



**EFFECT OF FOREIGN AID ON REVENUE MOBILIZATION:
CASE OF RWANDA**

**A Thesis Submitted in fulfillment of the requirements of the Master of
Science in School of Economics, College of Business and Economics,
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**SUBMITTED BY: STELLA RUSINE NTEZIRYAYO
REG No: 218014132**

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APPROVAL SHEET

This thesis entitled **Effect of Foreign Aid on Revenues Mobilization: Case of Rwanda** written and submitted by **Stella Rusine Nteziryayo** in partial fulfilment of the requirements for the degree of **Master of Science in School of Economics** is hereby accepted and approved.

Signature should be here

Name of the supervisor should be here

Supervisor

Date

The thesis is accepted in partial fulfilment of the requirements for the degree of Master of Business Administration.

Names should be here

Member of the Jury

Date

Names should be here

Member of the Jury

Date

Names here

Coordinator of Postgraduate Studies

Date

DECLARATION:

I, Stella Rusine Nteziryayo declare that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Rwanda or any other institution.

Stella Rusine Nteziryayo

Signature:

ABSTRACT

Foreign aid effect on domestic resource mobilization is a very controversial debate among researchers. While some studies support that foreign aid is beneficial to the recipient country, others argue that it may simply have a substitute effect or a crowding out effect. When aid is disbursed, the government invest the received funds in sectors that will create a potential for prospective tax collections. Instead of being substituted to tax collection efforts, aid receipts do complement government effort to finance its development program. Empirical studies have shown that a positive relationship between aid and tax occurs in countries where institutions are strong, sound macroeconomic policies, or low corruption levels. On the other hand, the lack of strong institutions, high levels of corruption, or weak macroeconomic management may represent a challenge for country's domestic revenues mobilization strategy.

Contrary to other studies, this research concludes that in the case of Rwanda there is a positive effect. As ODA flows increase, tax is affected by 0.6 percent, this is explained by Rwanda's institutional strength and efforts invested in tax administration. I use the two-step Engel Granger procedure, because variables are found to be non-stationary in the short run while they present a long term relationship.

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LIST ABBREVIATIONS

AfDB: African Development Bank
BNR : Banque Nationale du Rwanda
ECM: Error Correction Model
FRW: Rwandan Franc
GDP: Gross Domestic Product
HIPC: Highly Indebted Poor Country
IMF: International Monetary Fund
MINECOFIN: Ministry of Finance and Economic Planning
NST1: National Strategy for Transformation phase 1
ODA: Official Development Assistance
ODF: Official Development Finance
OECD: Organization for Economic Co-operation and Development
RRA : Rwanda Revenue Authority
SDG: Sustainable Development Goals
UNDP: United Nations Development Program
USD: United States Dollar
VAT: Value Added Tax

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CHAPTER ONE: INTRODUCTION

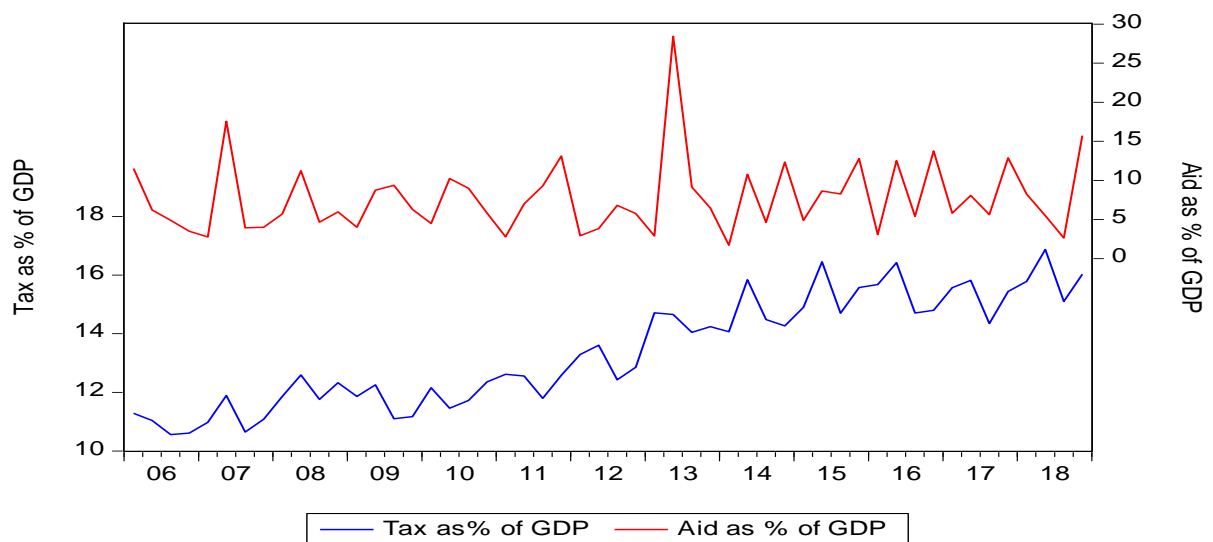
In January 2019, a discussion notes by the staff of the International Monetary Fund revealed that Low income countries may require on average 15 percent of GDP as additional spending in order to achieve the Sustainable Development Goals(SDGs) by 2030¹. This is consistent with the national strategy for transformation’s journey that the government of Rwanda has embarked on for the next seven years. Similar to the SDGs, the National Strategy for Transformation phase 1 (NST1) aims at transforming lives of Rwandans through different pillars which include: Economic Transformation, Social Transformation, and Transformational Governance. This also represents a challenge for the government which will need to increase its spending in order to achieve the NST1 goals and ultimately the SDGs. Current spending levels in Rwanda stood on average at 27 percent of GDP between 2008 and 2017². The NST1 costing, shows an additional requirement of 25 percent of GDP on average over the medium term (seven years). This is quite significant, if we take into account the level of foreign aid that low income countries have been receiving over the past twenty years, (and which is gradually decreasing going forward), but also the level of domestic revenues generated by those countries in general, and Rwanda in particular. According to the Ministry of Finance’s public macro dataset (April 2018)³, domestic revenues as share of GDP ranged between 14.3% in 2008 and 18.8% % by 2018 and are projected to be at a level of 18.1% by 2019. This clearly suggests that Rwanda may not be able to achieve financing of its development agenda alone and would require the support from all development partners, as well as the private sector. Given the private sector participation in social development is small (as a result of the low return on investment), the support from development partners constitute the largest share of Rwanda’s financing sources as of date. Over the last two-decade

¹ Staff Discussion Notes, International Monetary Fund (January 2019) “Fiscal Policy and Development : Human, Social, and Physical Investments for the SDGs”, p. 19 Retrieved from <https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2019/01/18/Fiscal-Policy-and-Development-Human-Social-and-Physical-Investments-for-the-SDGs-46444>

