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Aiding to Repair: An Analysis on the Impact of Foreign Aid in Rwanda After the 1994 Genocide

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Abstract:

Between April 1994 to July 1994, about 1 million Hutus and Tutsis were murdered in the Rwandan genocide. The genocide not only severely declined the population of Rwandans, but largely impacted its infrastructure, government, and economy. After the genocide, about $15 billion US dollars was sent to provide humanitarian aid. Post-genocide Rwanda has seen a significant growth in its economy; however, speculators may question if the economic growth is attributed to the foreign aid it received after the 1994 genocide. This paper seeks to examine the impact of foreign aid on post-war reconstruction on Rwanda as a case study.

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1. **<u>Introduction</u>**

Between April 7, 1994 to mid-July, 1994, in a period of 100 days, 500,000-1,000,000 Rwandans were murdered in the Rwandan civil war (Rwanda: A brief history of the country, 2018). This war, between the Hutu majority and the Tutsi minority, devastated the country. Not only did this civil war devastate its people, but also its political, economic, and social systems. What became known as one of the bloodiest wars in the shortest length of time, now caused scholars to investigate the international response or lack there-of an international response during the war (Rwanda: Why the international community looked away, 2009). This is because international organizations such as the United Nations were informed of the occurrence of the genocide; however, little action was taken to aid in stopping further killings in the country. In part because of its failure to intervene to stop the genocide, the international community worked to help Rwanda recover after Tutsi forces established control over the government. Immediately after the genocide the Rwandan Recovery Program was established and over $206.9 million dollars was sent to Rwanda to help finance reconstruction efforts (Kumar, et al., 1996). It is through that international response that may have played a significant role in Rwanda's post-war reconstruction and its current economic success.

When it comes to the reconstruction process in a post-war country, there are numerous aspects that countries need to focus on. Martina Fischer, a leading scholar and policy consultant on peacebuilding in post-war societies, discusses the different challenges that post-conflict countries face during their reconstruction phase in her 2004 study, Recovering from Violent Conflict. In her study, she mentions that countries need to focus on infrastructure recovery, food security and agricultural rehabilitation, welfare needs, macroeconomic stability, and public safety when it comes to reconstruction. Yet, macroeconomic stability is one of the most

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important. This is because with macroeconomic stability, all other aspects of reconstruction can also be restored. It is also important for the citizens of the country as well. With macroeconomic stability comes psychological stability for the people that had experienced the war because macroeconomic growth will lead to the creation of new jobs which may help to relieve the stress and the turmoil of the war that they had just experienced (Fischer, 2004). Additionally, macroeconomic development is known to transform the "war economy" that was present during the war to a peace economy. This is a key objective during post-conflict recovery because dismantling the "war economy" will also dismantle the "legacy of industrial monocultures and centralized planning bureaucracy, as well as the lack of business know-how" (Fischer, 2004, p. 5).

Creating economic stability in a country post-conflict can also aid in the prevention of further conflicts during reconstruction. In fact, the "balancing of stable long-term macro-economic policies and economic management and locally sustainable community development" should be one of the main tasks in order to transition from war to peace in post-conflict societies. (Fischer, 2004, p. 5). Therefore, economic stability should be an important aspect for a country that is attempting to recover its infrastructure, institutions, and other systems. Moreover, one of the main ways for countries to finance their reconstruction is through receiving foreign aid (Fischer, 2004, p. 9).

Foreign aid has always been a way for countries to send assistance to one another in times of need. However, beginning after World War II, foreign aid was primarily used to help a country in its development. According to the Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD) foreign aid is also known as official development assistance (ODA). ODA is defined as

those flows to countries and territories on the DAC List of ODA Recipients and to multilateral institutions which are: provided by official agencies, including state and local governments, or by their executive agencies; and each transaction of which: is administered with the promotion of the economic development and welfare of developing countries as its main objective; and is concessional in character and conveys a grant element of at least 25 per cent (calculated at a rate of discount of 10 per cent) (ODA – definition and coverage, 2018).

In fact, there are many kinds of foreign aid that countries can receive, including multilateral aid, bilateral aid, military aid, and humanitarian assistance. However, two of the main types of support that countries that are going through post-war reconstruction receive are foreign direct investment and development assistance, which can be private or public and from governments of other countries as well as from international donor agencies, such as the International Monetary Fund or the World Bank (Ross, 2016). For many of these donors, the purpose of giving foreign aid differs from country to country or organization to organization. Nonetheless, the overall use and intention of foreign aid is to accelerate the economic development of the country that is going through reconstruction to the point that the country will be able to achieve economic growth and development on its own. This is because of the assumption that foreign aid will help to decrease the amount of time it takes a country to reach self-sustaining economic growth. However, foreign aid does have disadvantages and advantages with regards to its role in economic development.

One of the main misconceptions about the purpose of foreign aid is that it helps developing countries to equalize their incomes with other countries. However, according to Guljinder Kaur Randhawa, a lecturer at Chitkara University in Rajpura, India, and author of "Foreign Aid and Economic Development", foreign aid is to provide developing countries with the opportunity to achieve steady growth (Randhawa, 2012). That being said, foreign aid helps developing countries to establish an economic and social infrastructure. Foreign aid can also

assist in increasing the standard of living as well as helping developing countries meet their development requirements. Additionally, foreign aid can support this process because governments of developing countries are able to use that aid to purchase and import technology and raw materials that can help different sectors of the economy to develop (Randhawa, 2012). This is important with regards to post-war reconstruction because most of the time the country does not have any capital to rebuild its economy or even to purchase the necessary goods and services for its country. However, the disadvantages of foreign aid demonstrate how it can hurt a country as well.

Foreign aid can lead to an increase in debt servicing. Many developing countries continuously borrow money from donors. But, because they have borrowed so much, they continue to borrow in order to pay off the loans that they had borrowed in the past, which contributes to the foreign aid cycle of dependency (Randhawa, 2012). In addition, foreign aid may impede economic development in developing countries. Randhawa alludes to the idea that foreign aid does not allow for true economic growth in developing countries because it does not encourage domestic production of goods and services, which is what contributes to the overall GDP of a country (Randhawa, 2012). This heavy reliance on aid also makes it difficult for developing countries to be self-sufficient. Therefore, it is important for post-war countries that are going through reconstruction to consider the impacts of foreign aid on their economic development and sustainability.

As described earlier, although Rwanda experienced a civil war in 1994 it has achieved tremendous strides in its economic growth and development. Policies established by the Rwandan government such Vision 2020, promote economic, political, and social development and stability in the country with the assistance of foreign aid. This also causes one to wonder

what role, if any, foreign aid played in its immediate post-war reconstruction in economic growth and development. Therefore, the research question in this investigation is "How does foreign aid affect the economic growth/development of a country (Rwanda) in post-war reconstruction?"

Consequently, the focus of this paper is to analyze and understand the impact of foreign aid with regards to post-war reconstruction through the case study of Rwanda. This paper will examine the economic implications of foreign aid as it pertains to economic growth and development in Rwanda. The paper proceeds as follows. Section 2 describes the literature examined on the different kinds of impact that foreign aid can have on economic growth and development. Section 3 will examine the theoretical basis for this entire paper. Section 4 will examine the methods that were applied to this research. Section 5 explains the reasoning for choosing a country like Rwanda as a case study for this research. Sections 6-8 describes the variables, equations, data, and results of the empirical model that was utilized for this research. Section 9 provides the application of the results and data to the case of Rwanda. Section 10 describes the limitations that were discovered during this research. Section 11 presents the conclusion and implications. Section 12 displays the bibliography. Finally, Section 13 displays the appendix.

2. **Literature Review**

Empirical studies of the relationship between foreign aid and the economy of developing countries demonstrates that scholars have three arguments: foreign aid has a positive impact on the economy of a developing country, foreign aid has a negative impact on the economy of a developing country, and foreign aid has no substantive impact on the economy of a developing country. Although each school of thought has valid assertions and observations with regards to the relationship between foreign aid and developing countries' economies, I will examine each

school of thought in order to investigate if foreign aid has any impact on the economy of a developing country. Before examining and evaluating each argument, I first investigate studies on the effect of conflict on economic performance and growth. I then evaluated the effects role of foreign aid on economic growth, and upon that evaluation, I found that the third school of thought was most consistent with my research.

