Original Research Article

IMPACT OF REVENUE COLLECTION ON ECONOMIC GROWTH IN ZANZIBAR

ABSTRACT

The purpose of this study was to examine the relationship between revenue collections and economic growth in Zanzibar is tested empirically. The study was attempted to investigate the cointegrating relationship and causality between the variables using VECM model covering the period from 2000Q1 through 2019Q4. The study employed modern time series econometrics techniques such as, unit root test, lag selection criteria, cointegration test. The econometric analysis established that total revenue collected has a positive effect on real GDP Zanzibar. The result shows that total revenue and capital formation have a positive and significant effect on economic growth. Whereas, inflation rate and labor have a negative effect on real GDP as a measure of economic growth in Zanzibar in the long run. The researcher recommended that the government should intensify efforts generating tax revenue, establish a strong fiscal responsibility in the country, adopt tax reforms that would encourage increase in investment and policy to improve labor productivity should be sustained while policy to improve non-tax revenue is needed in a country.

1. Introduction

Governments need to perform various functions in the field of political, social and economic activities to maximize social and economic welfare. In order to perform these duties and functions the government requires a large number of resources. These resources are called Public Revenues. Taxes are the first and foremost sources of public revenue. Public revenue consists of taxes, revenue from administrative activities like fines, fees, gifts and grants. Public revenue can be classified into two types including: tax and non-tax revenue (Illyas and Siddiqi, 2010).

Countries used revenue as a fund to mobilize every economic activity. Sustained economic growth depends on the level of revenue collection, whose stocks increase mainly due to better tax administration and awareness by the people towards the taxation system. The vital instrument by which resources are assembled is through the implementation of an effective tax policy (Wawire, 2011). Economic growth is caused by an increase in aggregate supply and aggregate demand for which tax revenue is of the vigorous importance for the sustainability of both developed and developing countries.

The measure of the amount of tax revenue countries are expected to raise is widely measured by the tax to GDP ratio. Tax- to- GDP ratio is the best and comprehensive indicator to check the tax revenue status in any country. Tax system is rarely based on Canons of taxation, like Principle of equality, certainty, convenience, economy, productivity, elasticity, simplicity and the canon of coordination. (Shahzad et al., 2016). As a percentage of GDP, total non-tax revenues were lower than tax revenues in all 16 African countries, although the amounts varied considerably between countries due to a wide disparity in natural resource revenues and international donations (foreign aid, debt relief, or funding of national programmes). Non-tax revenues as a percentage of GDP also varied significantly more than tax revenues over time (Revenue statistics in Africa, 2017).

A sound tax system should identify surpluses in the economy and should tax it in such a fashion as to cause minimal damage to productive activity. Tax collection should act as a catalyst for economic growth. Ideally a tax system should be neutral with respect to its effect on economic behavior. In the real world, however, it is impossible to achieve neutrality. Administrative feasibility and practicability are two important constraints on tax policy. These are also matters of convenience to varying degrees.

A tax policy is administratively feasible when its enforcement does not cost too much. At the same time administrative feasibility should not be an excuse to compromise the original objective. Further, a tax structure should treat equally those individuals who are approximately in the same situation and account for differences among people who are in dissimilar situations. Finally, every tax should be collected at the time or in the manner in which it is the most convenient for the contributor to pay it, and every tax should be so contrived as both to take out and keep out of the pockets of people as little as possible over and above what it brings to the public treasury (David G. Davies, 1986).

1.1 Trend of Revenue collections

Government resource envelope, consisting of domestic revenue and foreign grants, amounted to TZS 720.0 billion in 2017/18, of which TZS 685.5 billion was domestic revenue and the balance was grants. Revenue collection was above the annual target by 1.4 percent, largely associated with improved tax administration and compliance. Tax revenue accounted for 90.6 percent of the revenue collections, and was above the target by 1.6 percent. All tax revenue categories were above the annual targets except tax on imports. Non-tax revenue amounted to TZS 64.7 billion, above the annual target by 0.3 percent largely due to dividend from public corporations (BOT report 2018).

Tanzania Revenue Authority (TRA) and Zanzibar Revenue Board (ZRB) largely attributed good performance in revenue collection of Zanzibar to increased tax collection efforts, until April 2019, domestic revenue amounted to TZS 637.0 billion e of the target for the period. Tax revenue was 92.5 percent of the target, while non-tax revenue was 105.3 percent, coupled with improved tax compliance.

1.2 Economic Growth of Zanzibar

Zanzibar economy continued to record strong performance, growing at an average of 6.3 percent in the period from 2011 to 2018. In 2018, real GDP grew by 7.1 percent compared with 7.7 percent in the preceding year. Major contributors to the registered growth were accommodation and food services; trade and repairs; and transport and storage activities. Zanzibar economy is projected to grow at 7.8 percent in 2020 on account of the ongoing public investment in health, education, and infrastructure in particular roads, ports and airports, and increase in private sector investment in tourism related activities (BOT Report, 2019).

The inflation remained below the medium target of 5 per cent, same as the previous month of October, while annual headline inflation was 2.4 per cent in October 2019 compared with 3.7 percent recorded in October 2018 largely due to easing in non-food inflation. On the same mark, the twelve-month non-food inflation eased to 2.7 percent in October 2019 from 4.5 percent in the corresponding month of 2018 mainly due to a decline in prices of kerosene, diesel and petrol, while in October the inflation was moderated by prices of fish, rice, and bananas (BOT Report, 2019).