² Ministry of Finance, Macro dataset as at end June 2018, Primary expenditures (Total expenditures –Interest payments on debt), <http://www.minecofin.gov.rw/index.php?id=173&L=-1%2527>

³Ministry of Finance, Macro dataset as at end June 2018, <http://www.minecofin.gov.rw/index.php?id=173&L=-1%2527>

foreign official development assistance⁴ to Rwanda have reached a level of 20 percent of GDP on average, principally coming from the world bank, the united states of America, the global fund, the European union, the African development bank group to support Rwanda’s development agenda. It’s worth noting that part of the support was granted under the Highly Indebted Poor Country (HIPC) assistance framework, which aimed at reducing the country’s debt service burden and allow more spending in government priority areas. Excluding HIPC assistance, Rwanda has received on average, one billion USD every year since 2006 to finance the above mentioned priorities. This significant level of ODA flows into Rwanda, has mainly been attributed to its aid effectiveness policy, which ensures that received aid is spent in a manner that has maximum impact on economic development and poverty reduction. However, according to several studies (Gupta et al. 2003), a high level of ODA flows into a country could have a negative effect on its efforts to mobilize domestic revenues For example: Aid may substitute revenue mobilization efforts, while being used for consumption instead of being used for revenue generation projects Gupta (2007). In addition, unconditional Aid may not be effective, in country with weak institutions and tax administration Ghura (1998). The figure below shows the relationship between ODA inflows as percent of GDP and the level of tax revenue collected as a share of GDP.



⁴ Net official development assistance (ODA) consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. It includes loans with a grant element of at least 25 percent.

Figure 1: ODA inflows⁵ % of GDP vs tax revenue collected % GDP,

Source: RRA, NBR and MINECOFIN DATA, May 2019

There seems not to be any relationship between tax revenues and ODA flows. As ODA increased as a share of GDP, tax revenues in percentage of GDP tend to be low or remain stagnant in some years (i.e.: year 2009-2012), while the opposite would occur in other years (i.e: year 2012 during the aid cut). The high level of ODA flows in 2006 represents the HIPC assistance for debt cancellation which was granted by different multilateral and bilateral creditors. Despite the results in figure above, critics have argued over the years that the aid-taxation relationship is also sensitive to the composition and length of the estimation sample, but also the methodology used, which is the effect of aid on different tax systems. For example, import taxes might increase with aid while other taxes may stay flat or decline. Official development assistance is important in Rwanda's development agenda, however, it is critical to assess if and to what extent it may have a crowding out effect on its revenue mobilization efforts.

1.1 Evolution of Tax systems in Rwanda

Tax revenues are important for a government which has the vision to sustainably finance its development agenda. Rwanda is well known for the number of reforms it implements and this is also reflected in the evolution of its taxation system. Until 1994, Rwandan Taxation system consisted of graduated tax and, tax on real property, profit tax introduced in August 1925, and the customs and excise duties introduced in July 1968⁶.

Following the pre-1994 genocide period, a number of reforms were gradually introduced into the Rwandan taxation system. An initial step was to reduce the number of waivers and exemptions given to public enterprises, the establishment of a "presumptive income tax of 3% "for all public enterprises and an increased tax on specific consumption products (AfDB, 2010).

⁵ Official development aid has played an important role in Rwanda development agenda in the past twenty years (19.2 per cent on average between 2000 and 2018).

⁶ African Development Bank Group, Domestic Resource Mobilization for Poverty Reduction: A Case Study for Rwanda, Page 57, November 2010.

Then follows a large reform agenda which spread over the years 2001 to 2010. Major reforms included the introduction of the Value Added Tax (VAT), replacing ICHA which was as effective as the VAT regime, a new Income tax law with the introduction of three brackets of progressive categorization with rates of 0 percent, 20 percent, and 30 percent. Incentives were introduced through the Tax, Investment and Export promotion code, to attract more foreign investors into the country, though some suggest that this has had a counterproductive effect on the tax collected revenues (IMF, 2007).

In 2006, more enforcement measure was established to improve tax collection. Also reforms related to eliminating internal tariffs when Rwanda became a signatory of the East African Community as well as further incentives related to petroleum and gas products.

In addition to Tax policy reforms, institutional reforms were applied, with the build-up of strong institutional capacity for Rwanda Revenue Authority. A critical element is the retention policy of the institution to insure business continuity of low corruption practices. With regards to internal procedures, its mandate consisted in maximizing collection of revenues, facilitate tax collection, and had put in place a fraud prevention and investigation support department, to ensure protection of collected revenues. Tax administration systems which are modern and “tax-payer friendly” were also put in place to manage revenue collection, enforcement and audit. Another major reform in Rwanda taxation system in the decentralization of tax administration functions. Local districts represented some potential untapped revenues like local user fees, and charges, but also an efficient way of providing services to the districts, hence ensure sustainable economic development and poverty reduction for local communities.

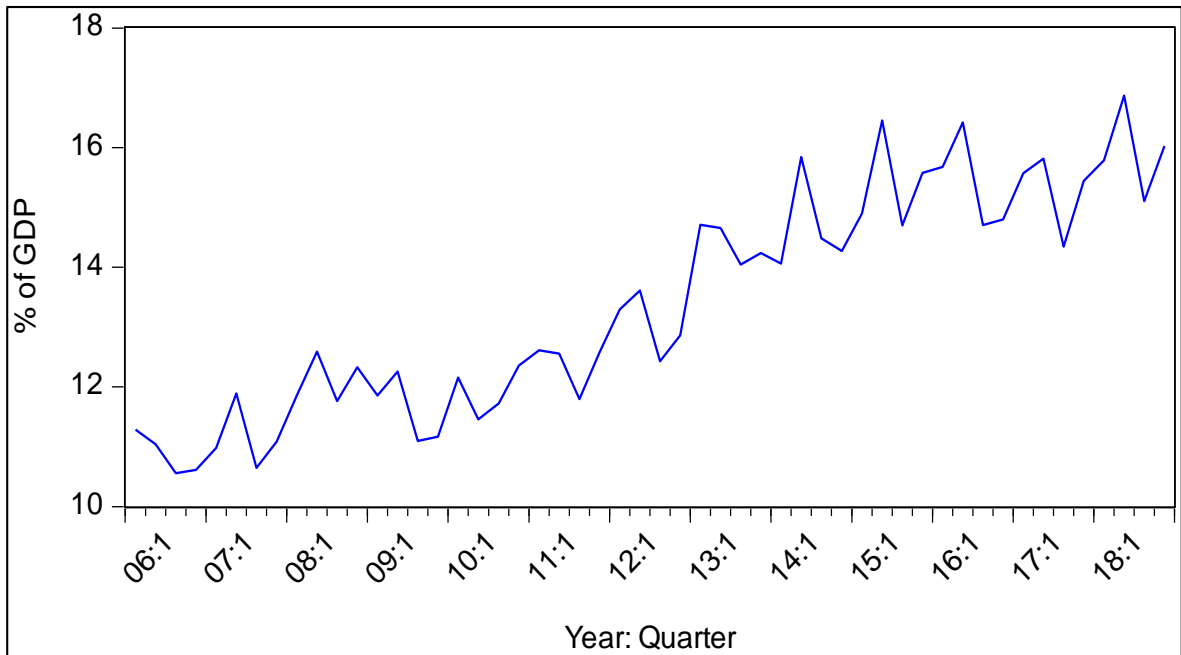


Figure 2: Total tax as percentage of GDP, Source: RRA, may 2019

Today, Rwanda taxation system is comprised of different tax systems. Our research focused on four in particular. This includes:

Value Added Tax (VAT):

VAT is a tax added to the cost of goods and services which is normally paid by final consumers, but ultimately transferred to the government on behalf of the consumers at each stage of the production (RRA Tax Handbook, 2017).

