December 2018

Developmental State Economic Model Versus Neo-classical Principles: The Case of Rwanda and Burundi

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DEVELOPMENTAL STATE ECONOMIC MODEL VERSUS NEO-CLASSICAL PRINCIPLES: THE CASE OF RWANDA AND BURUNDI

by

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A Dissertation Submitted in

Partial Fulfillment of the

Requirements for the Degree of

Doctor of Philosophy

in Africology

at

The University of Wisconsin –Milwaukee

December 2018

ABSTRACT

DEVELOPMENTAL STATE ECONOMIC MODEL VERSUS NEO-CLASSICAL PRINCIPLES: THE CASE OF RWANDA AND BURUNDI

by

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The University of Wisconsin-Milwaukee, 2018
Under the Supervision of Professors Abera Gelan and Nolan Kopkin

The purpose of this thesis is to examine the significance of the developmental state model using the economic performances of two African countries, Burundi and Rwanda. The two neighboring African countries share similar economic characteristics and face virtually same social and political challenges. In the last two decades, Burundi and Rwanda have taken two different approaches to develop their economies. Burundi is using a standard neoclassical economic model in contrast to Rwanda that is applying the developmental state model. I use the standard method of difference-in-difference and the annual data over the period 1974-2014 from the two countries to compare the similarities and differences of their economic performances in order to learn the value of the developmental state model for African economies.

To

my parents,

my brothers and sisters,

my nieces, nephews, friends,

and especially my daughter Bettina Mianzo-Kuna

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LIST OF ABBREVIATIONS

BIF: Burundian Francs

CIA: Central Intelligence Agency

CNDD-FDD: The National Council for the Defense of Democracy–Forces for the Defense of Democracy

DAC: Development Assistance Committee Donors

D-in-D, DD, or DID: Difference-in-differences

EDPRS: Economic Development and Poverty Reduction Strategy

EQ: Equation (Regression Equation)

FAOSTAT: Food and Agriculture Organization of the United Nations

FE: Fixed effects

GDP: Gross Domestic Product

GoR: Government of Rwanda

HDI: Human Development Index

IMF: International Monetary Fund

ISTEEBU: Institut de Statistiques et d'Etudes Economiques du Burundi or Burundi Institute of Statistics and Economic Studies

LDC: Less developed countries

M_2: Money

MDG: Millennium Development Goals

NC: National Currency

NISR: National Institute of Statistics in Rwanda

OECD: Organization for Economic Co-operation and Development

OSL: Ordinary least squares

PWT: Penn World Tables

RPA: Rwandan Patriotic Army

RPF: Rwanda Patriotic Front

RRA: Rwanda Revenue Authority

RWF: Rwandan Francs

Tri-Star/CVL: Tri-Star Cristal Ventures Ltd

UN: United Nations

VUP: Vision Umurenge program

WB: World Bank

ACKNOWLEDGEMENTS

I am very grateful to my advisors, Dr. Abera Gelan and Dr. Nolan Kopkin, for their support and insights throughout this process. Their guidance and collaboration greatly improved my dissertation and, more importantly, have enormously contributed to my personal development.

I would like to pay special thankfulness, warmth and appreciation to Dr. Gladys Mitchell -Walthour for her vital support and assistance. Her encouragement made it possible to achieve this goal.

I would like to acknowledge the financial assistance from the Advanced Opportunity Program Fellowship (University of Wisconsin – Milwaukee – Graduate School), which allowed my graduate studies to run smoothly and in good conditions.

I recognize the valuable support provided by the Africology Department, especially Chairpersons, Joyce Kirk, Erin Winkler, Doreatha Mbalia, Anika Wilson, and Jeffrey Sommers, their interventions and support contributed to make this dissertation a success.

Last but not least, I would like to thank my friends and family for their tireless support and encouragement during this endeavor.

CHAPTER

I. Introduction

In this thesis, I aim to explore the role of state policy and the market system in achieving economic development in African economies using the experiences of Burundi and Rwanda over the period 1974-2014. In both countries, poverty is the principal cause of hunger and desolation. A shortage in basic infrastructure stifles their economic performances and an insufficient healthcare system leads to some of the highest infant mortality rates in the world. The two countries also experience a lack of adequate access to educational opportunities and millions of their children are deprived of their vital intellectual and social development.

By and large, the many socioeconomic problems and challenges that characterize of the two countries cannot be solved without economic development. In order to develop, however, Burundi and Rwanda not only must adopt the most suitable economic model, but also must adhere to a pertinent state policy in their respective countries. Khan (2011) states that a viable governance and sound economic policy could accelerate economic growth and sustain development if the state leadership has appropriate vision and commitment to the attainment of the goal of development. Or, as standard theories posit, the alternative approach would be to rely upon market forces to bring about desirable changes by transforming backward economies into advanced economies. In that case, the role of state is limited to creating rules and protecting private property rights.

Although Burundi and Rwanda have recognized the need for economic development, especially after the horrific genocide that took place in Rwanda in 1994[1] and recurrent massacres

[1] During April - July 1994, Hutus extremists massacred about one million Tutsis and moderate Hutus.

in Burundi, the development path that the two countries have taken is starkly different. Burundi's policy is based on the neoclassical economic model of the laissez-faire economic philosophy where government policy interference with markets is very limited. Rwanda, on the other hand, embraced the developmental state model that emphasizes the crucial role of government activities to transform its economy from a subsistence economy into an advanced economy. In this thesis, I use selected primary data from Burundi and Rwanda in order to determine how well their economies have performed in the last twenty years given their respective economic models.

The neoclassical development model that Burundi uses is based on the tenet of neoclassical economic theory. This theory conjectures that the interlinking of prices, outputs, and income distributions in the market economy is determined through supply and demand. Thus, the establishment of organized markets is a pivotal goal for development. This theory accredits market-virtues to its essential mechanism of increasing productivity and development. The prerequisite for successful economic development is the availability of investment that augments the growth rate of per capita output. In a perfectly competitive market that the neoclassical theory assumes to prevail, entrepreneurs are motivated by potential rent benefits to innovate and discover new methods to produce goods and services. The success of rent creation gives rise to the creation of wealth and leads to the realization of development as a result of that process. It is equally important to note that according to the neoclassical economic theory, the appropriate role of the state in a market economy is that of a nightwatchman. That is to say, for development to ensue in less developed countries, such as in Burundi, the role of the state must be limited to minimum activities.[2] The central argument for a limited role of the state in a market economy is built around

[2] State role, by and large, is limited to the protection of individual and property rights, the enforcement of contracts and the protection of competition among economic actors, etc.

the theory of rent-seeking. Rent-seeking is the direct opposite to rent creation. It refers to the transference of already generated wealth through unethical or illicit means by state agencies to preferred clients (Zenawi, 2012). The state is not only a conduit for rent-seeking activities, but also a source for the perpetuation of rent-seeking that creates and preserves inefficient resource allocation. As much as the role of the state is incongruous to the process of rent-creation, it is rational to appeal to the nightwatchman theory of the state in neoclassical economic development.

The atomistic paradigm of neoclassical economics assumes perfect mobility of resources and unconstrained interaction among economic agents in a leveled playing field. In this unfettered field, information is readily available for a self-interested and utility-maximizing individuals that operate in an environment devoid of uncertainty. In short, neoclassical economics underlies the assumption of non-market failure or resorts to the theory of market mechanisms that states the free market system dissipates market failure if it arises. Conversely, the theory prescribes a role of nightwatchman for the state on the ground that the market is both pervasive and Pareto-efficient and increased state intervention creates socially wasteful rent-seeking activities.

The other basic feature of the neoclassical development model is the assumption that economic growth commences with static technology. The acquisition of labor abilities and skills as well as the augmentation of higher quality capital that are needed to absorb technology in the local market are left to the role of arbitrageurs. Least developed countries are expected to benefit from the relative price differential. Resources would move away from advanced countries where they are in abundance and therefore their prices are low compared to the least developed countries where they are scarce and their prices are higher. Under such likelihood of efficient resource allocation across international boundaries, the flow of capital and skilled labor from advanced

countries to LDCs would fill the gap between the two groups and leads to the famous theory of convergence.

Rwanda is pursuing its own development in order to transform its economy that is predominantly dependent on traditional commodity production to an advanced economy by investing in the developmental state model. The developmental state model is different from a variety of traditional neoclassical models because its tenets do not originate exclusively from the historical experiences of western advanced countries. The foundational theory of the developmental state model is anchored on national characteristics and particularities of economic complexities that it is designed to change. These characteristics and particularities may include socioeconomic status, sociocultural aspects, other social norms, institutions and ideologies of an individual country.

The property of the developmental state model is based more on the assumption that it is to transform the economy of a less developed country from a subsistence level to an advanced level. But, its principles do not subscribe to universal laws of applicability to all countries. It is this notion of applicability that distinguishes the developmental state model from neoclassical development economics. The ideology of the developmental state is based on the assumption that each developing country is beleaguered by distinct and varying degrees of rigidities and market failures. The root causes for these problems are embedded into the fabrics of each individual country, which in many cases are unique and complicated.

One of the guiding principles of the developmental state is the realization of the important role of sociological, cultural, and other social environments in shaping the goal of economic development. These human behaviors connect people together in their communities, regions and

nations because they are the building blocks for any human ethos and life experiences. At the same time, these community members are made up of individuals who are not only self-interested but also group associates with non-self-interested behaviors that form the basis of their economic system. Such unique blend of economic actors' self-interested and non-self-interested behaviors, values, norms and rules, also known as social capital, underpin their very existence and can be understood more effectively by a sociological approach. The development of social capital on the other hand is vital for eliminating economic stagnation and underdevelopment and accelerating growth and development.

Social capital has distinctive properties that makes it stand out from other forms of capital. First, it is a public good and has increasing returns to scale. As long as the components that comprise social capital exist in the social fabric of society, the benefits obtained by a group of individuals from using them do not diminish when other groups also use these same components of social capital. That is, the consumption of social capital is non-rivalrous and [non-excludable].

In the developmental state paradigm, the state plays a crucial role in the creation of social capital and in its supply as would be the case for other public goods. Social capital involves considerable positive spillovers of benefits or externalities. For that reason, it is undersupplied by the market even though it plays a vital role in accelerating economic growth and development. Among its attributes are reducing uncertainty and minimizing transaction costs. The state, by the virtue of its political power in social capital accumulation can weaken patronage networks and promote fairness, equity, as well as enhance participation and democracy to accelerate growth and development (Zenawi, 2012, 147).

In most cases the private sector does not have an interest in producing public goods because of free rider problems. Yet, in order to reduce poverty, increase productivity, promote growth and raise development, public goods are vital to developing countries. Investments in health care systems, education, access to safe drinking water, hydroelectric power, infrastructure such as roads or irrigation systems, etc. are important to improve the quality of life in developing countries. Returns on such investments, however, can only be realized in the long-run since these are long-run projects and extremely expensive to produce. This makes unattractive investement in developing countries and even for a well-intentioned domestic or foreign private investor working in a well-functioning market pursuing investment in such long-run projects to produce public goods in which returns cannot be realized in the short-run. In early developing countries such as Rwanda, only the state is a better alternative in the production of public goods.

One other distinguishing principles of the developmental state is the idea that the state plays a crucial role in establishing industrial policies with the specific aim of "improving the competitiveness and capabilities of domestic firms and promoting structural transformation" (Alice Hoffenberg Amsden, 1992). In the developmental state model, development is defined as a transformation and structural change that is permanent and irreversible (Hirschman, 1958; Pasinetti, 1993). This puts policies in the forefront to reach the desired objective of economic transformation and structural change. In developing countries such as Rwanda where the production of agriculture and the informal service sector are used to support human life, only an effective developmental state can design measured policies to transform an agrarian mode of production to a modern capitalist mode of production.

The challenge facing developing countries is the lack of functional or sometimes total absence of institutions to support economic transformation and structural change. Institutions in

areas such as market, education, health, communication channels, transportation, democracy, etc. are at their infancy with rudimentary functioning capabilities. To foster industrialization and structural change, these and similar institutions must be created and nurtured simultaneously with the acquisition of increased technology. With indigenous entrepreneurs and a market system operating at a minimum level of efficiency and needing support for their very own existence, to exclusively depend on the mechanism of the private sector is far from being an ideal strategy for efficient industrialization in early developing countries.

The other avenue is to faithfully pursue the virtue of international trade to maximizing revenue by exclusively relying on primary commodity exports. The rationale of this persuasion depends on the assumption that the developing countries have a comparative advantage at producing commodities at lower cost than advanced nations. Hence, each of these countries are better off specializing in producing only primary commodities to take advantage of their comparative advantage. The same principle of comparative advantage purports that industrialized countries that are endowed with the ownership of superior technology and skilled-labor force are better off specializing in producing only manufacturing goods. In such a static regime of international trade theory, developing countries are "forced" to abandon the option of manufacturing but are "required" to import to satisfy their need for manufactured goods. However, for several decades, the terms of trade between developing countries and advanced countries have been continuously declining because of a sustained decrease in the price of commodities and sustained increase in the price of manufactured goods. The deterioration of the terms of trade has resulted in many dire consequences facing particular African countries such as Rwanda thwarting their prospect for catching up with industrialized nations. In other words, the theory of international trade of comparative advantage has been far from being a way to maximize the well-

being of developing countries through the exchange of goods and services but has become an injurious conduit to retard the progress of developing countries because of market failure. The dependence on primary product exports in the last four decades had several measurable negative effects particularly in African countries (Noman & Stiglitz, 2012). First, it limited export variety and diversification of exports. Second, it forced African countries to underinvest in domestic infrastructure, particularly in agriculture and manufacturing. Third, there was very little domestic value added to extracted resources. Fourth, it depleted the continent's natural resources without the benefit of enhancing growth in most countries in Africa. This process is interpreted as a replacement of political colonialism by economic colonialism. Fifth, African countries have been effectively blocked from industrial capital and real technology transfer.

In developing countries where market failures are pervasive, indigenous private industries are in their embryonic stage and the lack of institutions to overcome poverty traps is immense, market solutions are scares and deficient. It is equally clear that the nightwatchman state of neoclassical type is neither capable nor has an agenda to overcome the bottleneck of backwardness and accelerate development. Thus, the single most important issue of economic development cannot be left to the rightful mercies of the market. The appropriate matter then becomes what the nature of the developmental state is as the alternative to the neoclassical or neoliberal model of development.

The developmental state must possess certain unique properties to ensure that it can overcome deep-rooted and pervasive market failures that create poverty traps and vicious circles that have plagued developing countries. There are two components that the literature identifies as the main features of the development state that distinguishes it from other states (Zenawi, 2012).

First, it must be guided by an ideology that postulates accelerated development as its core mission. Second, it must have a structure that empowers it with a capacity to implement policy effectively.

The ideological nature of the developmental states relies on Alexander Gerschenkron's seminal study of history of industrialization in Europe that shows the more delayed industrialization, if it comes, the more explosive the spurt of industrialization (Gerschenkron, 1962). His conclusion illustrates that when a less developed country embarks on the process of economic development, it need not reinvent the wheel because much of the technology required for the process will be available. The other advantage for such a country will be avoidance of mistakes and the replication of successful experiences in the process of learning from available technology. Therefore, despite a heavy burden that requires many resources and time to assimilate the already-existing technology, it is more than likely that industrialization takes place at a more accelerated pace than early industrialization should it arise. The other reality that late industrializers may encounter will be an inexorable undertaking to compete successfully with the early industrializers on a level playing field. This may create a legitimate and necessary reason for more state intervention concerning the circumstance of late industrialization (Oqubay, 2015).

If the ideological nature of the developmental state is based on the single-minded pursuit of accelerated development, which is the source of its legitimacy, the development project must be a hegemonic project in the sense that the key actors voluntarily adhere to its objective and principles[3]. That is, it should maintain control not through violence and political and economic coercion, but also through ideology that galvanizes the targeted and strategic section of the public.

[3] I discuss hegemony in the Gramscian sense. This is the view that asserts a class cannot dominate in modern conditions by merely advancing its own narrow economic interests; neither can it dominate purely through force and coercion. Rather, it must exert intellectual and moral leadership, and make alliances and compromises with a variety of forces.

The second component relates to the structure that the developmental state retains in order to have ". . . the capacity to implement policy effectively, which is the result of various political, institutional, and technical factors, which in turn are based on the autonomy of the state." (T. Mkandawire, 2001). This autonomy enables the state to pursue its development project without succumbing to myopic interests. Developmental state autonomy is qualitatively different from the subordinate state whose autonomy is used to maintain corporate coherence and serves the systemic interests of market autonomy. In the case of the developmental state, decisions are made autonomously based on its developmental agenda, denying the private sector the means to reshape them or avoid compliance as they are implemented. On the contrary, the subordinate state decisions and their outcomes are the result of the interplay between private-sector pressure and government motives and are rarely final (Rodrik, 1992). Hence, the distinction between an autonomous state and subordinate state depends on the implementation of policy decisions. The autonomy of the developmental state is a source for its ability to make and successfully implement policy despite the notion of the private sector. In stark contrast, the subordinate state makes and implements decisions by weighing interests of various groups of the private sector. In other words, it is directly accountable to these interests.

It does not imply that the autonomous state would not interact with the private sector and take into consideration its response in the process of decision making and implementing it. The pivotal role of the autonomous state is that it commands power to use a set of incentives and disincentives to guide the process of day-today economic decisions of a market economy that are essentially run by the private sector so that it make its decisions in a manner that accelerate economic growth. For example, the state can reward growth-enhancing activities and restrict and penalize socially wasteful activities to achieve its accelerated growth agenda. "If the state is not

autonomous from the private sector, it will not be able to discipline, encourage, and cajole it to act in a manner designed by the state." (Rodrik, 1992). The autonomous state must also get a wide range of support for its development agenda. It can achieve this by developing social capital through civic engagement in mutually beneficial horizontal networks. Sustenance of a development agenda cannot be realized by coercion alone; it must be built on national consensus.

As stated previously, a developmental state must design strategies to mobilize investments in order to provide public goods. In essence, that is what distinguishes the developmental path that Rwanda or Burundi undertakes to develop. Chemouni (2016) draws attention to this point by highlighting the historical experiences of the nature and role of the two states. He writes that both countries "experienced recurrent ethnic violence since independence that culminated in the civil war in Burundi (1993 -2003) and the civil war and genocide in Rwanda (1990 – 1994). Their states are both headed by liberation movements, the National Council for the Defense of Democracy-Forces for the Defense of Democracy (CNDD-FDD) in Burundi, and the Rwanda Patriotic Front (RPF) in Rwanda that came to power after a long period of conflict" (Chemouni, 2016). This turbulent period caused a serious deterioration of the tax base in both countries. However, in the case of Rwanda, the country was able to recover and strengthen its entire tax base after the genocide of 1994. For example, in 1997 it developed an effective agency called the Rwanda Revenue Authority (RRA) to maximize its tax collection. As a result, the country was able to attain 15% of GDP revenue collection reaching a standard suggested by the International Monetary Fund (IMF) for low-income countries such as Rwanda during the recovery period after the horrendous genocide (UNDP – Rwanda, 2007).

In order to rebuild the country and improve the standard of living of its people, Rwanda needed to mobilize an enormous amount of capital for investment in some critically important

sectors such as in healthcare, education, and various infrastructures. Over the last 15 years the country has steadily been increasing both its fiscal revenue and overall government spending. It has effectively utilized its RRA policy to augment its capacity of boosting finance from indigenous sources with an ultimate goal of financial self-sufficiency and lessening of dependence on foreign aid. A large portion of its government budgets have been spent on numerous infrastructure projects and poverty reduction programs in order to enhance developmental plans. The government has consistently maintained that taxation and public spending are closely linked.

The country's budget was supported mainly by foreign aid assistance and only a small portion of it came from domestic revenues during the recovery period. In addition, remittance was an equally important source of income for several families that improved their ability to pay for food, shelter and other essential needs. As the country continued to extract itself from the ghastly Genocide of 1994 and its aftermath, the government paid more attention to its development plan by making targeted investments in the sectors that it considered to be strategically important to stimulate rapid economic growth. Every effort was made to gradually increase agricultural products, construct healthcare and educational institutions especially in the rural areas of the country where most people live. The country also expanded capital expenditures notably to build physical infrastructures such as airports, railways, roads, in addition to increasing access to clean water and sanitation and adding electricity projects. Rwanda's economic transformation is apparent as the country is now engaged in building a new international airport in Bugesera located 40 kilometers from Kigali, constructing two railways connecting Mombasa-Kampala-Kigali and Dares Salaam-Isaka-Kigali, and investing in more constructions of ring roads in the city of Kigali and bypass roads in five other important cities. It is worth stating that the government of Rwanda has also created a Special Economic Zone in its major city of Kigali and four Industrial Parks in

four other major cities to achieve its ideology of accelerated economic development in order to industrialize the country.

More than two-third of the population earn their living from agricultural activities in Rwanda. Because of that, the country has been investing considerably in the agriculture sector. Most investments have been directed at providing irrigation systems development, water and land management, a development of crop diversification and intensification, fix soil erosion, conservation and fertility, distribution to farmers of improved and certified seeds, and livestock development.[4] Policies have been designed and implemented to increase agricultural productivity by improving the land reform system, ownership, and efficient use of land and labor in larger productive units.