Figure 1: Real GDP Growth
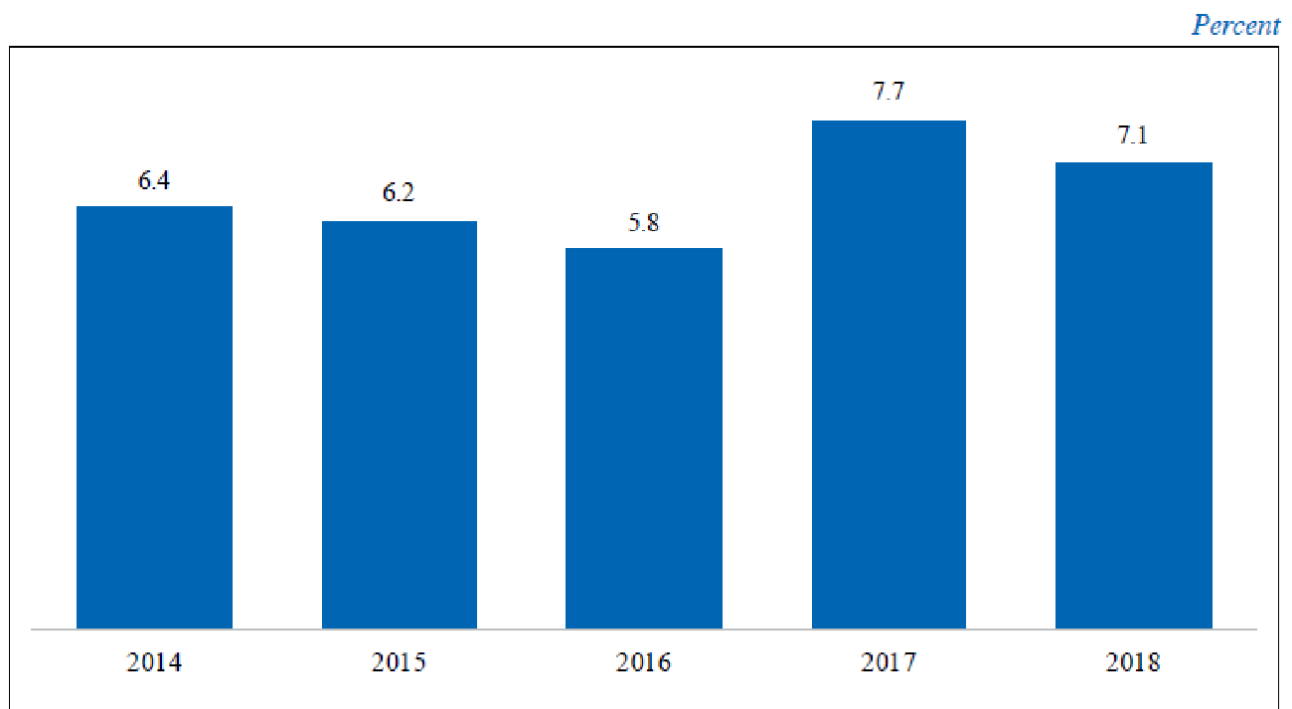
1.3 Statement of the Problem

The government can raise its revenue through levying indifferent sectors while giving careful attention in balancing its revenue with economic growth. High levels of tax collection increase the spending power of the government in other states and may discourage certain productive economic activities (Christina 2014).

Over the past twenty years, the Revolutionary Government of Zanzibar has prepared and implemented the Zanzibar vision 2020, which is now going to an end. The vision intended by the year 2020 Zanzibar should have made the achievements for the objective of attain a high and sustainable economic growth averaging 9-10 percent per annum over the period from the current level of 4.5 percent in (1999). During 2019/20, the Governments will continue to implement various projects under Zanzibar vision 2020 and MKUZA III (2015 – 2020) that aim at improving the business environment, reducing cost of doing business, building the foundation for industrialization and spurring inclusive economic growth towards transforming the country into a middle-income economy (BOT Report 2019).

Therefore, the vision 2020 expanding Domestic Financial Resource Base, then vision's policy on increasing domestic financial resource base is to initiate investment programmes that shall generate domestic revenue. During the period July 2018 to April 2019, domestic revenue amounted to TZS 637.0 billion equivalent to 94.1 percent of the target for the period. Specifically, tax revenue was

92.5 percent of the target, while non-tax revenues was 105.3 percent. Tanzania Revenue Authority (TRA) and Zanzibar Revenue Board (ZRB), coupled with improved tax compliance (BOT report 2019), largely attributed good performance in revenue collection to increased tax collection efforts. But still The expected growth between the year 2000 to 2005 should be between 5-6 percent at 1985 prices, rising to between 7-8 per cent by the year 2010 and attained the level of between 9 and 10 percent by 2020 (Zanzibar vision 2020). Therefore, the target of 10 per cent overall annual economic growth has not been met, with growth reaching average of 7 per cent annually since 2014 (Zanzibar Strategy For Growth And Reduction Of Poverty, ZSGRP III). Therefore there is a need to analyze the impact of the revenue collections on economic growth of Zanzibar.

Most of the studies done in other countries on the relationship between tax revenue and economic growth attain different decisions. Biruk (2014) studied on "The Relationship between Government Revenue growth and Economic Growth in Ethiopia; the result revealed that "Government tax revenue growth in general and with its component though affect economic growth found to have no causal relationship with economic growth in the long run. This implies there is fiscal independence between tax revenue and economic growth; however Delessa (2015) controversially shows that there is unidirectional causality running from direct tax to Economic growth. Hence, to bring consensus about the relationship between government revenue and economic growth, other studies are mandatory.