Income Tax:

Income Tax is generated out of business, self-employment and investment activities. Its essence is that all businesses benefiting from the country’s infrastructure, security and prosperity contribute their fair share towards the nation’s development (RRA Tax Handbook, 2017).

Excise Duty

This is a tax applied to specific products. Its essence is to discourage consumption that may have negative social impacts, and which could cause government spending on social issues like health (RRA Handbook, 2017).

Customs (Tax on international trade):

This consists in a tax applied on both goods imported or exported in or from a country (RRA Handbook, 2017).

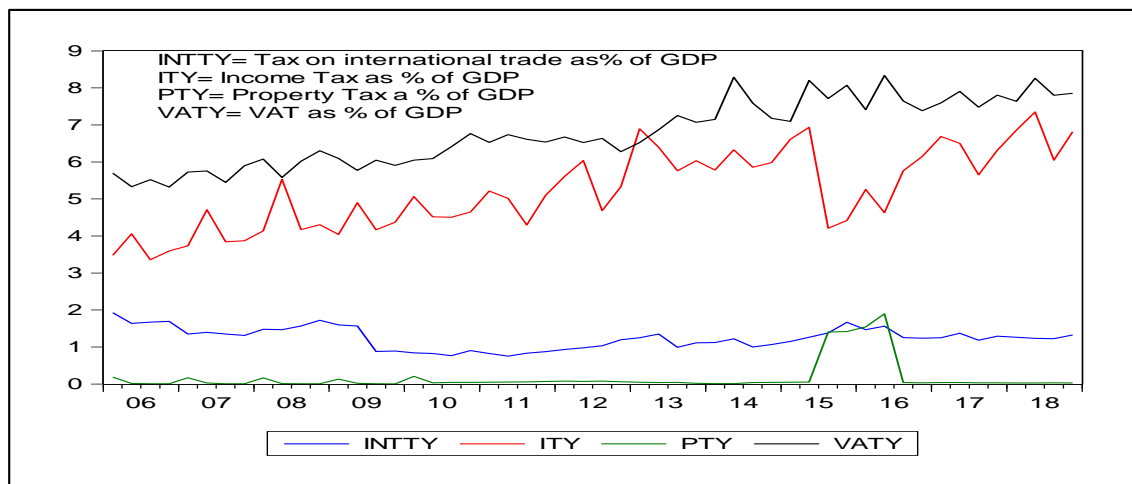


Figure 3: Rwanda tax systems, Source: RRA, May 2019

1.2 EVOLUTION of Foreign Aid in Rwanda:

Overall, foreign development assistance always played an important role for Rwanda's investment plans and macroeconomic stability. The Organization for Economic Co-operation and Development (OECD) categorizes foreign aid in two types: (i) Official development assistance (ODA) and (ii) Official development finance (ODF). The first category consists of technical aid, official grants, or loans promoting economic development and welfare, and having concessional terms, with a grant element of at least 25 percent⁷. The second category consists of "non-concessional development lending by multilateral financial institutions" and "other official flows for development purposes. ODA flows to Rwanda represented USD 262 million on average between 1970 and 1979. This constitutes 13 percent of the total ODA allocated in the EAC region at the time. Even during the pre- 1994 Tutsi Genocide, a period where hostilities against Tusti could easily be visible, ODA inflows continued to be "generous" as described by Ndikumana (2001). If we refer to his study, disbursements raised to an average of USD 356 million against a

⁷ The grant element measures the concessionality of a loan. It is defined as the difference between its nominal value (face value) and the sum of the discounted future debt-service payments (net present value) to be made by the borrower, expressed as a percentage of the face value of the loan.

level of USD 230 million ten years earlier. Following the 1994 Tusti Genocide, a period of reconstruction begun, the new government which had the task to first deal with the consequences of the genocide, also had to address the institutional structure which was considered responsible of the massacres UNDP (2006) (as cited by Ndikumana, 2001). In addition to the difficult reform agenda, and the scarcity of resources to invest in the country's reconstruction, external debt alone had reach unsustainable levels of approximately a billion USD against a nominal GDP of USD 1,294 billion. Between 2000 and 2005, the government of Rwandan embarked on a number of reforms under the Poverty Reduction Strategy Program with the IMF. Successful implementation of the program made Rwanda eligible to the decision point under the HIPC initiative in 2000, and to the completion point in 2005, where it received USD 1.4 billion of debt relief from multilateral and bilateral creditors. Pedro Alba, the World Bank's Country Director for Rwanda said: "The HIPC completion point is an important achievement for Rwanda, and reflects major and sustained efforts to improve the delivery of social services and other reforms over several years, "He added also that: "The budget savings from this debt relief are an important contribution to further improvements in social indicators and more generally to reduce poverty in the years ahead. "The IMF's mission chief for Rwanda Kristina Kostial also added: "Rwanda has largely achieved macroeconomic stability and established a good track record of policy implementation in 2004, looking forward, the key challenge for Rwanda is to raise the economic growth rate while maintaining macroeconomic stability and debt sustainability". She added: "Reaching the completion point is thus an important milestone for Rwanda toward debt sustainability while providing more resources for poverty reduction and the attainment of the MDGs."

