lowest value was selected for the model because the lower the value of AIC the better the model. The optimal lag length selected is lag 4 cause the smallest value of all four criterions lies at lag 4.

Unit root Test

Before attempting estimation, it is vital to check stationarity of relevant variable for the essence of identifying the order of integration which could help in selecting the appropriate model according to order of integration. Variables were differenced prior to statistical analysis to stabilize their mean and variances. To determine the presence of the unit root, the conventional method of Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were adopted and were then run for each variable at both levels and differences. It's used to check for stationarity of variables at various levels, and it takes into consideration

all economic structural brakes. Most macroeconomic data become stationary after first differences (Kelly & Mavrotas, 2003).

Hypothesis

H_0 : Time-series data is non-stationary

H_1 : Time series data is stationary

Table 4.8: Unit Root Test Results

The ADF Test						
	Level		First difference		Order of integration	
Variable	Test Statistics	Critical value	Test Statistics	Critical value	Order of integration	
PDI	-4.627	-3.000	-5.322***	-3.000	I(1)	
CIT	-1.957	-3.000	-3.034***	-3.000	I(1)	
PU	-1.887	-3.000	-3.371***	-3.000	I(1)	

THE PP TEST						
	Level		First Difference		Order of integration	
Variable	Test Statistics	Critical value	Test Statistics	Critical value	Order of integration	
PDI	-4.241	-3.000	-4.350***	-3.000	I(1)	
CIT	-2.282	-3.000	-4.687***	-3.000	I(1)	
PU	-1.435	-3.000	-6.415***	-3.000	I(1)	

Table 4.9 shows the unit root results for all variables by using ADF test and Phillip=Perron test. ADF test revealed that at level I(0) all variables were not stationary except PDI while after first differencing I(1) all variable are stationary. While, the Phillip Perron unit root test results revealed that at level I(0) all

variables were not stationary except PDI and ED but after taking the first differences $I(1)$ all variable are stationary. As, the time series data were integrated at $I(0)$ and $I(1)$. Error correction model (ECM) model was the appropriate method for estimating the short run and long run effect of repressors variable on regress and variable which not yielded a spurious regression results. *** indicate rejection of the “null hypothesis of non-stationary” at 1% levels of significance.

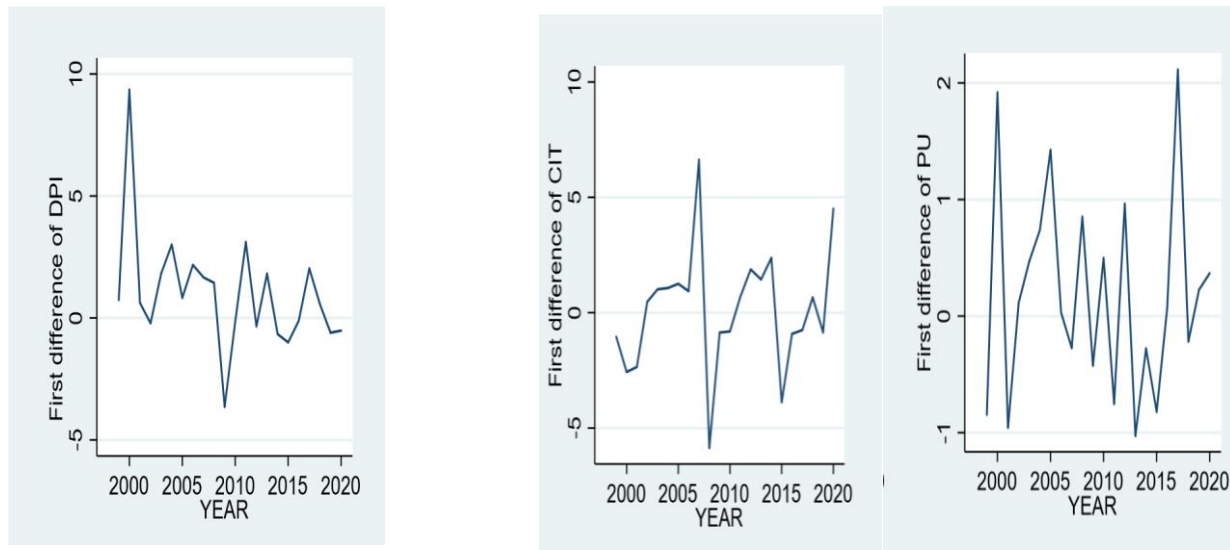


Figure 4. 5: All Variable Achieve Stationarity Only After First Difference

After testing stationarity for raw data by using ADF-test and Phillip-Perron test, the result revealed that all variables are non-stationary except private domestic investment. After applying the first difference all variables becomes stationary and means have constant variance and mean (0.05).