Most of them support that increase in tax reduces economic growth whereas others argue that tax is an essential tool for economic growth and government especially in fiscal policy. The research done mainly focuses on the tax side of government revenue such as. Moreover, there is little research done in the area of tax revenue and economic growth in our country. Thus, this research will examine the impact of the revenue collections and economic growth in Zanzibar.

1.4 Objectives of the Study

The objective of the study was to analyze the impact of the total revenue collected and economic growth in Zanzibar.

2.0 Empirical Literature Review

Mashkoor (2010) examined the relationship between tax revenues and the rate of economic growth in Pakistan narrowed on the "perception that the low ratio of direct to total taxation promotes high economic growth". The author claims that higher taxes decrease the investment rate, discourage research and development activities (that are key to higher productivity), reduce the work effort and distort both labor and capital markets. By using Pakistani data for the period 1973-2008. The author concluded that the direct tax to GDP ratio Granger caused the growth in real GDP significantly and recommended that the country should decrease its heavy reliance on indirect taxation. Delessa et al (2015) analyzed the long run relationship between direct tax and economic growth in Ethiopia for the period 1971-2013. The granger causality test shows that direct tax causality on economic growth of Ethiopia was found to be significant.

Stoilova & Patonov (2012) conduct about the impact of taxation on economic growth in 27 European Union countries, using data for the period 1995 – 2010. They discovered that direct tax revenue made a more efficient impact on economic growth in EU countries than indirect taxes. In a related study, Otu & Theophilus (2013) examined the effects of tax revenue on economic growth in Nigeria, utilizing time series data for the period spanning from 1970 to 2011. Their results showed that domestic investment, labor force and foreign direct investment have positive and significant effects on economic growth in Nigeria.

Ogbonna & Appah (2016) investigated the effects of tax administration and revenue on economic growth of Nigeria. Data collected from the questionnaires and secondary data were analyzed using relevant regression analysis. Their results revealed that there was a significant relationship between the following: Personal income tax revenue (PITR) and per capita income; Company income Tax Revenue and Gross Domestic product of Nigeria; VAT revenue and PCI of Nigeria, Petroleum Profit Tax revenue and GDP of Nigeria.

Dani(2013) employed the appropriate fixed and random effect to determine the fitness of the model using Housman test. The study conducted the Hausman test to determine the appropriate estimator between fixed and random effects. To confirm the robustness and validity of the regression model, some past estimation tests are conducted which omit variable Test, and Hetroskedasticity test. Findings indicated that tax revenue is positively related to GDP and promotes Economic Growth in Africa. It was significant at 5% level. The study conducted that tax revenue has a significant positive relationship with Gross Domestic product. Therefore, high and weak levels of taxation are favorable to economic growth as they uphold the economic effect of Ibn Khaldun's theory on taxation ,which approves the positive impact that lower tax rates have on work, output performance. However, in the midst of harsh economic conditions such as crashing oil prices, rising exchange rates, drop in Naira value, the government should be ready to develop a comprehensive tax structure or model that will grow, nature and sustain its tax base so as to drive economic performance.

A study by Basirat et al. (2014) applied the ARDL model to examine the effect of economic variables on total tax revenues for Iran economy for a period of 1974 to 2011. The finding revealed that the value-added of the industry sector with coefficient of 1.0841 had a positive and significant effect on total tax revenues. On the other hand, the value-added of agriculture sector with coefficient of 1.1801 had a significant negative impact on total tax revenues. The study revealed that the speed at which tax revenue adjusts to its long run steady state (i.e. measured by error correction term) is 57% annually.

Muibi and Sinbo (2013) attempts to examine the macroeconomic determinants of tax revenue in Nigeria for the period 1970 to 2011 and for this he applied Johnson co integration approach and error correction model. The study justified that in Nigeria, the level and growth rate of economic activity affect tax revenue positively. The study also revealed that any past deviation in tax revenue will be corrected towards long run steady state by 47% speed of adjustment in period under consideration. By using the same methodology Bayu (2015), analyzed tax buoyancy and its determinants in Ethiopia. The result on this study revealed that direct and domestic indirect tax revenues were non-buoyant both in the short and long run, though foreign trade taxes showed sign of buoyancy in the long run. The study find out the share of services sector value added, level of

import and over all government budget deficits to GDP affected the tax buoyancy positively, whereas the impact of the share of official development assistance toGDP was negative and the impact of the share of industry value added to GDP was positive but not statistically significant.

Sekou (2015) in his study utilised ordinary least squares method, and reports positive and significant positive correlation between the collection of taxes and growth in Mali. Godin & Hindriks (2015), examine some of the main determinants of tax collection using database covering 203 countries with 40 tax items over the period 1980-2010. They concluded that tax revenues have a positive effect on economic growth, government efficiency, and trade openness, along with the size of tax rates. On the contrary, trade taxes and a higher share of agriculture in GDP decreases the amount of tax revenues. Delessa et al (2015) analyzed the long run relationship between direct tax and economic growth in Ethiopia for the period 1971-2013. The granger causality test shows that direct tax causality on economic growth of Ethiopia was found to be significant.