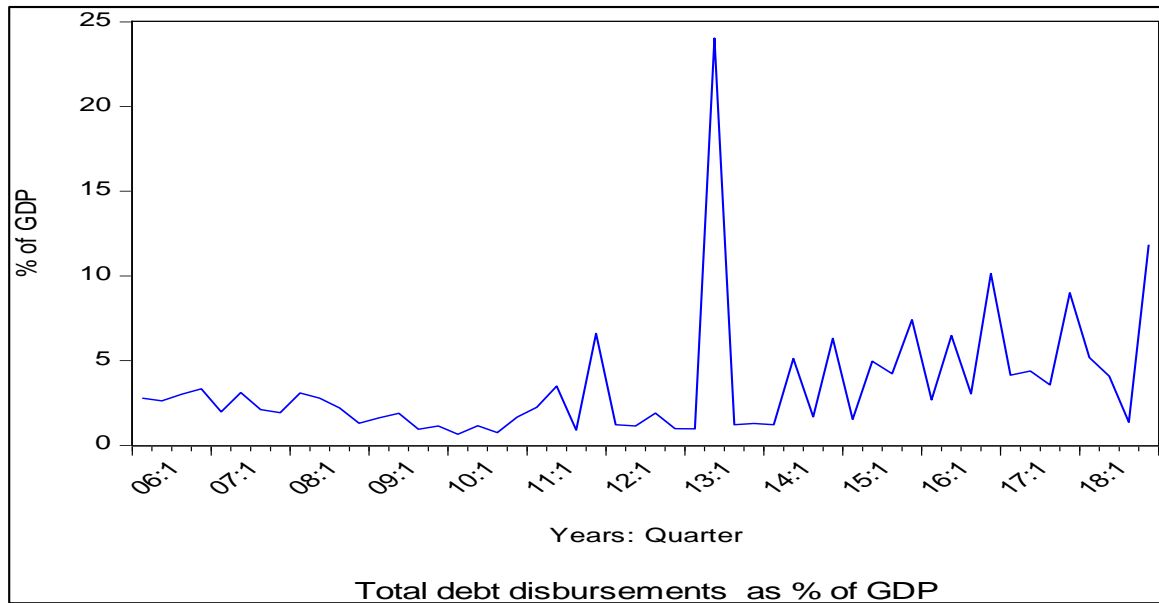


Figure 4: Total loans disbursed as a percentage of GDP, Source: MINECOFIN, May 2019

After the debt relief episode, Rwanda continues to receive on average, 25 percent as a share of GDP of ODA net inflows. This represent an average of USD 1.036 billion of both financial and technical assistance over a period of 11 years (2007-2018). However, despite this significant amount of foreign aid inflows, Rwanda’s vision of becoming self –reliant, will remain strong due to its tragic history in the eyes of a passive international community. In fact, all political discourses in Rwanda reflect a sense of pride and independence vis a vis foreign aid, which would be considered effective, if it is consistent with government’s own development strategies.

1.3 Problem Statement

Aid-taxation relationship has always been subject to controversial critics across different studies. While some argue that the aid affects tax revenues positively, others support the opposite. In principle, a country relies on its domestic revenues to fund development programs as the most sustainable way. However, tax revenues generation depends on how big is the taxable base of a country. Statistics show that for a large number of Sub-Saharan African countries, the level of tax as a share of GDP remains below 15 percent. It suggests that low-income countries may continue to require external funding (loans and grants) to complement their efforts in bridging the financing gap. As of end 2017, ODA by income group represented 60.7 percent of net disbursements.

A review of the existing literature on the aid-taxation relationship has revealed mixed results. Aid may have a negative effect, as explained by Gupta (2007). He finds that loans have a positive effect on tax mobilization efforts because they will ultimately be repaid, while grants have a negative effect. A negative effect of aid on tax revenues is mainly attributed to the unconditional grants, while loans would imply higher efforts by the government in tax collection.

On the other hand, Mascagni (2014) shows a positive relationship between aid and tax for the case of Ethiopia. Most specifically, both loans and grants have a positive effect on tax revenues due to the role of aid in supporting fiscal reforms, and improvements in tax administration. The subject is further explored by Gambaro et al. (2007), while looking at the impact of aid on the quality of tax administration but also, on the quality of institutions on the effective use of aid.

Rwanda's tax to GDP ratio is estimated at 16.02 percent as of end 2018. This is slightly higher than the average for sub-Saharan African countries. Despite all the efforts it has invested in improving the quality of tax administration, external funding will continue to play an important role in its development program. As a matter of fact, Rwanda has received, on average net ODA inflows worth, more than a billion every year since 2006. This includes both financial and technical assistance.

In times where financing is needed to achieve SDG goals, it is more than crucial to ensure that ODA inflows do actually complement Rwanda's efforts to collect more tax revenues. Previous studies conducted on Rwanda have only looked at the impact of aid on government expenditure choices. For example, Ezemenari et al. (2008) have assessed the impact of aid on government allocation between current and capital expenditures. They find that the more aid was received during the pre-1994 period, the more it was used for consumption than investment.

As opposed to other studies, this study is the first to assess the state of the aid taxation relationship for Rwanda from a revenue perspective. This paper will assess the state of the aid-taxation relationship between 2006 and 2018. This paper will not discuss the impact of aid on different taxation systems, or the impact of aid composition (loans and grants) on tax. It will instead respond to the question of aid effectiveness in Rwanda's effort to

generate domestic revenues. Also, the study intends to guide policymakers and Rwanda development partners in view to support the domestic revenue mobilization strategy. Furthermore, this paper will constitute a starting point for future research on Rwanda's aid-taxation relationship.

Data used are time series drawn from national sources, and the estimation method used is the Error Correction Model (ECM), mainly because variables are found to be non-stationary in the short run while they present a long term relationship.

1.4 RESEARCH Question

Questions that will guide our research will be as follow:

Does Aid still have an impact on tax revenues in Rwanda over the period 2006-2018?

How is the status of the relationship (positive or negative)?

1.5 Hypothesis:

Based on the established questions, the study intends to reveal, the Aid- Taxation relationship status in the period 2006-2018.

$H_0 = \beta=0$ Aid received has no impact on tax revenues

$H_0 = \beta \neq 0$ Aid received has an impact on tax revenues

1.6 Objective:

The objectives of this study is to reveal:

The existence of an aid-taxation relationship within the Rwandan context, over a period of 2006-2018.

The effectiveness of the aid-taxation relationship (positive, negative).

1.7 Significance of the Study:

Assessing the effect of Aid on domestic revenue mobilization is critical for Government of Rwanda, which may face challenges in financing its national strategy for transformation phase 1. Current domestic revenue projections are not enough to achieve the set targets in NST1, and will have to be complemented, partly by ODA. It is therefore important for GoR and donors, to insure that aid flows to Rwanda do not have a negative effect on Tax revenue mobilization.

1.8 Scope of the Study:

The scope of this study is limited to the effect of official development assistance in Rwanda. Official development assistance will include both loans to the government and grants. Domestic revenue will include only tax revenues, though disaggregated in tax related to the value added (VAT), tax on international trade, property, and income Tax. The timeframe will cover quarterly observations from 2006 to 2018.