The government has also invested heavily in education and health. As a result, more schools and hospitals have been built in the post -genocide period, which accounts for the rapid economic growth the country has been experiencing. In the education area, the ministry of education created three key agencies: (a) High Education Council (b) Rwanda Education Board (REB) and (c) Workforce Development Agency (WDA). The purpose of these agencies was to provide guidance and support to all educational systems so that more people are educated at a faster growth rate. In addition, the government reorganized the university system by putting together all former seven higher education public schools under one entity. This restructuring was intended to improve the quality of education, respond to job market dynamics, exchange staff and experts with surrounding regions especially with the Inter-university Council of East

[4] Ministry of Agriculture – Minagri- Rwanda
www.minagri.gov.rwa

Africa.[5] In the area of health, Rwanda has done remarkably well in responding to the people's health needs within a short time after the 1994 genocide. For example, the country provides universal health access to all people and communities through a decentralized healthcare public service with 400 health posts, 502 health centers, 42 district hospitals, and 5 national hospitals. It also has two advanced specialized medical centers, King Faysal Hospital and the University Teaching Hospital of Kigali (CHUK) to take care of more complex cases. This universal health coverage is built around the concept of a community-based health insurance program (or CBHI) and Mutual Health.[6]

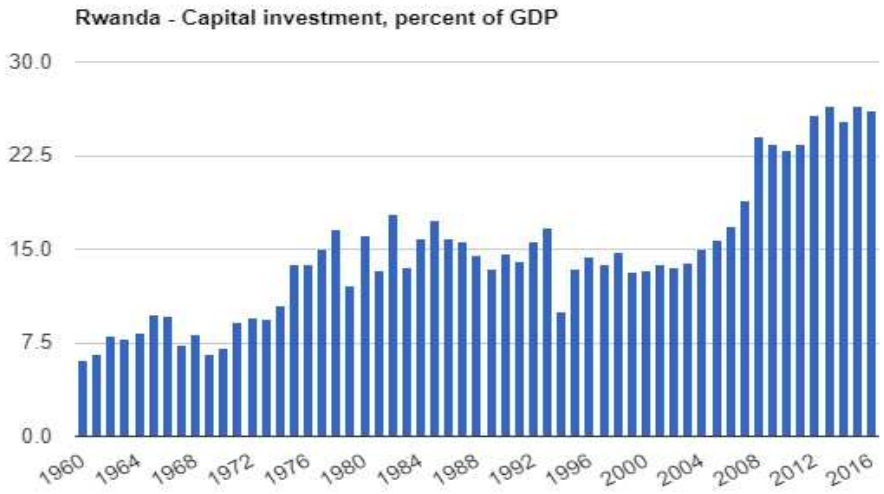

Figure 1: Capital investment (percent of GDP in Rwanda)

Figure 1 shows that the average value of capital investment in Rwanda between 1960 and 2016 was 14.65% with a minimum of 6.05 percent in 1960 and a maximum of 26.52 percent in

[5] Ministry of Education – Mineduc – Rwanda
www.mineduc.gov.rwa
[6] Ministry of Health -MoH -Rwanda
www.moh.gov.rwa

2013. This figure also highlights how government expenditure investment remains steady around 15% on average before the genocide, went down in 1994, and finally restarted to increase gradually around 2000 in Rwanda reaching a maximum in 2013.

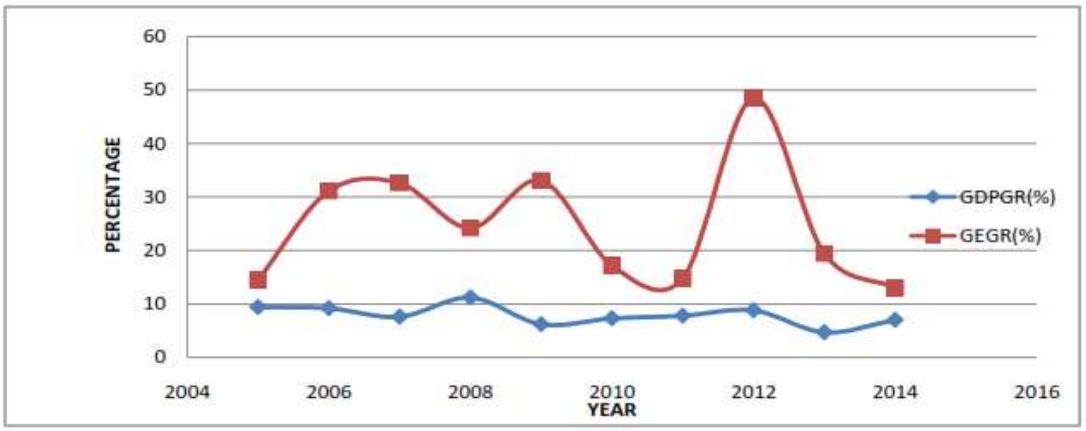

Figure 2: Government expenditure growth rate and GDP growth rate in Rwanda

Figure 2 shows the government expenditure growth rate (GEGR) and GDP growth rate (GEGR) in Rwanda from 2004 to 2014. The data is only from 2004 to 2014. We observe here that the government expenditure growth rate is on average, higher than the GDP growth rate. The trend of the government expenditure is relatively positive compared to the GDP that remains steady around 10 percent during this period. The government of Rwanda increased its spending, but did not significantly affect economic growth.

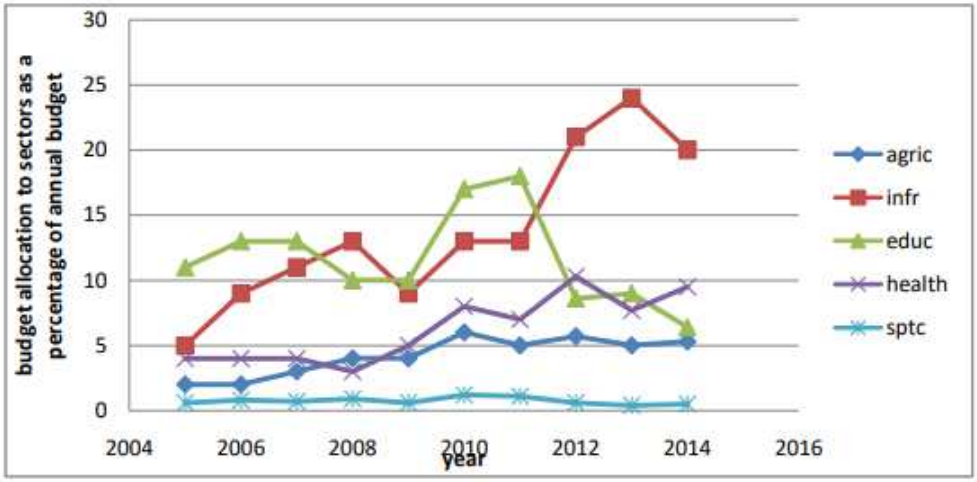

Figure 3: Distribution of public spending in selected sectors in Rwanda[7]

Figure 3 shows the distribution of public spending in certain important sectors in Rwanda. There is a comparison of public expenditure among some important sectors such as education, agriculture, health, sports, and culture. This figure also indicates that on average most, if not all trends are positive except in education when at once it was positive and then turned negative between 2010 and 2014. We clearly see the trend of infrastructure is positive and higher than in other sectors. We understand that Rwanda spends and values more infrastructures among other important sectors such as education, agriculture, and health. Indeed, Rwanda is investing very much in infrastructures because they are very important to achieve economic development. Infrastructure allows all economic networks to connect and assure the mobility of productive resources. It is important for people and for the distribution of goods and services in the country.

[7] Ochieng, Amos et al."Effect of Government Expenditure on Economic Growth in Rwanda (2005 – 2015)" International Journal of Economics, Commerce, and Management.
October 2017.

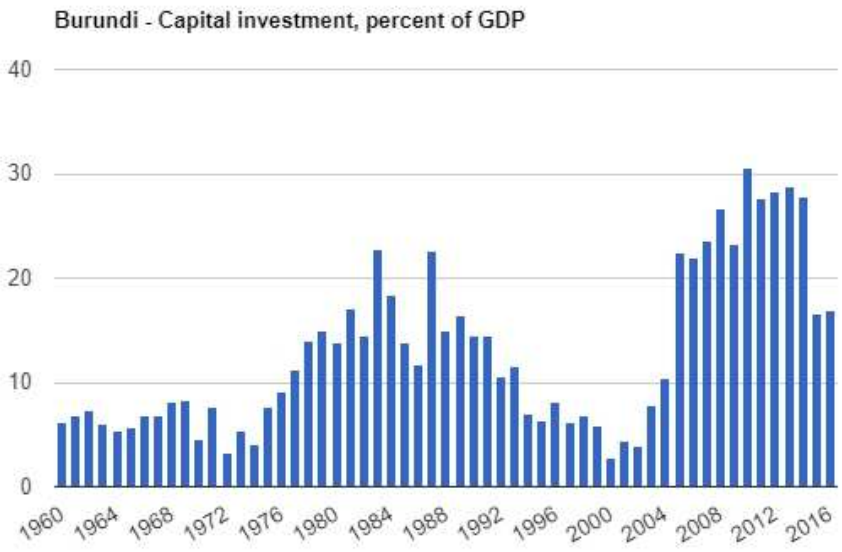

Figure 4: Burundi – Capital investment as percent of GDP

Figure 4 indicates that the average value of capital investment in Burundi from 1960 to 2016 was 12.82 percent with a minumum of 2.78 percent in 2000 and a maximum of 30.52 percent. In comparison to Rwanda, this figure also shows that capital investment in Burundi was slightly higher from 2008 to 2014. However, the difference on average in capital investment as percent of GDP between Burundi and Rwanda is not significant, even though it remains higher in Rwanda.

This predicts that Burundi could spend more resources in terms of contribution to GDP in building infrastructures. Although it has huge potential, the government of Burundi has not invested much of all the allocated resources in the key sectors of infrastructure, agriculture, education, health, and tourism like her neighboring sister country Rwanda. Resources were not used efficiently because of rent-seeking and corruption. Money was just consumed and spent in other non-developmental projects. Burundi's government investment is least efficient than in

Rwanda and needs to be improved. There is a large infrastructure gap between Rwanda and Burundi. It is worth noting here that capital expenditure in Burundi is a shared responsibility between the government through its ministries and agencies and all other donors from international organizations. This mechanism does not help much to make the execution rate of investment expenditure more effective.

Table 1. Development Expenditures for Core Infrastructure Program (US$ millions at 2007 constant prices)[8]

Category	2010-19	2020-30	Total
Public expenditures on development			
Power sector	813	764	1 577
Transport sector			
Roads sector	1 139	989	2 129
Ports program	13	15	28
Civil aviation	11	6	16
Sub-total	1 163	1 009	2 172
Communications	48	28	75
Total	2 024	1 801	3 825
Associated private investment			
Power sector	458	8	465
Civil aviation	190	55	245
Communications	24	33	57
Total	672	96	767
Grand total	2 695	1 896	4 592

Table 1 shows the sectors in which Burundi plan to invest to build its fundamental economic infrastructures between 2010 and 2030. To reduce the shortage of infrastructure, since 2017 the government of Burundi launched an Infrastructure Action Plan over twenty years (2010 – 2030) requiring $5.8 billion to catch up with other neighboring countries especially in the key sectors of energy, transport, and telecommunications. This program plans to bring new business opportunities to Burundi.[9] In fact, Rwanda and Burundi depend heavily on the two larger and

[8] African Development Bank. An Infrastructure Action Plan for Burundi Accelerating Regional Integration. September 2009

[9] African Development Bank. An Infrastructure Action Plan for Burundi. Accelerating Regional Integration, 2009.

important international ports in East Africa Mombasa (Kenya) and Dar es Salaam (Tanzania) especially for their export product such as coffee, tea, and minerals. While Rwanda already started building both railways to Mombasa and Dar es Salaam, Burundi still lags behind at their feasibility studies and is still looking for resources to finance this most expensive infrastructure among various projects. In addition, the international airport in Burundi needs to be expanded and modernized to attract more airlines and freight companies from the world. Burundi also needs the same productive economic infrastructures as Rwanda. However, Burundi has not yet started to invest in key developmental projects such as airports, railways, roads like in Rwanda to improve access to local and international markets. Furthermore, Burundi possesses a large reserve of minerals such as nickel, coltan, and bauxite. Therefore, the government of Burundi has identified agricultural and industrial exploitation of nickel to accelerate economic growth and reduce poverty when productive infrastructure is completed and effective.[10]

It is important to mention that capital expenditures expand between 10 and 28 percent of GDP from 2004 to 2014 in Burundi and these investments benefited largely the sectors of education, health, and productive infrastructure. Every time there is an increase of investments in social sectors, foreign donors are at the source and responsible. To generate and then sustain rapid economic growth necessary to reduce poverty and develop, Burundi should first reduce the deficiencies in physical infrastructures and invest then massively and efficiently in the sectors of agriculture, education, health, tourism, water, and mining.

[10] An Infrastructure Action Plan for Burundi. Accelerating Regional Integration 2009. African Development Bank

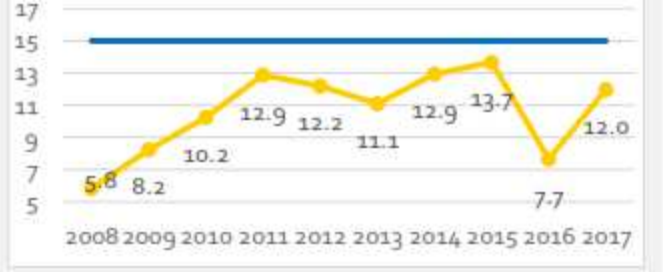

Figure 5: Share of Budget Allocations to the Ministry of Health (%)[11]

Figure 5 shows how the government of Burundi had already been struggling to contribute at least 15% of GDP in health expenditures as required by the Abuja declaration[12] in 2001 before it committed to invest in grandiose expensive infrastructural projects over 20 years.

Let us now find when Rwanda started to implement the developmental state strategy to seek its economic development. Just after the genocide in 1994, Rwanda started a period of recovery which lasted almost 5 years from 1994 to 1999, and the government of Rwanda had been led by a Hutu Pasteur Bizimungu, who was at once president of the country and chairman of the RPF party. Under his supervision, Rwanda organized an initial national dialogue called Urugwiro Village and then in 2012, organized the Umushyikirano (Dialogue National Counsel) to think and design a developmental agenda to improve the standard of living of people and achieve economic development (Obidegwu, 2003). It was during the first dialogue that the project of choosing the developmental state economic model as a systematic way to achieve economic development had been initiated and elaborated, which itself is patterned after the Singapore model. The main goal of the government of Rwanda was to transform Rwanda to look like Singapore. Ayittey (2017) criticizes this very strong assumption in his study on Rwanda. He

[11] Budget Brief: The 2017 Health Sector Budget- Burundi

[12] In 2001, leaders of African countries met in Abuja (Nigeria) and decided to commit to invest at least 15 % of the GDP every year to the health sector.

argues that “the Asian Tiger economic model Rwanda copied from Singapore-development under authoritarianism—has failed miserably in postcolonial Africa. No dictator—civilian, military nor rebel—has brought lasting prosperity to any African country” (Ayittey, 2017).

Additionally, with the aim of fighting poverty, Rwanda with the assistance of United Nations (UN) experts developed programs such as the Economic Development and Poverty Reduction Strategy (1 & 2) (Ansoms & Rostagno, 2012, 9–10; UNDP (Rwanda), 2007, 65–66), in which it has clearly showed its preoccupation to implement the developmental state model to succeed. Furthermore, in Rwanda Vision 2020, the government of Rwanda put in place a long-term developmental plan to accelerate social and economic progress, which inevitably will improve the people’s quality of life.

The empirical focus of this research is on two small, resource-poor, and landlocked countries, Rwanda and Burundi located in the region of the Great Lakes in Central Africa. Rwanda and Burundi can be considered very populous compared to the size of their land in regard to their higher population density. These two countries could be just one because they are fairly similar in terms of size, languages (Kinyarwanda, Kirundi, Swahili), and ethnic group configurations such as 84% Hutus, 15% Tutsis, and 1% Twa. They also share the same colonial history and were colonized first by Germany, which lost control of these colonies after losing to Belgium during World War One, and then became independent countries from Belgium in 1962.

Rwanda and Burundi went through several cycles of violence and political conflicts between the two major ethnic groups Hutus and Tutsis that was initiated during the Belgian colonial occupation. These violent and continued conflicts were characterized by massacres, assassinations, and forced migrations to neighboring countries. In Rwanda, Tutsis have been

massacred by Hutus in 1959, 1973 and 1994. Similarly, Burundi also suffered a series of ethnic violence. The only difference was the culprits were the Tutsis and the victims were the Hutus. Over 300, 000 Hutus were massacred by the Tutsis military government in 1972. The most tragic one was the 1994 massacre of nearly one million Tutsis at the hand of extremist Hutus in Rwanda. That catastrophe had immeasurable calamity on the Rwandan economy. As a matter of fact, on April 6, 1994, the Presidents of Rwanda and Burundi, Juvenal Habyarimana and Cyprien Ntaryamira were killed together after their airplane returning from negotiation with Tutsis Rebels in Tanzania crashed near Kigali International Airport and fell inside the presidential palace. This event is considered as a starting point of the genocide in Rwanda, which lasted three months, and stopped on July 7, 1994, by the Rwandan Patriotic Front (RPF) led by General Paul Kagame. To avenge the assassination of President Juvenal Habyarimana, attributed to Tutsis, extremist members of the Hutu ethnic majority killed at least 800,000 people mostly Tutsis and moderate Hutus. It is worth noting that all violence stopped in Rwanda after the RPF seized power and successfully controlled the entire country, meanwhile Burundi continued to experience mass killing and political instability until 2003. Rwanda and Burundi are now using two different economic models of the capitalist system and as a result they have divergent economic outcomes. The main question is which one of these two economic models works better in the context of Africa to promote economic development.

In this thesis, I examine the efficacy of the developmental state model using data from Rwanda and Burundi in applying the standard method of difference-in-difference to compare both countries Rwanda and Burundi in order to contrast their two different models of development. In fact, I use Burundi as a control country and the treatment country is Rwanda. In this regard, the treatment simply consists of the application of the developmental state

framework in Rwanda after the genocide in 1994. The time is divided in two periods, before and after the genocide in 1994 of Tutsis and moderate Hutus, to which the limit is 1994. The purpose of this research is to find the source of difference on the path of sustained, rapid growth and the way to development for both countries although they are almost identical and have numerous similarities.

The paper proceeds as follows. In section II the review of the literature is presented. Section III focuses on the source of data. Section IV is devoted to the discussion of the standard method of difference-in-differences. Section V focuses on the Empirical results of the data. Whereas the final section VI is on the conclusive remarks about the thesis.

II. Literature Review

The literature on the developmental state is at its infancy despite the fact that the single most important facilitator of industrialization in all late industrialized economies has been the developmental state. It is only in the last four decades since the concept of the developmental state has been included in the lexicon of literature. Johnson (1982) was the first scholar who introduced the idea of the developmental state. He coined the term *developmental state* to point out the significant role that the Japanese government had during its industrialization as the first late industrialized country that achieved a remarkable development at an accelerated speed relative to the earlier industrialized Western countries (Öniş, 1991).

Amsden (1992) who studied more carefully the extent of state intervention during South Korean industrialization also enriched the developmental state literature. She examined the

importance of a series of measures that the South Korean government employed in order to accelerate growth. These measures included subsidies and regulations to nurture and protect the development of infant industries, tax-breaks and other forms of incentives to attract more inward foreign direct investments, acquisition of technology, creative ways of transforming rent-seeking into rent-creation, instituting special rules of the game in order to control and discipline the market as well as reduce corruption. The combined works of Johnson and Amsden were the earliest that illustrated the ideology and structure of the developmental state based on their studies of the Japanese and South Korean industrialization experiences. They highlighted the crucial role of the developmental state in formulating sound industrial and trade policies, such as utilizing the merits of dynamic comparative advantage for industrialization purpose as an alternative to static comparative advantage, and the acquisition of foreign technology to support the acceleration of development.

Other authors include Zenawi (2012) and Oqubay (2015) who persuasively argued about the vital role of state policy to enhance rapid economic progress based on their studies of Ethiopia's economic accomplishment in the last two decades. Zenawi reinforced the important role of state policy that improves agricultural productivity and direct the obtained surplus to generate industrialization. Oqubay presented detailed empirical analysis of industrial policy using the experience of Ethiopia.

The vital role of the developmental state model to stimulate dynamic transformation and achieve a full-fledged industrialization in the least developed economies has been supported by several more authors. For example, Mkandawire (2012), Kauzya (2005), Peter Evans (2012), Tshilidzi Marwala (2009) have provided further details on the centrality of state policies to kick start investment in higher education without which the success of transfer of technology cannot

be realized. These authors also demonstrated the distinct role of state policy that enabled and galvanized people to fully participate in the structural transformation of the later industrialized Asian countries. Similarly, Mkandawire (2012) provided detailed insights underlying the virtues of the developmental state that accelerates economic growth by mobilizing civil societies, marshaling bureaucratic capabilities and deploying its authoritative power to overcome the inefficiencies of disorganization that are widespread in LDCs. The other important contribution of Mkandawire and Zenawi is their enlightening analysis on the key role that social capital brings in order to achieve economic development. They elucidated on the strong link between social capital and economic development because of its distinguishing public good feature that only state policy is suited to provide.