The applied panel data estimation under the fixed effect assumptions deployed by Ugwunta and Ugwuanyi (2015) reported a positive but insignificant relationship between non-distortionary taxes and economic growth of sub – Saharan countries. Similar result was obtained by Yilimon (2014) using unit root test on panel data. It suggests the absence of a non-linear relationship between tax revenue and economic growth of West African Economic Monetary Union (WAEMU) countries. Anne (2014), in her own study adopted Ordinary Least Squares, Unit Root tests, Johanssen Cointegration Test, Vector Error Correction Model (VECM), and finds a negative but insignificant effect of income taxes on the Kenyan economy.

Bargicho (2016) analyze the effect of government expenditure and tax on economic growth in Ethiopia, during the sample period of 1980/81 to 2013/14 and he found that the long run current expenditure and direct taxes have negative and significant effect on the real Gross domestic product but capital expenditure and indirect taxes have positive and significant effect on the real Gross domestic product and finally he proved the Keynesian view.

Al-Fawwaz (2016) examine the impact of government expenditures on economic growth in Jordan from the period between1980-2013 and the results show that there is a positive impact for both total government expenditure and current government expenditure on economicgrowth. This result supports the Keynesian model. Similarly, Hua (2016) studied the relationship between public expenditure on education and economic growth in China. The empirical findings from the study show that there is positive and significant relationship between public expenditure, education and economic growth.

2.1 Research Gap

The empirical literatures show different and disaggregated findings. Ugwunta and Ugwuanyi (2015) and Dasalegn (2014), indicated positive relationship between taxation and economic growth. On the other hand, a negative relationship was reported in the works of Keho (2013), Juniours and Tafirenyika (2010), Delessa and Daba (2014), Saima et al. (2014).

In general the conflicting findings on the relationship between government revenue and economic growth necessitate this study which seeks to further investigate both in the short run dynamism and

the long run relationship of these variables, specifically Zanzibar environment. Therefore, the present study examines revenue collections and economic growth from the context of Zanzibar by applying the Johansen cointegration approach.

3.0 Research Methodology
3.1 Research Design
The study adopted a descriptive research design. According to Cooper and Schindler (2003), a descriptive study is concerned with finding out the what, where and how of a phenomenon. Descriptive research design is chosen because it allows one to collect quantitative data which can be analyzed quantitatively using descriptive and inferential statistics. Also a descriptive approach in data collection is able to collect accurate data on and provide a clear picture of the phenomenon under study. This design is also selected because the researcher sought to build a profile about the relationship between revenue collections and economic growth of Zanzibar.

3.2 Data Analysis
The study employed a statistical package for windows mainly used for time series oriented econometric analysis EVIEW 12 which is the worldwide leader in windows based econometric software for the very best and quality output..

3.3 Model Specification

The following model tests the relationship between revenue collections and economic growth: This model employs multivariate regression. The basic model used is the modern economic growth theory based on the Cobb-Douglas production function as explained in the basic theoretical connection below:

The neoclassical growth model of Solow (1956) and Swan (1956) provides the basic theoretical connection between economic growth and revenue collections. To see why, consider the following Solow (or Solow-Swan) model, which explains total output in an economy (Y_t) as product of the combination of capital (K_t) and labor (L_t)

$$Y_t = f(K^\alpha_t L^\delta_t) \qquad\qquad (1)$$

Where Y_t is the total output, f is the technology which transforms K_t and L_t into Y_t, and t is the time subscript.

Y_t the total economy-wide output is attributed to labor and capital. In his seminal paper, Solow (1956) demonstrates that after accounting for the proportion of total output attributed to labor and capital, the remaining portion is due to what he calls total factor productivity (TFP). Thus, the growth in the total output of an economy is attributed to the growth in labor, capital, and TFP, according to Solow's growth accounting framework. The TFP growth is considered as the effect of exogenous technological progress in this neoclassical growth model, which can also be reflected in increasing productive efficiency. To account for this TFP in output, *Eq.* (1) is restated as

$$Y_t = f\ (K_t L_t\ A_t) \tag{2}$$

Where A_t is total factor productivity. If we assume that the functional form of *Eq.* (2) is Cobb-Douglas form, then we have

$$Y_t = A_t K_t^{\alpha} L_t^{\beta} \tag{3}$$

Where α and β are shares of capital and labor, respectively.

Solow (1956) argues that the Cobb-Douglas production function is convenient because it exhibits constant returns to scale. The key point to note here is that A_t is not constant but varies over time. This assumption is necessary in order to allow factors such as foreign direct investment, investment in research and development, tax revenue among others to influence TFP. The assumption that the functional form of *Eq.* (2) is Cobb-Douglas is widely used in the literature (for instance, Ram and Ramsey 1989; Fosu 1990; Mansouri 2005; Fosu and Magnus 2006; Fosu and Aryeetey2008).

3.3.1 Empirical Model Specification

This study adopts the basic neoclassical Solow growth model but departs from this model by allowing technology, A_t, to evolve over time. The majority of the literature on economic growth indicates that there are a large number of variables that can affect the TFP (A_t) in *Eq.* (3). Following studies such as Mansouri (2005), Fosu and Magnus (2006), we augment *Eq.*(3) as follows

$$A_t = f(TR_t, INF_t, EXP_t) = TR_t^{\delta 1},\ CPI_t^{\delta 2} \tag{4}$$

Then by substituting *Eq.* (4) into *Eq.* (3), we arrive at the following extended form

$$Y_t = \mu K_t^{\alpha} L_t^{\beta} INF_t^{\delta 1} CPI_t^{\delta 2} \tag{5}$$

where TR_t is total revenue collection, CPI_t is consumer price index inflation, and δ_i are the share of these inputs in the total output.