1.9 Structure/ Organization of the Study:

Following the introduction and background of this research topic in Chapter I, Chapter II, will explore and discuss studies, articles, books and different papers that have contributed to the topic of Aid-taxation relationship in both a conceptual and empirical perspective. Chapter III consists in methodology used during the research (an empirical specification and estimation strategy), it also exhibits features of the dataset used for our analyses. Chapter IV will present the main results of our research, while conclusions and recommendations will be covered in Chapter V.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The aid-taxation relationship has been explored through a number of studies and publications that have revealed mixed results. Most of them have mainly looked at the impact of aid on country's fiscal policies. To name a few, Fagernäs et al. have assessed in their different studies the impact of aid on fiscal policies for Malawi, Uganda, and Zambia. Ezemenari et al. did the same for Rwanda. In summary, a review of different studies has shown that the aid-tax relationship may be positive or negative, and sensitive to either the scope, the timeframe and/or the composition (either Loan or Grant) of the estimation sample (Clist & Morissey 2011). In addition, issues like the institutional environment, the macroeconomic policies, the aid conditionality and the level of corruption may also have some implications. In this section, I first review different work which have been produced around the aid taxation relationship, in order to identify different contributions made, gaps and limitations, and this will set the basis for this paper's contribution.

2.2 Literature Review on existence of aid-taxation relationship

The relationship between foreign aid and tax starts being explored with Heller's model (1975), which focuses on fiscal behaviours of 11 African countries' budget. Heller is interested in the effect of aid on government spending which need revenues (foreign aid and tax). He finds that aid has a negative effect on tax, while it increases public expenditure. This is because the fiscal behaviour depends on the type of aid (grant or loan). Aid is pro-consumption goods, while loans would be pro-investment. This lays the foundation for subsequent studies, where authors will explore the issue of aid-taxation relationship by expanding the model with other variables.

Carter (2013) will further argue that all cross-countries estimates suffer from heterogeneity and that country specific case would be more reliant and better inform policy makers

2.3 Literature Review on status of aid-taxation relationship (positive or negative)

As an illustration, Ghura's (1998), contribution to the Heller's work consists in adding variables like the institutional capacity of a country, as well as the macroeconomic policies. His work also focuses on African countries over a period of 11 years, (1985 to 1996) and reveals that the relationship between aid and tax is negative, particularly for countries with higher budget needs and some level of corruption. Gupta et al. (2004) (as cited by Clist and Morrissey 2011), will go further and disaggregate foreign aid into grants and loans for a sample estimate of 107 countries (both low and middle income) for a period of 30 years (1970-2000). He finds that loans have a positive effect on tax mobilization efforts, because they will ultimately be repaid, while grants have a negative effect. A further study by Gupta (2007), will demonstrate that the aid-tax relationship is negative and stronger for low income countries. Bird et al. (2008) will be more specific on issues like institutional environment and corruption. Thornton (2014), explains that the negative effect of aid on tax revenues is mainly attributed to the unconditional grants, while loans would imply higher efforts by the government in tax collection. Benedeck et al. (2012) explore aid effect on disaggregated tax system, and find that aid effect on different tax systems is negative except for tax on international trade. As opposed to above mentioned studies, Morrissey et al. (2006) conclude that total aid, with some lag tend to have a positive, though small effect on tax.

Carter (2013) will further argue that all cross-countries estimates suffer from heterogeneity and that country specific case would be more reliant and better inform policy makers. A review of country specific work literature shows only a few authors like Mascagni (2014) on Ethiopia and Ezemenari et al. (2008) on Rwanda. Mascagni's work covers a period from 1960 to 2009 and shows that both loans and grants have a positive effect on tax revenues, due to the role of aid in supporting fiscal reforms, and improvements in tax administration.

Ezemenari carries a theoretical and an empirical study to examine the effect of aid on tax rate and the implication that this may have on government allocation between current expenditures and public investment. He uses Rwanda data and finds that total aid has a negative effect on total average tax rate (tax to GDP), he also finds that this has a negative effect for allocated revenues (including aid) to public investment from 1981 (start of the estimation sample) until 1995, where many reforms became effective, one year after the end of the Tutsi Genocide and the change in political regime. Ezemenari concludes that

though a negative relationship exists between aid and tax, it is very small, and its negative implication for public investment stops in 1995. The study further explains that the reforms made, as well as the tax administration and expansion of tax base offset the effect of aid on tax revenues. hence, as opposed to the pre-1994 period, the post policy reform period is rather characterized by a positive effect of aid on government allocation in public investment.

My contribution to existing literature is to assess whether an aid-taxation relationship exists in Rwanda and in a more recent period (2006-2018) Most specifically my point of interest is its effect on the tax revenues mobilization in Rwanda (positive or negative).

2.4 Empirical Review

To assess the effect of foreign aid on tax revenues performance in Rwanda, I need to specify a model which reflects the aid-taxation relationship. The model is drawn from Heller's equation which is later developed by Ghura (1998). In addition, the choice of determinants of Tax are based on empirical literature from Gupta (2007). This was also used by Mascagni (2014) in her study of the aid-taxation relationship for the case of Ethiopia. Mascagni specifies her model as follow:

$$T = b_0 + b_1A + b_2NT + b_3Agri + b_4Manuf + b_5Trade + b_6GDPpc$$

Where: *A* is aid, *NT* is non-tax revenues, *Agri* is agriculture, *Manuf* is manufacturing and *GDPpc* is GDP per capita.

Mascagni uses a two-step procedure suggested by Engel granger (1987) to estimate the above equation given the presence of a long run relationship between variables and confirmation that they are all integrated at levels. In order to do that, she uses three different types of stationarity tests: The Augmented Dickey-Fuller test (dfgls), the Kwiatkowski-Phillips-Schmidt-Shin test (kpss), and the Clemente unit root test (clem).

The first step is establishing the existence of a Long run relationship, while the second step establishes the existence of short run relationship and includes an error correction term.

Results show that there exists a significant long run relation between aid and tax, and most importantly, aid does not have a negative impact for the case of Ethiopia. The significance of the relationship is estimated at 1 percent for loans and 10 percent for grants. This suggest that tax developments are strongly related to loans. Mascagni adds that there although the relationship between loans and tax appears to be more significant than grants, there are no evidence that grants would have a negative impact on tax developments in Ethiopia.

Results also show that an increase in grants implies 0.3 percent increase in tax while loans affect positively tax by 0.4 percent.

Regarding the second step relationship, results show a high significance level of 1 percent for both loans and grants, though loans present a lower coefficient than grants. Mascagni explains that this could be due to the fact that grants are usually used to address short term constraints in tax administration.

Overall Mascagni checks the robustness of these results using the cointegrated VAR methodology, which confirms that the aid-taxation relationship is positive for the case of Ethiopia.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

For the purpose of this study, foreign aid is considered to be the amount of grants and loans(concessional) received by Rwanda, while tax revenues refer to income tax, value added tax, property tax, and tax on international trade. There are some important aspects related to the data used, method / techniques used to estimate the aid-taxation relation, which contribute to the robustness of our empirical results, and that we have mentioned in the following lines.