One characteristic of the developmental state is the need to mobilize and create a conducive condition for full participation of the entire population if economic development is to succeed. This idea of the developmental state was brought to attention by Peter Evans (2012) and John Mary Kauzya (2005) in their respective studies of education and human capital. The developmental state model in theory and practice, they noted, have shown both the commitment and the ability to establish access to public education at all levels for all as the precondition for active participation of citizens. Johnson (1982) and Amsden (1992) in their illuminating studies of Japanese and South Korean industrialization, also reiterated the indispensable significance of the best talent and professional, knowledgeable, competent and motivated public service leaders and private entrepreneurs to consummate the process of industrialization.

Other studies focus on the process of how decisions are made to advance developmental agendas by the developmental state. In this regard, Zenawi (2012) and Rodrik (1992) identify one of the qualities of the developmental state and its status of *autonomy* that differentiates it

from the run-of-the-mill state and empowers it to implement policy effectively. They assert that the developmental state is able to pursue the developmental project without succumbing to myopic interests due to its autonomous status. Stiglitz (2012) also contends that the developmental state is capable of disciplining the market to avoid market failures that is pervasive in the least developed economies because its autonomous status lends legitimacy to its policy. Zenawi underscores that the basic characteristics of the developmental state that can be described as the single-minded pursuit of accelerated development can only be achieved in part due to its autonomous nature. While Peter Evans (2012) stresses the fact that without autonomy, the characteristics of the business community cannot be reshaped by state policy.

Some authors highlight the successful practice of the developmental state in utilizing its policy to create a diversified business conglomerate or a multi-industry company in order to develop a strong private sector. For instance, Johnson (1982) and Amsden (2001) point at the vital role of Zaibatsu and Keietsu in Japan and Chaebol in South Korea that were instrumental in achieving economic progress in both countries during their industrialization. According to Johnson, the creation of such conglomerates had served to speed up Japanese industrialization by facilitating partnerships and collaborations between the private sectors and the public sectors. Similarly, Amsden details the way Chaebol has been serving as corner stones to complete the Korean economic transformation from its medieval society to advanced society by utilizing the state-corporate alliance**.** In the case of Rwanda, the study by Golooba-Mutebi Frederick (2008) shows that the government has invested in the creation of a diversified business group, called Tri-Star/CVL, to reduce problems of market failures, manage externalities and deal with technology procurement. The ultimate objective is that the partnerships and collaborations of the

state and the private sector produce sustainable economic growth resulting in complete industrialization.

Another central feature of the developmental state is its conceptualization of the reality of deep-rooted and pervasive market failures and the commitment that it brings to eliminate or minimize their effects in hindering economic progress in less developed economies. According to Zenawi (2012) it is the existence of market failures that provide sound theoretical explanation for active state policy in the late industrializing economies. He states that market failures in developing economies obstruct access to some critical necessities most needed for development in such areas as education, health care systems, infrastructures, technology and especially in the development of national capitalists and industries. He argues that the private market in developing economies cannot provide the necessary economic fundamentals and ensure efficient outcomes, but only non-market interventions are capable to deliver them to society and bring about more efficient outcomes. Alluding to this point, Stiglitz (1989) states that given the pervasive market failures that are too common in less developed countries, only non-market interventions can alter the exclusionary characteristic of these types of necessities that normally exist in the domain of the private sector to the non-exclusionary characteristic in the domain of the public sector.

In the case of Africa, the dearth of studies on the developmental state is even more acute. The few studies that paid attention on this issue focused either on analyses that assess the advantage and disadvantage of the developmental state for African countries or explain similarities and differences between developmental states in East Asian countries and African countries. Pamela Mbabazi and Ian Taylor (2005) whose study is considered a pioneering work for the case of African countries, concentrated on the implications of the developmental state

economic model in African countries. Their research was based on the assessment of developmental experiences of two countries, Botswana and Uganda. The two countries are among very few African countries that are using the developmental state economic model to achieve developmental objectives. While Mbabazi and Taylor recognize the importance of the developmental state in African countries to promote and accelerate development, they also underline that the developmental state model designed and implemented in Botswana and Uganda was different from the East Asian countries because of the historical context and human capabilities differences. They also noted that Botswana has achieved remarkable economic successes compared to Uganda. Peter Meyns and Charity Musamba (2010) also contributed to our understanding of the value of the developmental state model for development in African countries. In their study, they presented detailed analysis explicating the economic success of Botswana and Mauritius due in part to active state interventions, which created access to health care, education, safe drinking water transportation, etc. that are essential elements for the quality of life and to reduce poverty, increase productivity and promote growth and sustain development.

Meles (2012) and Mkandawire (2012) introduced the concept of a democratic developmental state and provided conceptual underpinnings to its relevance and applicability as the best alternative model for African countries. They argued that in East Asian countries where the spectacular success of the developmental state has become its reference point, their socio-economic basis and the makeup of their people are quite different from most African countries. African countries are ethnically and culturally more diverse in contrast to the homogeneous ethnic groups in most East Asian countries. The underlying political, economic and institutional factors that can support the development process are also distinct between the two regions.

According to Zenawi and Mkandawire, given the heterogeneous character of African countries, only the democratic developmental state can pursue a national policy in which the freedom of all citizens without limitations can be unleashed to transform the less developed economy into a more advanced economy. Another novel contribution on the topic of late industrialization in general and the Ethiopian case in particular is the work of Oqubay (2015). Oqubay thoroughly examines conventional views and contemporary debates on issues of industrial policy. In addition, his study is the first of its kind that blends theory and practice to elucidate the industrial policy process of an African country that uses the developmental state model to industrialize.

As stated in the introduction section, this thesis uses the estimation procedure of difference-in-difference (Vicente, 2010) to study the economic performance in Rwanda and Burundi based on empirical analysis. The main motivation of the thesis is to explore the relative importance of developmental state model in African countries by studying the experiences of Rwanda and Burundi. These two countries provide a unique opportunity to contrast the standard growth model with the developmental state model. Although these countries historically shared much political, economic, cultural and institutional structures, after the 1994 genocide, they do not have the same nature of state, political leadership, and more importantly, they use different economic models to reduce poverty, accelerate growth, and achieve economic development. In other words, the two countries that used to have almost identical socio-economic and cultural heritage before the genocide, but have embraced two distinct models to attain advanced industrialization. To my knowledge, all previous studies about the developmental state in African countries are based on theoretical scrutiny. Hence, there is a lack of empirical analysis to support the role of the developmental state with empirical evidence. This thesis attempts to contribute to this gap in the literature. In contrast, none of the earlier studies have compared two countries

with two distinct economic models to examine the level of their economic performances, especially among African countries. More specifically, my thesis is to learn whether the developmental state model is a more suited alternative economic model to the standard neoclassical model for African countries based on the empirical study of Rwanda and Burundi's economies.

III. Section 3: Data

This study uses annual data covering the period 1974-2014. Since the annual data covers a period of 40 years, we shall be able to check whether a common trend existed before the developmental state economic model was implemented in Rwanda, and analyze the differences that came about after the intervention in Rwanda. The data used in this study is an annual panel dataset covering 1974 to 2014 because of the absence of quarterly data for both countries Rwanda and Burundi. Thus, the dataset contains 41 annual observations for each country.

The dataset is composed of 11 variables representing monetary and non-monetary social and economic indicators. The eight monetary variables used to conduct this empirical research were gross domestic product (GDP); GDP per capita; GDP growth rate; Real services, etc., value added; Real exports of goods and services; Real industry, value added; Real manufacturing, value-added, and Real agriculture, value added. GDP and GDP per capita are measured in national currency (Rwanda and Burundi Francs) and all other monetary variables are measured in terms of percentage of GDP.

This list of variables is not exhaustive. As mentioned, the dataset also includes non - monetary variables such as Life expectancy at birth (years), Children under-five deaths (persons), and Human capital index. In addition, we created seven independent variables to allow us to estimate our difference-in-differences model: Treated, After, Treated x After, Time, $Time^2$, Treated x Time, and Treaded x $Time^2$. Treated is defined as an indicator variable taking a 1 for Rwanda, which receives the "treatment" after 1994, and a 0 for Burundi, which serves as our "untreated" comparison country. In addition, After is defined as an indicator variable taking a 1 for all years after 1994 and a 0 before that period. Treated × After is the interaction term between the Treatment and After indicator variables that helps to capture the difference-in- differences in the outcomes between these two countries before and after 1994. Time is defined as the years of observations, which is divided in two time periods (0,1). Period 0 indicates a time period before the treatment (pre-treatment period) and period 1 indicates a time period after the treatment took place (post-treatment period). Timesquared expressed an indicator variable that multiply time by time to enlarge time after 41 years. Finally, Treated × Time and Treated ×Timesquared are defined as indicator variables to measure the effect of the change for each country in specific time. This is further described in the methodology section.

Moreover, data is divided into two periods ─ before and after 1994. The before period covers the years 1974 to 1994 and the after period covers the remaining years from 1994 to 2014. The year 1994 is always represented on the graph by a vertical line to separate the periods. The reasons for choosing this year is simple. First, 1994 is the year of the horrific genocide of Tutsis, where near one million people were killed in three months. Second, the same year (on April 6) the two Hutus presidents from Rwanda and Burundi were killed. Third, 1994 represents the change of regime when the Rwanda Patriotic Front (RPF) led by General Paul Kagame, the

current Rwanda President RPF, seized power in Rwanda after having stopped the genocide. And finally, for practical reasons, the specificity of the period helps to scope the boundaries of this study. With this separation and a balanced panel of data with paired observations for both countries over the period 1974-2014, we are able to show the parallel trends between Rwanda and Burundi over 20 years before the genocide when these two countries mainly applied neoclassical economic principles and followed the Washington Consensus policies to seek economic development. Then, we are able to look at 20 years after the genocide to capture the difference between the two countries while Rwanda switched to a developmental state economic model. In this regard, this data should help to estimate exactly the difference in the economic outcomes and social development between Rwanda and Burundi that lead us to better understand the impact of the development state framework.

IV. Methodology

In this study, we applied the standard method of difference-in-differences to evaluate the effect of the developmental state economic model on the economy of Rwanda by comparing its economic successes with the economy of Burundi, which uses a different model of development. The case study of Rwanda and Burundi is a natural experiment because these two countries show real world conditions that approximate what would have happened in a randomized controlled experiment, which motivate us to examine their levels of development. The current situation between these two countries Rwanda and Burundi should help to capture the effect of the different systems of government and policy changes on their economic growth and development.

The context between Rwanda and Burundi arises without our interference and the treatment appears as if it were randomly assigned (Hill, Griffiths, & Lim, 2010).

Furthermore, randomized controlled experiments are rare in economics. Natural experiments differs from randomized controlled experiments because natural experiments are not consciously designed by the researcher (Hill et al., 2010). Notably, Card and Krueger (1993) rely on a natural experiment and use the differences-in-differences method to study the effect of an increase of minimum wage on employment at fast food restaurants in New Jersey and Pennsylvania. In the African context, probably the most noted and affective difference-in-differences analysis example is the study by Vicente (2010), who uses a natural experiment to compare Sao Tome and Principe to Cape Verde to explore the impact of an oil discovery announcement on corruption (Vicente, 2010).

From the same perspective, we examine the treatment effects of the developmental state between Rwanda, which uses a developmental state economic model and Burundi, which maintains the status quo and is theoretically unaffected by the economic model change in Rwanda. The case study of Rwanda and Burundi is a natural experiment because these two countries are comparable and sorted into something like a control and treatment group. Of course, the fact that Rwanda uses currently a developmental state economic model and Burundi continues with the principles of neoclassical economics is not under our control. Therefore, we understand that this exposure can be recognized as a natural experiment. In other words, the case of Rwanda and Burundi also serves well as a natural experiment in which these two countries are exposed to the experimental and control conditions that have been created by their political leadership respectively and induced by policy changes. The key identifying assumptions of the difference-in-differences model as related to determining the impact of the developmental state

model in Rwanda is that, in the absence of treatment, that the underlying trends would have remained unchanged and any unobserved differences between Rwanda and Burundi would have been the same over time.

To this end, we show the Parallel trends assumption between Rwanda and Burundi before the genocide from 1974 -1994 and identify the differences after the genocide of 1994. The parallel trends assumption requires that the trend in the outcome variable for both treatment and control countries before the genocide of 1994 in Rwanda (1974 – 1994) to be similar. One of the most common problems with difference-in-differences method is the failure of the common trend assumption. To avoid this problem, David Albouy suggested collecting more data on other time periods before and after treatment to see if there are any other pre-existing differences in trends (Albouy, 2004).

A vital driver for success in the developmental state economic model is industrialization. For this precise reason, we will focus more attention in the interpretation of difference-in-differences coefficients of the variables such as GDP, GDP growth rate, GDP per capita, Human capital index, Services, Exports, Agriculture, Industry, Manufacturing, and Agriculture between both countries.

The framework of the developmental state economic model in Rwanda (Yi) is modeled by the following equation:

$$Y_{it} = \beta_0 + \beta_1 \text{Treated}_{it} + \beta_2 \text{After}_{it} + \beta_3 \text{Treated x After}_{it} + \varepsilon_{it} \qquad \text{(EQ1)}$$

$$Y_{it} = \beta_0 + \beta_1 T_{it} + \beta_2 A_{it} + \beta_3 T_{it} A_{it} + \varepsilon_{it}$$

Rwanda implements a change in their economic model to reduce poverty, sustain economic growth, and promote development. The outcome variable, Y_{it}, represents factors believed to be

tied to economic growth due to economic reforms from the developmental state strategy. By using the standard method of difference-in-differences. In this equation $Treated_{it}$ and $After_{it}$ are the aforementioned indicator variables. ε_{it} is a random unobserved error term which contains all other variables correlated with Y_{it} omitted in the model. We do not know at this time if the error term $\varepsilon_{i\,t}$ is actually unbiased error term; if there are other factors that affect the difference in trends between the two countries, Rwanda and Burundi, then the estimation of the impact of the development state economic framework in Rwanda will be biased. Our model also contains the subscripts i and t, in which i represents country, where i = 0,1 (i = 0 for Burundi and i = 1 for Rwanda) and t stands for time period, where t = 1….41.

Given this model, β_0 is the outcome in Burundi before the genocide, β_1 is the difference in outcome in Rwanda relative to Burundi before the genocide, β_2 is difference in outcomes in Burundi after the genocide compared to before the genocide, and β_3 is the difference-in-differences estimate, which is calculated as:

β_3 = (outcome in Rwanda after the genocide –outcome in Rwanda before the genocide) – (outcome in Burundi after the genocide – outcome in Burundi before the genocide).

As robustness checks in additional specification we include in the model (1) a linear time trend common to both countries, (2) a quadratic time trend common to both countries, (3) time fixed effects common to both countries, (4) a linear time trend specific to each country, (5) a quadratic time trend common to each country, or (6) time fixed effects specific to each country.

In addition, we use both Moulton and two-way cluster robust standard errors clustered on country and year to adjust standard error coefficients to avoid problems related to autocorrelation

and heteroskedasticity.[13] Bertrand, Duflo, and Mullainahan found after analyzing several articles on difference-in-differences that the use of fewer states and time periods is the main cause of serial correlation problems. There exist many solutions to adjust standard errors, such as using Moulton and two-way cluster robust methods (Bertrand, Duflo, & Mullainathan, 2004), which we implement here.

Using Moulton standard errors, we remark that all coefficients in the time fixed effects regression are identical to those in the basic regression. However, we obtained slightly different estimates for both β_0 and β_2 when we regress our data using two-way cluster robust standard errors.

V. Empirical Results

Over the last two decades, economic performances in Rwanda have been remarkable. Therefore, we would like to know whether the developmental state economic model implemented in Rwanda around years 1994-1998 is at the source of its economic development miracle. This comparative analysis between Rwanda and Burundi that used difference-in-differences method is based on 11 important variables from our dataset such as gross domestic product (GDP), GDP per capita measured in national currency (Rwanda and Burundi Francs), and GDP growth rate to name just a few. Real services, value added, Real exports of goods and services, Real industry, value added, Real manufacturing, value-added, and Real agriculture,

[13] Brigham R. Frandsen. Moulton, BRL_Moulton.zip
https://economics.byu.edu/frandsen/Pages/Software.aspx
Stata: net search vce2way

value added, Life expectancy at birth, Children under-five deaths, and the Human capital index. In the first step of this comparative study between Rwanda and Burundi, we regress these eleven dependent variables on seven independent indicator variables as control, and generated figures and tables to store their coefficients and standard errors.

Secondly, we also have performed robustness checks with this dataset and decided to remove three years for each country around 1994, especially the year before- and after the genocide to avoid the deep negative shock. Consequently, from the 82 observations that we had at first, after dropping 6 observations, which correspond exactly to three years 1993, 1995, and 1994 we end up with 76 observations in total for our final data analysis. None of these altered our coefficients. However, some coefficients increased,, and standard errors were adjusted. Most of our empirical analyses in this section will focus on comparing the post-genocide period with the pre-genocide period between Rwanda and Burundi for each dependent variable. Controls are the same in all regression equations of our model. Standard errors are clustered by Moulton and Vce2way at the country level and year. As already mentioned above, the main estimator is $\beta_3 T_{it} A_{it}$, which capture exactly the differences-in-differences between Rwanda and Burundi before and after the genocide of 1994. In order to check for the specification between both countries and year, which is exactly the specific country by year fixed effects, we correspondingly add a dummy variable T_{it}Time in EQ5 and EQ6 to consolidate our findings.

The real gross domestic product (GDP) is the best way and most accurate measure ofeconomic growth. It also remains the most important economic indicator to measure productivity of a country. Economic growth also can be used to judge and appreciate the effectiveness of a state like in the case of Rwanda and Burundi. Indeed, economic growth is fundamental, necessary, indispensable, but not sufficient to achieve economic development. To

sustain economic growth, other important dimensions are needed. Another measure of economic growth is GDP per capita. Let us now compare the GDP and GDP per capita to find out what country performs better and to know how large the difference in economic outcomes between Rwanda and Burundi is.

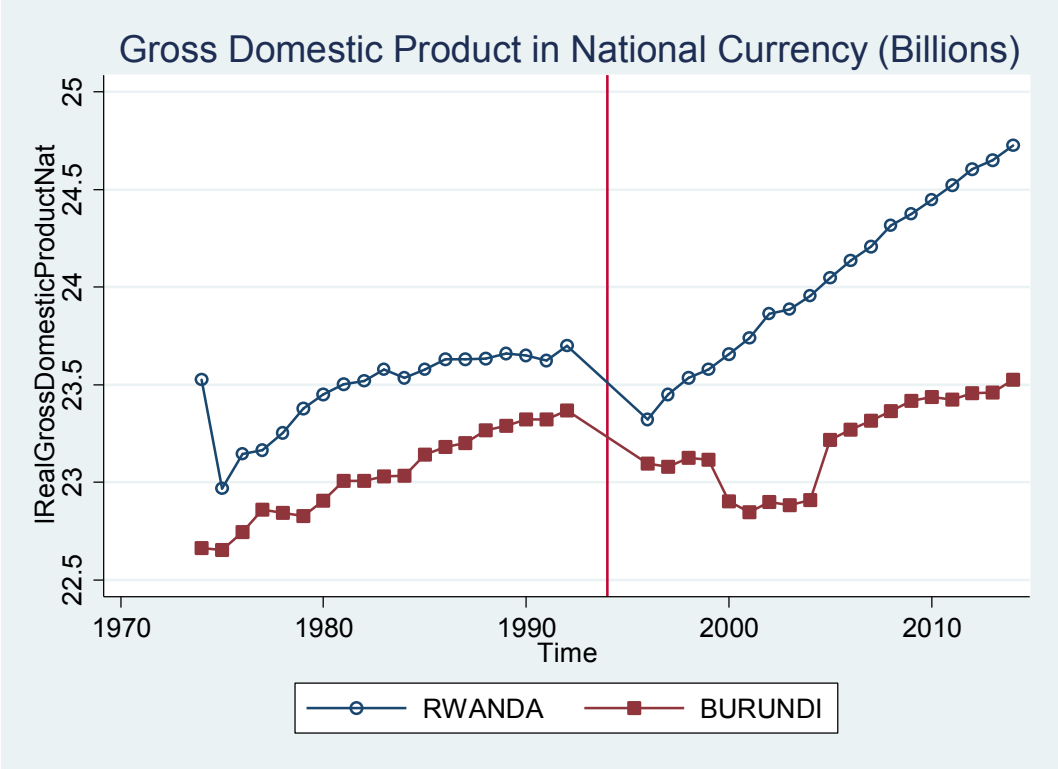

Figure 6. Real Gross Domestic Product (GDP) in National Currency (Billions)

Table 2: Coefficient estimates of the model: Effects of seven indicator variables on Real GDP.