The standard procedure for estimating *Eq.* (5) is by first log-linearizing it. By taking the natural logarithm of *Eq.* (5), we arrive at the following specification

$$Y_t = ln\mu + \alpha lnK_t + \beta lnL_t + \delta_1 lnTR_t + {}_2 ln\text{INF}_t + \epsilon_t \tag{6}$$

By letting $ln\mu = \gamma$, then *Eq.* (6) becomes

$$Y_t = \gamma + \alpha lnK_t + \beta lnL_t + \delta_1 lnTR_t + \delta_2 ln\text{INF}_t + \epsilon_t \tag{7}$$

Where ln is the natural logarithm operator; and ϵ_t denotes the unobserved determinants of the total output, Y_t, which is white-noise.

3.3.2 Unit Root Test

The classical time series regression model is based on the assumption that the data generating processes are stationary, i.e., the moments of the variables under consideration are time invariant. However, as the economy grows and evolves over time, most macroeconomic variables are likely to grow over time rendering them non-stationary (Granger and Newbold, 1974).

In order to avoid biased results, testing stationarity of those variables is very important. There are several ways to test the presence of unit root. To check the stationarity of each variable, this study will use two alternative unit root tests to investigate the property of time series data: Augmented Dickey-Fuller (ADF) test proposed by Dickey and Fuller (Dickey & Fuller, 1981) and Phillips-Perron test proposed by Phillips and Perron, (1988) In order to check the stationary of the variables.The famous one is Augmented Dickey Fuller (ADF) test as given in (Dickey & Fuller, 1981)was suitable for the model that includes the term dependent variables as independent variables. ADF test always assumes rejecting the null hypothesis of a unit root. The hypotheses of unit root are:

Null hypothesis

$H_o: \emptyset = 0$:   There is a unit root problem (non-stationary data)

Alternative hypothesis

$H_1: \emptyset < 1$:   There is no unit root problem (stationary data)

The test is conducted for the coefficient of the lagged dependent variables from the following equation:

$$\Delta Y_t = Y_t - Y_{t-1} = \emptyset Y_{t-1} + \mu_t \qquad\qquad (8)$$

The first difference of time series data Y_t

Another test for determining whether a series is stationary or nonstationary is Phillips Perron test (PP Test) was developed by Philips & Perron in 1988 with the assumption of error term to be more statistically independent and constant variance. The testing procedures are the same as the ADF test, but it has been concluded that PP test is more significant compared to ADF test because it presents the corrected non parametric test efficiently and more accounts of the serial correlation problem compared to the t-statistic of ADF test.

3.3.3 Co-integration test

Granger causality tests are sensitive to the stationarity of the series. This is why we first study the stationarity properties of the variables. Having discussed a variety of unit root tests, in order to proceed with co-integration and VEC analyses one needs to be confident as to the order of integration of the series used.

Co-integration among the variables means that two or more variables are said to be co-integrated if they share common trends, that is they have long run equilibrium relationships, co-integration is the necessary criteria for stationary among non-stationary variables. The series are linked by some long-run equilibrium relationship from which they can deviate in the short run but they must return to in the long-run that is they exhibit the same stochastic trend.

Once we proved that all variables are integrated at the same order $I(1)$, the second stage in our methodological process was a cointegration test. To perform this we used the Johansen cointegration test proposed by (Søren Johansen & Juselius, 1990) and (Søren Johansen, 1991; Soren Johansen, 1995), using both the trace and the maximum Eigenvalue tests. If the variables are found to be cointegrated, the relationship may be interpreted as a long run relationship.

The aim of the cointegration test is to determine whether a group of non-stationary series is co-integrated or not. The Johansen's methods take its starting points in the Vector autoregressive (VAR) model as:

$$Y_t = \varphi + a_1 Y_{t-1} + a_2 Y_{t-2} + \cdots + a_q Y_{t-q} + AX_t + \varepsilon_t \tag{9}$$

Where Y_t is a n- vector of non-stationary I (1) endogenous variables that are integrated of order one-commonly denoted I (1) and X_t is a vector of exogenous deterministic variables; $a_1,\ldots,a_q$ and A are matrices of coefficients to be estimated and ε_t is white noise residuals; that is a vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values and uncorrelated with all of the right hand side variables. Because most economic time series are non-stationary, the above stated VAR model is generally estimated in its difference form as:

$$\Delta Y_t = \varphi + \theta Y_{t-1} + \sum_{i=1}^{q-1} \varpi_t \Delta Y_{t-1} + AX_t + \varepsilon_t; \tag{10}$$

Where, $\theta = \sum_{i=1}^{q} a_i$ and $\Delta Y_t = \varphi + \theta Y_{t-1} + \sum_{i=1}^{q-1} \varpi_t Y_{t-1} AX_t + \varepsilon_t$, where

$$\theta = \sum_{i=1}^{q} a_i \text{ and } \varpi \sum_{j=i+1}^{n} a_j \dots \dots \dots \dots \dots \dots \dots \dots \tag{11}$$

Granger's representation theorem that states if the coefficient matrix θ has reduced rank r<n, then there exist nxr matrices α and β each with rank r such that the method state that if θ matrix has reduced rank r<n, then there exist nxr matrices of α and β each with rank r such that $\theta = \alpha\beta$ and βY_t is I(0); r is the number of cointegration relations (the co-integrated rank) and each column of β is the co-integrating vector and α is the matrix of error correlation parameters that measures the speed of adjustments in ΔY_t. On the other hand, model is based on the error correction representation given by the following equation:

$$\Delta Y_t = \varphi + \theta Y_{t-1} + \sum_{i=1}^{q-1} \varpi_t \Delta Y_{t-1} + \varepsilon_t \tag{12}$$

Where Y_t is an (nx1) column vector of q variables, is an (nx1) vector of constant terms, θ and ϖ represent coefficient matrices, Δ is a difference operator, k denotes the lag length, and ε_t is p dimensional Gaussian error with mean zero and variance matrix (white noise disturbance term).

