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Impact of Tax Revenue on Economic Growth in Rwanda from 2006-2021

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Abstract

This study uses time series data from Rwanda Revenue Authority (RRA) and the National Institute of Statistics of Rwanda spanning from 2006Q1–2021Q4. Gross Domestic Product (GDP) as a proxy for economic growth is the dependent variable, while Direct Tax (DT), Tax on Goods and Services (TGS), and Tax on International Trade (TIT), which are all independent variables. The unit root and co-integration tests found that all variables are co-integrated of order one which implying that there is a long-run equilibrium relationship among variables. As a result, the Johnsen test was used, and the results demonstrate that DT, TGS, and TIT have a long-run impact on GDP, but there is no short-run causation between DT, TGS, and TIT on GDP. The adjusted *R*-squared is 0.994407, it reveals that 60% of the variability observed in the target variable is explained by the regression model. The other 0.6% cannot be explained by the model used. Keeping all other variables equal, the result reveals that one percent (1%) change in DT and TGS leads to increased economic growth (GDP) by 0.19% and 0.58% respectively. This study concludes that direct tax and tax on goods and services variables have positive and significant impacts on economic growth, while the tax on international trade variable has no significant impact on economic growth. This study recommends that policymakers focus on domestic taxes to have an impact on the economic growth of Rwanda more than customs tax.

Keywords: Tax Revenue, GDP, Direct Tax, Tax on Goods and Services, Tax on International Trade and Transactions, Rwanda

1. Introduction

1.1. Background of Study

Rwanda was a proponent of economic development. The ability of a country to thrive and develop economically is largely determined by the amount of tax income collected to advance the economy.

According to Bruce *et al.* (2006), the most important role of a tax system is to generate enough income to fund government service delivery. The government is responsible for a wide range of goods and services for its population, including health, education, national security, law and order, and economic management.

According to Mustafa (2000), when the economy grows, more people and businesses will have more income and hence be liable to pay larger taxes. The effectiveness and responsiveness of tax revenue mobilization in response to

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growth in the tax base, GDP, or national income is measured by tax elasticity. If tax receipts increase more than proportionately in response to a rise in the tax base, the tax is said to be elastic. If the tax revenue were less sensitive to the tax base, the government would not be able to produce an adequate income in the long run.

The Rwanda Revenue Authority analyzes long-term tax elasticity in relation to changes in GDP in order to highlight tax gaps within a sector, as part of its mandate of assessing, collecting, and accounting for tax, customs, and other specified non-tax revenues, assisting taxpayers in understanding and meeting their tax obligations, and thus raising compliance.

Profitability benchmarking based on company operations must also be done within this framework in order to identify areas of tax compliance irregularities and, as a result, take actions to improve tax collection.

According to Azubike (2009), tax is an important player in every civilization on the planet. Taxation is the most effective way to reduce foreign aid by mobilizing internal government resources, resulting in a more conducive climate for economic growth.

Taxes, according to Nzotta (2007), are important sources of revenue for the federation account, which is shared by the federal, state, and local governments.

As a result, Rwanda's tax system is separated into two parts: decentralized taxation and fiscal taxation, as well as other administrative fees from Rwanda Online, known as Irembo.

2. Problem Statement

Rwanda, like other countries throughout the world, particularly in Africa, is currently experiencing a number of issues in terms of maximizing tax income and the tax-to-GDP ratio for economic growth and development, while attempting to achieve long-term development goals. The most obvious and challenging task is determining the best balance between a tax regime that is friendly to employees, businesses, and investors while still leveraging adequate money for public service delivery, which makes the economy more appealing to financiers.

Furthermore, tax compliance in Rwanda is shaky, as many people opt not to pay taxes. As a result of people's unwillingness to pay taxes and tax evasion, the economy continues to lose a significant amount of money. If this lost tax revenue were to be reintroduced into the economy and properly utilized, the nation's wealth could be transformed. This problem has persisted for a long time in poor nations like Rwanda, and it deserves urgent attention and solutions. A result, evaluating the impact of tax revenue on economic growth in Rwanda over a 15-year period from 2006 to 2021 is a timely research project, as there is a pressing need to delve deeper into the relationship between direct tax, tax on goods and services, and tax on international trade and transactions on Rwanda's economic growth. This research will not only increase Rwanda's income base, but will also benefit African Tax Administration Forum members and worldwide economies. As a result, this research project studies the impact of tax income on economic growth in Rwanda by assessing the system's tax gap through time and therefore highlighting the major difficulties that must be addressed. More research on tax income and its impact on Rwanda's economic development is required.

3. Objective of Study

The broad objective of this study is to examine the impact of tax revenue on economic growth in Rwanda, spanning from 2006 to 2021. The specific objectives of the study are to:

1. To scrutinize the relationship between direct tax and economic growth in Rwanda from 2006-2021;

2. To examine the relationship between taxes on goods and services and economic growth in Rwanda from 2006-2021; and

3. To assess the relationship between taxes on international trade and economic growth in Rwanda from 2006-2021.

4. Research Questions

The study attempted to answer the following questions.