Y variable: Real GDP in National Currency (Billions) in Burundi and Rwanda						
Descriptive Statistics	Observations	Mean	Std. Dev.	Min	Max	
	76	23.441	.483	22.654	24.724	
			Regression Models			
Coefficients	**(1) Estimate**	**(2) Linear**	**(3) Quadratic**	**(5) Time F.E.**	**(5)Linear cst**	**(6) Quadratic cst**
TREATED	.445***	.445	.445	.445***	-33.274***	0
	(.011)[14]	(.008)	(.001)	(.031)	(8.434)	(omitted)
	[.094]	[.047]	[.043]	[.094]	[11.329]	
AFTER	.162***	-.829	-.829	.825[15]***	-.642***	-.639***
	(.048)	(.182)	(.185)	(.041)	(.047)	(.057)
	[.094]	[.081]	[.075]	.162[16]	[.099]	[.091]
				[.123]		
TREATED	.411***	.411	.411	.411***	.037	.031
_AFTER	(.02)	(.034)	(.043)	(.074)	(.115)	(.135)
	[.134]	[.066]	[.061]	[.134]	[.140]	[.128]
TIME		.045	-1.717		.037	-1.709
		(.008)	(2.240)		(.002)	(2.258)
		[.003]	[.494]		[.004]	[.462]
TIME			.0004			.0004
SQUARED			(.001)			(.001)
			[.0001]			[.0001]
TREATED					.017	-.017
TIME					(.004)	(.005)
					[.006]	[.005]
TREATED						.000
TIMESQU						(.000)
						[.000]
CONSTANT	23.034	-66.283	1690.789	22.871[17]	-49.424	1691.012
	(.027)	(16.617)	(2225.095)	(.256)	(3.442)	(2251.128)
	[.067]	[5.97]	[491.993]	23.034[18]	[8.011]	[460.302]
				(.087)		
R-Squared	0.65	0.92	0.93	0.95	0.93	0.94

[14] Numbers in ( ) are standard errors from vce2way regression and [ ] contain standard errors of Moulton estimate regression clustered at the country and time levels

[15] Vce2 way regression with fixed time effects for After coefficient

[16] Moulton regression with fixed time effects coefficient After coefficient

All coefficients have been rounded to 3 decimal places

*** indicates that a coefficient is statistically significant at the 1 percent level

**significant at the 5 percent level.

[17] Vce2way regression with fixed time effects for constant coefficient

[18] Moulton regression with fixed time effects for constant coefficient

Linear and Quadratic Regressions served to check for country specific by year fixed effects in EQ5 and EQ6 (cst).

For this regression, the effect of β_3Treated x After$_{it}$ (β3= .411, p= 0.000) for Real Gross Domestic Product (GDP) in National Currency (Billions) is significant and positive. Results are shown in Table 2 and Columns 2, 3, 4, and 5. It captures the difference in real Gross Domestic Product in Rwanda relative to Burundi after 1994 compared to before the genocide period. This coefficient indicates that for every additional year in Rwanda we can expect natural log of real Gross Domestic Product to increase by an average 41.1 percent when Rwanda started using the developmental state economic model. The sign of β3 is positive as expected and it is statistically significant at both the 5% level and 1% level. The standard error of the $\beta_3 T_{it} A_{it}$ coefficient is smaller than that of $\beta_2 A_{it.}$ Therefore, this model is able to estimate the coefficient $\beta_3 T_{it} A_{it}$ with greater precision. Moreover, Treated ×Time is the coefficient that shows the difference in real Gross Domestic Product between Rwanda and Burundi over 40 years before and after the genocide in Rwanda in 1994 with and without treatment. Columns 6 and 7 of table 2 show that when we added Time, Treated ×Time, Timesquared, and Treated × Timesquared in the model equation to check for the country specific by year time effects, the coefficient $\beta_3 T_{it} A_{it}$ decreases, remains positive and fluctuates between .037 and .031 in the two equations EQ5 and EQ6. The sign of β3 stays positive as expected and statistically significant at both the 5% level and 1% level. Let us now examine the output results of the dependent variable, the GDP growth rate, between Rwanda and Burundi.

The difference between the coefficient estimates on the dependent variable real GDP for both countries are consistent and statistically significant across all columns. Overall, the results show that the economic growth differences between Rwanda and Burundi are substantial. After having analyzed the GDP for both countries, it is time to examine the dependent variables of GDP growth rate and real GDP per capita. The R-squared is 0.6520, which means that

approximately 65% of the variability of total real Gross Domestic Product, National Currency (real GDP) is accounted for by the model related to Rwanda and Burundi.

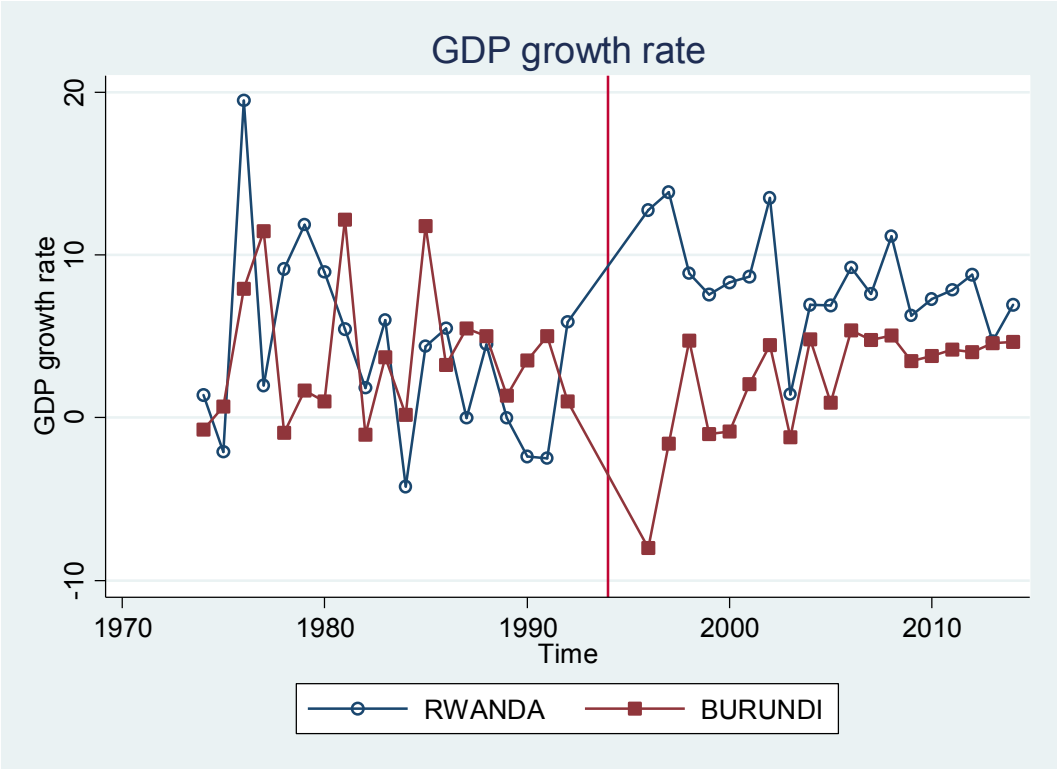

Figure 7. GDP growth rate

Table 3: Coefficient estimates of the model: Effects of seven indicator variables on GDP growth rate.

Y variable: Gross Domestic Product growth rate						
Descriptive Statistics	Observations	Mean	Std. Dev.	Min	Max	
	76	4.612	4.755	-8	19.5	
			Regression Models			
Coefficients	**(1) Estimate**	**(2) Linear**	**(3) Quadratic**	**(5) Time F.E.**	**(5) Linear cst**	**(6) Quadratic cst**
TREATED	.133	.133	.133	.133	1031.258***	0
	(.253)	(.232)	(.219)	(1.55)	(19.079)	(omitted)
	[1.384)	[1.391]	[1.386]	[1.384]	[336.845]	
AFTER	-1.487***	-.465	-.465	2.524	-6.185***	-6.193***
	(.274)	(5.773)	(5.796)	(4.045)	(.486)	(.820)
	[1.384]	[2.416]	[2.407]	-1.487	[2.952]	[2.935]
				[1.43]		
TREATED	5.892***	5.892***	5.892***	5.892***	17.332***	17.349***
_AFTER	(.310)	(.253)	(.321)	(1.942)	(1.068)	(1.368)
	[1.957]	[1.967]	[1.959]	[1.957]	[4.175]	[4.151]
TIME		-.047	-19.943		.214	-20.200
		(.266)	(9.626)		(.024)	(11.223)
		[.090]	[15.828]		[.120]	[14.946]
TIME			.005			.005
SQUARED			(.002)			(.003)
			[.004]			[.004]
TREATED					-.520	.515
TIME					(.010)	(.024)
					[.170]	[.167]
TREATED						-.0003
TIMESQU						(.000)
						[.000]
CONSTANT	3.816	95.938	19931.68	.274	-419.624	19931.75
	(.312)	(527.077)	(9484.842)	(1.595)	(47.253)	(11228.46)
	[.979]	[178.075]	[15780.54]	3.816	[238.185]	[14900.9]
				[1.011]		
R-Squared	0.23	0.23	0.25	0.64	0.32	0.34

Here again, the effect of β_3Treated x $After_{it}$ ($\beta 3$= 5.89, p= 0.000) for GDP growth rate is significant and positive. These are presented in Columns 2, 3, 4, and 5 of Table 3, which confirms the difference in GDP growth rate in Rwanda relative to Burundi after 1994 compared to before the genocide period. This coefficient indicates that for every additional year in Rwanda we can expect GDP growth rate to increase on average 5.9 percent when Rwanda started benefiting from the developmental state economic model. The sign of $\beta 3$ is positive, which is what we expected, and it is statistically significant at both the 5% level and 1% level. However, the coefficient for β_3 appears higher (17.33 & 17.35) in Columns 6 and 7 of Table 3 when we checked for the country specific by year time effects. $\beta 3$ remains consistently positive in the two specification regressions EQ5 and EQ6. Therefore, in Rwanda for every additional year we can expect GDP growth rate to increase by an average 17.4 percent. The sign of $\beta 3$ is positive as expected and it is statistically significant at both the 5% level and 1% level. We also use real GDP per capita to find the difference between Rwanda and Burundi based on their economic models. The R-squared is 0.2273, which means that approximately 23% of the variability Gross Domestic Product growth rate is accounted for by the predictor variables in the model related to Rwanda and Burundi.

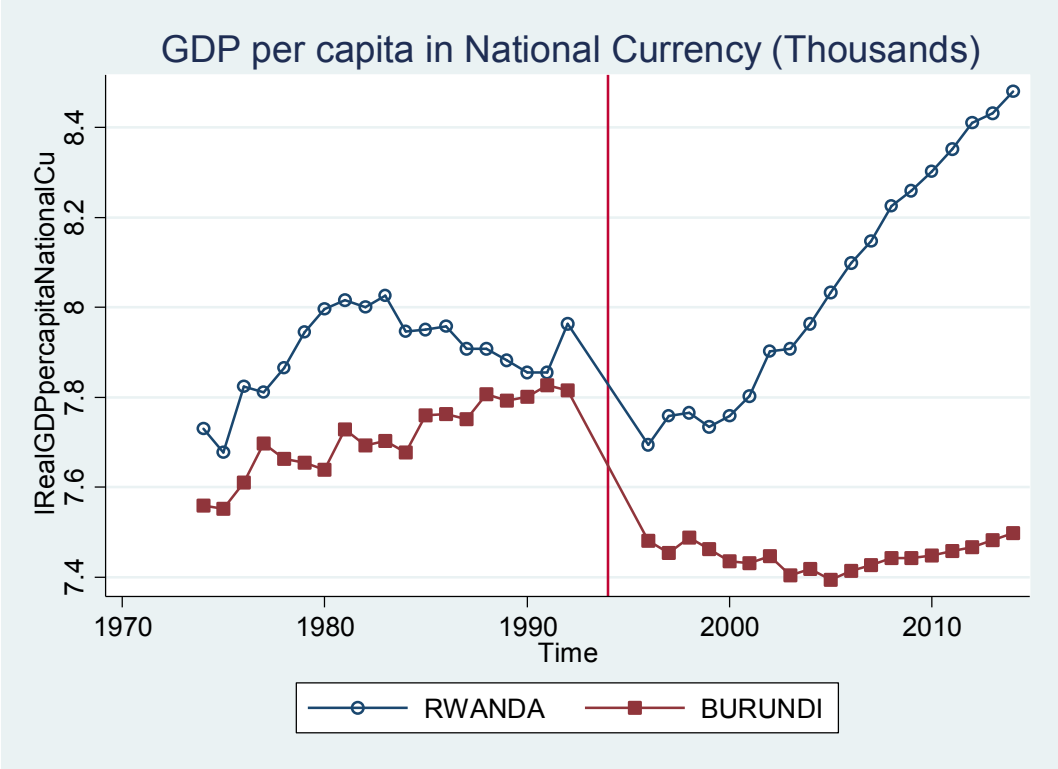

Figure 8. Real GDP per capita in National Currency (Thousands)

Table 4: Coefficient estimates of the model: Effects of seven indicator variables on Real GDP per capita.

Y variable: Real GDP per capita in National Currency (Thousands) in Rwanda and Burundi						
Descriptive Statistics	Observations	Mean	Std. Dev.	Min	Max	
	76	7.778	.271	7.395	8.480	
	Regression Models					
Coefficients	**(1) Estimate**	**(2) Linear**	**(3)Quadratic**	**(5)Time F.E.**	**(5)Linear cst**	**(6)Quadratic cst**
TREATED	.191***	.191***	.191***	.191***	-38.885***	0
	(.003)	(.004)	(.002)	(.022)	(6.767)	(omitted)
	[.048]	[.037]	[.035]	[.048]	[8.314]	
AFTER	-.263***	-.640***	-.640***	.136	-.423***	-.420***
	(.010)	(.218)	(.218)	(.228)	(.037)	(.042)
	[.048]	[.064]	[.062]	-.263	[.073]	[.068]
				[.051]		
TREATED	.42***	.42***	.42***	.42***	-.017	-.023
_AFTER	(.005)	(.039)	(.043)	(.066)	(.091)	(.102)
	[.068]	[.052]	[.050]	[.068]	[.103]	[.096]
TIME		.017	-1.094		.007	-1.085
		(.010)	(2.227)		(.001)	(2.252)
		[.0023874]	[.404252]		[.003]	[.347]
TIME			.0003			.0003
SQUARED			(.001)			(.001)
			[.0001]			[.0001]
TREATED					.020	-.020
TIME					(.003)	(.004)
					[.004]	[.004]
TREATED						.000
TIMESQU						(-.000)
						[.000]
CONSTANT	7.711	-26.230	1081.843	7.550	-6.692	1081.938
	(.008)	(19.576)	(2210.028)	(.019)	(2.769)	(2245.451)
	[.034]	[4.734]	[403.043]	7.711	[5.879]	[346.063]
				[.036]		
R-squared	0.71	0.83	0.85	0.87	0.87	0.89

In Columns 2, 3, 4, and 5 from table 4, we found that the effect of β_3Treated x $After_{it}$ (β3= .4162206, p= 0.000) for Real GDP per capita is significant and positive, which takes into account the difference in real GDP per capita in Rwanda relative to Burundi before and after 1994. Consistent with Figure 8, this coefficient indicates that for every additional year in Rwanda we can expect natural log of real GDP per capita to increase by an average 41.6 percent. The sign of β3 is positive as expected and it is statistically significant at both the 5% level and 1% level. Moreover, regarding real GDP per capita, the last two Columns 6 and 7 show the coefficient for β_3 decreases and turns negative (-.017 and -.023) when we checked for specifications between both countries and year time effects. The sign of β3 is negative which is not as expected and it appears not statistically significant at both the 5% level and 1% level. The R-squared is 0.7103, which means that approximately 71% of the variability of real GDP per capita is accounted for by predictor variables in the model related to Rwanda and Burundi.

When we compared the GDP and GDP per capita for both countries Rwanda and Burundi over 40 years from 1974 to 2014, we found that before and after 1994, they have always been higher in Rwanda than in Burundi except in 1994 and then the gap started increasing around year 2000 until now. Rwanda has done remarkably well economically, emerging out of a horrific genocide in 1994. What is the real cause of this continual economic growth? Economic success in Rwanda is first and foremost political. We found that Rwanda has made significant progress in GDP, GDP per capita, and economic growth because of the important role played by the ruling party-state in the promotion of development, which at once brought political stability, rebuilt an autonomous and competent bureaucracy after the collapse of the administration during the genocide. It also created a strong private sector through party ownership holdings such as Tri-Star Investments (Tri Star/CVL) and Horizon group, and applied good governance practices (the

rule of law underpinned by viable institutions). These four things represent the main features of a developmental state economic model (Meyns and Musamba, 2010). The Rwandan Patriotic Front (RPF) as a ruling party and Rwandan Patriotic Army (RPA) are politically involved in the private sector of the economy (Booth & Golooba-Mutebi, 2012). The use of party companies to launch business activity, places the ruling party at the heart of the economy.[19] It is also well appreciated that the rate of economic growth in Rwanda has averaged 8% since 2001 and has been pro-poor growth because it has considerably reduced poverty. In addition, this rapid and strong economic growth has been sufficient and quite superior to the population growth rate for a population in which one million people have been lifted out of poverty.

Another reason Rwanda sustains its economic growth is that it started to implement a series of political and economic policies during the period of recovery from 1994 to 1999, which have been effectively applied until now such as Gacaca[20], Umuganda[21], Girinka (One Cow per Family Program), Itorero (Civic Education or Rwanda's traditional and cultural of values such as language, dancing, songs, patriotism, defense, Agaciro (Development Fund), Ubudehe (Social Categorization for Collection Action and Mutual Support), Imihigo (Performance Contracts which is an ancestral practice to compete among one another), Decentralization, Urugwiro dialogue 1998-1999, Reduction Strategic program (PRSP1) & Economic Development and Poverty Reduction Strategy (EDPRS2), and Rwanda vision 2020 Umurenge Programme (VUP)[22]. Therefore, economic growth is continuing, supported by these specific economic and

[19] Why the developmental state economic model of Rwanda cannot work anywhere else. The Conversation. https://theconversation.com/why-rwandas-development-model-wouldnt-work-elsewhere-in-africa-89699

[20] Gacaca is a traditional system for conflict resolution

[21] Umuganda also translated as 'coming together in common purpose to achieve an outcome. In Rwanda, it is a community work day, which takes place every on the last Saturday of each month from 8a.m. and lasts for at least three hours. Rwandans between 18 and 65 are obliged to participate in Umuganda whereas participation by those above 65 years is optional

[22] Vision 2020 Umurenge Programme (VUP) - is an Integrated Local Development Program to Accelerate Poverty Eradication, Rural Growth, and Social Protection. This is an initiative by the Government of Rwanda (GoR) in collaboration with

public policies. As Norman and Stiglitz pointed out "Growth is the result of policy reforms" (Noman & Stiglitz, 2012, 17).

Rwanda has an effective and authoritarian state that brings into being development. However, the state in Burundi is weak and failed state delivering poor economic performance. In Burundi, GDP and GDP per capita indicators showed that this country has grown slowly relative to Rwanda, created unnecessary conflicts, and returned to political instability, violence, and chaos after having experienced 10 years of true peace. Burundi's dismal economic growth performance is mainly a direct result of a failure in the country's governance (Nkurunziza & Ngaruko, 2004). In addition, poor economic performance in Burundi has been shaped by political instability, so that the country failed to reconstruct national unity and a nation that is secure and at peace (Ministère du plan et du développement communal/cellule prospective & Programme des Nations Unies pour le développement au Burundi, 2011). The two ethnic groups Hutus and Tutsis in the country continue to compete and fight to control state institutions and capture rents. As Lastinger pointed out "A decade into the post-war period, very little has changed within Burundi's political landscape: the poor remain poor; the institutionalized system of corruption and clientelism continues to plague the government at all levels" (Lastinger, 2017).

Other factors also had contributed to economic growth in Rwanda. The real per capita income is the most reliable indicator of economic growth. Additionally, another best indicator to measure and judge the performance of an economy is the Human Development Index (HDI), which is composed of three pillars namely the real per capita income, life expectancy at birth, and education level. While it constitutes the most important factor in poverty reduction,

development partners and NGOs. The aim is to eradicate extreme poverty by 2020
(Vision 2020 Umurenge, EDPRS Flagship Program document (2007)

economic growth remains necessary and an unescapable aim of all economic development processes, but alone it is insufficient. To sustain economic growth, other important social and economic variables such as health, education, technology, energy, environment, and political stability, to name a few, must be taken into consideration and be enhanced (Todaro & Smith, 2008, p. 20). Hence, other indicators of human development, such as life expectancy, Children mortality of under five, Birth rate, Death rate, Human capital index, and literacy, have also improved in Rwanda after the genocide. In this comparative analysis between Rwanda and Burundi, we included other economic indicators rather than just looking only at economic growth. Let us examine three other dependent variables mentioned above to explore how both countries performed to sustain their economic growth.