Conflict and Economic Growth

Conflict can have devastating effects on an economy. According to Shahryar Minhas and Benjamin J. Radford of Duke University, there are five ways in which civil conflict can disrupt economic performance in a country: destruction of resources, disruption of social and economic activity, diversion of resources to the war effort, diversion of resources through dissaving, and diversion through portfolio substitution or divestment (Minhas & Radford, 2016). Each of these mechanisms are not only related to one another but they can also be aggravated by one another. Given that these mechanisms are prevalent during a civil war, a 2.2 percent decrease in annual economic growth can also be expected (Minhas & Radford, 2016). Moreover, post-conflict recovery can lead to stagnant economic recovery. One way it can lead to stagnant economic recovery is because of the country's inability to access its own resources. This can also affect the neighboring countries of the country that is involved in the civil war. If the country that is involved in a conflict has resources that its neighboring countries depend on, it can inhibit trade. In fact, during times of conflict, trade is difficult to accomplish, which also is a detriment to the economic performance of the country (Minhas & Radford, 2016). The impact that civil conflict has on domestic trade is also apparent in the authors' arguments. The authors state, "Violence near major population centers not only threatens residents directly but impedes business by threatening trade between the population center and other cities or rural areas" (Minhas &

Radford, 2016). When there is a chance that violence will erupt in a specific area, the residents of that area are less likely to "engage in economically productive activities" (Minhas & Radford, 2016). This is an example of the disruption of social and economic activity that is a result of conflict. Due to the lack of both international and domestic trade, this can impact the perception that investors may have of the country that is going through a conflict. Investors are hesitant to put their money towards projects in unstable countries as well as countries that are not economically thriving. Therefore, conflict in a country can make it difficult for foreign direct investment to occur (Minhas & Radford, 2016). Based on the negative effects of conflict, some scholars have argued that foreign aid is a potential solution to the aforementioned problems.

The Positive Impacts of Foreign Aid

The notion that foreign aid has a positive relationship on economic growth can be demonstrated through the economic theory of the Solow-Model. This model demonstrates that when there is an increase in capital/investment, it will contribute to an increase in the overall production of a state. An increase in production will contribute to growth in the real Gross Domestic Product (GDP) of a country, thus facilitating growth in its overall economy. Therefore, an increase in any capital such as foreign aid should theoretically increase the production and development of the state; however, this direct correlation is not always proven to be valid. Berthult Moreira argues that previous regression formulas and analyses do not take other elements into consideration. In her study, she examines the macroeconomic impact that foreign aid has on the economic growth of developing countries. (Moreira, 2005). She states that although there seem to be a positive association between foreign aid and growth, there are other interdependent factors that affect growth. Therefore, some of the growth models that examine various relationships between input factors and development are over simplified, including the

Harrod-Domar[1] growth model and the Chenery and Strout Two-Gap model[2] (Moreira, 2005).

Moreira also discusses the importance in recognizing that foreign aid affects every country

differently as well noting that the foreign aid from certain donor countries might have different

effects on the recipient country. However, overall, there is a positive association with foreign aid

and economic development.

One factor that is important to the effectiveness of foreign aid is the time lag relationship

between aid and growth. Most previous literature on the relationship between aid and economic

growth does not consider the time-lag that is often experienced when observing the relationship

between foreign aid and growth in a country. This time-lag is the idea that when aid is distributed

to a specific country, it is unlikely that the country will observe the immediate effects of the

increase in capital. Paul Collier and Anke Heffler of the Department of Economics at the

University of Oxford also discuss the implications that time-lag has on the relationship between

foreign aid and economic development. In their study, they focus on the interaction between

effective policy, aid, and its effect on developing economies. Additionally, they note that when

aid and effective polices are in place, a country can see a growth spurt of about two percentage

points per year, as supported by their regression analysis (Collier & Hoeffler, 2004). In their final

regression analysis, post-conflict affects economic growth when there is the interaction between

their post-conflict dummy and the aid-policy interaction variable[3] (Collier & Hoeffler, 2004).

However, the effectiveness of aid is not truly seen immediately after a conflict. In fact, the point

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[1] This growth model explains the relationship between an economy's growth rate relative to its savings rate and productivity of capital. This model suggests that there is no natural reason ~~of~~ why an economy cannot have balanced growth.

[2] This is an extension of the Harrod-Domar model that suggests there is a gap between savings and investments in an economy along with another gap between exports and imports.

[3] The authors also note that during their regression analysis they found the aid term, alone, to be insignificant, but when aid is interacted with policy that variable is significant.

at which aid absorption-the amount of aid that goes toward reducing the current account balance-is exceptionally high is between the fourth and the seventh-year post-conflict. Additionally, during the first full peace period, the absorptive capacity for aid is double the normal rate. However, the policies that are established along with the aid that a country receives are important since "in the absence of aid there would be little or no growth spurt" (Collier & Hoeffler, 2004). This shows that although foreign aid is necessary for economic growth and development, it is not sufficient.

Concerning the relationship that foreign aid has with economic development, foreign aid is found to have positive impacts on developing economies if paired with effective policy (Collier & Hoeffler, 2004). This is shown by the Collier-Dollar analysis, which finds that economic growth is greater in its value by aid and policy working together effectively. This determines that although aid is subject to diminishing returns and reaches a saturation point, the saturation point is dependent upon the policies that are created in conjunction with the aid that a country receives (Collier & Hoeffler, 2004). The better the policies that are created with regards to countries receiving foreign aid, "the greater the amount of aid that can be productively absorbed" (Collier & Hoeffler, 2004).

Collier and Hoeffler also assert the importance of the distribution of aid during and after a post-conflict situation. They find that during the immediate years of peace there is an abundance of aid that the country receives; however, the aid rapidly tapers off in a few years[4]. Although this aid distribution pattern does not allow for an appropriate absorption of aid, they note that this pattern may reflect the "political and bureaucratic expediency" of the receiving

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[4] Collier and Hoeffler find that this pattern with regards to the distribution of aid may not be appropriate for economic development in a developing country. They find that regarding their analysis this pattern is also too early for aid absorption

country (Collier & Hoeffler, 2004). Meaning that the pattern of the abundance of foreign aid a country receives immediately after a conflict, which eventually tapers off, reflects the political and bureaucratic need and convenience of the country receiving the aid rather than the ability of the aid to be absorbed well. Moreover, it suggests that donors are also not immediately responsive to growth opportunities. Nevertheless, aid is still able to provide economic growth for countries, especially after a conflict.

The distribution of aid is an important concept that is also discussed by Ana Carolina Garriga and Brian J. Phillips, professors of the Center for Economic Research and Teaching. Garriga and Phillips argue that the distribution of aid in a country can be used as a signal for foreign direct investment (FDI). The argument that these authors present suggests that the positive impact that foreign aid has on economic development is that it can help to increase the investments that a country receives, which is one of the economic principles that help to increase economic growth and development (Garriga & Phillips, 2014). The authors first note that the presence of foreign aid in a country, regardless of its achievement, is important to investors because it "signals the donors' trust of local authorities" (Garriga & Phillips, 2014). However, it is important to recognize that aid is only a signal when there is scarce or unreliable information; in such context, FDI, and possibly other investments, will only enter a country following the signaling of aid. Since FDI presents benefits to recipient countries and FDI is attracted to a country due to the presence of aid, aid therefore indirectly promotes growth in a post-conflict country (Garriga & Phillips, 2014). The type of aid that a country receives post-conflict also

affects its economic development and growth; however, the focus of this research is on nonstrategic aid[5].

There are many factors that influence an investor to invest in a country post-conflict. Some of those factors include market size, development, economic growth, and trade openness (Garriga & Phillips, 2014). Political factors and institutions are also taken into consideration when investors are trying to decide to invest in a country. However, when it pertains to foreign aid, Garriga and Phillips find that receiving aid leads to more investment only when there is good governance and financial market development, which is a point that was also previously asserted by Collier and Hoeffler.

The authors also cite a previous point that was also acknowledged by Collier, Hoeffler, and Moreira. These five authors recognize the impact of elapsed time on the effectiveness of aid in a developing country post-conflict. While Moreira investigated the time-lag relationship with the immediate effects of foreign aid, Collier and Hoeffler examined the relationship between the years since the conflict and the distribution of foreign aid. Garriga and Phillips also consider the relationship between time and effect that aid has on FDI. In fact, they discover that as time elapses, the likelihood of FDI being disbursed in a country decreases (Garriga & Phillips, 2014). This is because after the conflict, the informational effect to aid declines as well. Consequently, aid has the greatest impact on FDI in the years immediately after the conflict, which is demonstrated in their conclusive results.