1. What is the relationship between direct tax and economic growth in Rwanda from 2006-2021?

2. What is the relationship between taxes on goods and services and economic growth in Rwanda from 2006-2021?

3. What is the relationship between taxes on international trade and economic growth in Rwanda from 2006-2021?

5. Hypotheses

Three research hypotheses are of interest:

H_0: *There was no positive significant relationship between direct tax and economic growth in Rwanda. From 2006 to 2021.*

H_1: *There was a positive significant relationship between direct tax and economic growth in Rwanda from 2006-2021.*

H_0: *There was no positive significant relationship between taxes on goods and services and economic growth in Rwanda from 2006-2021.*

H_1: *There is a positive significant relationship between taxes on goods and services and economic growth in Rwanda from 2006-2021*

H_0: *There was no positive significant relationship between taxes on international trade and economic growth in Rwanda from 2006-2021.*

H_1: *There is a positive, significant relationship between the relationship between taxes on international trade and economic growth in Rwanda from 2006-2021.*

6. Scope of the Study

The scope of this study covers critical examinations of the impact of taxation on economic growth in Rwanda. To examine the relationship between tax revenues and GDP, quarterly data from RRA and NISR were used for these variables from 2006Q1 to 2021Q4.

7. Literature Review

The research looks at the opinions and perspectives of a number of authors who are passionate about the issue. The review focused on the following subheadings: historical context, conceptual framework, theoretical framework, related case studies, and a summary of the studied literature.

Taxation is believed to have existed "from the beginning of time," although there is no mention of when it began. In modern literature, tax levies may be traced back to the ancient cities of Greece and Rome, but according to the Bible, they are as old as the world. Consumption, saving, investment, and property taxes were all levied in these so-called Greek and Roman communities (Abomaye-Nimenibo *et al.*, 2018). According to St. Mark's gospel (chapter 12:14-16), a follower of Jesus Christ, namely St. Peter, was approached by tax authorities and met Jesus Christ, who directed him to obtain money with which Peter paid for himself and the Lord Jesus Christ. St.

Our Lord Jesus Christ paid tax, according to Matthew gospel chapter 17:24-27 in the Holy Bible. Furthermore, we find in Matthew 19:21 that tax money has a function in society, allowing government authorities to use it to provide social programs that will benefit all people of a country. The provision of health and education, the upkeep of law and order, the provision of basic amenities and infrastructures, and so on are examples of social services. As a result, paying taxes is a necessary aspect of being a good citizen in a well-organized and regulated society.

The initial tax legislation in Rwanda was inherited from colonial governments, according to Rwanda's tax history. The August 1912 Ordinance, which introduced a progressive tax and a tax on real property, was part of this tax law. On November 15, 1925, another Ordinance was passed, implementing and putting into effect the order issued in Belgian Congo on June 1, 1925, imposing a profits tax. This law was revised by a law enacting a direct tax on profits on June 2, 1964. On July 17, 1968, a substantive law controlling customs was ratified, together with the Ministerial Order of July 27, 1968, putting the Customs Law into effect.

This law has been updated from time to time to keep up with the changing economic climate. The 1973 law controlling property tax, the tax on licenses to carry out trade and professional activities, and the Law No. 29/91 of June 28, 1991 on sales tax (turnover tax), which has now been abolished and replaced by the Law No. 06/2001 of January 20, 2001 on the Code of Value Added Tax (VAT). The parliament passed bill No. 25/2005 on tax procedures on December 4, 2005, revising Decree-Law No. 28/73 on Personal Tax, Law No. 06/2001 on January 20, 2001 on the Code of Value Added Tax, and Law No. 9/97 on June 26, 1997 on the Code of Fiscal Procedures.

The parliament also passed Law No. 21 on April 18, 2006, which established the customs law, replacing the Law of July 17, 1968, as revised and finalized to date. Rwanda, on the other hand, enacted the EAC Customs Management Act, 2004, An Act of the Community to provide for the management and administration of Customs and related matters, on July 1, 2009 (Harerimana, 2018).

8. Theoretical Framework

The cost of service theory, the benefit theory, and the socio-political theories of taxes are all examined in this paper. The cost of government delivering certain services to the people, according to the cost of service principle, must be covered collectively by the people who are the ultimate recipients of the service (Jhingan, 2009) Tax, according to this view, is similar to price. As a result, if a person does not use a state's service, he should not be taxed. This theory has been subjected to some criticism. The cost of service theory, according to Jhingan (2009), places some constraints on government services. The government's goal is to provide assistance to the underprivileged. If the theory is put into practice, the state will not undertake welfare activities like medical care, education, social amenities, etc. furthermore, it will be very difficult to compute the cost per head of the various services provided by the state, again, the theory has violated the correct definition and tenets of tax, finally the basis of taxation as propounded by the theory is misleading.