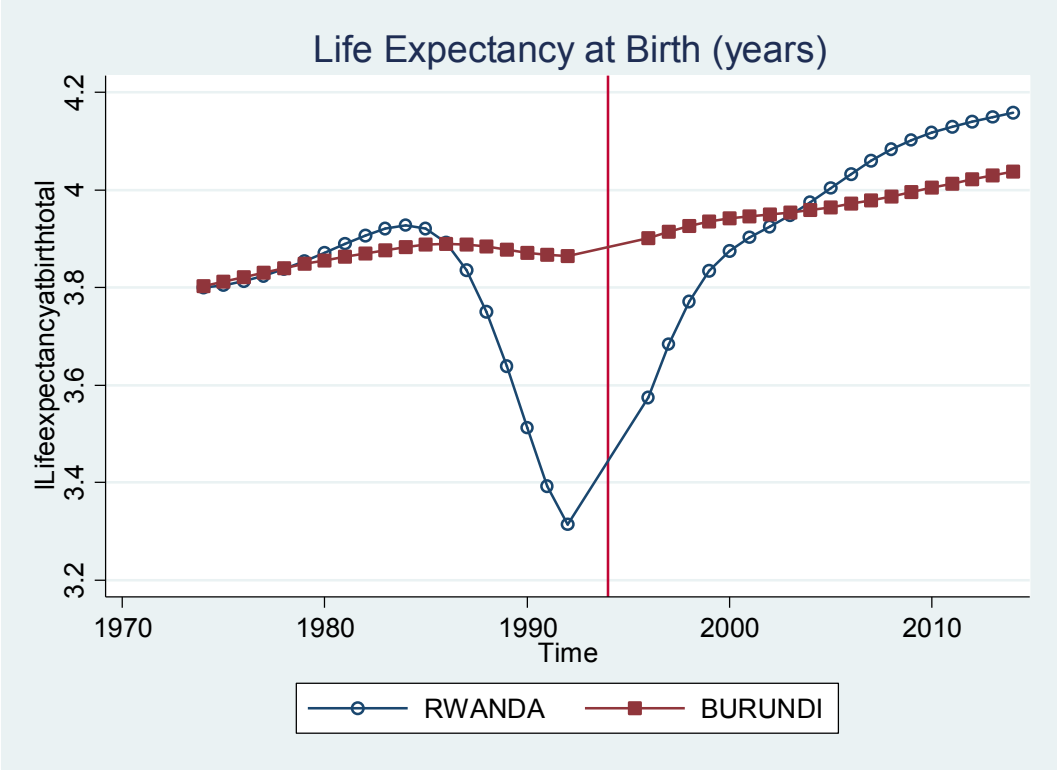

Figure 9. Life Expectancy at Birth (years)

Table 5: Coefficient estimates of the model: Effects of seven indicator variables on Life Expectancy at birth.

Y variable: Life expectancy at birth, total (years)						
Descriptive Statistics	Observations	Mean	Std. Dev.	Min	Max	
	76	3.894	0.148	3.314	4.158	
			Regression Models			
Coefficients	**(1) Estimate**	**(2) Linear**	**(3) Quadratic**	**(5) Time F.E.**	**(5) Linear cst**	**(6) Quadratic cst**
TREATED	-.086***	-.086***	-.086***	-.086**	2.172**	0
	(.006)	(.001)	(.003)	(.043)	(1.047)	(omitted)
	[.041]	[.040]	[.035]	[.041]	[10.283]	
AFTER	.110***	.004	.004	.253***	-.008	-.006
	(.011)	(.041)	(.014)	(.031)	(.034)	(.032)
	[.041]	[.069]	[.061]	.110	[.090]	[.079]
				[.045]		
TREATED	.087***	.087***	.087***	.087	.112***	.11
_AFTER	(.005)	(.003)	(.018)	(.053)	(.015)	(.081)
	[.057]	[.056]	[.050]	[.057]	[.127]	[.112]
TIME		.005	-1.882		.005	-1.883
		(.002)	(1.712)		(.001)	(1.725)
		[.003]	[.400]		[.004]	[.403]
TIME			.001			.001
SQUARED			(.0004)			(.0004)
			[.0001]			[.0001]
TREATED					-.001	.001
TIME					(.001)	(.003)
					[.005]	[.005]
TREATED						-.000
TIMESQU						(.000)
						[.000]
CONSTANT	3.860	-5.721	1875.758	3.844	-6.850	1875.715
	(.001)	(3.073)	(1707.538)	(.061)	(2.376)	(1719.853)
	[.029]	[5.107]	[398.550]	3.860	[7.271]	[401.304]
				[.032]		
R-Squared	0.32	0.35	0.51	0.73	0.35	0.51

We examine the output from this regression to capture the difference in Life Expectancy at Birth in both countries before and after the genocide in Rwanda in 1994. We found that the effect of β_3Treated x $After_{it}$ ($\beta 3 = .087$, $p = 0.000$) is significant and positive. Results are shown in Columns 2, 3, 4, and 5 of Table 5. This coefficient captures the difference in the life expectancy at birth in Rwanda relative to Burundi after 1994 compared to before the genocide period and indicates that for every additional year in Rwanda we can expect the natural log of life expectancy at birth to increase by an average of 8.74 percent. The sign of $\beta 3$ is positive as expected and statistically significant at both the 5% level and 1% level. The standard error of the coefficient for β_3 is smaller than that of β_2. Therefore, my model estimates the coefficient for β_3 with greater precision. Furthermore, the coefficient β_3 increases in the two equations EQ5 and EQ6 (.112 and .11) as shown in the last two Columns 6 and 7 of Table 5 when we estimated the specification between the two countries and year time effects. The sign of $\beta 3$ is positive as expected, but it is not statistically significant at both the 5% level and 1% level. The R–squared is 0.316 meaning that approximately 32% of the variability of Life Expectancy at Birth is accounted for by the predictor variables in the model. Now let us turn to the dependent variable Children mortality of under five and examine whether the two countries Rwanda and Burundi show differences in outcomes.

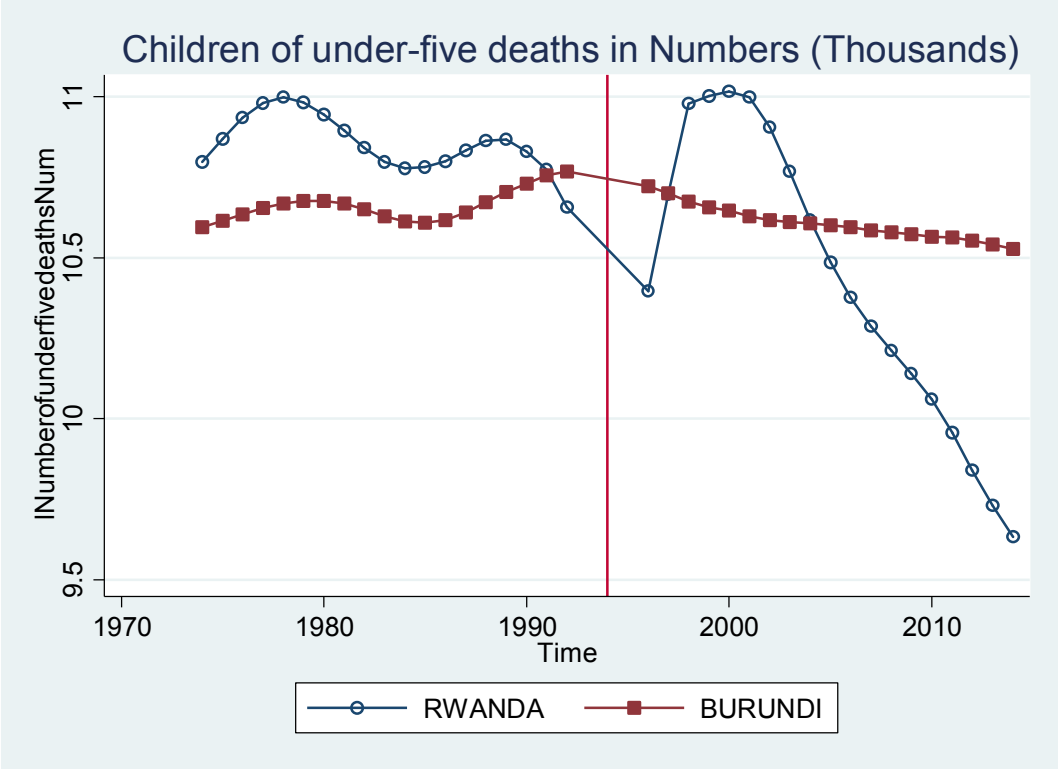

Figure 10. Children of under-five deaths in Numbers (Thousands)

Table 6: Coefficient estimates of the model: Effects of seven indicator variables on Children of under-five deaths in Numbers (Thousands).

Y variable: Children of under-five deaths in Numbers (Thousands)						
Descriptive Statistics	Observations	Mean	Std. Dev.	Min	Max	
	76	10.637	.277	9.632	11.016	
			Regression Models			
Coefficients	**(1) Estimate**	**(2) Linear**	**(3) Quadratic**	**(5) Time F.E.**	**(5) Linear cst**	**(6) Quadratic cst**
TREATED	.192***	.192***	.192***	.192***	76.213***	0
	(.009)	(.017)	(.006)	(.025)	(1.641)	(omitted)
	[.076]	[.066]	[.056]	(.076)	[14.471]	
AFTER	-.054	.407	.407	-.429	-.015	-.018
	(.019)	(.434)	(.440)	(.399)	(.040)	(.035)
	[.076]	[.115]	[.096]	-.054	[.127]	[.096]
				[.082]		
TREATED	-.374***	-.374***	-.374***	-.374***	.47***	.48***
_AFTER	(.008)	(.038)	(.065)	(.101)	(.017)	(.086)
	[.108]	[.094]	[.079]	[.108]	[.179]	[.136]
TIME		-.021	3.522		-.002	3.502
		(.020)	(2.331)		(.002)	(2.388)
		[.004]	[.634]		[.005]	[.4883]
TIME			-.001			-.001
SQUARED			(.001)			(.001)
			[.0001]			[.0001]
TREATED					-.038	.038
TIME					(.001)	(.004)
					[.007]	[.006]
TREATED						-.000
TIMESQU						(.000)
						[.000]
CONSTANT	10.662	52.250	-3479.604	10.6	14.240	-3479.508
	(.004)	(38.989)	(2304.244)	(.015)	(3.830)	(2381.311)
	[.054]	[8.483]	[632.195]	10.662	[10.232]	[486.9155]
				[.058]		
R-squared	0.31	0.48	0.64	0.71	0.63	0.79

Table 6 provides the results from the regression model when we estimate the relationship between the dependent variable Children under five deaths and the other seven indicator variables. The effect of β_3Treated x After$_{it}$ (β3= -.374, p= 0.000) is significant and negative as presented in Columns 2, 3, 4, and 5 in Table 6. This coefficient grasps the difference in the number of children dying before reaching age five in Rwanda relative to Burundi after 1994 compared to before the genocide period and shows that for every additional year in Rwanda relative to Burundi we can expect natural log of death of children under five to decrease on average 37.4 percent. The sign of β3 is negative as expected and β3 is statistically significant at the 5% level and 1% level. The smaller the standard error, the more precise the estimate. The standard error of the coefficient for β_3 is smaller than that of β_2. Therefore, my model estimates the coefficient for β_3 with greater precision. However, the coefficient for β_3 turns positive and increases in the two equations EQ5 and EQ6 (.47 and .48) when I estimated the specification between the two countries and year fixed effects as shown in the last two Columns 6 and 7 of Table 6. The sign of β3 is positive which is not as expected but is statistically significant at both the 5% level and 1% level in EQ6, and only statistically significant at the 5% level in EQ5. According to these results, in Rwanda for every additional year we can expect the number of children dying before reaching age five to increase on average 48 percent when we added the specifications. The R–squared is 0.3083 meaning that approximately 31% of the variability of Number of children dying before reaching age five is accounted for by the predictor variables in the model related to Rwanda and Burundi.

Another important indicator needed to sustain economic growth is human capital. Both education and human capital have a strong relationship. Rwanda and Burundi should invest significantly in education to acquire and develop human capital in order to achieve higher

productivity. It is well known human capital provides better standards of living for people and in general well-educated people also enjoy good health. A close look at the trend of human capital in Rwanda and Burundi indicates a clear distinction between the two countries, where there is a difference in the two to build capabilities and create a more skilled workforce.

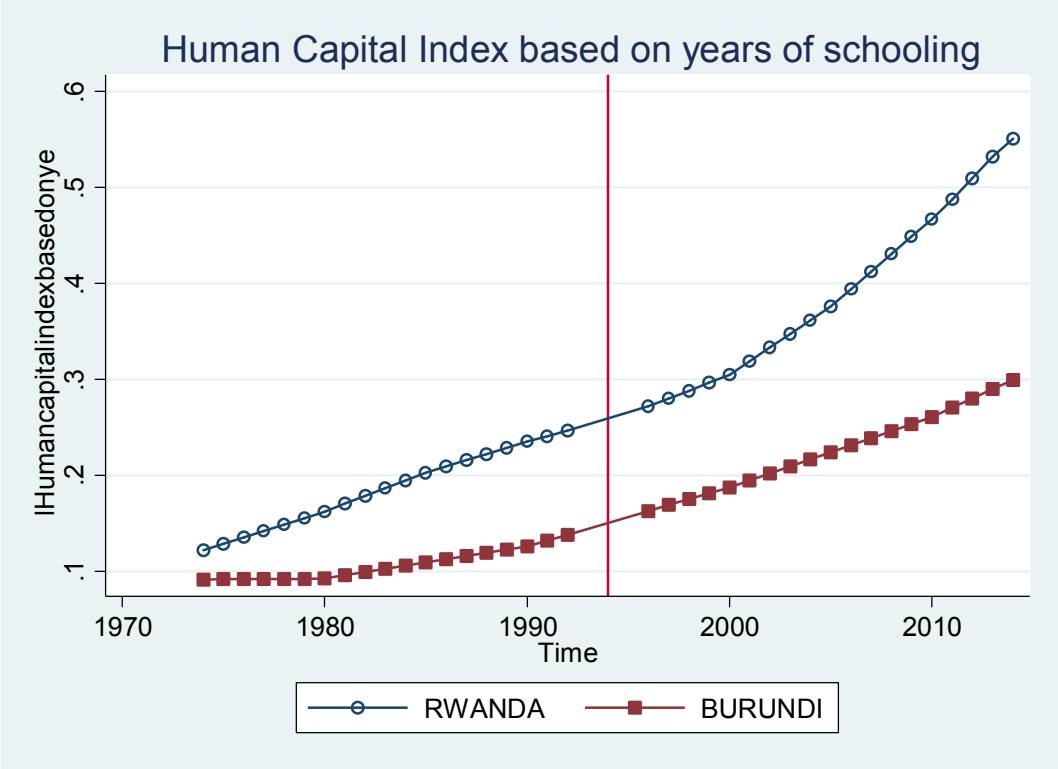

Figure 11. Human Capital Index

Table 7: Coefficient estimates of the model: Effects of seven indicator variables on Human Capital Index, based on years of schooling and returns to education.

Y variable: Human Capital Index, based on years of schooling and returns to education						
Descriptive Statistics	Observations 76	Mean .227	Std. Dev. .117	Min .092	Max .551	
			Regression Models			
Coefficients	**(1)Estimate**	**(2) Linear**	**(3)Quadratic**	**(5)Time F.E.**	**(5)Linear cst**	**(6) Quadratic cst**
TREATED	.079**	.079***	.079***	.079***	-12.620	0
	(.001)	(.002)	(.004)	(.006)	(.376)	(omitted)
	[.018]	[.009]	[.006]	[.018]	[1.755]	
AFTER	.120***	-.062	-.062	.276***	.008	.009***
	(.009)	(.073)	(.086)	(.085)	(.010)	(.003)
	[.018]	[.016]	[.011]	.120	[.015]	[.005]
				[.023]		
TREATED _AFTER	.085***	.085***	.085***	.085***	-.056**	-.057***
	(.004)	(.003)	(.009)	(.013)	(.004)	(.007)
	[.025]	[.013]	[.009]	[.025]	[.022]	[.007]
TIME		.008	-.607		.005	-.604
		(.003)	(.142)		(.001)	(.169)
		[.001]	[.073]		[.001]	[.027]
TIME SQUARED			.0002		.079	.079
			(.00004)		(.004)	(.006)
			[.00002]		[.006]	[.018]
TREATED TIME					.006	-.006
					(.0002)	(.0003)
					[.001]	[.0003]
TREATED TIMESQU						.000
						(.000)
						[.000]
CONSTANT	.107	-16.258	597.1416	.0671	-9.908	597.181
	(.003)	(6.538)	(137.356)	(.035)	(.904)	(168.179)
	[.012]	[1.152]	[72.661]	.107	[1.241]	[26.436]
				[.016]		
R-squared	0.80	0.95	0.97	0.97	0.97	0.99

Table 7 in Columns 2, 3, 4, and 5 shows β3 = .085 is the coefficient for Human Capital Index. Indeed, the effect of β_3Treated x $After_{it}$ (β3= .085, p= 0.000) is significant and positive, which captures the difference in Human Capital Index in Rwanda relative to Burundi after 1994 compared to before the genocide period. This coefficient indicates that for every additional year in Rwanda relative to Burundi we can expect the natural log of Human Capital Index to increase on average 8.5 percent. The sign of β3 is positive as expected and it is statistically significant at both the 5% level and 1% level. The standard error of the coefficient for β_3 is smaller than that of β_2. Therefore, my model estimates the coefficient for β_3 with better precision. Moreover, in the last two Columns 6 and 7 in Table 7, the coefficient for β_3 turns negative and diminishes in the two equations EQ5 and EQ6 (-.056 and -.057) when we estimated the specification between the two countries and year fixed effects. The sign of β3 is negativewhich is not as expected, but it is statistically significant at both the 5% level and 1% level in EQ6, and then only statistically significant at the 5% level in EQ5. Henceforth, in Rwanda for every additional year we can expect the Human Capital Index to decrease by an average 5.6 percent when we added the specification, which contradicts the previous results of β3. The R–squared is 0.7948 meaning that approximately 80% of the variability of the Human Capital Index is accounted for by the predictor variables in the model.We also found that Rwanda has been performing well relative to Burundi in other dependent variables such as Agriculture, Exports and Services.

In fact, Agriculture, Exports, Services, and Savings (gross domestic savings and gross savings) drive the economic growth that we see in Rwanda. Agriculture and exports are expected to continue driving growth with the support of the first Special Economic Zone (SEZ) in Kigali which opened in 2012. We are going to examine now the output from our model equations for the dependent variables of Agriculture and Exports capture the difference in both countries.

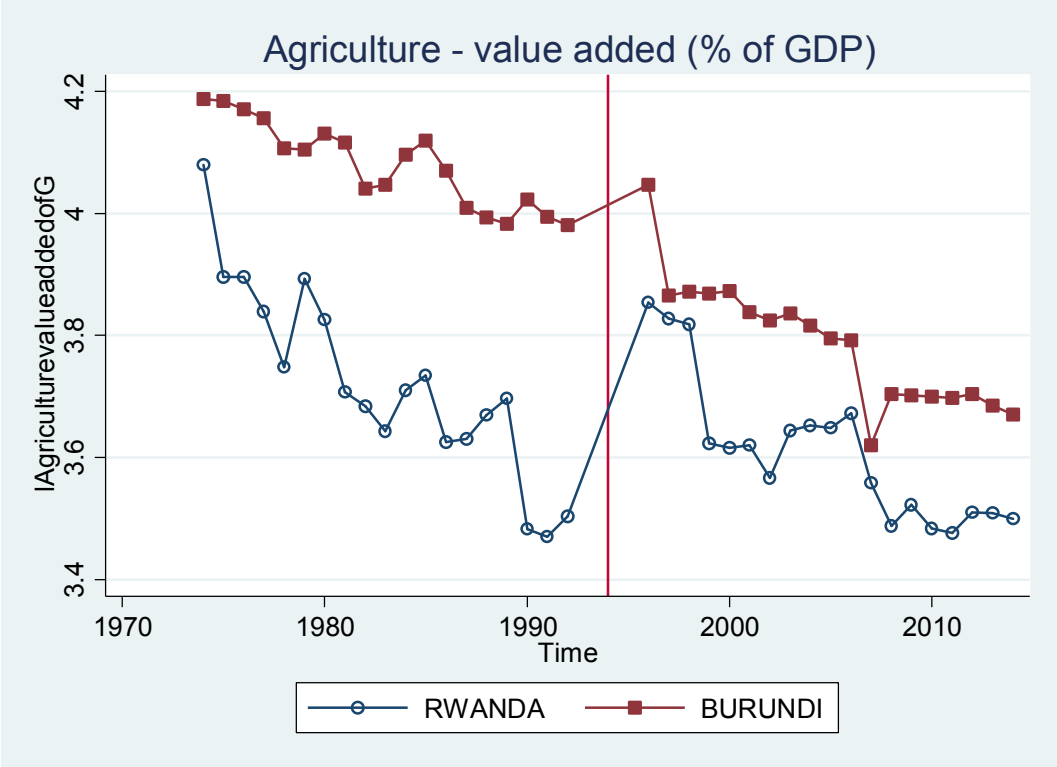

Figure 12. Agriculture, value-added (% of GDP)

Table 8: Coefficient estimates of the model: Effects of seven indicator variables on Agriculture, value – added (% of GDP).