There is also evidence that aid affects the distribution of FDI in post-conflict countries; however, the "direction of the effect" is dependent on where the aid is originating. When aid

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[5] In this study, the authors differentiate between non-strategic aid and strategic aid, where non-strategic aid is aid that is not given for geopolitical purposes, and strategic aid is aid that is given for geopolitical purposes.

comes from countries like the United States, it tends to be an ambiguous signal for investors, because of the possible geopolitical strategies that are attached to the aid (Garriga & Phillips, 2014). The authors also find that there is a positive association between aid and FDI and that association is almost immediate, which demonstrates that this signaling effect can take place before and independent from the success or failure of foreign aid (Garriga & Phillips, 2014). Finally, the authors suggest that FDI is important to the economic development of post-conflict countries and aid is a way for FDI to occur in developing countries (Garriga & Phillips, 2014).

Ghassan Dibeh, professor of economics from Lebanese American University, also provides information on how foreign aid and other investments encourage economic growth in post-conflict countries. Using Lebanon as his case study, he explains how foreign aid helped the country to reconstruct its infrastructure as well as the economic stability that it gave to Lebanon after its conflict. He discusses that the foreign aid Lebanon received post-conflict was focused on restoring electricity, water, telephone, and road networks to the country (Dibeh, 2007). After the conflict Lebanon received various types of foreign aid from its donors. A small amount of its aid was donated from foreign grants, rather than loans. In fact, the aid the Lebanon received after its conflict was more than the aid that most sub-Saharan countries have received post conflict. The foreign aid that Lebanon also received was specific to different projects as well. Lebanon received aid that was specific to its reconstruction project as well as aid that was specific to Lebanon's balance of payments. Ultimately, the total amount of foreign aid that Lebanon received from 1992-2004 was $5.8 billion USD[6] (Dibeh, 2007).

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[6] US Dollars

Figure 1: GDP, Inflation Rates and Real Interest Rates in Post-War Lebanon

Year	Real GDP growth, %	Inflation rate, %	Real interest rates, %
1992	4.5	131.0	-105.4
1993	7.0	24.7	13.3
1994	8.0	8.0	1.9
1995	6.5	10.6	4.1
1996	4.0	8.9	7.6
1997	3.5	7.7	6.4
1998	3.0	1.6	9.83
1999	4.0	1.5	9.38
2000	2.0	-0.9	11.78
2001	1.4	2.9	8.0
2002	1.0	4.2	6.6

Source: UNCDB (nd) for GDP growth; Eken and Helbling (1999) for inflation rates, 1992-97; Audi Bank (2005) for inflation rates, 1998-2002; author calculations for real interest rates (real interest rate = 3 months T-bill rate minus inflation).

Regarding the impact that the foreign aid had on the economic development on Lebanon, Dibeh finds that Lebanon had a period of real GDP growth from 1998-2002 (Dibeh, 2007). Figure 1 shows the real GDP growth, Inflation rate, and real interest rates in Lebanon post-conflict. Figure 1 shows that from 1992-2002 there is a substantial amount of real GDP growth. In fact, Figure 1 demonstrates the notion that in the first few years during reconstruction there was a significant amount of economic growth in Lebanon; however, as time elapsed, economic growth was not as evident. The growth that Lebanon experienced as a result of foreign aid, along with macroeconomic policy, helped with the unsustainable deficit and public debt growth that began in 1997. This fiscal crisis also led to high real interest rates and an economic recession (Dibeh, 2007). The foreign aid that Lebanon received from the United States was used to specifically resolve the macroeconomic imbalances. It also relieved the central bank with regards to losing reserves, calmed the currency market, restored confidence in the Lebanese currency, and gave the government the ability to mobilize foreign funds during a time of crisis (Dibeh, 2007). When Lebanon attended the Paris II meeting in 2002, it requested more aid that was going to be used to further decelerate public debt, decrease the cost of government borrowing, decrease market interest rates, increase foreign exchange revenues, and improve their balance of payment (Dibeh, 2007). Although the foreign aid that the country received helped the economy of

Lebanon, it only did so in the short run, as demonstrated by Figure 1. Overall, Dibeh notes that foreign aid played a critical role in the economic stability in Lebanon post-conflict, when coupled with effective macroeconomic policy. Conversely, the effects that foreign aid had on the country were not long-term effects, but it helped to put Lebanon on the path to sustainable development (Dibeh, 2007).

The Negative Impacts of Foreign Aid

Other scholars question the impact of foreign aid in promoting economic growth and development. An argument that has been presented by many authors is the fact that foreign aid can cause Dutch Disease, which is when a focus on one sector of the economy causes a decline in the other sectors of an economy. When that happens, people in the country are discouraged from working in that particular sector, which will ultimately disrupt economic growth. An example of this would is when the exchange rates in the recipient country are too strong and may in fact discourage labor-intensive exports (Ranis, 2011). This not only discourages the labor-intensive exports but it will also make the products in the country less competitive on the export market.

Economists Volker Bornschier, Christopher Chase-Dunn, and Richard Rubinson, from the University of Zurich and Johns Hopkins University respectively, also suggest that foreign aid might have a relatively small impact on the economic growth and development of a country. In their study, they perform a cross-national, quantitative study that analyzes the effects of foreign investment, foreign aid, as well as inequality on the development of a country. In fact, they suggest that foreign investment as well as foreign aid have "long-term effects of decreasing the rate of economic growth and of increasing inequality" (Bornschier, Chase-Dunn, & Rubinson,

1978). The authors also consider the dependency theory[7] that other scholars have noted is a result of foreign aid. With this theory in mind, this study implies that the effect that foreign aid has on economic growth could also be dependent on the global economy and whether it is in a period of contraction or expansion. The authors suggest that between 1965 and 1975 the global economy was in a period of expansion, during this expansionary period foreign aid had greater negative effects on developing countries. This could be because during an expansionary period it creates greater inequality between developed and developing countries. In fact, during expansion period, the value of the foreign aid a country receives is not worth as much as it would be during a contraction. Therefore, having a more negative impact on the economy of a developing country.

As previous authors have also noted, time is another critical factor. Time is important because as time lags it produces a greater negative effect on the effectiveness of foreign aid in developing countries. Bornschier, Chase-Dunn, and Rubinson affirm that time is an important factor with regards to the effects it has on foreign aid effectiveness. According to their study, foreign investment has a "cumulative effect of decreasing the relative rate of economic growth of countries" (Bornschier, Chase-Dunn, & Rubinson, 1978). Initially the effect is small in the first five years; however, in the next fifteen years, the effect gradually increases. With regards to foreign investment, it also creates uneven development across economic sectors which could lead to a lowered rate of economic growth. The authors also argue that foreign investment can lead to inequality, early monopolization, and structural underemployment, which in the long-run decreases the capital formation[8] in a country. Investment also contributes to the reduction of state

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[7] This is the idea that when countries receive foreign aid they become dependent on it which creates a cycle of dependency.
[8] Capital formation helps to contribute economic growth in a country. It is known as the capital stock or accumulation that a country receives.

power and "the ability of the state to undertake a policy of growth" which, as demonstrated by Collier and Hoeffler, is an important component of economic growth (Bornschier, Chase-Dunn, & Rubinson, 1978).

However, when foreign aid is disbursed into a country, it has immediate effects on its growth. This is a result of the "capital formation and demand as foreign corporations purchase land, labor, and materials and start production" as it pertains to reconstruction. The negative effects of foreign aid are a result of "structural distortions of the national economy produced by foreign investment" and exporting the profits also have negative effects over time (Bornschier, Chase-Dunn, & Rubinson, 1978). This study explains that the effect that foreign aid has on economic growth initially is small; however, as time goes on, it has a larger negative impact[9].

Foreign aid and foreign investment can also lead to economic inequality[10] in developing countries. Additionally, the effects that foreign investment and aid have on inequality may vary, depending whether the world economy is going through an expansion or contraction. A country's dependence on aid or investment tends to increase the amount of inequality[11] that is experienced in a country. This could be because of aid and investment dependence on the class structure of a country.