The government will not provide services such as medical care, education, or social amenities. Furthermore, calculating the cost per head of the numerous services given by the state will be extremely difficult; additionally, the theory has breached the correct definition and fundamentals of taxes; and finally, the theory's taxation premise is misleading.

The cost of service theory was modernized as a result of its inherent constraints. The benefit received theory of taxation was born as a result of this change. Citizens should be requested to pay taxes in proportion to the benefits they receive from government services, according to this viewpoint. The notion assumes that tax payers have an exchange connection or a quid pro quo between taxpaying citizens and the government. The government provides some benefits to tax payers by providing social goods for which they pay a fee in the form of taxes. This hypothesis is inapplicable due to the impossibility to quantify the benefits gained by an individual from government services (Ahuja, 2012).

According to the socio-political taxation theory, the primary considerations in taxation should be social and political purposes. The notion proposed that a tax system should not be designed to benefit individuals, but rather to address society's problems as a whole (Bhartia, 2009). As a result, this research is based on this notion.

According to Bhartia (2009), a tax revenue theory may be derived on the assumption that there need not be any relationship between tax paid and benefits received from state activities. As a result, we'll take a look at some of these theories in the sections below.

Socio-Political Theory: This theory of tax revenue states that social and political objectives should be the major factors in selecting taxes. The theory advocated that a tax system should not be designed to serve individuals, but should be used to cure the ills of society as a whole.

Benefit Received Theory: This theory is based on the assumption that there is a basic exchange relationship between tax-payers and the government because the government provides certain goods and services to society's members. As a result, society's members should contribute to the cost of these supplies in proportion to the benefits they receive (Bhartia, 2009). Anyanfo (1996) backs up this claim by stating that taxes should be distributed based on the advantages derived from government spending.

Faculty Theory: This notion suggests that one should be taxed according to one's ability to pay, according to Anyanfo (1996). It is simply an attempt to maximize an explicit value judgment about the distributive effects of taxes. Bhartia (2009), shares this same view by arguing that a citizen is to pay tax just because he can, and his relative share in the total tax burden is to be determined by his relative paying capacity.

Expediency Theory: According to this notion, any tax plan must satisfy the practicality test. It must be the only factor taken into account by the authorities when deciding on a tax proposal. The state's economic and social goals, as well as the repercussions of a tax system, should be ignored (Bhartia,2009). The expediency argument is predicated on a relationship between tax liabilities and state activity, according to Anyafo (1996) and Bhartia (2009). It is assumed that the state should charge society's members for the services it provides. This rationale justifies the application of taxes to fund state activities by conclusions, which serves as a foundation for dividing the tax burden among society's members.

9. Conceptual Framework

The independent and dependent variables are depicted in the (Figure 1). Because there are so many factors, the researcher should focus on the three most significant ones: the independent variable, the dependent variable, and the intervening variables. Following their interdependence, this conceptual framework connects those three categories of variables. Direct taxation, goods and services taxation, and international trade and transaction taxation all have an impact on economic.
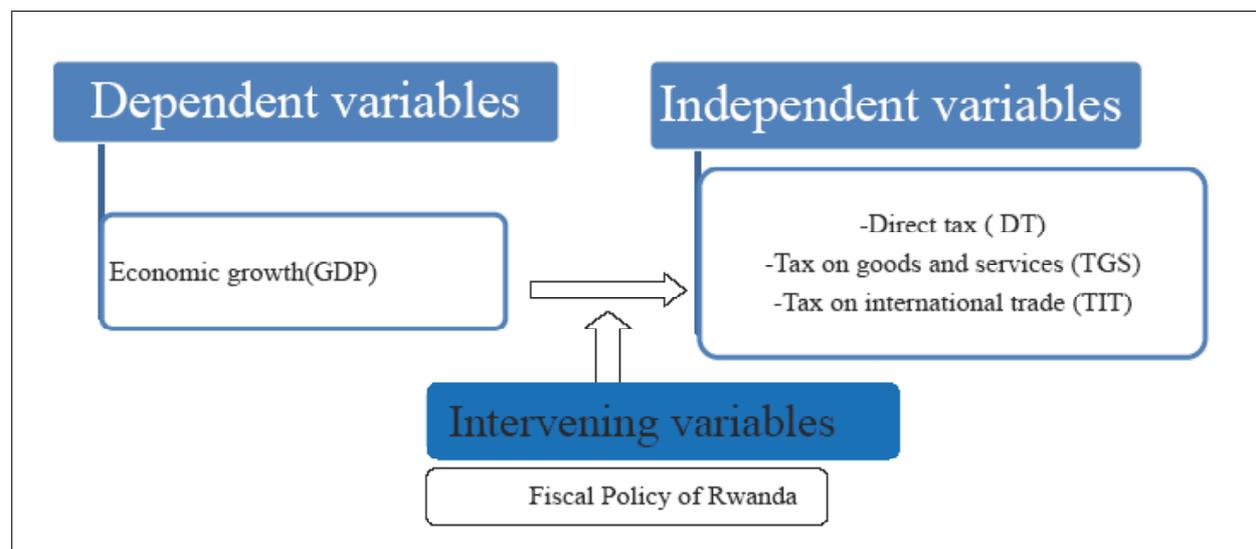

Figure 1: Independent and Dependent Variables

Source: Researcher, 2022

10. Research Methodology

Introduction, research design, theoretical framework, related case studies and summary, data collection techniques and tools, data processing, methods of data analysis, limitation, ethical consideration, and model specification were all covered in this chapter.