3.2 Data Collection

The first aspect is the size of the time series, which covers 52 quarterly observations, from 2006 to 2018. Most of the data used in this study are purely coming from national sources, tax information has been drawn from RRA, while grants and loans are from the BNR and MINECOFIN respectively. Information related to grants were sourced from BNR, except for World Bank and African Development Bank information which were sourced from client connection and own electronic dataset respectively. It is important to note that grants information from BNR is only the cash component of the amount of grants that flows into Rwanda. The same process was applied for data coming from World Bank and AfDB. There is no centralized national database for the other component of grants that Rwanda receives. It would ideally include technical and humanitarian assistance, but also any other type of donation that is not disbursed through treasury. Like Mascagni (2014), our research will focus on the cash component because it usually constitutes the basis for decision making by the policy makers. Loan information were drawn from the Ministry of Finance which is the custodian of external debt information. Loans that flow into Rwanda are essentially concessional (with at least 25 percent grant element as per the OECD definition). After the debt relief in 2006, Rwanda has maintained prudent approach to debt management which has resulted into a predominance of concessional debt in its portfolio with 80 percent as a share of total external debt (MINECOFIN, 2019).

All data used are relative to GDP, except the GDP per capita which is expressed in log, and is used as one of the determinants of tax. Another determinant used in this study is the

level of trade openness which is also relative to GDP, agriculture, manufacturing, and services. Both determinants were drawn from the NISR quarterly statistical publications. All variables are expressed in Rwandan Franc.

3.4 Model specification

To assess the effect of foreign aid on tax revenues performance in Rwanda, we will use time series analysis. As earlier shown in Figure 1, it may not be evident that a trend exists between our variables of interest, however, in order identify trends, and seasonal pattern that could be used to predict future behaviors, we will use the equation below, which is in line with the existing literature:

$$tty_t = \beta_0 + \beta_1 ady_{t-2} + \beta_2 agriy_{t-3} + \beta_3 mny_{t-2} + \beta_4 servy_t + \beta_5 tradey_{t-3} + \beta_6 lypc_{t-3} \quad (1)$$

Where:

tty_t = Tax revenues in percentage of GDP

ady_t = ODA (grants + loans) relative to GDP

$agriy_t$ = agriculture relative to GDP

mny_t = manufacturing (total industry sector) relative to GDP

$servy_t$ = services relative to GDP

$tradey_t$ = trade openness relative to GDP

$lypc_t$ = GDP per capita expressed in log form

In addition to total aid as an explanatory variable, the choice of other determinants of tax is based on existing empirical literature, (Gupta, 2007). He finds that, strong determinants of Tax include trade openness, agriculture, and manufacturing. Services were added to our empirical equation given its important contribution to GDP growth in the context of

Rwanda. There are also other non-typical factors which determine tax like the level of corruption, the economic policy environment, structural reforms implementation, and the human capital (Ghura, 1998). Ghura finds that, as human capital increases, there is a likelihood to collect more taxes. Furthermore, countries which have a stable and sound macroeconomic environment, and which take measures to fight corruption are likely to raise more tax. The approach that used in this study is in line with the one developed by Mascagni, (2014), at the exception that our equation includes services as a share of GDP instead of non-tax revenues as determinant of Tax. I have specified the model by identifying the number of lags that need to be associated to our explanatory variables. Once the lags are included, the aid-taxation relationship in Rwanda becomes significant.

3.4 Technique used

The two-step procedure by Engle and Granger (1987) is used to assess the aid-taxation relationship for Rwanda. The first step is to identify the long-run relationship, then identification of a Short-run effect (which includes an error correction term).

Before describing in details the different steps that have been followed during this analysis, it may be important to explain why the two-step procedure by Engle and Granger was preferred as opposed to other estimation technics. Indeed, there exist different estimations techniques for time series, but the choice of an ECM technique is based on the type of data that used in this analysis. First, the ECM requires that all seven variables be integrated of order one ($I(1)$), this means that they are non-stationary at levels ($I(0)$) but become stationary after differencing them once. Second, these variables are required to be cointegrated. This means that a linear function of the $I(1)$ variables is stationary or $I(0)$. In other terms, when combining our $I(1)$ variables in a linear function, their regression is not spurious (like a random walk), but rather suggests that our variables may have a long run relationship (Wooldridge, 2003).

The two step Engel and Granger procedure, starts by testing the existence of a unit root for the variables, using the Augmented Dickey-Fuller test. As explained by Wooldridge, (2003), this is a common procedure that helps determine if the probability distribution remains unchanged overtime. Then I test for cointegration. From the estimation of equation (1), I generate residuals, and test for existence of unit root. If residuals are stationary, variables are cointegrated.

Second, I formulate an ECM which will act as a corrector of short run deviations between aid and total tax, therefore maintaining the long run equilibrium (Granger,1983). I difference the variables once, and include a lag to the error term.

3.5 Tests

However, it is important to mention that prior to estimating the short run relationship, we have assessed the quality of our model to check if it does not violate requirements suggested by the heteroscedasticity test, the normality test, and the CUSUM test of stability.

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Interpretation of results

This section presents the main results of the estimation of the effect of foreign aid on total tax (equation 1). The objective in conducting this analysis is to assess the state of the aid taxation relationship in Rwanda. This is be the first study to look specifically at the aid-taxation relationship for Rwanda. Other studies that exist have either been looking at the effect of aid on government spendings or have assessed this relationship for a group of countries . In this last category, Mascagni (2014) was the first to test this relationship at country level the specific case of Ethiopia. Like Mascagni for the case of Ethiopia, this study is the first to assess the aid taxation relationship for Rwanda.

Most specifically, I have specified the model by identifying the number of lags to be included. Like Morrissey et al. (2006) aid is found to positively affect tax when we include some lags. Hence, in order to take into consideration, the dynamic of the relationship between total tax and the different explanatory variables. The identified model is:

$$tty_t = \beta_0 + \beta_1ady_{t-2} + \beta_2agriy_{t-3} + \beta_3mny_{t-2} + \beta_4servyt + \beta_5tradey_{t-3} + \beta_6lypc_{t-3} + \text{error term}$$

First, in order to perform ECM, the variables need to be integrated of order 1 I (1). I have used the Augmented Dickey Fuller procedure to test for the existence of unit root. All variables are found to be I (1) as indicated in the table1 and 2 below:

Table 1 Results of the Augmented Dickey-Fuller test for stationarity at levels

Variables	Augmented Dickey-Fuller test statistic	Test critical value (1%)	Test critical value (5%)	Test critical value (10%)	Probability
ADY	-0.238776	-2.616203	-1.94814	-1.61232	0.5948
TTY	3.395679	-2.614029	-1.947816	-1.612492	0.9997
AGRIY	-0.861897	-2.611094	-1.947381	-1.612725	0.3377
MNY	0.79863	-2.61301	-1.947665	-1.612573	0.8819
SERVY	0.442613	-2.611094	-1.947381	-1.612725	0.8062
TRADEY	0.752023	-2.611094	-1.947381	-1.612725	0.8735
LYPC	6.448509	-2.614029	-1.947816	-1.612492	1.0000