International economist Gustav Ranis of Yale University doubts that foreign aid in general can promote economic growth in a country. He agrees with the sentiment made by Bornschier, Chase-Dunn, and Rubinson concerning the impact that aid has on the policy in

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[9] It is important to note that although the authors find that foreign aid and investment have diminishing returns over time to all countries, the effect is stronger initially in richer countries than it is in poorer countries. However, the economic stance of the countries is relative.
[10] including but not limited to income inequality, land inequality, and sectoral income inequality
[11] Authors note, although they were able to draw a conclusion for their inequality variable, there were issues with regards to the availability of inequality data.

developing countries as well as its impact on other economic factors. He explains that foreign aid impacts the decisions that the governments in the recipient countries make. In fact, he argues that foreign aid encourages inappropriate policy regimes because it takes the pressure off the countries to make reform (Ranis, 2011). This inadvertently leads to lower domestic savings, rent seeking, corruption, and capital flight in the recipient country.

Ranis alludes to the idea that the problems with foreign aid not only stem from the lack of reforms and responsibility of the recipient country, but he also discusses the problems with the way that donors disburse and manage foreign aid (Ranis, 2011). The problems that are identified with the interactions between the donors and the recipients demonstrate how foreign aid can create a frenzied environment, which ultimately makes it difficult for economic development and growth to occur. Additionally, the failure of foreign aid stems from the Structural Adjustment Lending of the 1980s and 90s. These programs were conditional programs that insisted that the recipient countries make changes and reforms to policy and their government; even though placed conditions on the aid they eventually still disbursed the aid to the country because of the need for aid (Ranis, 2011). This may negatively affect growth because the necessary economic changes that are suggested by the conditions and structural adjustment policies are never implemented; therefore, not yielding the economic growth as the reforms would propose.

The presence of NGOs in the recipient countries affects the overall effectiveness of foreign aid. When NGOs come to the recipient countries, they give the country conflicting advice with regards to how to proceed (Ranis, 2011). This creates a chaotic environment in the recipient country. Because so many NGOs, faith-based groups, contractors, UN players, and private foundations, it makes it difficult for any real goals to be accomplished in the recipient country. Even though the country might receive the aid from a finite number of agencies, when

they arrive to the recipient country, each of those agencies has separate identities and goals that they indeed to achieve (Ranis, 2011). Therefore, it makes it difficult for the government of the recipient country to implement all the rules that each agency requires that could possibly lead to development. Haiti is used as an example to explain the effect that an over-abundance of NGOs has on a country. During the earthquake in 2010, there was an abundance of NGOs and foreign that was sent to the country. However, because of the abundance of such resources it made it difficult for the already failed state to handle the situation as well as the resources that were there. (Ranis, 2011).

Steven Radelet, a professor at Georgetown University, further discusses how foreign aid affects the government of the recipient country in his study. In his study, he explores both sides of the debate over the effects of foreign aid on economic development and growth. He ultimately concludes that foreign aid has more negative effects than positive ones. He focuses on the simple relationship between foreign aid and economic development. This relationship shows that some countries have been able to achieve economic growth and development with aid, while others have seen negative or no economic growth with foreign aid (Radelet, 2006). Therefore, per some scholars, the inconsistencies that are provided here show the failure of foreign aid to achieve its basic objectives. However, some of the other scholars that Radelet references state that the simple relationship between foreign aid and growth is misleading because there are other factors that lead to economic growth.

The idea that foreign aid can lead to diminishing returns as the volume of aid increases is also discussed. This, once again, demonstrates the importance of time with regards to receiving foreign aid. The idea of diminishing returns suggests that as time goes on, subsequent flows produce fewer benefits, and in fact the benefits gradually decrease (Radelet, 2006). Furthermore,

foreign aid can undermine growth in the recipient countries by contributing to the corruption in a country. In the past, there is evidence that governments have used the foreign aid that they have received on items such as limousines and presidential palaces (Radelet, 2006). Foreign aid can also keep those corrupt governments in power, which will continue the poor economic policies that those governments have already instilled. It could also lead to more instability in the country especially during times of a conflict. Radelet also brings up the idea of the limited absorptive capacity of aid (Radelet, 2006). This implies that the absorptive capacity declines in recipient countries because of the lack of skilled workers and weak infrastructures. With regards to the economic effects that foreign aid can have on recipient countries, it can reduce domestic saving, private saving, and government saving in the country because the country is reliant on the aid it is receiving (Radelet, 2006). Moreover, aid can "undermine private sector incentives for investments or improve productivity" (Radelet, 2006). Radelet also mentions how aid can contribute to Dutch disease, aforementioned by Ranis. This once again asserts that foreign aid can spur inflation and cause an appreciation in the exchange rates which will decrease the profitability of the production of all tradeable goods.

The conditional relationship that foreign aid has with growth is also discussed in this study, as well as the notion that growth is only stimulated under certain circumstances but not under all circumstances. There are certain characteristics that a recipient country must possess in order to reap the possible benefits of aid, such as having good policies (Radelet, 2006). The practices of the donor countries/organizations as well as the type of aid is important concerning its relationship to growth. However, another concept that must be examined is the principal-agent[12] problems that exist with regards to foreign aid. With foreign aid, there is a principal-

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[12] This is the idea that one person or an entity gets to make the decisions for other people.

agent problem in foreign aid itself, in its delivery process, and in the recipient country (Radelet, 2006). The separation that exists between the donors and the beneficiaries make it difficult for the success of aid (Radelet, 2006). Donors are not able to figure out if their money is well spent and the beneficiaries at times do not know about the programs that they have access to and the penalties and rewards of such programs.

In addition, the conditionality that donors apply to foreign aid affect its effectiveness on development and economic growth overall. In this study, the three problems that are associated with conditionality are discussed. The first is that the policies are not always "appropriate to ensure sustained growth and development" (Radelet, 2006). Secondly, sometimes donors do not apply enough conditions. Finally, conditionality just does not seem to work especially with economic development (Radelet, 2006). This is because developing country governments tend to only implement reforms when it is in their interest to do so. In fact, even if the recipient countries of foreign aid fail to implement the conditions that are associated with the aid they are receiving, donors tend to still disburse the aid. Although some of the intentions that aid has for its recipient countries are good, the process in which it is carried out does not overall demonstrate economic growth, especially with ineffective policies (Radelet, 2006).

Foreign Aid Has an Indiscernible Effects on Economic Development

Finally, one scholar argues that foreign aid has an indiscernible impact on economic growth or development. Lawrence McMillan of the Business Intelligence Research Centre of London discusses the last school of thought that can be applied to the foreign aid argument, which is that foreign aid has an indiscernible impact on the economic growth or development of a recipient country. In his study, McMillan examines the relationship between foreign aid and macroeconomic development in developing countries (McMillan, 2011). He discusses the two

schools of thought; foreign aid has a positive impact on macroeconomic development and foreign aid has a negative impact on macroeconomic development. In his analysis, he finds that the scholars on both sides of the argument only look at the direct positive or negative relationship that aid may have on growth, rather than analyzing the circumstances in which foreign aid promotes a positive or negative impact on growth (McMillan, 2011). He also states that scholars cannot make a qualified conclusion as it pertains to the relationship between the two variables because the methods that have been used in each of the studies that he analyzed are subject to sensitivity analysis (McMillan, 2011). He also states in his research that many scholars who attempt to find a relationship between foreign aid and economic growth do not capture all the necessary variables that will be able to help demonstrate if there is a relationship between the two.

The discussion of two models is also examined in this paper. Those models are the Two Gap Model and the Poverty Trap Model. The Two Gap Model is the relationship between investment and growth, where growth in dependent on investment. The Poverty Trap Model assumes that growth is restricted because of poverty traps which can come from several factors. Although these models are widely used and accepted in economics, McMillan acknowledges that these models are restrictive, meaning they do not consider other factors for economic development. The Two Gap model for example assumes that investment is the only determinant of growth while ignoring other factors such as education, research and development (McMillan, 2011). With regards to the Poverty Trap model, the original observation that a one-time infusion of aid should spur economic growth in developing countries is not a pattern that is seen today. These two models are also the models that many scholars cite when stating the relationship between foreign aid and economic growth and development (McMillan, 2011). Therefore, if

these models have limitations to the relationship between aid and development, the theories presented by the scholars within the two schools of thought also have limitations (McMillan, 2011). This also explains the concerns that McMillan had with regards to the direct relationship between foreign aid and economic growth/development (McMillan, 2011).