10.1. Research Design

A research design is a blueprint that lays out the methods and procedures for gathering and interpreting the data. Research design refers to the strategies and procedures for conducting research, which include everything from general assumptions to specific data collection and analysis methodologies. The ultimate decision entails deciding which design should be employed to investigate a subject. The researcher's worldview assumptions, techniques of inquiry (called strategies), and specific methods of data collection, analysis, and interpretation should all play a role in this decision.

The nature of the research problem or topic being addressed, the researchers' personal experiences, and the study's target audiences all play a role in choosing a research design (Creswell, 2008) "A study design is essentially the frame work or framework for the study utilized as a guide in gathering and interpreting data," Churchill (1992) says. The study's methodology.

10.2. Data Collection Techniques and Tools

The secondary data was used to acquire information. The Rwanda Income Authority (RRA) offers independent variable data in the form of tax revenue, while the National Institute of Statistics of Rwanda (NISR) provides nominal Gross Domestic Product data for the years 2006Q1 through 2021Q4.

10.3. Data Processing

Between 2006Q1 and 2021Q4, this study examines the impact of tax revenue on Rwanda's economic growth. Several economic and social changes occurred in Rwanda during this time EDPRSI, EDPRS II, and NST1. It is critical to examine and evaluate the elements that influenced economic growth throughout this time period. The regression model was used

to assess the relationship between the dependent and independent variables in order to determine the influence of tax revenue on GDP and to test the study hypotheses. As a result, a multiple regression model was created to meet the aforementioned goals. GDP is the dependent variable in our model, whereas the independent variables are direct tax, tax on goods and services, and tax on foreign trade and transactions. The research comprises quarterly data from the Rwanda Revenue Authority (RRA) and the National Institute of Statistics of Rwanda (NISR) from 2006Q1 to 2021Q4. Data was processed in this empirical investigation, and information relating to the study's premise and objectives was taken into account and translated into meaningful data for easy interpretation and comprehension. This was done with the help of SPSS Version 25.0.

10.4. Techniques of Data Analysis

In order to determine the relationship between the dependent and independent variables, a regression model was used to analyze the data. The relationship between tax revenue and economic growth was estimated using an economic approach in the study. Because it has several advantageous qualities, the ordinary least square method was chosen. It has a straightforward computing process.

10.5. Model Specifications

The method employed in this study, involves discussion of data collection analysis techniques. We adopted a quasi-experimental research which is purely analytical. In this study we used quarterly data covering the period from 2006 to 2021, from the Rwanda Revenue Authority (RRA) statistical bulletin and annual reports and National Institute of Statistics of Rwanda (NISR). The economic growth variable is nominal GDP at current basic prices. The study uses three independent variables: direct tax including tax on property, taxes on goods and services, taxes on international trade including others tax.

The following models to estimate long run tax revenue and economic development in Rwanda:

$$L GDP = f (LDT, LTGS, l TIT,) \qquad \qquad ...(1)$$

The estimable econometric model is shown in equation as

$$LGDPt0 = \alpha + \beta_1 LDT + \beta_2 LTGS + \beta_3 LLTIT + \varepsilon_t \qquad \qquad ... (2)$$

where

$L GDP$, to is time series period whereas the dependent variable, LDT, $LTGS$ and $LTIT$ are independent variables and the ε_t is the error term. The parameters of the model are β_1, β_2 and β_3. The parameters are estimated using the least square method.

Note that:

$L GDP$ = Natural logarithm of Gross Domestic Product

$L DT$ = Natural logarithm of Direct tax

$L TGS$ = Natural logarithm of Tax on Goods and Services

$L TIT$ = Natural logarithm of Taxes on International Trade Transactions

10.6. Definition of Variables and Their Expected Signs

Table 1 provides the definition of variables used, their estimation coefficients and expected signs of each explanatory variable.

Table 1: Table Showing Definition of Variables Used, Their Estimation Coefficients and Expected Signs			
Variable	**Definition**	**Estimation Coefficient**	**Expected Sign**
GDPt	The total monetary worth of all finished goods and services produced within a country's boundaries in a given time period is known as the Gross Domestic Product (GDP).	This is the dependent variable	

Table 1 (cont.)			
Variable	**Definition**	**Estimation Coefficient**	**Expected Sign**
DTt	**Direct tax** is set of Pay as You Earn (PAYE), Taxes on Corporations & Enterprises and Tax on property (Property tax on Vehicles).	β_1	Positive
TGSt	**Taxes on goods and services** is the set of Value Added Tax (VAT), Excise Duty, Road Fund, Mining Royalties, Strategic reserves levy	β_2	Positive
TITt	**Taxes on international trade transactions** are include custom duties and other taxes on international trade and transactions. These are imposed by the government on trade transactions involving exchange of goods and services between home country and foreign countries.	β_3	Negative

11. Research Findings

This chapter provides the empirical results and as well as their interpretations.