Y variable: Agriculture, value added (% of GDP)						
Descriptive Statistics	Observations	Mean	Std. Dev.	Min	Max	
	76	3.799	.209	3.470	4.188	
	Regression Models					
Coefficients	**(1) Estimate**	**(2) Linear**	**(3) Quadratic**	**(5)Time F.E.**	**(5) Linear cst**	**(6) Quadratic cst**
TREATED	-.357***	-.357***	-.357***	-.357***	14.841***	0
	(.006)	(.013)	(.013)	(.024)	(.652)	(omitted)
	[.038]	[.020]	[.020]	[.038]	[4.722]	
AFTER	-.295***	.094	.094	-.640***	.010	.011**
	(.019)	(.085)	(.086)	(.129)	(.008)	(.005)
	[.038]	[.034]	[.034]	-.295	[.041]	[042]
				[.050]		
TREATED	.182***	.182***	.182***	.182***	.351***	.35***
_AFTER	(.008)	(.009)	(.010)	(.029)	(.020)	(.011)
	[.053]	[.028]	[.028]	[.053]	[.059]	[.059]
TIME		-.018	-.227		-.014	-.230
		(.004)	(.551)		(.0002)	(.573)
		[.001]	[.224]		[.002]	[.211]
TIME			.0001			.0001
SQUARED			(.0001)			(.0001)
			[.0001]			[.0001]
TREATED					-.008	.007
TIME					(.0003)	(.001)
					[.002]	[.002]
TREATED						-0.000
TIMESQU						(0.000)
						[0.000]
CONSTANT	4.080	39.161	247.284	4.312	31.562	247.106
	(.013)	(7.680)	(552.736)	(.132)	(.302)	(571.33)
	[.027]	[2.512]	[223.728]	4.080	[3.339]	[210.408]
				[.035]		
R-Squared	0.7	0.92	0.92	0.96	0.93	0.93

Clearly, the effect of β_3Treated x $After_{it}$ (β3= .182, p= 0.000) in Columns 2, 3, 4, and 5 in Table 8 is significant and positive, which captures the difference in the Agriculture, value – added (% of GDP) in Rwanda relative to Burundi after 1994 compared to before the genocide period. This coefficient indicates that for every additional year in Rwanda relative to Burundi we can expect the natural log of Agriculture (% of GDP) to increase by an average 18.2 percent. The sign of β3 is positive as expected and statistically significant at both the 5% level and 1% level. The standard error of the coefficient for β_3 is smaller than that of β_2 Therefore, my model estimates the coefficient for β_3 with greater precision. In addition, the coefficient for β_3 displayed in Columns 6 and 7 of Table 8 increases in the two equations EQ5 and EQ6 (.351 and .35) when we estimated the specification between the two countries and year fixed effects. The sign of β3 is also positive as expected and it is statistically significant at both the 5% level and 1% level. Therefore, in Rwanda for every additional year we can expect natural log of Agriculture (% of GDP) to increase by on average 35 percent. The coefficient β3 augments when we checked for the specification. The R–squared is 0.7019 meaning that approximately 70% of the variability of Agriculture (% of GDP) is accounted for by the predictor variables in the model related to Rwanda and Burundi.

The economy in Rwanda is based mainly on agriculture, which has considerable potential for economic growth and modernization. Indeed, Rwanda had started to modernize the agriculture sector by introducing systems of agriculture production and the development of agribusiness. Actually, expenditure on agriculture, education, and health also had positive impact on economic growth in Rwanda. We see that the contribution of agriculture to GDP has gradually decreased from 90 to 36% during the period 1974 – 2014. However, agriculture sector continue to employ 80-90% of the active population, in which women represent the majority and

mostly Hutu farmers who live in rural areas. Generally, the majority of Tutsis are not interested in agricultural activities, and they stay in urban areas where theyprefer to raise cattle instead. In Rwanda 70% of the population lives in rural areas, and are mostly Hutu farmers, and thirty percent reside in major cities such as Kigali, Butare, Gisenyi, Ruhengeri, and Gitarama. Rwanda has always achieved food self-sufficiency because it produced almost 90 percent of total food required to feed the entire population. As already stated above, coffee and tea are the country's most important export commodities. Agriculture contributes to about 70-80% of the country exports revenues.

Rwanda is the "land of a Thousand Hills", and there are hillsides throughout the landlocked country and arable land still represents about 52% odf the country. This is necessary for agricultural development. The country is too small for its dense population. Therefore, land becomes a scarce commodity, but farmer labor remains abundant. However, there is also a shortage of skilled farm labor. To overcome these obstacles, Rwanda, at first sought land reform and second provided training to form skilled farmers. Rwanda formulates and implemented special agriculture policy called PSTA I since 2004, which was improved in 2008 and became PSTA II, composed of four interrelated programs. The first program serves to intensify and develop sustainable production systems. The goal of the second program is to support and assure the professionalization of producers. The promotion of commodity chains and agrobusiness development stands as the mission of the third program. Finally, the last and fourth program focuses on institutional development. Rwanda's agriculture policy puts more focus on three essential points such as the creation of new farming systems to operate large productive units, offer farmer training to make them skilled and knowledgeable, and develop entrepreneurial capacities. The Rwandan government through its ministry of agriculture launched a program

called Girinka, which consists of offering a cow to poor families, and other programs to train farmers and agro-entrepreneurs to develop value-added products and create new products. In addition, Rwanda distributes improved seeds to farmers and helps them to find solutions vis-à-vis water irrigation and soil erosion problems. All these actions and programs initiated by the government of Rwanda made agriculture remain the driver and backbone of economic growth in the post genocide period.

The sectors of agriculture and exports are often linked together and strongly intertwined to one to another. Let us now compare the performances of these two countries in the sector of exports of goods and services.

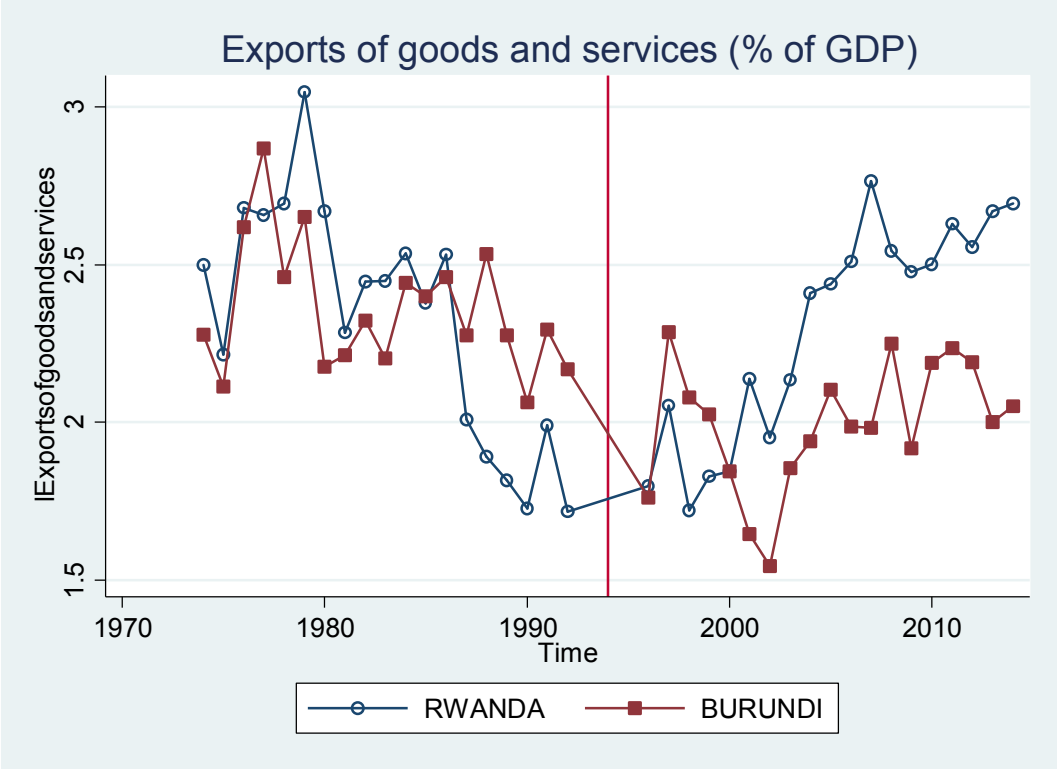

Figure 13. Exports of goods and services (% of GDP)

Table 9: Coefficient estimates of the model: Effects of seven indicator variables on Exports of goods and services (% of GDP).

Y variable: Exports of goods and services (% of GDP)						
Descriptive Statistics	Observations	Mean	Std. Dev.	Min	Max	
	76	2.245	.323	1.545	3.047	
	Regression Models					
Coefficients	**(1)Estimate**	**(2) Linear**	**(3)Quadratic**	**(5)Time F.E.**	**(5) Linear cst**	**(6) Quadratic cst**
TREATED	-.031**	-.031***	-.031**	-.031	-2.964	0
	(.012)	(.005)	(.013)	(.073)	(3.227)	(omitted)
	[.095]	[.096]	[.079]	[.095]	[24.729]	
AFTER	-.365***	-.398***	-.398***	-.184***	-.382***	-.377***
	(.038)	(.109)	(.005)	(.062)	(.093)	(.040)
	[.095]	[.167]	[.137]	-.365	[.217]	[.178]
				[.114]		
TREATED _AFTER	.335***	.335***	.335***	.335***	.302***	.293***
	(.016)	(.014)	(.014)	(.104)	(.039)	(.089)
	[.135]	[.136]	[.112]	[.135]	[.307]	[.252]
TIME		.002	-5.318		.001	-5.317
		(.005)	(3.284)		(.004)	(3.307)
		[.006]	[.902]		[.009]	[.908]
TIME SQUARED			.001			.001
			(.001)			(.001)
			[.0002]			[.0002]
TREATED TIME					.002	-.002
					(.002)	(.001)
					[.013]	[.010]
TREATED TIMESQU						.000
						(.000)
						[.000]
CONSTANT	2.359	-.595	5302.341	2.404	.872	5302.326
	(.029)	(9.262)	(3273.616)	(.175)	(7.725)	(3297.676)
	[.067]	[12.278]	[899.346]	2.359	[17.486]	[905.619]
				[.081]		
R-Squared	0.21	0.21	0.47	0.77	0.21	0.47

For Exports of goods and services, the effect of β_3Treated x $After_{it}$ (β3= .3347007, p= 0.000) in Columns 2, 3, 4, and 5 of Table 9 is significant and positive. It shows the difference in the Exports of goods and services (% of GDP) in Rwanda relative to Burundi before and after 1994. This coefficient signifies that for every additional year in Rwanda relative to Burundi, we can expect the natural log of Exports of goods and services (% of GDP) to increase by an average 33.5 percent. The sign of β3 is positive as expected and statistically significant at both the 5% level and 1% level. The standard error of the coefficient for β_3 is smaller than that of β_2. Therefore, my model estimates the coefficient with greater precision. However, the coefficient for β_3Treated x After, presented in Columns 6 and 7 in Table 9 decreases a little in the two equations EQ5 and EQ6 (.302 and .293) when we assessed the specification between the two countries and year. The sign of β3 is positive as expected and statistically significant at both the 5% level and 1% level. The R–squared is 0.2079 meaning that approximately 21% of the variability of Exports of goods and services (% of GDP) is accounted for by the predictor variables in the model related to Rwanda and Burundi.

The sector of Exports of goods and services is very dynamic and brings important resources in Rwanda. Tourism, minerals, coffee, and tea are Rwanda's main source of foreign exchange.[23] The key minerals for exports in Rwanda are coltan and cassiterite.[24] Minerals in 2013 represent 32 % of total goods exports by value, up from 22 % in 2009. They contributed 15 percentage points to growth in 2013. Coltan (Rwanda's most important mineral) grew by 136 % in 2013. Tourism is Rwanda's largest single export activity, accounting for about 30 percent of total exports.[25] Coffee, tea, and minerals accounted for 59% of total exports in 2013 for example,

[23] The World CIA Factbook
[24] Rwanda EN 2014 African Economic Outlook
[25] Rethinking Africa's structural transformation. The rise of new industries
January 11, 2018
https://www.brookings.edu/research/rethinking-africas-structural-transformation/

five percentage points higher than in 2011. Conversely, Burundi's exports are essentially cash crops, namely coffee, tea and cotton. Coffee accounts for more than 80 percent of total exports. Burundi is a primarily agricultural economy, with coffee, tea, and cotton accounting for over 90 percent of foreign exchange earnings (Lastinger, 2017). Burundi has few export destinations and has less revenue in international trade because coffee and tea are exported in their raw states with almost no value-added. The country is endowed with enormous mineral deposits. For instance, Burundi has the second largest coltan reserve in the region and 6% of world nickel, but the extractive industries provide only less than 1% of GDP. Mining remains mainly an artisanal and informal activity.

Even though today's economic growth in Rwanda is driven by agriculture and exports, we acknowledge very well that in Rwanda and Burundi, the economy has long been dominated by the primary sector of agriculture, the secondary sector of industry and manufacturing, and the tertiary sector of service. When we look back in the past, we note that among all early or late advanced capitalist and rich countries, none has fully developed without industrialization. This assumption remains evident and still valid until today, so it is almost impossible to achieve economic development without industrializing. The results of variables such as Industry, and Manufacturing are not consistent with Rwanda's recent economic growth. Let us take a close look at these two dependent variables in order to show the difference between both countries.

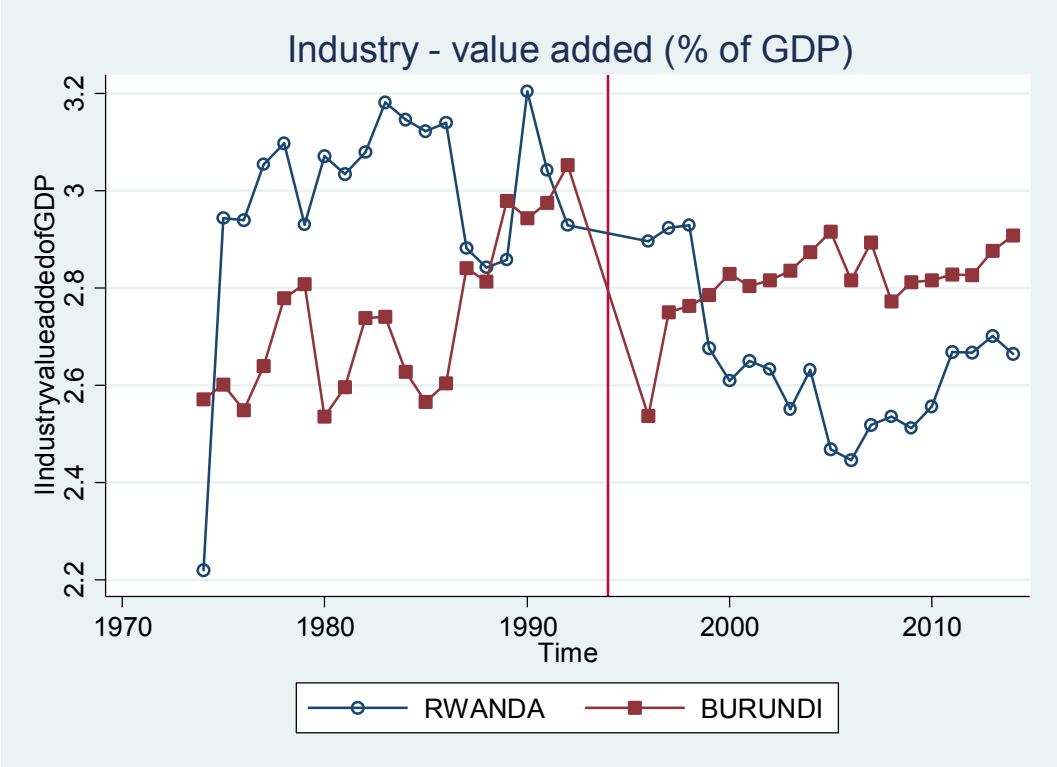

Figure14. Industry, value-added (% of GDP)

Table 10: Coefficient estimates of the model: Effects of seven indicator variables on Industry, value added (% of GDP).

Y variable: Industry, value added (% of GDP)						
Descriptive Statistics	Observations	Mean	Std. Dev.	Min	Max	
	76	2.794	.200	2.22	3.204	
			Regressions			
Coefficients	**(1) Estimate**	**(2) Linear**	**(3) Quadratic**	**(5)Time F.E.**	**(5) Linear cst**	**(6) Quadratic cst**
TREATED	.250***	.250***	.250***	.250***	31.058***	0
	(.006)	(.022)	(.030)	(.062)	(1.034)	(omitted)
	[.052]	[.050]	[.047]	[.052]	[12.337]	
AFTER	.079***	-.087	-.087	.600**	-.257***	-.258***
	(.011)	(.169)	(.197)	(.262)	(.065)	(.040)
	[.052]	[.087]	[.082]	.079	[.108]	[.102]
				[.052]		
TREATED	-.420***	-.420***	-.420***	-.420***	-.078	-.076
_AFTER	(.0246057)	(.0315039)	(.0400003)	(.0776187)	(.2087159)	(.097)
	[.073]	[.071]	[.067]	[.073]	[.153]	[.144]
TIME		.008	1.617		.015	1.609
		(.008)	(.486)		(.0004)	(.461)
		[.003]	[.541]		[.004]	[.519]
TIME			-.0004			-.0004
SQUARED			(.0001)			(.0001)
			[.0001]			[.0001]
TREATED					-.016	.016
TIME					(.001)	(.004)
					[.006]	[.006]
TREATED						-.000
TIMESQU						(.000)
						[.000]
CONSTANT	2.735	-12.144	-1616.973	2.270	-27.548	-1616.848
	(.008)	(15.698)	(475.760)	(.323)	(.720)	(458.514)
	[.036]	[6.392]	[539.722]	2.74	[8.724]	[517.739]
				[.037]		
R-Squared	0.4	0.44	0.50	0.67	0.49	0.55

For Industry, value-added (% of GDP), the effect of β_3Treated x After$_{it}$ (β3= -.4196602, p= 0.000) in Columns 2, 3, 4, and 5 of Table 10 is significant and negative, which captures the difference in Industry (% of GDP) in Rwanda relative to Burundi before and after 1994. This coefficient indicates that for every additional year in Rwanda relative to Burundi we can expect the natural log of Industry (% of GDP) to decrease by a percent. The sign of β3 is negative which is not as expected, but statistically significant at both the 5% level and 1% level. The standard error of the β_2After$_{it}$ coefficient is smaller than that of β_3Treated x After$_{it}$. Therefore, this model estimates the coefficient β_2 with greater precision. However, in Columns 6 and 7 of Table 10 the coefficient for β_3 remains negative and drops a great extent in the two equations EQ5 and EQ7 (-.078 and -.0764) when we estimated the specification between the two countries and year fixed effects. The sign of β3 is still negative which is not as expected and it is not statistically significant at both the 5% level and 1% level. The R–squared is 0.3976, which means that approximately 40% of the variability of Industry (% of GDP) is accounted for by the predictor variables in the model related to Rwanda and Burundi.

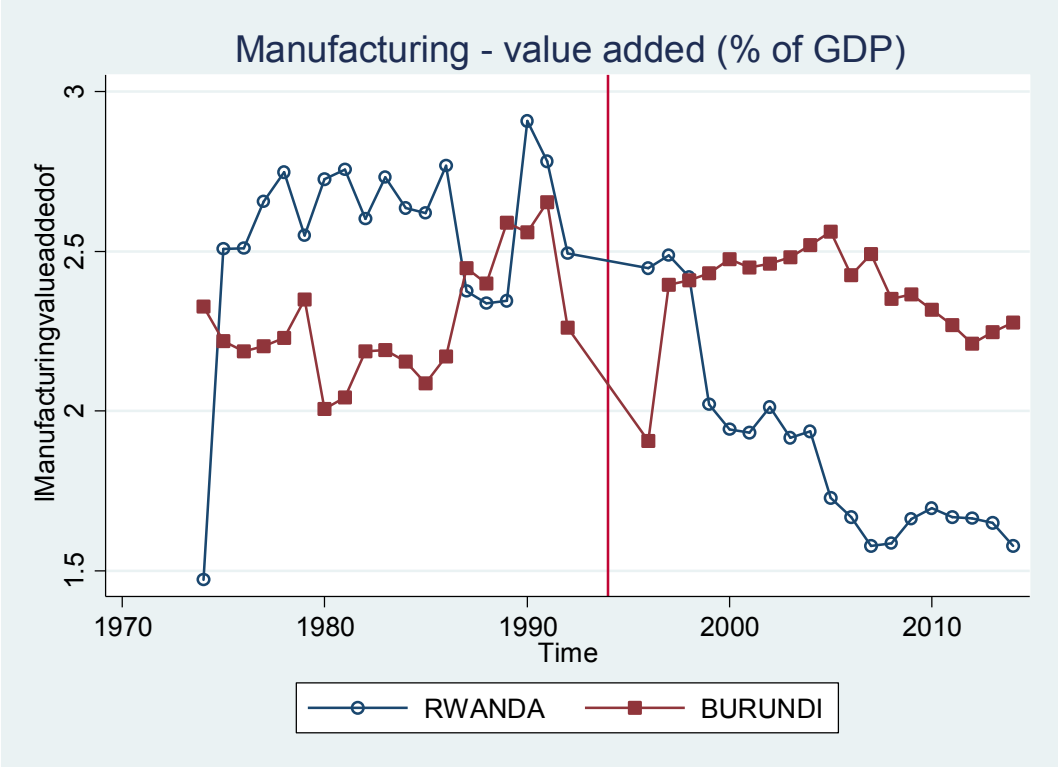

Figure 15. Manufacturing, value-added (% of GDP)

Table 11: Coefficient estimates of the model: Effects of seven indicator variables on Manufacturing, value added (% of GDP).