There has been a large amount of information that has been investigated with regards to the relationship that foreign aid has with economic growth and development. Each of the perspectives that has been investigated demonstrates similarities as well as differences among their arguments; however, it is difficult to ascertain which school of thought is correct in its study and conclusions. Although some research has been conducted as it pertains to post-conflict countries and the impact that foreign aid can have on reconstruction, this research has not been specifically applied to Rwanda. With regards to this study, it is imperative that these factors be explored while also assessing the true direct impact of foreign aid in Rwanda during post-war reconstruction. It will be shown, later in this paper, that in fact, foreign aid has an indeterminate impact on economic growth.

3. Empirical Reasoning/Thesis

The impact of foreign aid has been long disputed among scholars. The basis of this dispute is whether foreign aid has a positive impact on the development and economic growth of a developing country. There are numerous developing countries that receive an abundance of foreign aid each year from developed countries, international organizations, and non-governmental organizations (NGOs). Yet, many of these countries are not progressing or developing as quickly and consistently as economic theory may suggest with an increase of capital flow. Many scholars believe that foreign aid helps to promote economic growth and development in developing countries because economic theory demonstrates that the more

capital and investments a country receives, the more that country's overall productivity will

increase[13] (Jones, 2013). Increased productivity should increase aggregate GDP values and

economic growth; therefore, aid is posited to have a positive impact on development and the

economic growth of a country. However, when observing the realities of the impact of foreign

aid in developing countries, this notion that capital accumulation leads to productivity and

ultimately to economic growth does not always hold true.

In economics, productivity is a "measure of output per unit of input" (Productivity,

2018). In fact, productivity can be measured in several ways. It can be measured by observing

the number of people employed in a country[14] or even the overall health levels[15] of citizens in

developing countries. With the help of foreign aid, poverty has been reduced substantially in

many developing countries. For example, in 1991, Ghana's poverty rate was at 52.6%; however,

in 2012 the poverty rate was at 21.4% (Poverty reduction in Ghana: Progress and challenges ,

2015). Nevertheless, the reality is that the absolute number of poor people has increased in many

sub-Saharan African countries and other developing countries, according to the Africa Poverty

Report by the World Bank (Bank, 2016). However, this report also states that the share of

Africans who live below the poverty line has declined from 56% in 1990 to 43%. Consequently,

in 1990 there were 280 million people living in poverty, but in 2012 there were 330 million

people living in poverty (Bank, 2016). Hence, demonstrating the overall impact of foreign aid

does not necessarily mirror the realities of its impact.

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[13] Solow Model. See page 31 for more details.

[14] The more employed persons in a country the more goods and services being produced,
therefore contributing and increasing the GDP

[15] The healthier a population, the more they can work, which leads to an increase in the
production of goods and services, contributing to the GDP of the country.

The case of Uganda illustrates this point. Uganda has been among the world's top recipient of foreign aid since before its independence in 1962. Therefore, per economic theory, because Uganda has received and continues to receive a large amount of foreign aid it should be more productive than some of its recipient counterparts. Harvard Bergo discusses the impact that foreign aid has had on the economic growth and development in Uganda, stating that as it pertains to Uganda, foreign aid has helped in poverty reduction, HIV reduction, "school enrollment, and infant mortality" (Bergo, 2015). However, as it pertains to overall development, the country is still struggling. Bergo makes note that Uganda's "global competitiveness is low and decreasing…business conditions remains unfavorable to private companies" (Bergo, 2015). He states that Uganda has a weak infrastructure, education levels are low, financial services are poor, and corruption continues to increase in all parts of the government (Bergo, 2015). This suggests that although foreign aid can help in certain aspects of development and economic growth in a country, there are other aspects of growth that foreign aid is unable to impact. Thus, the true impact of foreign aid in economic growth and development remains unclear.

Although the direct impact that foreign aid has on development and economic growth is not readily observed in some cases, there are other cases in which foreign aid has had a clear positive impact. Aforementioned in the previous section, Lebanon received foreign aid and investments during and after its fifteen-year war, starting in 1975 (Dibeh, 2007). This continuous need for aid was a result of the war and the repeated failures of the country's economic policies. The aid that Lebanon received during this period occurred in two phases and encouraged its economic growth and development. In the first phase, the ODA was geared towards infrastructure rebuilding, such as in electricity, water, telephone, and road networks, channeled through the Council of Development and Reconstruction (Dibeh, 2007). During the second

phase, the focus of aid was shifted from reconstruction projects and put towards financial stability projects. This included foreign exchange reserve deposits, foreign currency, soft loans, and balance of payments (Dibeh, 2007).

It was through the foreign aid that Lebanon received that it was able to resolve many of the macroeconomic imbalances that it had as a result of the war (Dibeh, 2007). The foreign aid that Lebanon received helped to increase real GDP growth, decrease inflation rates, and increase the real interest rates. The aid that Lebanon received was also coupled with macroeconomic policies. Therefore, both the policies and the aid "led to a sharp increase in nominal and real interest rates, having positives effects on the external balance and on the subscription rates in T-bills and bonds issued by the Lebanese government" (Dibeh, 2007). Although foreign aid played a large role in the economic growth and stability that Lebanon experienced post-war, foreign aid also led to some detrimental effects on its economy as well. The Lebanese government began to rely on aid for resolving all its macroeconomic problems rather than using other means to promote economic growth and stability. Dibeh notes that "foreign aid via donor conference and direct deposit with the central bank were to become the government procedure for resolving the macroeconomic imbalances during this period" (Dibeh, 2007). Dibeh also shows how this reliance on foreign aid was detrimental to the economy of Lebanon. He states that "the macroeconomic and stabilization policies, coupled with the foreign aid in its post-1997 form, also played a role in the deindustrialization[16] process that occurred during the post-war period" (Dibeh, 2007). In fact, foreign aid became a "disincentive for fiscal and economic reforms by successive post-war governments" (Dibeh, 2007).

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[16] This is the process in which an economic change leads to the reduction or removal of the industrial capacity or activity in a country.

While foreign aid can lead to success in some aspects of economic growth and development, it can also be a detriment to countries as well. Perhaps in the case of Lebanon, these differences of the impact of foreign aid occurred because it was a post-conflict country going through reconstruction. As such, we see that the current state of a country has bearing on the effectiveness of foreign aid. This also brings up ideas about the short-run and long-run effects of foreign aid in developing countries. As per the situation in Lebanon, foreign aid seems to have a positive outlook in a developing country in the short-run. The aid that the country received helped it to immediately start reconstruction projects and give it financial stability. However, as time went on, foreign aid began to reverse its effectiveness. As previously shown in Figure 1, Lebanon saw real GDP growth, but over time the growth slowed, especially from 1999 to 2002. This helps to explain the economic theory of the importance of capital accumulation and the initial impact that capital accumulation has in a country, especially one that has had an unstable economy due to war. Although the long-run period is not specified in economic theory, we can see a change in Lebanon's response to foreign aid through its reliance on aid to solve macroeconomic problems rather than utilizing other means such as the revenue earned off the production of goods and services in the country. It is also important to recognize the fact that aid played a major role in the types of policies that Lebanon establish. In fact, those policies were not necessarily conducive to the aid that it received (Dibeh, 2007).

In sum, there are many factors that impact whether foreign aid will have a positive or negative impact on economic growth and development. In Uganda, we see that foreign aid helped to improve specific economic issues such as poverty reduction, school enrollment, and infant mortality; however, aid was less successful in building infrastructure and financial services. In Lebanon, on the other hand, aid was successful in reconstruction and financial

stability, but it led to further dependence on aid to maintain its economy. For the purposes of this research, we see that in the short-run, aid may have a positive impact on a country during post-war reconstruction. Depending on the degree of the conflict, it is highly likely that the economy/economic structure of the country no longer exists. Therefore, any inflow of capital will create a significant increase in the economic growth. This is because capital accumulation in a country will lead to greater productivity which in turn spurs economic growth. We also see that, in the years after the conflict, aid could have a negative impact on economic growth because of the reliance that countries have on the aid. Also, the policies that may result from aid dependency can affect the political structure, which can also impact the economic outcome for the country. Therefore, it can be hypothesized that foreign aid will initially have a positive impact on economy of a country going through post-war reconstruction; however, it will eventually lead to a negative impact on the economy of that country due to the heavy reliance on aid. Considering that this research is focused on Rwanda, the application of this hypothesis is that foreign aid initially will have had a positive impact on the economy and development of Rwanda, but as time goes on, it would have had reversing impacts on the economy of Rwanda.