11.1. Descriptive Statistics of Variables as Common Sample

The main objective of this study was to examine the impact of tax revenue on tax revenue from 2006Q1-2021Q4. Descriptive Statistics of Variables as common sample are presented in table below (Table 2).

Table 2: Descriptive Statistics of Variables as Common Sample			
	LNNGDP	**LNDT**	**LNTGS**	**LNTIT**
Mean	7.144135	4.228385	4.444905	2.756077
Median	7.201493	4.388084	4.527077	2.833213
Maximum	7.983099	5.318120	5.407172	3.526361
Minimum	5.993961	2.639057	3.091042	1.945910
Std. Dev.	0.529181	0.745400	0.662505	0.495196
Skewness	-0.364221	-0.391135	-0.393274	-0.040040
Kurtosis	2.130876	2.065888	1.996579	1.623864
Jarque-Bera	3.429345	3.958704	4.334699	5.067100
Probability	0.180023	0.138159	0.114481	0.079377
Sum	457.2246	270.6167	284.4739	176.3889
Sum Sq. Dev.	17.64206	35.00414	27.65155	15.44880
Observations	64	64	64	64
Source: Author's Computations,2022			

The GDP of Rwanda from 207Q1 to 2021Q4 was 7.144135 billion Rwf on average, with a standard deviation of 0.529181 billion Rwf. From 207Q1 to 2021Q4, direct tax was 4.228385 billion Rwf on average with a standard deviation of 0.745400 billion Rwf, tax on goods and services was 4.444905 billion Rwf on average with a standard deviation of 0.66250558.770 billion Rwf, and tax on international trade and transactions was 2.756077 billion Rwf on average with a standard deviation of 0.495196 billion Rwf.

11.2. Unit Root Test (Test for Stationarity)

The test for stationarity is used to avoid spurious regressions which may arise as a result of carrying out regressions on time series data which are not stationary. Stationarity of time series was tested using the Augmented Dickey Fuller (ADF) tests (Table 3).

Table 3: ADF Tests

Variables Tests	Significance Levels	Levels		First Difference		Conslusion	Order of the Variables
		t-Statistics	Prob*	*t*-Statistics	Prob*		
LN*NGDP*	Augmented Dickey-Fuller test	-3.762394	0.60	-8.37	0.00	Reject the Null at 1% confidence level	I(1)
	1% Level	-3.54		-3.54			
	5% Level	-2.91		-2.91			
	10% Level	-2.59		-2.59			
LN*DT*	Augmented Dickey-Fuller test	4.11044	0.11	-16.58	0.00	Reject the Null at 1% confidence level	I(1)
	1% Level	-3.56		-3.56			
	5% Level	-2.92		-2.92			
	10% Level	-2.60		-2.60			
LN*TGS*	Augmented Dickey-Fuller test	-3.482763	0.67	-13.24	0.00	Reject the Null at 1% confidence level	I(1)
	1% Level	-3.54		-3.54			
	5% Level	-2.91		-2.91			
	10% Level	-2.59		-2.59			
LN*TIT*	Augmented Dickey-Fuller test	-3.169372	0.48	-10.34	0.00	Reject the Null at 1% confidence level	I(1)
	1% Level	-3.54		-3.54			
	5% Level	-2.91		-2.91			
	10% Level	-2.59		-2.59			

Note: *Significant at 5%.
Null Hypothesis: The variable has a unit root; Exogenous: Constant; Lag Length: 0 (Automatic - based on SIC, maxlag=10)

Source*: Author's Estimates, Computed Result Using (E-Views 8)*

Noman (2017) commented about OLS and cointegration as such: If all variables are I(0), no integration tests are required and OLS can be used. However, the regression of a non-stationary time series to another non non-stable time series may produce spurious to a non-sense regression.

The results from the econometric estimation are presented in the following subsections.

11.3. Test for Co-integration

Since all variables are non-stationary at levels, but became stationary at first difference. We performed a co-integration test using Johnsen cointegration tests based on unit root tests of regression residuals.

Table 6 shows the results of the Johansen Cointegration test used to investigate whether there exists long-run relationship among the cointegrating variables.