Y variable: Manufacturing, value added (% of GDP)						
Descriptive Statistics	Observations	Mean	Std. Dev.	Min	Max	
	76	2.268	.346	1.472	2.907	
	Regression Models					
Coefficients	**(1)Estimate**	**(2) Linear**	**(3)Quadratic**	**(5)Time F.E.**	**(5)Linear cst**	**(6) Quadratic cst**
TREATED	.277***	.277***	.277***	.277***	43.585***	0
	(.032)	(.023)	(.046)	(.089)	(7.184)	(omitted)
	[.079]	[.079]	[.070]	[.079]	[19.766]	
AFTER	.094***	.182	.182	.414	-.058***	-.061
	(.018)	(.241)	(.255)	(.427)	(.022)	(.071)
	[.079]	[.138]	[.122]	.094	[.173]	[.151]
				[.079]		
TREATED _AFTER	-.774***	-.774***	-.774***	-.774***	-.294***	-.289
	(.044)	(.046)	(.073)	(.121)	(.056)	(.171)
	[.112]	[.112]	[.099]	[.112]	[.245]	[.214]
TIME		-.004	3.671		.007	3.66
		(.011)	(1.784)		(.001)	(1.762)
		[.005]	[.799]		[.007]	[.770]
TIME SQUARED			-.001			-.001
			(.0005)			(.0004)
			[.0002]			[.0002]
TREATED TIME					-.022	.022
					(.004)	(.008)
					[.010]	[.009]
TREATED TIMESQU						-.000
						(.000)
						[.000]
CONSTANT	2.277	10.232	-3653.605	1.761	-11.422	-3653.467
	(.013)	(21.935)	(1766.109)	(.598)	(2.746)	(1755.777)
	[.056]	[10.144]	(796.575)	2.277	[13.976]	[767.298]
				[.056]		
R-Squared	0.53	0.53	0.64	0.73	0.56	0.67

We see that the effect of β_3Treated x After$_{it}$ (β3= -.7742161, p= 0.000) in Columns 2, 3, 4, and 5 of Table 11 is significant and negative. It catches the difference in Manufacturing, value-added (% of GDP) in Rwanda relative to Burundi before and after 1994. This coefficient indicates that for every additional year in Rwanda we can expect the natural log of Manufacturing (% of GDP) to decrease by an average 77.42 percent. The sign of β3 is negative, which is not what we would expect, but it is statistically significant at both the 5% level and 1% level. The standard error of the β_2 coefficient is smaller than that of β_3. Therefore, this model is able to estimate the coefficient β_2 with greater precision. Furthermore, the coefficient β3 stays negative and falls in the two equations EQ5 and EQ6 (-.294 and .289) from Columns 6 and 7 of Table 11 when we estimated the specification between the two countries and year fixed effects. The sign of β3 is negative which is not as expected and it is not statistically significant at both the 5% level and 1% level in EQ6. The R–squared is 0.525, which means that approximately 53% of the variability of Manufacturing (% of GDP) is accounted for by the predictor variables in the model related to Rwanda and Burundi.

This study clearly shows that Economic growth in Rwanda is not driven yet by manufacturing and industry sectors. We found agriculture and services do and constitute the engine of economic transformation. Growth in services is generated by trade, transport and communication, finance and insurance, public administration and education, which all together account for 57% of service sector output. However, Rwanda has the highest transport costs in the region, estimated at 40% of the value its imports/exports. The tertiary sector has expanded and boomed in recent years accounted for 45 % of GDP in 2013. The boom has most prominent in the banking, insurance, post and telecommunications, and hotels and restaurants sectors. Tourism continues to grow gradually with the important investment of Rwanda in productive

infrastructure. In addition, tourism contributes more towards both exports and services sectors in Rwanda. Currently, the share of services to GDP is higher than that of industry and manufacturing combined. For Samir Amin, what is happening in Rwanda today is the opposite to what he thinks about Africa countries. A country cannot improve services sector without industrialization at first. The services sector is an important part of any economy, but it cannot prosper and expand without the development of manufacturing and industry sectors. In any country, economic development depends on the growth and evolution of these three sectors of the economy. However, the service sector is always growing at the speedier rate and has become a largest sector of economy. Service sector usually begins from the production of goods and service and ends with the exchange and consumption of them between sellers and buyers. What is the difference between Rwanda and Burundi in regard to the services sector?

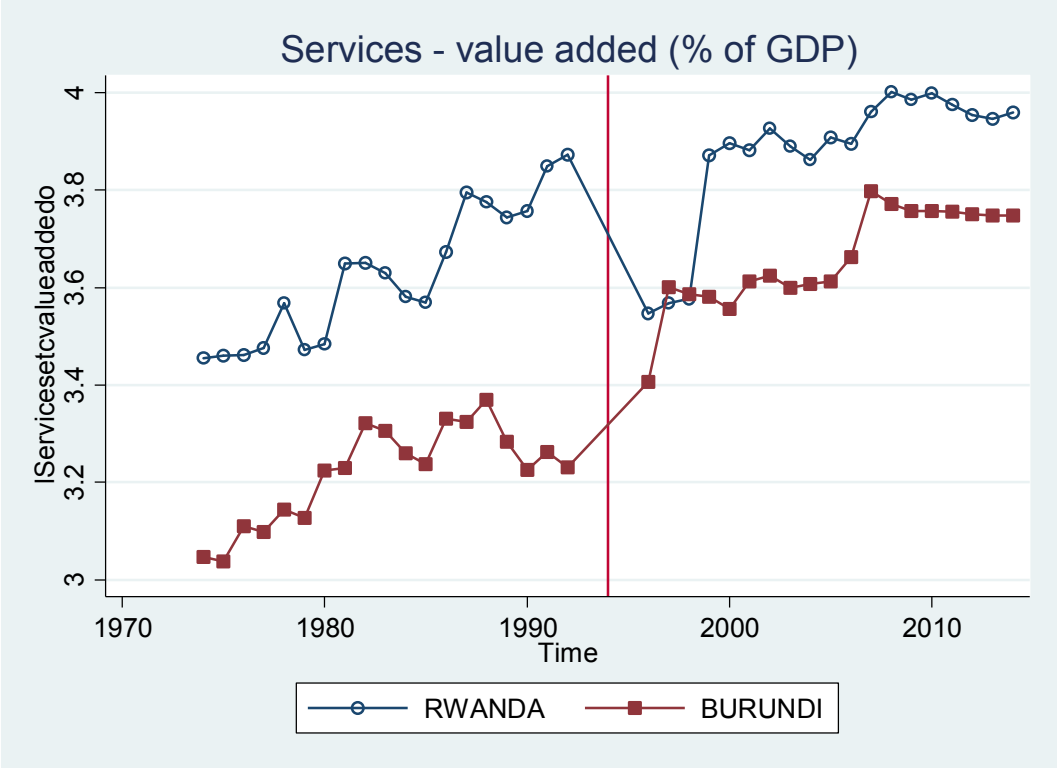

Figure 16. Services, value-added (% of GDP)

Table 12: Coefficient estimates of the model: Effects of seven indicator variables on Services, etc., value added (% of GDP).

Y variable: Services, etc., value added (% of GDP)						
Descriptive Statistics	Observations	Mean	Std. Dev.	Min	Max	
	76	3.595	.267	3.037	4.001	
Regression Models						
Coefficients	**(1)Estimate**	**(2) Linear**	**(3)Quadratic**	**(5)Time F.E.**	**(5) Linear cst**	**(6) Quadratic cst**
TREATED	.409***	.409***	.409***	.409***	-13.600***	0
	(.006)	(.009)	(.009)	(.023)	(.399)	(omitted)
	[.040]	[.023]	[.023]	[.040]	[5.654]	
AFTER	.441***	.045	.045	.700***	.123***	.122***
	(.020)	(.075)	(.078)	(.016)	(.009)	(.012)
	[.040]	[.040]	[.040]	.441	[.050]	[.050]
				[.052]		
TREATED	-.194***	-.194***	-.194***	-.194***	-.350***	-.349***
_AFTER	(.008)	(.004)	(.005)	(.032)	(.003)	(.004)
	[.057]	[.032]	[.032]	[.057]	[.070]	[.070]
TIME		.018	.265		.015	.268
		(.004)	(.233)		(.001)	(.248)
		[.002]	[.262]		[.002]	[.253]
TIME			-.0001			-.0001
SQUARED			(.0001)			(.0001)
			[.0001]			[.0001]
TREATED					.007	-.007
TIME					(.0002)	(.0002)
					[.003]	[.003]
TREATED						.000
TIMESQU						(.000)
						[.000]
CONSTANT	3.219	-32.439	-278.243	3.047	-25.434	-278.038
	(.014)	(7.158)	(235.337)	(.011)	(.972)	(247.059)
	[.028]	[2.928]	[260.693]	3.219	[3.998]	[251.714]
				[.037]		
R-squared	0.8	0.93	0.94	0.97	0.94	0.94

We have here the effect of β_3Treated x $After_{it}$ ($\beta 3$= -.1942849, p= 0.000) in Columns 2, 3, 4, and 5 of Table 12. The coefficient is significant and negative, which captures the difference in Services, value- added (% of GDP) in Rwanda relative to Burundi after 1994 compared to before the genocide period. This coefficient indicates that for every additional year in Rwanda relative to Burundi we can expect the natural log of Services, value- added (% of GDP) to decrease by an average 19.43 percent. The sign of $\beta 3$ is negative which is not as expected, but it is statistically significant at both the 5% level and 1% level. The standard error of the coefficient β_3 is smaller than that of β_2. Therefore, this model can estimate the coefficient for β_3 with greater precision. The coefficient for β_3 remains negative and increases in the three equations EQ5 and EQ6 (-.35 and -.349) in Columns 6 and 7 of Table 12 when we estimated the specification between the two countries and year. The sign of $\beta 3$ stays negative which is not as expected, but it is statistically significant at both the 5% level and 1% level. For that reason, we can continue to say that for every additional year Services, value- added (% of GDP) in Rwanda decreases by on average 35 percent when we added the specification. The R–squared is 0.7963, which means that approximately 80% of the variability of Services, value- added (% of GDP) is accounted for by the predictor variables in the model related to Rwanda and Burundi.

Overall, Rwanda relative to Burundi performs well in all dependent variables except in two important variables industry and manufacturing. On the contrary, Burundi in paradox where economic has been grown slowly for the last two decades appears to be more industrialized than Rwanda despite its so-called economic miracle. Industrialization is the big challenge everyone expects Rwanda to achieve through its economic performance. Rwanda is not yet fully engaged in industrialization. This is an important and crucial problem because industrialization is a

concept which goes beyond having industries and Rwanda remains committed to realize this objective.

Before, manufacturing and industry sectors were the engine of economic transformation. Today, new technologies have spawned a growing number of services and agri-food sectors, including horticulture, which share many features in common with the manufacturing sector. In addition, Infrastructure, skills and competition are the three fundamental factors to attract investments. It is clear that economic development cannot be achieved without government efficient spending in the key sectors mentioned above. Overall, data show that Rwanda is spending more than Burundi to finance its development. Looking at Rwanda itself, it has spectacular economic performance, but compared to Burundi, the analysis of industry and manufacturing dependent variables as already discussed above contradict the remarkable economic progress achieved by Rwanda since the genocide of 1994.

VI. Conclusion

This study has shown the evidence of the outstanding progress accomplished by Rwanda in several areas of economic and human development since the genocide. Indeed, Rwanda achieved all eight Millennium Development Goals (MDGs), reduced poverty from 58.9% in 2000 to 39.1% in 2013 and extreme poverty went from 40% in 2000 to 16.3% in 2013[26], rebuilt socioeconomic infrastructures and economic bureaucracy destroyed during the genocide. Many of the achievements under Kagame's political leadership and Rwandan Patriotic Front which I

[26] National Institute of Statistics in Rwanda (NISR)
http://www.statistics.gov.rw/

often described as a party-state are impressive. Many economic progresses in Rwanda have been attributed to developmental state features and a series of economic and political reforms. In fact, the government of Rwanda decided to incorporate indigenous knowledge such as Girinka and Imihigo together with ubudehe, umuganda, itorero, agaciro, abunzi and gacaca in their policies and development strategy (Biedermann, 2015). The GoR increases its legitimacy when it manages to improve the quality of life and standard of living for people and wins their trust (Hutus and Tutsi) in the long-term developmental agenda.

While Rwanda and Burundi share many characteristics, there are also important differences. We found considerable differences between Rwanda and Burundi in the effectiveness of policies formulation and application. The successful economic performance and social progress in Rwanda is the primary source of the difference between both countries Rwanda and Burundi. Undeniably, Burundi has grown so slowly economically compared to Rwanda and it fell again into ethnic violence in 2015 after President Pierre Nkurunziza decided to run and won its third term election after the country experienced a true peace from 2003 to 2015. As Lastinger pointed out “What appears to be central to the disparate trajectories of these two countries is the nature of their respective dominant political parties, the source of government legitimacy within their societies, and the parameters of the political settlement during the transition from conflict to peace. Incorporating these three aspects can help international organizations to understand the political drivers in post-conflict states that constrain or facilitate economic growth and development (Lastinger, 2017). From this point of view, Mukasa (2012) has a very strong argument when he stated, “The role of leadership is shown to be an important factor in determining economic growth as in Rwanda’s case and economic decline in Burundi’s case” (Mukasa, 2011). Burundi's development lagged far behind Rwanda’s.

For instance, in terms of Millennium Development Goals (MDGs), Burundi did not achieve any of the eight goals by 2015.

In contrast, we find in this study that structural economic transformation is taking place in Rwanda, but the country still faces significant challenges. The economic miracle is real, but not complete. Rwanda created Rwanda Revenue Authority (RRA) to maximize its tax collection and this agency is very effective in the mission, but the country does still not have enough resources to spend for building its socioeconomic and productive infrastructures. Rwanda spends more money (M_2) and contribute more in terms of the percentage of GDP than Burundi in capital expenditures. Government finances are still highly dependent on foreign aid and investment has been principally led by the public sector (Mold, United Nations, & Economic Commission for Africa, 2016). In addition, the private sector is relatively weak. Nevertheless, the party-state RPF and army are involved in the private sector under the Tri-Star/CVL and Horizon group, which constitutes a big obstacle for the private sector in general to develop and expand properly. It is evident, however, that Government of Rwanda (GoR) must continue to intervene efficiently in the economy to encourage development. The government of Rwanda creates rent-seeking and transforms it to rent creation. Only in Rwanda can Tri-Star CVL and Horizon group benefit most of the rents. As a matter of fact, government should attract more local and foreign direct investments (FDI) to strengthen the private sector, which is a true engine of economic growth.

The main finding of this study is that Agriculture, Services and Exports plus savings drive economic growth in Rwanda, which has been strong since 1998. In 2012, Rwanda completed the first modern Special Economic Zone (SEZ) in Kigali.[27] However, when compared

[27]Indexmundi. Rwanda vs. Burundi – economy comparison
https://www.indexmundi.comfactbook/compare/rwanda.burundi/economy

to Burundi a country that the World Bank (WB) and International Monetary Fund (IMF) acknowledged to have been grown slowly economically, Rwanda performed even poorly in the sectors of Industry and Manufacturing than Burundi. Therefore, there is a real need to formulate more appropriate industrial Policies to truly sustain economic growth in both countries. Rwanda has a comparative advantage in agriculture and it is very committed to modernize and industrialize it.

This is the reason why the GoR is pouring more resources to maximize productivity in Agriculture. It also means the government in Rwanda is aware that building strong industries and manufacturing activities demand long-term dedication, patience, trainings, and skills. In order to achieve the goal of industrialization, Rwanda must efficiently invest in education to acquire human capital. Industrialization and human capital go hand by hand and they are strongly correlated. Industry and manufacturing mean much more than having schools and machines. It means building linkages, strong institutions, acquiring technology and expertise, spillovers, public goods, engineers, and all whose knowledge must be used to nurture industries. We understand that the threshold of human capital remains low and while Rwanda is catching up to increase its skilled workforce, it is reasonable for this country to develop agriculture in the first place. Another important point to mention is that there are a couple major problems in Rwanda's economic model such as an absence of sound industry policies, a lack of democracy, and the relationship of the RPF and state are ambiguous, which is at once an effective and authoritarian state.

Kagame's leadership and the RPF kept the country stable without any major conflict after the genocide of 1994, except the long period of insecurity and insurgency of genocidaires who hide in the forest in the neighboring Democratic Republic of Congo (DRC). The actions of

chasing genocidaires in the DRC to capture and bring them to justice is at the source of recurrent violence and military conflict between Rwanda and the Democratic Republic of Congo (DRC). The security and democracy situations remain crucial in Rwanda and Burundi. Some studies began to show that the current regime is building up the same conditions that lead Rwanda to the genocide in 1994. It is a sarcastic situation (Ayittey, 2017). Burundi continues to face many political and economic challenges. Both countries must improve democracy promotion efforts and create conditions of the true dialogue and reconciliation between Hutus and Tutsis to establish genuine political stability, which is the fundamental condition for economic development to take place.

It is too soon to tell if the economic model of Rwanda is appropriate for African countries. Rwanda is a small country with only two main ethnic groups compared to large countries like Nigeria, Democratic Republic of Congo, Tanzania, Cameroon, Cote D'Ivoire, to name a few, which are composed of multiple ethnic groups and tribes making governance more difficult. Indeed, economic, financial, and even the social situation in most African countries is very critical and complex and it seems obvious that without democracy and freedom, the Rwanda model may not work anywhere else in Africa. Africa's development model leaves economists perplexed.

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VIII. Appendices

Appendix A: Data Files

Rwa_Bur_Data_DSD11018.dta

Rwa_Bur_Data_DSD11018.dta

Here is the list of the 11 important variables from our dataset.