The Co-Integration Analysis

Co-integration tests are mostly used to examine the relationships between research variables. The bound co-integration test is used to determine whether an error correction model is necessary to analyze the existence of a short- run and long- term relationship between corporation income tax revenue and private domestic investment. The Johansen test for co-integration is no longer valid if the variables are stationary at different levels, there are other tests for co-integration such as the Johansen test this always adopted when their order integration is homogeneous among all variable, Gregory-Hansen test that accounts for structural

break if present and Engle-Granger is used in determining the long run dynamics among the variables. The ECM can only be performed if the F-value exceeds the critical value for the upper bound and lower bound.

Bounds Test for Co-integration

The appropriate co-integration test if the variables are integrated of different orders is Bounds test as proposed by Pesaran, Shin and Smith (2001) which means variable estimated were integrated at I(0) at level and I(1) at first difference. The bound testing approach is used to investigate the existence of co-integration between the regressand and regressors. Since all the study variables have a combination of I(0) and I(1) it has heterogeneous order of integration and no variable is integrated at I(2), the researcher is therefore certain that the co-integration analysis using the ARDL bound approach not yielded spurious regression results. If F-value is greater than critical value for upper bound I(1), then there is co-integration we can reject the null hypothesis. The bound co-integration test has one co-integration vector used in ECM because the optimal lag was selected by matrix e(lags).

If F-value is lower than critical value for lower bound I(0), then there is no co-integration we fail to reject the null hypothesis.

Hypothesis

H_0 : Data does not have co-integration.

H_1 : Data has co-integration

Table 4.9: The ARDL Bound Co-Integration Test Results

	0.1		0.05		0.025		0.01	
F statistics	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound	Upper Bound
9.496	2.12	3.23	2.45	3.61	2.75	3.99	3.15	4.43

Bound test results shows that the F-statistic (9.496) is greater than both the upper bound and lower bound at 1%, 2.5%, 5% and 10% hence we reject the null hypothesis that indicates that is co-integration. This implies that there is a long run relationship among the variables.

Error Correction Model (ECM)

The error correction model (ECM) was used to capture both short-run and long-run information. If the model's variables are co-integrated, it was necessary to estimate the ECM in order to assess the speed of adjustment (ADJ) and the long-run convergence of the dataset's variables toward the equilibrium. An Error Correction Model (ECM) can be used and enable the long run equilibrium relationship and the short-run dynamics to be estimated simultaneously (Gujarati, 2004; Chindengwike, 2021; Chindengwike, 2022; Chindengwike and Kira, 2022; Shayo and Chindengwike, 2022). The Error Correction Model (ECM) can be derived from ARDL model through a simple linear transformation, which integrates short run adjustments with long run equilibrium without losing long run information (Nkoro & Uko, 2016). Also, the ECM was employed in this study because the variable has heterogeneous order of integration. According to findings of the bound co-integration test does not meet the VECM's because it is if there is homogeneous integration order. Using Akaike Information Criteria (AIC), the model starts from general to specific by including maximum of 4-lags of selected but the in Error Correlation Model (ECM) estimation results there is no lags because $e(\text{lags})$ used to select lags in ARDL.

This research was done to find out how tax revenue generation affected private domestic investment in Tanzania as shown in the table below Table 4.10 below. The regression model fits because the adjusted R Square shows 73% of the value of the dependent variable is explained by the independent variables included in this study, but the rest 27% is explained by other external variables of this study which have been designated as error terms. The 4-lags was selected by information criteria but error correction model (ECM) estimates have no any lags because ARDL approach used the lags chosen by Matrix list $e(\text{lags})$.