The Unrestricted Cointegration Rank Test (Trace) results as shown in Table 4 indicate that there is 1 cointegrating equation at the 5% level, since the trace statistic is greater than the critical value at 5% level. Having verified that all variables are integrated to order one, I (1) cannot be rejected, the next step is to perform, an integration test. Because there are multivariate time series, the multivariate cointegration technique proposed by Johansen (1988) and Johansen and Juselius (1990) is applied to determine whether there are stable long-run relations between direct tax, tax on goods and services and tax on international trade and transactions as independent variables and economic growth as dependent variables. It should be noted that the cointegration test is performed before the Vector Error Correction Model (VECM) because the cointegration vectors will be utilized for the following VECM and the presence of cointegration also rules out the possibility of spurious correlation.

The optimal lag is 1 as favored by all the information criteria.

Table 4: Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.412666	56.45004	47.85613	0.0063
At most 1	0.204723	23.98822	29.79707	0.2009
At most 2	0.122471	10.01528	15.49471	0.2796
At most 3	0.032983	2.045903	3.841466	0.1526

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
Note:* denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug-Michelis (1999) p-values.
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.412666	32.46182	27.58434	0.0109
At most 1	0.204723	13.97294	21.13162	0.3673
At most 2	0.122471	7.969379	14.26460	0.3818
At most 3	0.032983	2.045903	3.841466	0.1526

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
Note:* denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNNGDP	LNDT	LNTGS	LNTIT
20.25883	-20.40088	5.277696	1.697541
-2.749471	-4.909480	12.20818	-4.382739
-14.55114	3.343147	4.758300	5.522549
31.36077	-1.869016	-22.47823	0.665904

Lag order selection

Table 5: VAR Lag Order Selection Criteria						
Included observations: 64						
Lag	LogL	LR	FPE	AIC	S C	H Q
0	100.9893	NA	1.04e-07	-4.731184	-4.564006	-4.670307
1	227.5260	222.2108*	4.74e-10*	-10.12322*	-9.287330*	-9.818834*
2	241.8056	22.29014	5.28e-10	-10.03930	-8.534698	-9.491405
3	251.0213	12.58728	7.82e-10	-9.708356	-7.535045	-8.916956
Note: * indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion.						

11.4. Vector Error-Correction Model (VECM)

The presence of co-integration between variables suggests a long-run relationship among the variables under consideration. Then, the VECM model can be applied. The VECM directly estimates the speed at which a dependent variable returns to equilibrium after a change in another variable.

From Table 6, the estimated coefficient of the error correction term is -0.128431which implies that the speed of adjustment is approximately 12.8% per quarter. This negative and significant coefficient is an indication that cointegrating relationship exists among which are DT, TGS and TIT. This means DT, TGS and TIT has influence to GDP in long run. means there is long run causality running from DT, TGS to GDP.

Table 6: Results of Vector Error-Correction Model (VECM)				
	Coefficient	**Std. Error**	***t*-Statistic**	**Prob.**
$ECT(-1)$	-0.128431	0.085931	-1.494582	0.0412
LNDT(-1	0.103252	0.197042	0.524007	0.6025
LNTGS(-1)	0.011764	0.184987	0.063591	0.9495
LNTIT(-1)	-0.043250	0.068592	-0.630534	0.5312
D(LN$NGDP$(-2))	0.029488	0.048948	0.602429	0.5496
D(LNDT(-2))	-0.016361	0.084753	-0.193043	0.8477
D(LNTGS(-2)	-0.039163	0.088269	-0.443673	0.6592
D(LNTIT(-2))	-0.015982	0.036372	-0.439400	0.6622
D(LN$NGDP$(-1))	-0.001696	0.035426	-0.047887	0.9620
Constant	0.029054	0.007583	3.831400	0.0004

11.5. Short Run Dynamic Model Analysis

H_0:$C(4)=C(5)=0$ means there is no short run causality running from DT to GDP

Table 7: Short Run Causality of DT to GDP test

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	1.546295	(2, 51)	0.0729
Chi-square	3.092590	2	0.0630

Null Hypothesis: C(4)=C(5)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(4)	-0.043250	0.08592
C(5)	0.029488	0.048948

Note: We fail to reject H_0 because $p = 0.0630 > 0.05$, means there is no short run causality running from DT to GDP

Table 8: Short Run Causality of TGS to GDP test

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	0.099063	(2, 51)	0.0659
Chi-square	0.198125	2	0.05257

Null Hypothesis: C(6)=C(7)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(6)	-0.016361	0.084753
C(7)	-0.039163	0.088269

Note: We fail to reject H_0 because $p = 0.0659 > 0.05$, means there is no short run causality running from DT to GDP.

Table 9: Short Run Causality of TIT to GDP test

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	0.102198	(2, 51)	0.9030
Chi-square	0.204396	2	0.9029

Null Hypothesis: C(8)=C(9)=0
Null Hypothesis Summary:

Table 9 (Cont.)		
Normalized Restriction (= 0)	**Value**	**Std. Err.**
C(8)	-0.015982	0.036372
C(9)	-0.001696	0.035426
Note: We fail to reject H_0 because $p = 0.9029 > 0.05$, means there is no short run causality running from DT to GDP.		