Even though foreign aid (ODA), the short-run, long-run, and policies will be considered in the realm of this research, other factors will also be evaluated. These factors will include the real GDP, capital stock, total factor productions, political stability, and government effectiveness[17]. The reasoning for these variables will be explained in the next section.

4. **Methods**

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[17] It the preliminary write-up of this section, there were three other variables that were to be included in this research, however, after running the regressions in SAS all the variables were removed for the final regression analysis.

In order to test the different theories that were presented by various authors, I conducted an empirical analysis to determine whether foreign aid had a significant effect on Rwanda's economic growth since the end of the genocide. As the first step in identifying variables to test, I investigated the factors identified in prominent economic models, beginning with the Solow Model[18] developed by Robert Solow in 1956 (Robert Merton Solow, 2008). The purpose of this model was to explain long-run economic growth by looking at exogenous variables. Those exogenous variables that the model examines are productivity, capital accumulation, and labor growth (Solow, 1956). The model essentially states that capital accumulation, labor growth, and productivity will lead to economic growth, especially in developing countries. However, this model also states that the effects that capital accumulation, labor, and productivity have on the economic growth of a country are temporary (Solow, 1956). This is due to the relationship between capital accumulation and depreciation. According to the Solow model, capital accumulation comes from savings and investments. The savings come from a percentage of the

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[18] This model was an extension of the Harrod-Domer model that was created in 1946.

income that countries receive and investments can come from various sources (Solow, 1956).

Figure 2, shows visually the relationship between capital, depreciation, and income/output.

Figure 2: Solow Model Graph
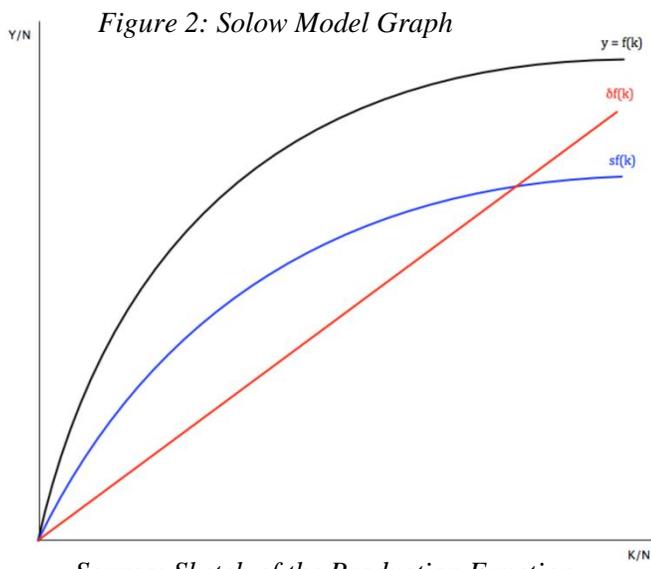
Source: Sketch of the Production Function from Mnmeconomics.wordpress

As shown in Figure 2 (The concept of steady state, 2011), investment[19] is represented by the blue line, depreciation is represented by the red line and the output is represented by the black line. The point at which the depreciation and investments cross each other is known as the steady state. At this point, investments are equal to the depreciation of capital (University, 2016). This is when all the capital from investments is being used to replace and take care of the existing depreciating capital. Therefore, no new capital is being created. This is also translated into the economic output of the country. Figure 2 also shows that initially when capital in poured into a country it leads to a significant amount of economic growth. However, due to the diminishing returns of capital and depreciation, over time, the economic growth is slowed and eventually plateaus.

The equations of the Solow Model are also important in understanding the relationship between capital accumulation, labor, and productivity. The first equation of the Solow Model is the production function (Buera, Navarro, & Nicolini, 2011). The equation includes the capital accumulation (K), labor force (L), and productivity/technology (A). This equation also has alpha (α) which is the elasticity of the output relative to productivity. The production function

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[19] It is important to recognize that investments are a component of capital.

demonstrates that capital, labor, and productivity/technology are the necessary inputs in order to achieve economic output that will lead to economic growth.

$$Y_t = AK_t^{\alpha}L_t^{(1-\alpha)}$$

The second equation of the Solow Model is the equation for savings flow, which is also known as the investments (I) equation (Buera, Navarro, & Nicolini, 2011). The formula for investments is equal to savings rate (s) multiplied by output (Y), shown below. However, it is important to note that the savings rate equation is also equal to the investment equation. The savings rate and savings flow equations are important because they determine how investment is calculated.

Savings flow Equation: $S_t = I_t$

Savings Rate: $S_t = sY_t$

The third equation of the Solow model is the equation for capital accumulation (Buera, Navarro, & Nicolini, 2011). In this equation, capital in the next period is equal to the rate of depreciation (δ) multiplied by capital (K) in the current period plus investments (I).

$$K_{t+1} = (1 - \delta)K_t + I_t$$

The fourth equation that relates to the Solow model is the equation for labor (Buera, Navarro, & Nicolini, 2011). This equation is focused on the growth rate (n) of labor force in the next period.

$$L_{t+1} = L_t + (1 + n)$$

Finally, the last equation for the Solow model is the equation for productivity (Buera, Navarro, & Nicolini, 2011). This equation measures the growth rate of productivity/technology.

$$A_{t+1} = A_t + (1 + g)$$

The Solow Model also considers the differences in exogenous and endogenous variables (Solow, 1956). Exogenous variables are those that involve external factors. In this case, they would be external factors that promote economic growth while endogenous variables would be internal factors that promote economic growth. Although the Solow Model overall is an exogenous model, the labor force of a country can be considered an endogenous variable, while capital and technology/ productivity are exogenous factors. Because of such assumptions, the empirical model for this research will model the overall Solow Model, while taking exogenous and endogenous variables into consideration. The empirical model for this research will model the Solow Model because it will include the capital accumulation, labor force, and productivity aspects of the model. In this research the capital accumulation variable will be the main independent variable, foreign aid, and data on the capital stock of Rwanda. The rest of the variables in the production formula will remain the same for this investigation. Other variables that fall under endogenous variables are government effectiveness and the interaction variable between government effectiveness and ODA. These variables will help to demonstrate if there is an impact of foreign aid on economic growth and development or if other factors have a larger impact.

Once I gathered the data for the variables that were going to be used, I developed my three equations. The first equation is a non-linear regression model that will test the direct impact that foreign aid, as well as the other variables, had on economic growth. The second equation is a logarithmic-linear equation that will test the rates of the variables on economic growth. The last equation contains an interaction variable between foreign aid and government effectiveness. This will test how the interaction between the two variables impact economic growth and development. The purpose of including this interaction variable is test the argument forwarded

by Collier and Hoeffler that ODA can make a significant impact on economic growth and development when there are effective policies and institutions in place to ensure that aid will be used effectively. Therefore, this interaction variable will test whether the effect of ODA on economic growth depends on the effectiveness of the government institutions and policies.

To test the impact that foreign aid has on economic growth and development, a regression analysis was performed on each of the equations in SAS. This analysis tested the relationship between the variables and economic growth through the values of the coefficients. The t-statistics were also important to the research because they would demonstrate the significance of each of the variables in the regression. However, if other issues were found such as serial correlation[20]or multicollinearity[21], they were corrected in the data.

All the data and results that are found in the regression analysis will be applied to Rwanda as a case study. It is also important to note that for the purposes of this research the terms civil war and genocide will be used interchangeably. Economic growth and development will also be used interchangeably.

5. <u>Why Rwanda?</u>

Although the economic implications are an important aspect of this research, the country that this research is based on is also equally important if not more important. The purpose of this research was to investigate the economic impact of foreign aid on a developing country that is post-conflict and is still reconstructing its economy and country. This applies to Rwanda. Rwanda's civil war was recent enough that the effects of the civil war are still shown in the

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[20] This is when the error terms in one period is related to the error terms in another period
[21] This is when variables seem to be highly correlated to each other.

country, and the reconstruction process is still occurring and publically viewed by the international community.