The coefficient matrix θ is known as the impact matrix and it contains information about the long-run relationships. This Equation resembles a vector autoregressive (hereafter, VAR) model in first differences, except for the inclusion of the lagged level of Y_{t-1}, an error correction term (hereafter, ECT), which will contain information about the long run among variables in the vector Y_t.

The vector error correction (hereafter, VEC) method equation above allows for three model specifications:

1.   If θ is of full rank, then Y_t is stationary in levels and a VAR in levels is an appropriate model.
2.   If it has zero rank, then it contains no long run information, and the appropriate model is a VAR in first differences.
3. If the rank of θ is a positive number, r and is less than p (where p is the number of variables in the system), there exists matrices α and β, with dimensions (p x r), such that $\beta\alpha' = \theta$. In this representation β contains the coefficients of the r distinct long run cointegrating vectors that render $\beta'X_t$ stationary, even though X_t is itself non-stationary, and α contains the short-run speed of adjustment coefficients for the equations in the system (Awokuse, 2003).

The Johansen approach to cointegration test is based on two test statistics: the trace test Statistic and the maximum eigenvalue test statistic, as suggested by Johansen (1988) and Osterwald Lenum (1992).

Trace Test Statistic: The likelihood ratio statistic (LR) for the trace test (λ_{trace}) as suggested by Johannes (1988) can be specified as:

$\lambda_{trace}(r) = -T \sum_{i=r+1}^{k} \quad ln\,(1 - \lambda\hat{}_i)$ Where $\lambda\hat{}_i$ is the ith largest Eigenvalue of matrix θ and T number of observations. In the trace test the null hypothesis is that the number of   distinct cointegrating vector(s) is less than or equal to the number of cointegration relations (r) in the trace statistic λ_{trace} will be small when the values of the characteristic roots are closer to zero.

Maximum Eigenvalue Test: The second test statistic is known as the maximal Eigenvalue test which computes the null hypothesis that there are exactly r co-integrating vectors in Yt. The maximum eigenvalue test as suggested by Johansen (1988) examines the null hypothesis of exactly r co-integrating relations against the alternative of r+1 co-integrating relations with the test statistic and is given by:

$\lambda_{max}(r, r + 1) = -Tln(1 - \lambda\hat{}r + 1)\,where\,\lambda\hat{}r + 1\,is\,the\,(r + 1)$is the largest Eigenvalue. In the trace test, the null hypothesis of r=0 is tested against the alternative of r+1 co-integrating vectors. If the estimated value of the characteristic root is close to zero, then the $\lambda trace$ will be small.

For trace statistics, the null hypothesis is that the number of cointegrating vectors is less than or equal to co-integrating vectors (r) against an unspecified alternative. In the case of maximum Eigen-value cointegration test, the null hypothesis is the number of cointegrating vectors (r) against the alternative of $1 + r$ (Ng *et al*., 2008). If the trace statistic is greater than the Eigen-value (critical value), we conclude that the model contains at least one cointegrating equation. Where this condition is violated at a higher order, determines the maximum number of cointegrating equations. Therefore, this study used the Johansen approach.

3.4 Vector Error Correction Model

The vector error correction (VEC) model is just a special case of the VAR for variables that are stationary in their differences (i.e., I(1)). The VEC can also take into account any cointegrating relationships among the variables. According to Engle-Granger (1987) if two time series are cointegrated then the VECM represents them most efficiently. If co-integration has been detected between series we know that there exists a long-term equilibrium relationship between them so we apply VECM in order to evaluate the short run properties of the co-integrated series. In case of no cointegration VECM is no longer required and we directly precede Granger causality tests to establish causal links between variables.

An error correction model is defined as a dynamic model in which the movement of a variable in any period is related to the previous period's gap from the long-run equilibrium. Although it may be possible to estimate the long-run or co-integrating relationship, $Y_t = \beta X_t + \varepsilon_t$ economic systems are rarely in equilibrium, as they are affected by institutional and/or structural changes that might be temporary or permanent.

The variable is subjected to Johansen cointegration test and if it is found that the variables are co-integrate. Followed by using the Granger causality theorem, we posited the following testing relationships that constitute a vector error correction (VEC) model for output growth.

$$\Delta lnRGDP_t = \alpha_0 + \sum_{i=1}^{p} u_{1i}\Delta lnRGDP_{t-i} + \sum_{l=1}^{p} v_{1i}\Delta lnTRC_{t-1} + \sum_{t=1}^{p} w_{1i}\Delta lnK_{t-1} + \sum_{t=1}^{p} x_{1i}\Delta lnL_{t-1}$$
$$+ \sum_{t=1}^{p} y_{1i}\Delta lnINF_{t-1} + \theta_1 ECT_{t-i} + e_t \quad (13)$$

4.0 Data Analysis, Findings and Discussion

4.1 Unit root test

This section, in order to change time series data from non stationary to stationary, it is necessary to test the nature of stationary of the variables before running regression analysis. This helps us to avoid the possibility of running spurious regression, which makes the result unreliable and inconsistent. This test was done using the Augmented Dickey-Fuller (ADF) unit root tests. When

the ADF test statistics is larger than the critical value in absolute terms at 5% level of significance, the null hypothesis of unit root is rejected, and if the ADF test statistics is less than the critical value in the absolute terms, we fail to reject the null hypothesis. The results of ADF test for unit root of variables used in presented in the following table 1.