11.6. Relationship Between Tax Revenue and Economic Growth (GDP)

The researchers used regression analysis to see if there was a link between tax revenue and economic growth (GDP). To compute regressions for the study, the researcher used econometric software (E-Views 8.0).

As shown in this Table 10, Tax on international trade and transactions (TIT)

Is statistically insignificant, since its p-value = 0.5787 < 0.05. This means Tax on international trade and transactions (TIT) does not impact to GDP, after discovering that the coefficient of TIT is not significant to predictor GDP, we eliminate it in the model.

Table 10: Regression Analysis Between GDP and DT, TGS and TITT				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LN*DT*	0.191560	0.041920	4.569689	0.0000
LN*TGS*	0.571236	0.052495	10.88177	0.0000
LN*TIT*	0.016871	0.030214	0.558388	0.5787
C	3.748559	0.046809	80.08275	0.0000

Table 11: Regression Analysis Between GDP and DT and TGS				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	3.741594	0.044861	83.40444	0.0000
LN*DT*	0.190631	0.041650	4.577005	0.0000
LN*TGS*	0.584148	0.046861	12.46555	0.0000
R-squared	0.994585	Mean dependent var	7.144135	
Adjusted *R*-squared	0.994407	S.D. dependent var	0.529181	
S.E. of regression	0.039576	Akaike info criterion	-3.575470	
Sum squared resid	0.095540	Schwarz criterion	-3.474273	
Log likelihood	117.4150	Hannan-Quinn criter.	-3.535603	
F-statistic	5601.538	Durbin-Watson stat	1.205395	
Prob. (*F*-statistic)	0.000000			

Therefore, consider only Direct tax and TGS as predictor of GDP.

Then we run the OLS regression on those three variables, and we got the following results:

The Final model will be:

$$LNNGDP = 3.741594 + 0.190631 * LNDT + 0.584148 * LTGS$$

We are happy that model is fit because Adjusted R-squared is 0.994407 is 99.4%, which indicates that the variation in GDP was explained by 99.4% of DT, TGS. The model utilized cannot account for the remaining 0.01%. The model is accurate enough to be used for forecasting. The p-value is used to ensure if the model is suitable for use. The significance threshold in this study is p=0.000000. This indicates that the model ensures higher-quality predictions. This result shows that holding all other factors constant, one percent (1%) change in DT and TGS leads to increased economic growth (GDP) by 0.19 % and 0.58 % respectively.

Direct Tax: And based on this equation, one percent (1%) change in DT and TGS leads to increased economic growth (GDP) by 0.19 %, Holding all other factors constant. This is also statistically significant, since its p-value is much less than 0.00 level of significance. In this case the null hypothesis of no effect is rejected at 0.05 level of significance, in favor of the alternative.

Tax on Goods and Services (TGS): one percent (1%) change in DT and TGS leads to increased economic growth (GDP) by 0.58 %, keeping all other variables constant. This is also statistically significant, since its p-value is much less than 0.00 level of significance. In this case the null hypothesis of no effect is rejected at 0.05 level of significance, in favor of the alternative.

Tax on International Trade and Transactions (TIT): TIT Is statistically insignificant, since its p-value =0.5787<0.05. This means TIT does not impact to GDP.

12. Summary, Conclusion and Recommendations

This chapter presents the summary, Conclusions and Recommendations for further research.

The research looks at Rwanda's tax income and economic growth from 2006 through 2021. This research was based on socio-political theory, expediency theory, faculty theory, and benefit received theory.

As a result, data on GDP, DT, TGS, and TIT were acquired from Rwanda Revenue Authority (RRA) and Rwanda National Institute of Statistics in order to meet our goals (NISR). The data was analyzed using a regression equation, which demonstrated the link between the variables.

The Result Shows that the unit root and co-integration tests found that all variables are co-integrated of order one, I (1), implying that there is a long-run equilibrium relationship between variables. As a result, the Johnsen test was used, and the results demonstrated that DT, TGS, and TIT have a long-run impact on GDP, but there is no short-run causation between DT, TGS, and TIT on GDP. The OLS regression was then deployed. The regression results showed that the coefficients for DT and TGS were significant, while the coefficient for TIT were not significant; Therefore, TIT was excluded in the model. The adjusted R-squared is 0.994407, showing that 99.4% of the variation in GDP was explained by the variation in DT and TGS, indicating that the model.

Direct Tax: And based on this equation, a one percent (1%) change in DT)and TGS leads to increased economic growth (GDP) by 0.19 %, holding all other factors constant. This is also statistically significant, since its p-value is much less than the 0.00 level of significance. In this case, the null hypothesis of no effect is rejected at 0.05 level of significance, in favour of the alternative.

Tax on Goods and Services (TGS): One percent (1%) change in DT and TGS leads to increased economic growth (GDP) by 0.58%, keeping all other variables constant. This is also statistically significant, since its p-value is much less than the 0.00 level of significance. In this case, the null hypothesis of no effect is rejected at 0.05 level of significance, in favor of the alternative.