R-squared = 0.8742

Adj R-squared = 0.7358

Table 4.10: Error Correction Model (ECM) Estimation Results

	D.PDI	Coef	Std. err	T	P> t	(95% conf.	interval)
ADJ							
	PDI						
	L1	-.726643	.1344686	-5.40	0.000	-1.030833	-.422455
LR							
	CIT	.3961879	.2039362	1.94	0.084*	-.0651477	.8575236
	PU	.5064219	.6270926	0.81	0.440	-.9121602	1.925004
	LD	.6197828	.1557682	3.98	0.003**	.2674107	.9721549
	PU						
	D1	.4143927	.5500625	0.75	0.470	-.8299351	1.658721
	LD	1.33939	.4394307	3.05	0.014*	.345335	2.333458
		18.99721	5.61318	3.38	0.008	6.299319	31.69511
	_cons						

NOTE: PDI: Private domestic investment as GFCF of private sector as % of GDP; CIT: Corporation tax revenue; Std. Err: standard error; T: t-statistics; P>|t|: P-value; Conf. Interval: confidence interval; Cons: constant term and *, **, *** present the significance at 10%,5% and 1% respectively.

ADJ (Adjustment Coefficient); Results from table 4.10 shows that the parameter of error correction term (ADJ=-0.726) that is negative. The coefficient value is 72.6% meaning that the system corrects the previous period disequilibrium at a speed of 72.6 and the p-value < 5% this show that there is existence of long run causality among the variables. It means the speed of adjustment, 0.726643, which implies that about 72.66 43% point of the last period's disequilibrium is corrected for in the following period.

Long Run (LR) and Short Run (SR); The study was aimed at investigating the long run effect of corporate tax revenue on private domestic investment in Tanzania. This imply that, on average, a percentage increase

in corporate income tax increases private domestic investment by 0.396187% in the long run keeping all other factors constant. Thus, the findings provide an econometric confirmation for the empirical reviews, the company income tax has a significant positive effect on private domestic investment if and only if the CIT has influence on the rate of return on investment thus implying that investment is favored and stimulated by lower taxes while the higher corporate taxes hinders the private domestic investment (William, 2018). This finding is consistent with Nkem and Sunday (2019) findings that found that company income tax has positive effects on private domestic investment. However, it contrasts with Adejare and (2018), Djankov et al. (2010) and Vergara (2004) who found that corporate income tax was negatively related with private domestic investment and Edame and Okoi (2014) analyses that found that the parameter estimates of corporate income tax were negatively related to the level of investment. The results were inconsistent with investment theory, which argued that higher taxes on corporate income reduces business investment because the effect of a corporate income tax that raises the cost of capital will be to reduce the level of investment spending.

Granger Causality Test

Granger causality test is a statistical hypothesis test used to verify the usefulness of variable to forecast another, a variable is said to granger cause another if it is helpful for forecasting another variable. Table 4.11, shows Granger causality tests results for the impact of corporate income tax on private domestic investment in Tanzania for the period 1998-2020.

Table 4.11: Granger Causality Wald Test Results

Null hypothesis	chi2	Prob > chi2	Decision
PDI does not Granger Cause CIT	14.917	0.002**	Rejected
CIT does not Granger Cause PDI	5.4478	0.142	Failed to reject
PDI does not Granger Cause PU	23.608	0.000***	Rejected
PU does not Granger Cause PDI	30.994	0.000***	Rejected

Note: PDI: Private domestic investment; CIT: The Corporate income tax; PU: The Public investment (***, ** and * show presence of causality at 1%, 5% & 10% level of significant).

The Wald test results revealed that, corporate income tax granger cause private domestic investment simply because its Prob > chi2 (0.002) is less than 0.05 significant level, So the null hypothesis that corporate income does not Granger cause Private domestic investment cannot be accepted. The private domestic

investment does not Granger cause corporate income because Prob > chi2 (0.142) is greater than 0.05, therefore null hypothesis can be accepted. The results also, revealed a unidirectional granger causality between private domestic investment and corporate income at 5% level. So, one-way direction was proved between private domestic investment and corporate income tax at 5% level, it means there was no reverse causation from corporate income tax to private domestic investment.

Model Stability Test

The Cumulative Sum (CUSUM) test used to check the model stability. It was used to test if model is dynamically stable and that variables were never affected by external shocks in the prior period. According to the CUSUM testing approach's rules, the estimated model will be stable if its line falls within the fixed CUSUM lines. According to (Xiao & Phillips, 2002), a model is stable if the plot shows that the CUSUM of recursive residuals lie within the range of critical values. All CUSUM of recursive residuals are inside the 5% zone.