Table 1 Results of Augmented Dickey Fuller Test

Unrestricted Cointegration Rank Test (Trace)	

Source: Author computation

(2020) Using Eviews 10

Table 1 shows unit root results of the series at level and first differences. The absolute values of the calculated test statistics for all variables are less than its critical values at 5% level of significance. The result indicates that all variables non-stationary at level. Thus, the null hypothesis that each variable has unit root at a level, which cannot be rejected by the ADF test. However, all the variables were found to be stationary at their first difference, and thus we reject the null hypothesis, and the model can be accepted since the coefficients of variables in all cases are negative and statistically significant. The result imply that all the variables included in the models are integrated of order one, I (1). Thus, with the establishment of the order of integration, the studies proceed to

Variable	Test Statistic (Level)	P-Value (Level)	Test Statistic (Differenced)	P-Value (Differenced)	Order of Integration
LNRGP	-0.487	0.8946	-3.450	0.0094	I (1)
LNCPI	-1.967	0.7381	-2.732	0.0052	I (1)
LNLAB	-1.925	0.8542	-2.641	0.0041	I(1)
LNCAP	0.527	0.9857	-3.361	0.0124	I (1)
LNTRC	2.320	0.9990	-3.019	0.0331	I (1)

testing for long-run relationship by employing Johansen approach to test co-integration.

4.2 Johansson Co-Integration Test

Table 2: Johansen's co-integration test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.402410	105.0371	69.81889	0.0000
At most 1 *	0.328681	65.39355	47.85613	0.0005
At most 2 *	0.272667	34.70826	29.79707	0.0125
At most 3	0.123965	10.19375	15.49471	0.2661
Trace test indicates 3 cointegratingeqn(s) at the 0.05 level				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.402410	39.64351	33.87687	0.0092
At most 1 *	0.328681	30.68530	27.58434	0.0193
At most 2 *	0.272667	24.51451	21.13162	0.0160
At most 3	0.123965	10.19091	14.26460	0.1997
Max-eigenvalue test indicates 3 cointegratingeqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				

Source: Author computation (2020) Using Eviews 10

The results in this section can be seen from table 2 that the unrestricted co-integration rank tests both trace statistics (λtrace) and maximum Eigen value (λmax) show the existence of one co-integrating vectors in the system.

This means, the null hypothesis of no co-integration is rejected by both the (λmax) and (λtrace) statistics. Thus, both λtrace and maximum Eigen value (λmax) are significant at 5% level. It can be conclude that among the variables there is long run relationship. The result of testing the number of co-integrating vector is shown in table 2concludes that both the trace statistic and the maximum-Eigen value statistic indicate the presence of one cointegration among the variables. This confirms the existence of a stable long-run relationship among economic growth (RGDP)

as measured by real GDP, revenue collections, labor, capital and inflation. Both trace and Max-Eigen statistics confirm the variables are cointegrated at most one.

4.3 Vector Error Correction Estimate: Objective number one

The results of the long run estimates from VECM indicated that both total revenue collection and capital contribute positively to economic growth. However, the results show labour and inflation rate contributed negatively to economic growth. Then vector error correction model (VECM) is considered to be appropriate for the study in examining objective one, Based on the unit root and cointegration test outcomes, the following Vector Error-Correction Model (VECM) is anticipated to fulfill the nature of the short-run and long-run relationships between the variables.

4.3.1 Normalized cointegrating coefficients

The normalization of real GDP was done as shown in Table 1. VECMs representations would have the following form, in equations as presented in the table 1 and equation below.

Table 2 Vector Error Correction Estimate equation

Normalized cointegrating coefficients						
Variable	LNRGDP	LNLTRC	LNCAP	LNINF	LNLAB	Constant
Coefficient	1.000000	1.03693	0.524172	-3.31460	-1.511704	26.1491
Standard error		0.27871	0.11318	0.92631	0.47115	
t-statistics		3.720487	4.63132	-3.57829	- 3.20855	

Source: Author computation (2020) Using Eviews 12

The following regression equation

$$LOGGDP_t = 26.1491 + 1.03693LOGTRC_t + 0.524172LOGCAP_t - 1.511704LOGLAB_t - 3.31460LOGINF_t \quad (17)$$

All the coefficients of LNTRC, LNINF and LNLAB were statistically significant on the LNRGDP at the 5% level for its absolute t-values was greater than two. The model above represents the long run estimation. Firstly, the trend exerts a positive effect of revenue collected and capital formation on real GDP, while it shows inflation rate and labor are negatively related with real GDP and all variables have significantly effect on real GDP since their t-statistics were greater than 2.