Approximately 12% of Rwanda's population died in the civil war and genocide in 1994 (Nadjaldongar, 2008). The genocide also led to 2 million displaced persons, many of whom left the country (Nadjaldongar, 2008). Additionally, the genocide had detrimental effects on the economy. In fact, "the war destroyed the macroeconomic and institutional infrastructure needed for balanced growth of a modern market-based economy" (Kumar, et al., 1996). The interim government at the time stole 24 billion Rwanda francs as well as the money in the central bank (Kumar, et al., 1996). The demand and the supply of the Rwandan francs became extremely volatile immediately after the genocide. Furthermore, the inflation rate skyrocketed to 40% and there was nothing the country could do about it because it did not have a functioning banking system (Kumar, et al., 1996). The value of the currency and exchange rate depended on private currency traders and the influx of foreign currency. Prior to the genocide, Rwanda was a state that depended heavily on agriculture; however, after the genocide, the rural economy was devastated (Kumar, et al., 1996). The coffee harvest declined in half and over 80% of the cattle population had been lost. For the country to regain its economic footing, the leaders requested US$206.9 million for the 1995 Rwanda Recovery Program (Kumar, et al., 1996).

The purpose of this program was to assist the country in its reconstruction after the war. This program began by helping to rehabilitate the coffee and tea plantations, the education system, and it gave the country financial, economic management, and public administration support. In addition, other countries as well as NGOs provided Rwanda with forms of aid that were to help stimulate the economy. Initially those programs helped to gain some control over the economy (Kumar, et al., 1996). In fact, the $50 million-dollar credit that was granted to

Rwanda by the World Bank helped restore the economic foundation of the country and reactivate

the financial system (Kumar, et al., 1996). However, the credit was supposed to be temporary but

it was difficult for a permanent resolution to be established (Kumar, et al., 1996). This was due

to the initial delays in the disbursement of the credit but also because of the limited absorptive

capacity of the Rwandan government (Kumar, et al., 1996). Because much of the assistance that

was provided to Rwanda was supposed to be temporary, eventually the government established

its own goals and plans that would help the reconstruction process. According to Kladoumadje

Nadjaldongar, those plans were to:

- assure its internal and external security
- guarantee responsible governance and everyone's participation
- assure repairable, reconcilable justice, promote human rights and fight impunity
- rely on humanitarian aid for social and economic development
- mobilize all types of resources
- strengthen socio-economic power and policies regarding women (Nadjaldongar, 2008).

Eventually these goals were the basis of the pillars in Rwanda's Vision 2020 plan that

was established by President Paul Kagame in 2000. This plan included a list of reconstruction

policies that Rwanda hoped to accomplish by the year 2020. The pillars of Vision 2020 included:

- construction of the nation and its social capital
- development of a credible state effectively governed by the rule of law
- development of human resources so that Rwanda may prosper economically based on know-how
- development and entrepreneurship of the private sector
- development of basic infrastructure including urban planning
- modernization of agriculture and livestock sectors (Nadjaldongar, 2008).

Currently, Rwanda is continuously making progress towards its Vision 2020 goals. In the

24 years after the genocide, Rwanda has seen economic growth annually of 8% per annum since

2001 (The World Bank in Rwanda, 2017). Its World Economic Forum competitiveness number

has moved from the latter end of the scale to 63[22] (Langfitt, 2012). It is also regarded as an African country where it is not overly difficult to conduct foreign business (Langfitt, 2012). In addition, Rwanda has maintained political stability and attained a number of social goals since 1994. In fact, by the end of 2015, Rwanda had met many the Millennium Development Goals (Fact sheet on current MDG progress of Rwanda , 2015). It was able to increase its primary school enrollment from 72.6% in 2000 to 96.5% by 2012. It has been a leader among African countries for creating equality among women. In its parliamentary elections in 2013, 64% of the seats were filled by women, making it the only country in the world with a majority female parliament (Fact sheet on current MDG progress of Rwanda , 2015).

Rwanda's transformation from an economic and developmental failure to an economic and developmental success offers a fascinating case study. The remainder of the paper will test the role of various economic and political factors in Rwanda's and will demonstrate the critical role of labor productivity in promoting economic growth and development in Rwanda. Significantly for this research project, the data will show that foreign aid can help stimulate economic development when combined with effective government institutions.

6. **Empirical Model and Expected Hypotheses**

The variables that have been selected for this research are informed by previous research that suggests a relationship between those variables and economic growth. Below are the explanations for each of the variables that will be used in the empirical model along with the predictions for the outcomes of the model. The period for each of these variables will be from 1990 to 2014. The reasoning behind such a temporal parameter is to gather data prior to the

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[22] Out of 140 countries, and about 50% better than other countries

genocide and after the genocide as close to the present day as possible, in order to see the change over time.

GDP

This variable is the dependent variable in this research and is denoted as GDP. The data for this variable was taken from the World Bank Database. Per the World Bank, this measurement is determined as the "sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products[23]" (World Bank, 2018). It will be through an investigation of this variable that I will be able to examine if the main independent variable, ODA, truly has a significant impact on economic growth in Rwanda, or if other variables have a more significant impact on economic growth.

ODA

Foreign aid is the main independent variable and measured as such. It is operationalized as ODA. The data for this variable was taken from the World Bank Database. From this database ODA is the net official development assistance and official aid received in current US dollars. According to the World Bank, this data consists of the "disbursements of loans made on concessional terms and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and non-DAC countries to promote economic development and welfare" (World Bank, 2018). As scholars have noted, whether a country receives aid and its amount can have effects on economic growth and development (Moreira, 2005). This variable will also show the type of relationship that is associated with aid over time in a country that is going through post-conflict reconstruction. Consequently, an

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[23] Measured in USD

increase in the ODA that a country receives is posited to initially have a positive impact on economic growth in Rwanda but eventually lead to negative economic growth.

LABF

This variable represents the labor force of Rwanda before, during, and after the civil war. The data for this variable was taken from the World Bank Database. In this case, labor force[24] is based on "people ages 15 and older who supply labor for the production of goods and services" (World Bank, 2018). Labor force is an important aspect of this research because it reflects the number of people who could supply labor to Rwanda before, during, and after the civil war. It gives us an indication of the change in the number of individuals who are able to be over the 24-year period. This is important for this research because the Solow Model suggests that labor is an important component of economic productivity and growth (Jones, 2013). Therefore, increases in the size of the labor force will theoretically increase the contributions that citizens can make towards economic growth. Thus, if the model holds true with respect to Rwanda, an increase in the labor supply should increase the productivity of the country leading to more economic growth.

CS

The capital stock of Rwanda will be denoted as CS. This data is drawn from Penn World Tables. The capital stock is at constant national prices[25] and measures the total amount of resources that is used to produce goods and services (Data Planet, 2018). The capital stock factors in the differences in the compositions of assets across different countries and over time. As it pertains to Rwanda this data, will demonstrate the amount of resources that is brought into

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[24] The values for population are taken as mid-year estimates
[25] in millions of 2011 US dollars

the country, measured monetarily. This can include but is not limited to investments, aid, and machinery. This is important to the research because according to the Solow model, capital stock is also an important component of economic growth. An accumulation of capital stock suggests that increasing the capital that a country has or receives will lead to economic growth. Therefore, the model predicts that an increase in capital stock will lead to an increase in economic growth and development[26].

TFP

Total factor productivity is denoted as TFP. Total factor productivity, as measured by Penn World Tables, is the "portion of output not explained by the amount of inputs used in production" (Data Planet, 2018). This measurement for productivity accounts for the differences in trade and the productive capacity of the country (Data Planet, 2018). With regards to Rwanda, the total factor productivity will demonstrate how efficient Rwanda is in utilizing its inputs towards production. This variable is important for this research because this variable is also one of the components in the Solow Model. The model explains that some of the most important aspects of economic growth and development are capital, labor, and productivity. For this research, productivity will be measured by TFP. Because the Solow model states that economic growth and development are a result of productivity, we can assume that the higher the productivity level of Rwanda, the stronger economic growth and development will be.

GE

Government effectiveness is represented by the variable GE. The data for this variable was taken from the Worldwide Governance Indicators. According to the Worldwide Governance

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[26] Although foreign aid can be counted as a form of capital stock, in this research they are counted as separate things because the two data sets were adjusted according to two different years

Indicators, this measure of government effectiveness "captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formation and implementation, and the commitment to such policies" (Worldwide Governace Indicators, 2018). This measure also looks at infrastructure disruption, state failure, and policy instability. This variable is important for this research because literature suggests that the effectiveness is not just limited to the direct impact it has on economic growth and other aid programs, but the effectiveness of aid is also dependent on the effectiveness of the government (Collier & Hoeffler, 2004). Thus, a country with good policies and institutions in place can use the aid it receives effectively, whereas a country that has ineffective polices and institutions can lead to inefficient and ineffective use of foreign aid. As it pertains to this research, if Rwanda is deemed to have an effective government, it increases the chance that foreign aid will be successful in its country; however, it can be anticipated that during times of war and post-conflict governments are unable to be effective.