Ho: variables has a unit root

Table 2 Results of the Augmented Dickey-Fuller test for stationarity at 1st difference

Variab les	Augmented Dickey- Fuller test statistic	Test critical value (1%)	Test critical value (5%)	Test critical value (10%)	Probabi lity
ADY	-7.07924	-2.616203	-1.94814	-1.61232	0.0000
TTY	-3.644888	-2.615093	-1.947975	-1.612408	0.0005
AGRI Y	-6.525961	-2.612033	-1.94752	-1.61265	0.0000
MNY	-9.918788	-2.61301	-1.947665	-1.612573	0.0000
SERV Y	-7.265957	-2.612033	-1.94752	-1.61265	0.0000
TRAD EY	-8.50226	-2.612033	-1.94752	-1.61265	0.0000
LYPC	-1.780153	-2.615093	-1.947975	-1.612408	0.0072

Ho: variables have a unit root

The second step is to test for cointegration. From the estimation of equation (1), I generate residuals, and test for existence of unit root. As indicated by Engle- Granger test, the 7 variables are cointegrated, which suggest that there exists a long run relationship between total tax and the explanatory variables. Indeed, p- value of Engle Granger test is 0.039 less which is less than 5% (0.05) see table 1 below as well as the Mackinnon critical values.

Table 3: Cointegration test

Dependent Variable: TTY

Included observations: 48 after adjustments

Cointegrating equation deterministic: C

Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth
= 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGRIY(-3)	0.176655	0.079418	2.224385	0.0317
MNY(-2)	0.308003	0.124529	2.473333	0.0176
TRADEY(-3)	0.118964	0.044047	2.700846	0.0100
ADY(-2)	0.058314	0.024162	2.413501	0.0204
LYPC(-3)	6.415046	1.086043	5.906808	0.0000
SERVY	-0.120823	0.116608	-1.036148	0.3062
C	-71.22194	13.35721	-5.332097	0.0000
R-squared	0.810765	Mean dependent var		13.54302
Adjusted R-squared	0.783072	S.D. dependent var		1.719399
S.E. of regression	0.800819	Sum squared resid		26.29373
Long-run variance	0.585311			

Cointegration Test - Engle-Granger

Specification: TTY ADY(-2) AGR1Y(-3) MNY(-2) SERVY TRADEY(-3) LYPC(-3)

C

Cointegrating equation deterministics: C

Null hypothesis: Series are not cointegrated

	Value	Prob.*
Engle-Granger tau-statistic	-5.524616	0.0391
Engle-Granger z-statistic	-39.10462	0.0250

*MacKinnon (1996) p-values.

I also ensured that the quality of the model, by testing certain requirements for estimation using OLS like the error term being homoscedastic and normally distributed. I have also used the CUSUM test for the stability of estimated coefficients in the sample period. As indicated in the tables below, the residuals from the estimated model are homoscedastic as indicated by the white test of Heteroscedasticity

Table 4: Heteroskedasticity Test

Heteroskedasticity Test: White

Null hypothesis: Homoskedasticity

F-statistic	0.999538	Prob. F(26,25)	0.5015
Obs*R-squared	26.50380	Prob. Chi-Square(26)	0.4357
Scaled explained SS	24.22878	Prob. Chi-Square(26)	0.5629

I

In addition, the residual terms are normally distributed. The p-value of Jarque Berra test is 0.408 bigger than 0.05

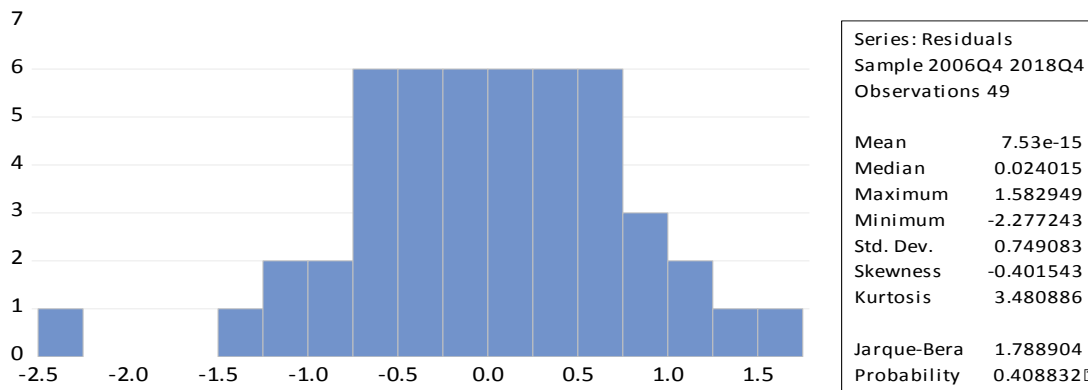


Figure 5: Normality test

As indicated, before estimating short-term relationship, we have tested if coefficients are stable by running the CUSUM test of stability. As shown in the graph below, the blue line is inside the interval indicating that the coefficients are stables.

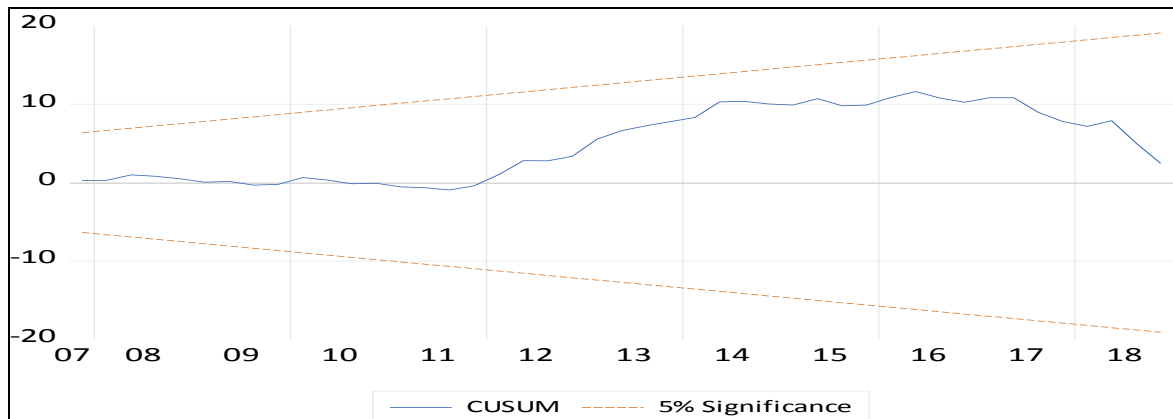


Figure 6: Cusum test of stability

Second, we formulate an error correction model which will act as a corrector of short run deviations between aid and total tax, therefore maintaining the long run equilibrium (Granger,1983). I difference all variables once, and include a lag to the error term. The estimate ECM is:

Table 5: Error correction model

Dependent Variable: D(TTY)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(AGRIY(-3))	-0.106040	0.117754	-0.900520	0.3734
D(MNY(-2))	0.439645	0.130354	3.372693	0.0017
D(TRADEY(-3))	0.018153	0.044540	0.407574	0.6858
D(ADY(-2))	0.061882	0.013887	4.455950	0.0001
D(LYPC(-3))	4.207452	4.478615	0.939454	0.3533
D(SERVY)	-0.107582	0.096986	-1.109246	0.2741
R(-1)	-0.646632	0.139978	-4.619530	0.0000
C	0.059315	0.104926	0.565301	0.5751
R-squared	0.530346	Mean dependent var		0.071596
Adjusted R-squared	0.446049	S.D. dependent var		1.032860
S.E. of regression	0.768736	Sum squared resid		23.04722
Long-run variance	0.397640			

ECM model shows that only aid and manufacturing significantly contribute to an increase in total tax in the short term. More importantly, the coefficient of adjustment is negative (-0.646) and significant as its p- value is 0.000 (less than 0.05). If any deviation to long run relationship occurs, 64.7% of that deviation will corrected within one quarter.