Tax on International Trade and Transactions (TIT): TIT is statistically insignificant, since its p-value = 0.5787 < 0.05. This means TIT does not impact to GDP.

13. Conclusion

This study concludes that DT and TGS variables have positive and significant impact on economic growth, while TIT variable have an insignificant impact on economic growth.

14. Recommendations

This study recommends the following points:

To achieve a world-class efficient and contemporary revenue agency, Rwandan officials should strengthen both direct tax and tax on goods and services (domestic tax) policy.

The Rwandan government should guarantee that taxation is appropriately managed in order to boost economic growth, lower inflation, and create jobs in the country.

Tax money should be wisely spent on basic education, social security schemes, agricultural development, transportation, primary health care, adequate power supply, road and bridge construction, and national defense and security, among other things that would benefit many sectors of the economy.

15. Scope for Further Studies

- The goal of this study was to determine the impact of tax revenue on economic growth. The study focuses primarily on a quantitative approach to evaluating the influence of tax revenue on economic growth. As a result, a qualitative method should be used to evaluate the influence of tax revenue on economic growth.

- The study also suggests that more research be done on the influence of tax income on Rwanda's economic growth.

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Appendix					
Quarters Data Used From 2006Q1 To 2021Q4 In Rwandan Francs' Billion					
Periods	**NGDP**	**DT**	**TGS**	**TIT**	**TT**
2006Q1	401	14	22	8	44
2006Q2	451	18	23	8	49
2006Q3	479	16	26	8	50
2006Q4	499	18	26	9	52
2007Q1	506	19	28	7	54
2007Q2	547	25	30	8	63
2007Q3	573	21	30	8	59
2007Q4	599	22	34	8	63
2008Q1	607	25	35	9	68
2008Q2	687	36	36	10	82
2008Q3	749	30	43	11	84
2008Q4	788	32	47	14	94
2009Q1	786	31	46	14	91
2009Q2	774	36	43	13	92
2009Q3	808	32	47	8	87
2009Q4	855	36	49	9	94
2010Q1	853	43	50	9	101
2010Q2	857	37	50	7	94
2010Q3	905	39	56	9	104
2010Q4	955	43	61	9	113
2011Q1	963	49	61	11	121
2011Q2	999	49	65	9	123
2011Q3	1,074	45	69	10	124
2011Q4	1,095	54	69	11	134
2012Q1	1,114	61	72	12	145
2012Q2	1,143	68	72	13	153
2012Q3	1,209	56	78	17	151
2012Q4	1,234	65	76	13	154
2013Q1	1,213	82	77	12	172
2013Q2	1,252	79	84	12	175

Appendix (Cont.)				
Periods	**NGDP**	**DT**	**TGS**	**TIT**	**TT**
2013Q3	1,261	71	89	15	175
2013Q4	1,328	78	91	15	185
2014Q1	1,355	77	94	18	189
2014Q2	1,394	86	112	17	215
2014Q3	1,437	82	106	17	205
2014Q4	1,435	84	100	17	201
2015Q1	1,464	95	101	17	212
2015Q2	1,500	102	120	19	240
2015Q3	1,567	85	120	18	224
2015Q4	1,616	92	129	23	244
2016Q1	1,659	109	121	20	250
2016Q2	1,710	107	139	22	269
2016Q3	1,696	98	129	21	248
2016Q4	1,777	108	129	22	259
2017Q1	1,845	122	138	23	283
2017Q2	1,917	122	148	26	296
2017Q3	1,944	109	144	23	276
2017Q4	1,988	126	155	26	306
2018Q1	2,026	137	152	25	314
2018Q2	2,057	148	165	25	338
2018Q3	2,081	125	161	25	311
2018Q4	2,139	146	167	28	342
2019Q1	2,154	142	170	28	340
2019Q2	2,349	184	191	30	405
2019Q3	2,356	150	183	31	365
2019Q4	2,455	157	204	33	394
2020Q1	2,408	149	182	31	362
2020Q2	2,175	201	151	23	374
2020Q3	2,452	150	191	31	372
2020Q4	2,572	171	201	34	406
2021Q1	2,588	193	184	29	405

Appendix (Cont.)				
Periods	**NGDP**	**DT**	**TGS**	**TIT**	**TT**
2021Q2	2,668	204	217	31	453
2021Q3	2,758	187	194	30	411
2021Q4	2,931	201	223	33	458

Data Description
GDP: Gross Domestic Product.
DT: Direct tax (Pay as You Earn (PAYE)), Taxes on Corporations & Enterprises and Tax on property (Property tax on Vehicles).
TGS: Taxes on goods and services (Value Added Tax (VAT), Excise Duty, Road Fund, Mining Royalties, Strategic reserves levy).
TIT: Taxes on international trade (Import Duty, Other Customs Revenues, Infrastructure development levy) and others regular tax.

Source: Rwanda Revenue Authority (RRA)-Planning and Research department and National Institute of Statistics in Rwanda (NISR)