- Gross Domestic Product (GDP) in National Currency (Billions)
- GDP growth rate
- GDP per capita in National Currency (Thousands)
- Life Expectancy at Birth (years)
- Children of under-five deaths in Numbers (Thousands)
- Human Capital Index, based on years of schooling and returns to education
- Agriculture, value-added (% of GDP)
- Exports of goods and services (% of GDP)
- Industry, value-added (% of GDP)
- Manufacturing, value-added (% of GDP)
- Services, value-added (% of GDP)

Appendix B: Do Files for Regressions Analyses

```
cd "C:\Users\maxime\Desktop"

use "C:\Users\maxime\Desktop\Rwa_Bur_Data_DSD11018.dta", clear

log using Rwa_Bur_Data_DSD11018.dta, replace text

gen TREATED = 1 if CountryName=="Rwanda"

replace TREATED = 0 if CountryName=="Burundi"

gen AFTER = 1 if Time>1994

replace AFTER = 0 if Time<1994

gen TREATED_AFTER = TREATED*AFTER

gen Timesquared = Time^2

gen Timecubic = Time^3

gen TREATEDTime = TREATED*Time

gen TREATEDTimesquared = TREATED*Timesquared

gen TREATEDTimecubic = TREATED*Timecubic

gen lRealGrossDomesticProductNat =log( RealGrossDomesticProductNat )

gen lRealGDPpercapitaNationalCu =log(RealGDPpercapitaNationalCu)

gen lLifeexpectancyatbirthtotal =log(Lifeexpectancyatbirthtotal)

gen lNumberofunderfivedeathsNum =log(Numberofunderfivedeathsnum)

gen lHumancapitalindexbasedonye =log(Humancapitalindexbasedonye)

gen lExportsofgoodsandservices =log(Exportsofgoodsandservices)

gen lServicesetcvalueaddedo =log(Servicesetcvalueaddedo)

gen lIndustryvalueaddedofGDP =log(IndustryvalueaddedofGDP)

gen lManufacturingvalueaddedof =log(Manufacturingvalueaddedof)

drop in 20

drop in 58

twoway (connected lRealGrossDomesticProductNat Time if TREATED==1, msymbol(Oh)) (connected lRealGrossDomesticProductNat Time if TREATED==0, msymbol(S)), xline(1994) title( Gross Domestic Product in national Currency (Billions)) legend(on order(1 "RWANDA" 2 "BURUNDI"))

twoway (connected lRealGrossDomesticProductNat Time if TREATED==1, msymbol(Oh)) (connected lRealGrossDomesticProductNat Time if TREATED==0, msymbol(S)), xline(1994)
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title( Gross Domestic Product in National Currency (Billions)) legend(on order(1
"RWANDA" 2 "BURUNDI"))

twoway (connected lRealGDPpercapitaNationalCu Time if TREATED==1, msymbol(Oh))
(connected lRealGDPpercapitaNationalCu Time if TREATED==0, msymbol(S)), xline(1994)
title( GDP per capita in National Currency (Thousands)) legend(on order(1 "RWANDA" 2
"BURUNDI"))

twoway (connected GDPgrowthrate Time if TREATED==1, msymbol(Oh)) (connected
GDPgrowthrate Time if TREATED==0, msymbol(S)), xline(1994) title( GDP growth rate)
legend(on order(1 "RWANDA" 2 "BURUNDI"))

twoway (connected lLifeexpectancyatbirthtotal Time if TREATED==1, msymbol(Oh))
(connected lLifeexpectancyatbirthtotal Time if TREATED==0, msymbol(S)), xline(1994)
title( Life Expectancy at Birth (years)) legend(on order(1 "RWANDA" 2 "BURUNDI"))

twoway (connected lNumberofunderfivedeathsNum Time if TREATED==1, msymbol(Oh))
(connected lNumberofunderfivedeathsNum Time if TREATED==0, msymbol(S)), xline(1994)
title( Children of under-five deaths in Numbers (Thousands)) legend(on order(1 "RWANDA"
2 "BURUNDI"))

twoway (connected lHumancapitalindexbasedonye Time if TREATED==1, msymbol(Oh))
(connected lHumancapitalindexbasedonye Time if TREATED==0, msymbol(S)), xline(1994)
title( Human Capital Index based on years of schooling) legend(on order(1 "RWANDA" 2
"BURUNDI"))

gen lAgriculturevalueaddedofG =log(AgriculturevalueaddedofG)

twoway (connected lAgriculturevalueaddedofG Time if TREATED==1, msymbol(Oh)) (connected
lAgriculturevalueaddedofG Time if TREATED==0, msymbol(S)), xline(1994) title(
Agriculture - value added (% of GDP)) legend(on order(1 "RWANDA" 2 "BURUNDI"))

twoway (connected lExportsofgoodsandservices Time if TREATED==1, msymbol(Oh)) (connected
lExportsofgoodsandservices Time if TREATED==0, msymbol(S)), xline(1994) title( Exports
of goods and services (% of GDP)) legend(on order(1 "RWANDA" 2 "BURUNDI"))

twoway (connected lIndustryvalueaddedofGDP Time if TREATED==1, msymbol(Oh)) (connected
lIndustryvalueaddedofGDP Time if TREATED==0, msymbol(S)), xline(1994) title( Industry -
value added (% of GDP)) legend(on order(1 "RWANDA" 2 "BURUNDI"))

twoway (connected lManufacturingvalueaddedof Time if TREATED==1, msymbol(Oh)) (connected
lManufacturingvalueaddedof Time if TREATED==0, msymbol(S)), xline(1994) title(
Manufacturing - value added (% of GDP)) legend(on order(1 "RWANDA" 2 "BURUNDI"))

twoway (connected lServicesetcvalueaddedo Time if TREATED==1, msymbol(Oh)) (connected
lServicesetcvalueaddedo Time if TREATED==0, msymbol(S)), xline(1994) title( Services -
value added (% of GDP)) legend(on order(1 "RWANDA" 2 "BURUNDI"))

gen lDeathratecrudenumbersper =log(Deathratecrudenumbersper)

gen lBirthratecrudenumberspe =log(Birthratecrudenumberspe)

gen lGrosscapitalformationofGD =log(GrosscapitalformationofGD)

destring Enrolmentinprimaryeducation, generate(nEnrolmentinprimaryeducation) force

destring Enrolmentinsecondaryeducation, generate(nEnrolmentinsecondaryeducation) force
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gen lnEnrolmentinprimaryeducation = log(nEnrolmentinprimaryeducation)

gen lnEnrolmentinsecondaryeducation = log(nEnrolmentinsecondaryeducation)

twoway (connected lDeathratecrudenumbersper Time if TREATED==1, msymbol(Oh)) (connected lDeathratecrudenumbersper Time if TREATED==0, msymbol(S)), xline(1994) title( Death Rate in Numbers (per 1,000 people)) legend(on order(1  "RWANDA"  2  "BURUNDI"))

twoway (connected lBirthratecrudenumberspe Time if TREATED==1, msymbol(Oh)) (connected lBirthratecrudenumberspe Time if TREATED==0, msymbol(S)), xline(1994) title( Birth Rate in Numbers (per 1,000 people)) legend(on order(1  "RWANDA"  2  "BURUNDI"))

twoway (connected lGrosscapitalformationofGD Time if TREATED==1, msymbol(Oh)) (connected lGrosscapitalformationofGD Time if TREATED==0, msymbol(S)), xline(1994) title( Gross Capital Formation (% of GDP)) legend(on order(1  "RWANDA"  2  "BURUNDI"))

twoway (connected lnEnrolmentinprimaryeducation Time if TREATED==1, msymbol(Oh)) (connected lnEnrolmentinprimaryeducation Time if TREATED==0, msymbol(S)), xline(1994) title( Enrolment in Primary Education in Numbers) legend(on order(1  "RWANDA"  2 "BURUNDI"))

twoway (connected lnEnrolmentinsecondaryeducation Time if TREATED==1, msymbol(Oh)) (connected lnEnrolmentinsecondaryeducation Time if TREATED==0, msymbol(S)), xline(1994) title( Enrolment in Secondary Education in Numbers) legend(on order(1  "RWANDA"  2 "BURUNDI")) moulton lRealGrossDomesticProductNat TREATED AFTER TREATED_AFTER, cl(CountryName)

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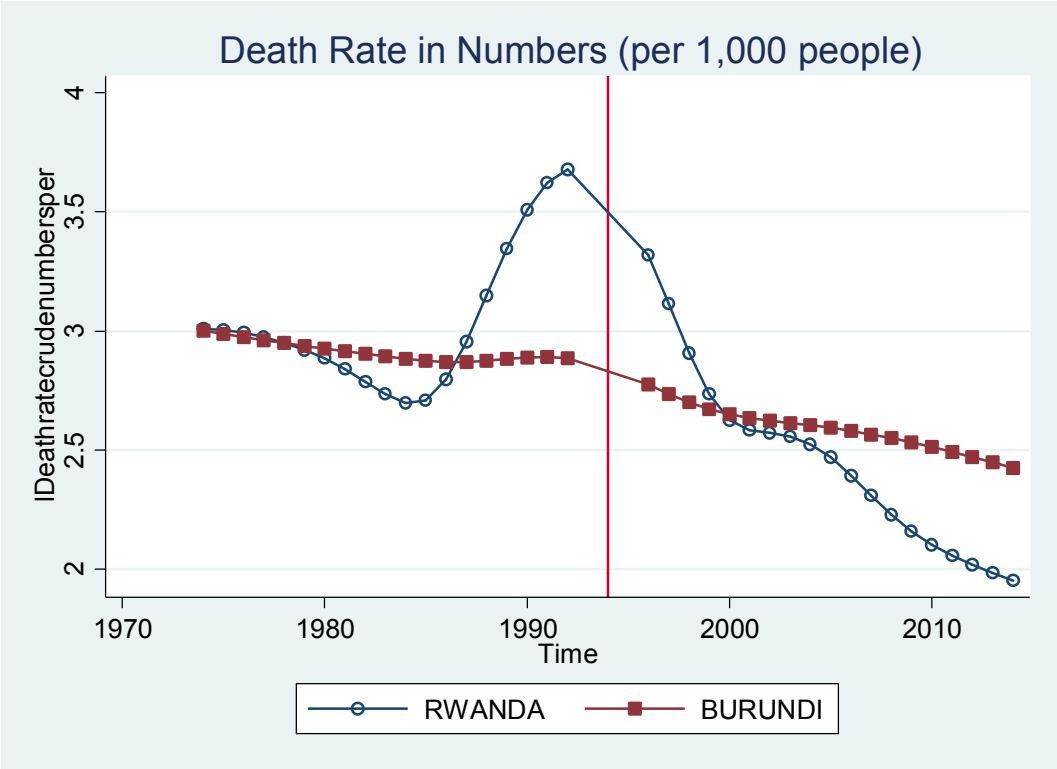
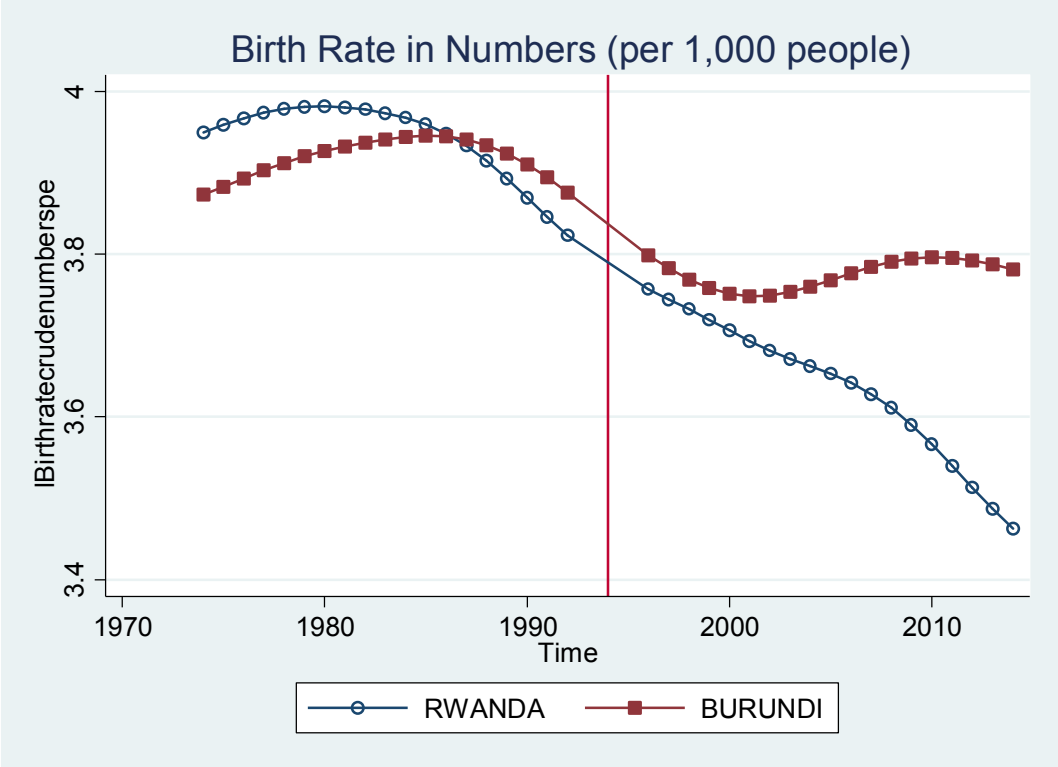
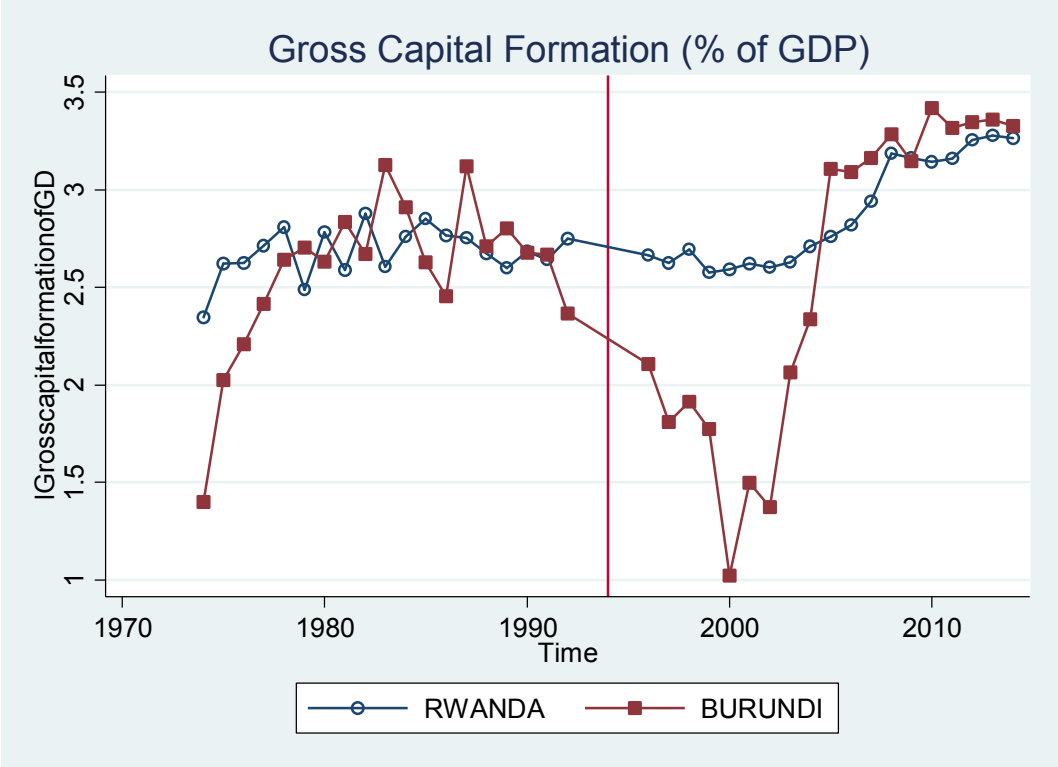
Appendix C: Figures



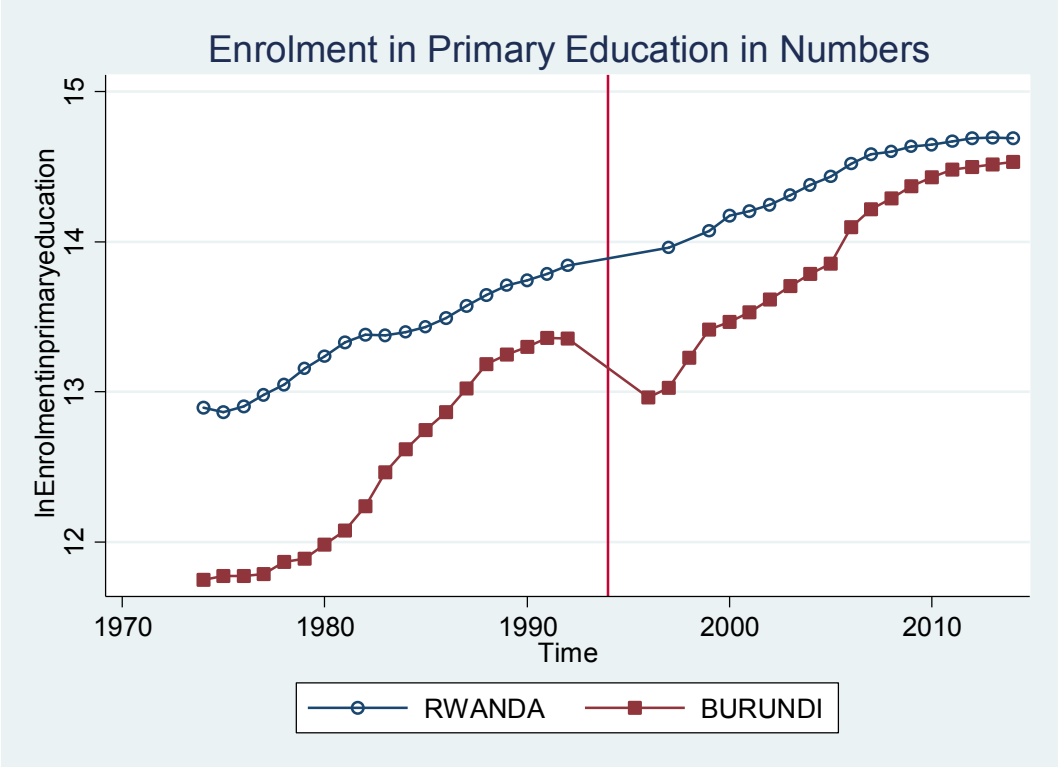
Death Rate in Numbers (per 1,000 people)



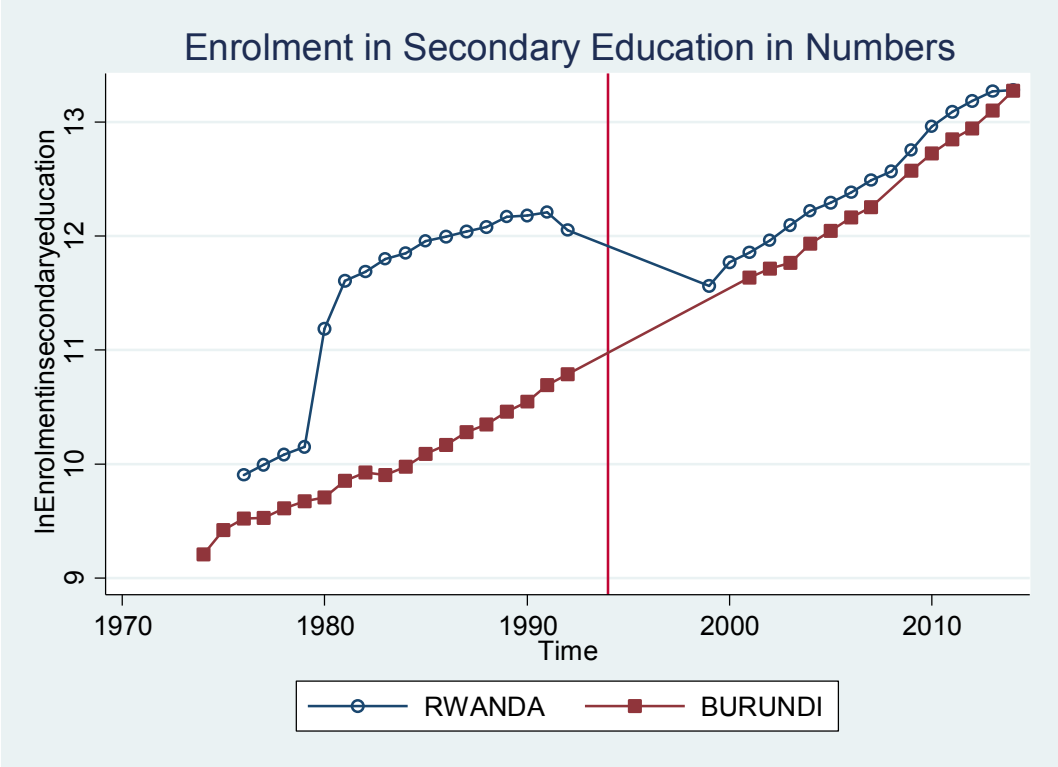
Birth Rate in Numbers (per 1,000 people).



Gross Capital Formation (% of GDP)



Enrolment in Primary Education in numbers



Enrolment in Secondary Education in numbers

Appendix D: Data Sources

The sources for my data collection include:

(1) The World Bank Databank,

(2) The International Monetary Fund (IMF),

(3) The Penn World Tables (PWT),

(4) Food and Agriculture Organization of the United Nations (FAOSTAT), and

(5) Index Mundi.

IX. Curriculum Vitae

Maxime Sarah Mianzokouna

Place of birth: Brazzaville, Republic of Congo

Education (list only those institutions from which you received a degree)

B.A., University Marien Ngouabi, June 1996
Major: Psychology

M.A., San Diego State University (SDSU)—Milwaukee, May 2009
Major: French and Francophone Literatures

Dissertation Title: Developmental State Economic Model Versus Neo-Neoclassical Principles: The Case of Rwanda And Burundi

Professional Experience

French Lecturer, Marquette University (Fall 2018)

French Instructor, Milwaukee Area Technical College (2016 to present)

Graduate Teaching Assistant, Department of Africology
2016 (Spring Semester) Black Reality -University of Wisconsin Milwaukee (UWM)
2013- 2015 Economics of the Black Community -University of Wisconsin Milwaukee (UWM)
2013 (Summer Course) Intensive French and Francophone Culture in Sub-Saharan Africa Course for Marines at Language Acquisition Resource Center - San Diego State University (LARC – SDSU)

French Teacher, Department of Continuing Education at University of Wisconsin Waukesha
French for Real Life and for Travelers (Spring & Fall 2010)
Lunch Time French Language Program at Heyer Elementary School - Waukesha (Spring 2010)

Graduate Teaching Assistant, Department of European Studies (French Program) 2007- 2009
San Diego State University (SDSU)

- Taught French 100 A&B classes (Fall 2007)

French Lecturer at Language Acquisition Resource Center (LARC with SDSU Foundation), San Diego, CA

- Taught two groups of U.S. Navy Seals in French and Francophone culture
- Mastered the course management systems: Blackboard and Moodle

- Participated in creating interactive language and francophone culture materials for Navy Seals' North African French courses that LARC designed for military personnel.

Graduate Student Assistant to Dr. JoAnne Cornwell, African Literature Association (ALA) Headquarter Director (SDSU), San Diego, CA for two semesters 2007-2008
Basic Headquarters functions include preparing mailings for elections, memberships and renewals; printing and mailing quarterly bulletin; maintaining membership lists; and fielding request for information regarding African culture and literature
Searching and posting call on papers for all ALA members.
Publishing ALA Handbook
Editing ALA newsletters.

Additional Experiences

- Food server at Manchester Grand Hyatt San Diego (MGHSD) 2002-2008
- Volunteer at San Diego Hospice located in Hillcrest, San Diego, CA 2005-2006