The relationship between total revenue collected and real GDP as measure of economic growth found to be a positive relationship and statistically significant at 5 percent level for its absolute t-values was greater than two (Gujarati, 2004) having the value of 3.720487; its coefficient is 1.03693. This implies that holding all other factors constant in the long run, as time passes by, if total revenue has increased by one unit then real GDP of Zanzibar will grow by about 1.03693 units. This is justified by the fact that as time goes on, the positive effect is justified by the fact that total revenue collected by the government will be used for infrastructural development in the various sectors of the economy which will lead to increase in output for economic development of Zanzibar. This is consistent with the findings of Ogbonna and Ebimobowei (2012) who found a positive and significant effect of tax revenue on economic growth in the long-run, also this finding is in line with Delessa et al (2015) whom they found that revenue have granger cause economic growth.

The results shown in table 1 revealed that there is a positive and significant (statistically significant at 5 percent level for its absolute t-values was greater than two (Gujarati, 2004)) relationship between capital formation and real GDP as a measure of economic growth in Zanzibar. The coefficient of capital formation is 0.524172 this reveals that a unit increase in capital will result in an increase of 52.4 percent in real GDP. This finding is supported by a study of Ibe S, Osuagwu N. (2016) which highlighted that economic growth will increase if there is an increase in the capital stock.

With respect to other explanatory variables, it was observed that the labor force had a significant negative on economic growth with coefficient values of -1.511704. The implication of this is that a one percent increase in labor would negatively stimulate economic growth in the long run at the 1.51 percent. With results, we conclude that it does not contribute positively to economic growth of Zanzibar. The negative labor impact on the economic growth observed and presently indicates that a focused policy encouraging employment is needed.

Furthermore, the inflation rate has the sign that accord with prior expectations, that is, inflation has a negative impact on real GDP as a measure of economic growth in Zanzibar. The coefficient value of inflation rate found in table 1 is -1.511704 and statistically significant at 5 percent level for its absolute t-values was greater than two (Gujarati, 2004) which is -3.57829.

The estimated equation (17) indicated that the negative impact of inflation on real GDP can be interpreted as an increase in an inflation rate by one unit will lead to a decrease in real GDP by 1.511704 units. These results agreed with various theories of inflation and economic growth (Monetarists) as well as other previous researchers such as (Ahmed, 2010; Chimobi, 2010; Quartey, 2010). These statistically significant results indicated that persistent increase in the general price has a negative impact on economic growth in Tanzania.

5.0 Conclusion

From the findings of the empirical analysis, for Zanzibar to attain its economic growth and development, she must be able to generate enough revenue. The general objective of the study is to analyze the impact of the total revenue collected and economic growth in Zanzibar, over the period 2000-2019 quarterly. The revenue profile of Zanzibar consists of revenue from tax revenue and non- tax revenue sector accounting for 2000 to 2019 of the total revenue. The total revenue of Zanzibar consists of direct tax and indirect taxes.

The study was therefore to provide empirical evidence of the relationship between total revenue collected and economic growth in Zanzibar. The ordinary least squares method was used in multiple linear regression and VECM models in analyzing the relationship between total revenue and economic growth. The variables such as total revenue collected, inflation rate Labor force and capital are added as the variables that affect the real GDP as a measure of economic growth of Zanzibar. The unit roots are undertaken to check whether variables are stationary or not. All variables are stationary at their first difference by using augmented dickey fuller test. Since all the variables are stationary at their first difference the researcher runs the cointegration test to check whether the long run relationship among variables. The trace statistics had told us there is a long

run relationship between variables at 5% level of significance level of P value. Hence we can run the VECM model to check the relationship among variables.

The long run cointegrating vector indicates that total revenue collected, inflation rate, labor and capital formation have registered the expected sign and are statistically significant. A 1% change in total revenue collected and capital will result in 103.693% and 52.4172% increase in real GDP respectively, while 1% changes in inflation rate and labor will result in 331.460% and 1.511704% decreases in real GDP respectively. However, all variables were shown to be statistically significant on real GDP.

The result shows that lag in one of all the variables used, only real GDP is statistically significant; meaning in the long run the impact on economic growth is only observed from the previous one quarter of growth in Real GDP itself.

The study therefore contributes to the existing body of knowledge by determining the relationship of total revenue collected and economic growth in Zanzibar.

5.1 Recommendations

From the empirical analysis, the findings of the researcher recommended that Zanzibar should intensify efforts in generating total revenue, establish a strong fiscal responsibility and transparency system, adopt tax reforms that should encourage increase in investment, particularly attracting foreign direct investment, fight corruption, invest generated revenue in critical infra-structure so as to provide the enabling environment to foster stability and economic growth in the economy.

Revenue collected has a positive relation with economic growth in Zanzibar, so the government of Zanzibar must take care and make an appropriate action while increasing the revenue collection since the population of the country is at a low standard of life.

Grants should be a last resort by the government to improve the economy and if need be the grant should be plowed into productive ventures so as to accelerate economic activities in the country.

Government should adopt more effective and efficient measures for tax administration in Zanzibar, to further emphasize the issue of transparency and accountability in the government's performance of its fiscal responsibility to the people. This will improve tax compliance.

5.3 Areas for further

There is a need to conduct further study on the assessment of the impact of the VAT on GDP and revenue collection in Tanzania which can be useful in comparative analysis between Tanzania and Zanzibar thus deviation and experience can be leant. Also suggested topics for further research include: The Challenges of Tax Collection in Zanzibar Economy. The assessment of the impact of the VAT and revenue collection on Tanzania economy. Other areas not covered include transparency in import tax collection leading to corruption, lack of improper import tax information

system, the problem of the tax system to meet requirements of a market economy to ensure trade competitiveness and the fluctuation of the value currency. The researcher believes that further studies into these areas bring substantive results.

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