4.2 Making sense of estimation results: positive Aid –Tax relationship

Like Mascagni’s study on aid-taxation relationship for the case of Ethiopia, this study suggests that foreign aid received by Rwanda since 2006 has had a positive effect for the country’s ability to generate more tax. In the short run, aid contributes to tax increase by alleviating barriers like infrastructure, human capital development, institutional capacity, etc. And this is reiterated by Ghura,1998, as he finds that there exists a relationship between a country’s ability to generate tax revenues, and its ability to implement reforms,

rising human capital, and declining corruption. The estimation shows a positive relationship between tax increase and human capital increase.

On the other hand, though not specified in our estimation, latest measures of Rwanda's corruption perception index, support the empirical results of Ghura,1998. The index shifted from a rank of 121 out of 175 in 2006 to a rank of 48 in 2018⁸. Finally, the number of reforms implemented with regards to domestic revenues mobilisation has also yielded into positive results with regards to tax revenue collection since the start of their implementation in 1995. Major reforms were introduced in tax laws, tax administration systems, enforcement measures, and modern tax administration systems. In addition, it is important to mention that strong political support in a country matters. For the case of Rwanda, this has also contributed to implementation and enforcement of elements cited above.

When Tax is decomposed, VAT and Income tax as percentage of total taxes, account for the largest share with 51 percent and 39 percent respectively, while tax on international trade and property tax account for the 9 percent and 1 percent respectively. This suggests that results are mainly attributed to VAT and Income Tax which represent the largest share of total tax.

When ODA are disbursed, the government invest the received funds in sectors that will create a potential for prospective tax collections. Instead of being substituted to tax collection efforts, ODA receipts do complement government effort to finance its development program. Since the 2000's lot of efforts have been made in tax reforms, tax administration and tax compliance mechanisms, and this has created the right environment for government to rise more tax as national income have been growing.

Benedeck et al. 2012, find a positive relationship between aid and tax on international trade, and explains that higher aid implies higher imports and ultimately more revenues from trade tax. However, for the specific case of Rwanda, the share of tax on international trade is low and may not be contributing to the positive relationship between Aid and Total Tax.

⁸ The Country corruption perception Index, measures the perception on the level of corruption of a country's public sector(<https://tradingeconomics.com/rwanda/corruption-rank>).

The low level of Tax on international trade is explained by a number of exemption that are applicable to certain categories of imported goods. This includes mainly products imported from the East african community, specific raw materials and capital goods, specific intermediate goods, finished goods, and some sensitive products⁹.

Overall the results of this research is partly in line with existing literature, and empirical studies related to aid-taxation relationship. Aid is positively related to total tax, and this may be to a large extent attributed to VAT and income Tax as opposed to tax on international, and property tax which represent a low share. As a matter of fact, VAT and income tax have consistently been increasing as nominal income has been rising, but also the level of tax compliance has improved over the estimated period (2006-2018).

Though this research has revealed some interesting features with regards to aid-taxation relationship in Rwanda, it has not exhausted all questions that arise in with regard to this topic. For example, further research could be conducted with regards to countries within the EAC and see where Rwanda stands compared to its peers. Also, if tax were to be decomposed, what could be the level of significance of different tax systems? Benedeck et al. do find that VAT and income tax are negatively related to aid, while tax on international trade is positively related to an increase in aid. In addition results from Mascagni 2014 on Ethiopia as well as Gambaro et al. 2007 show that VAT, Income Tax, and tax on international trade are positively related to aid.

4.3 Policy implications of the results

Assessing the effect of Aid on domestic revenue mobilization is critical for Government of Rwanda, which may face challenges in financing its national strategy for transformation phase 1. This study suggests that ODA received by Rwanda do have a positive impact as they complement government efforts to finance its development plans. The results of the ECM model reveal a significant and positive effect of aid, manufacturing, and GDP per capita on total tax. An increase in ODA inflows as percentage of GDP will affect

⁹ Rwanda tax expenditure report: this represent the amount of tax forgone by the state to support country's priority sectors, attract investors, and regional integration and harmonization

http://www.minecofin.gov.rw/fileadmin/templates/documents/Data_Reports/Tax_Expenditure/Rwanda_tax_expenditure_report_June_2019.pdf

positively total tax as percentage of GDP by 0.6 percent in the short run. Furthermore, manufacturing and GDP per capita do affect tax revenue increase by 0.4 percent and 4.2 percent(log) respectively. these results suggest that over the medium term the aid-taxation relationship will become more and more significant as long as human capital and taxable sectors in the economy grow. This is an important finding for both the government and the development partners as it suggests that the government is investing aid in sectors which are contributing to economic growth and ultimately to tax revenue collection. Furthermore, as tax reforms implementation have been crucial to tax collection increase over the years, more efforts will have to be made with regards to strengthening the government tax policy capacity in order to reach an optimal level of tax revenue collection. Most specifically if Rwanda's ambition is to become an upper-middle income country and high income country by 2030 and 2050 respectively, it is crucial that ODA receipts do not crowd out domestic revenue mobilization.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

The aid –taxation relationship does present mixed results in existing literature. For the case of Rwanda this analysis reveals that the relationship between aid and tax is positive and significant in the short run and with the Engle-Granger two step procedure, this relationship is maintained in the long run.

While disaggregating different tax systems we find that VAT and income tax represent the largest share of total tax and therefore could be the ones mostly affected by aid, while tax on international trade combined represent a maximum of 10 percent. This research could be replicated at regional level, comparing the results to those of the EAC. An estimation by tax type could also be conducted to reveal whether different tax systems are in any way affected by foreign aid.

Our main finding is that, ODA received by Rwanda do not have a crowding out effect on domestic revenues mobilization efforts. ODA receipts do complement government tax revenues efforts in the case of Rwanda, and this has been coupled with a conducive environment of tax reforms implementation which have contributed to a continuous improvement in tax revenue administration.

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