Table 4.12: The Cumulative Sum (CUSUM) Test Results

Statistic	Test statistics	1% Critical value	5% Critical value	10% Critical value
Recursive	0.4253	1.1430	0.9479	0.850

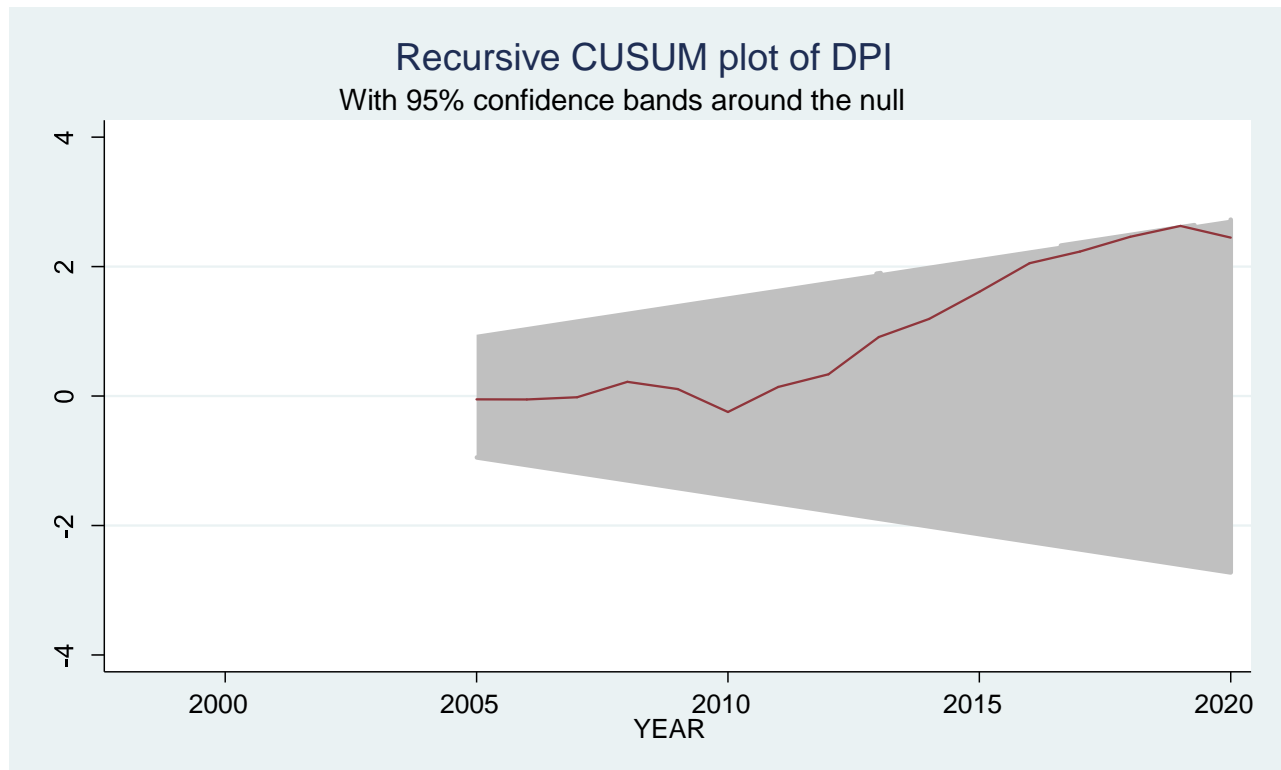


Figure 4.6: Cumulative Sum Test

The Cumulative sum test results revealed by Figure 4.6 shows the straight line represents critical bounds at 5% level of significance. The model was stable due to fact that the graphs of the recursive residuals fell within the critical zone (the model stays within the boundaries of 5% level of significance). The model is valid hence can be used for forecasting and planning in future movement of tax revenue generation and private domestic investment.

Conclusions and Recommendations

The results show that there is a significant positive effect of corporate income tax on private domestic investment in the long-run. The company income tax has a significant positive effect on private domestic investment if and only if the private domestic investment has influence on the rate of return on investment.

The government of Tanzania have to restructure an appropriate corporate income tax policy, where the corporate income tax should be levied at moderate rate and the government can extend the tax bases by formalizing the large informal sector that exists in the Tanzania because that would help to reduce the business and individual tax burdens hence attract potential investors. Another study might be conducted

that places more emphasis on macroeconomic factors like inflation and other tax factors like individual income tax and withholding taxes on private domestic investment.

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