Models to be Tested

In order to observe the impact of above-listed variables on the economic growth and development in Rwanda, three regression models were tested. The first model is a non-linear model to test the direct relationship between each of the variables and economic growth. The second model that was examined was a logarithmic-linear form of the non-linear equation. The purpose for this transformation was to be able to present the results as rates rather than aggregate levels. Finally, the last model that was tested was an interaction model that tested for possible interactive effects between government effectiveness (GE) and official development aid (ODA).

The purpose of this interaction was to further understand the relationship between government policies and the effectiveness of foreign aid[27]. Below are the listed variables.

1st Model: Non-Linear Model

$$GDP_{Rwanda} = \beta_0 + \beta_1\,ODA_t + \beta_2\,LABF_t + \beta_3\,CS_t + \beta_4\,TFP_t + \beta_5\,GE_t + \varepsilon_t$$

2nd Model-Logarithmic-Linear Model

$$LOG(GDP_{Rwanda}) = LOG(\beta_0 + \beta_1\,ODA_t + \beta_2\,LABF_t + \beta_3\,CS_t + \beta_4\,TFP_t) + \beta_5\,GE_t + \varepsilon_t$$

3rd Model-Interaction Model between GE and ODA

$$ECONGR_{Rwanda} = \beta_0 + \beta_1\,ODA_t + \beta_2\,LABF_t + \beta_3\,CS_t + \beta_4\,TFP_t + \beta_5\,GED^{28}{}_t + \varepsilon_t$$

Expected Hypothesis

Table 1 provides a summary of the expected hypotheses[29] for each of the named variables.

Table 1. Expected Hypotheses for Variable

Variable	Label	Expected Sign
ODA	Net Official Development Assistance and Official Aid (millions of US Dollars)	+/-
LABF	Total Labor Force (millions)	+
CS	Capital Stock (millions of 2011 US Dollars)	+
TFP	Total Factor Productivity (2011=1)	+
GE	Government Effectiveness (-2.5 to +2.5; higher scores correspond to better governance)	+
GED	Interaction Variable between ODA and Government Effectiveness	+

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[27] The reason for this variable is discussed in the methods section
[28] This is the label for the interaction variable between ODA and GE
[29] The hypotheses for each variable was also mentioned at the end of each variables section, but the table is being used as a summary

7. __Data__

Table 2. Summary Statistics of Key Variables of Model 1 (Years 1990-2014)

Variable	N	Mean	Standard Deviation	Minimum	Maximum
GDP	25	$3,263,643,797 USD	$2,219,941,195 USD	$753,636,370 USD	$8,016,288,347 USD
ODA	25	$604,465,600 USD	$306,969,307 USD	$229,730,000 USD	$1,263,210,000 USD
LABF	25	4,161,958.60	933,353.33	2,936,690.00	5,788,477.00
CS	25	$15,273.34 USD (millions)	$7,422.83 USD (millions)	$9,266.35 USD (millions)	$34,480.55 USD (millions)
TFP	25	0.8263304	0.1532865	0.4285398	1.0268205
GE	25	-0.5819497	0.4042264	-1.1496797	0.0704055

Table 2 displays the descriptive statistic of the dependent variable, Gross Domestic

Product, as well as the independent variables. There were only 25 observations available for each

of the variables for this investigation. Rwanda's average annual GDP was $3,263,643,797, while

the average ODA that it received was $604,465,600. Therefore, on average over 18% of its GDP

is from ODA, as shown by the data displayed above. In the data set, the values for GDP were

also consistent except during the years of the civil war, which is shown by the minimum GDP

value. However, surprisingly the maximum amount of ODA that Rwanda received was not

during or immediately after the genocide, but in fact it was in 2011.

The TFP with regards to this research indicates that Rwanda's productivity on average is

increasing. Figure 3 shows the change in the TFP starting from 1990. The graph demonstrates that around the time of the civil war, there was a significant decrease in the productivity of

Figure 2: Total Factor Productivity for Rwanda from 1990-2014

Rwanda, which is not surprising, nor is the increase in productivity after the violence ended.

It should be noted that the CS variable is measured in millions of US dollars. The mean demonstrates the average amount of money required in order to produce goods and services in Rwanda is approximately $15,273,340,000. The table also shows that the standard deviation of the CS indicates that approximately 66% of the average capital stock deviates by $604,465,600 US dollars. It is surprising to note that, according to the data, the time that Rwanda's government was least effective was in 1997 rather than during the time of the civil war.

Table 3. Summary Statistics of Key Variables of Model 2 (Years 1990-2014)

Variable	N	Mean	Standard Deviation	Minimum	Maximum
GDP2	25	21.704%	0.637%	20.440%	22.805%
ODA2	25	20.096%	0.508%	19.252%	20.956%
LABF2	25	15.217%	0.227%	14.893%	15.571%
CS2	25	9.542%	0.417%	9.134%	10.448%
TFP2	25	-0.210%	0.209%	-0.847%	0.026%
GE	25	-0.5819497	0.4042264	-1.1496797	0.0704055

Table 3 shows the summary statistics of model 2, which is the logarithmic-linear equation of the non-linear model. The sample size is also 25 observations per variable. This data set shows the rates of change for each of the variables. As it shows, on average, ODA increased by 20.096% annually in the data set. The GDP, on average, grew by 21.704%. The labor force growth seems to be consistent with the rest of the data because the minimum and maximum growth rates are not too far from the mean, as shown by the standard deviation as well. In fact, this is the case for most of the other variables, showing that there is not much variation in the rates of change for these variables. One thing to note about the summary statistics is the mean for TFP. This mean shows that on average, there is a change in the TFP rate by -0.210%, which demonstrates that on average the TFP rate for Rwanda declines by 0.210%.

Table 4. Summary Statistics of Key Variables of Model 3 (Years 1990-2014)

Variable	N	Mean	Standard Deviation	Minimum	Maximum
GDP2	25	21.704%	0.637%	20.440%	22.805%
LABF2	25	15.217%	.227%	14.893%	15.571%
CS2	25	9.542%	.417%	9.134%	10.448%
TFP2	25	-0.210%	0.209%	-0.847%	0.026%
GED	25	-11.540%	8.001%	-22.946%	1.475%

Table 4 is the summary statistics for model 3 and is essentially the same as Table 3. The sample size for this table was also 25 observations per variable. The only difference is with the interaction variable between GE and ODA2, which created GED. The table shows that with the two variables interacting, the mean value for the interaction was -11.540%. This shows that that on average the values for the GE variable declined by 11.540%. However, the standard deviation demonstrates that the variation in the values deviated by about 8%.

8. Results

An OLS model was run to test Model 1. Table 5 provides the regression statistics of the data.

Table 5. Impact of Different Factors on Rwandan Economic Growth and Development (Years 1990-2014)-Model 1

VARIABLE	COEFFICIENTS	T-STAT		P-VALUE	VIF
ODA	0.47507	1.04		0.3120	4.78509
LABF	-784.935	-3.43	*	0.0028	11.07140
CS	248878	10.18	*	<.0001	7.99612
TFP	3962182672	5.38	*	<.0001	3.09086
GE	1149629243	2.37	**	0.0284	9.31469
INTERCEPT	-162899051	-0.14		0.8874	0

N(OBSERVATIONS)	25
DURBIN WATSON-1ST ORDER	1.1835
DURBIN WATSON-2ND ORDER	1.8897
ADJUSTED R-SQUARE	0.9799
F-VALUE	2.52

*, **, *** denotes the significance at the 1%, 5%, and 10% levels respectively.

Prior to understanding the results for this data, it is important to note that corrections had to be made for this regression. Because the data is a time-series the two violations that were corrected were for multicollinearity[30] and serial correlation.[31]. As shown above, LABF proves shows to have the highest VIF[32] compared to the other variables. It is possible that the linear relationship could be between TFP and LABF, because the size of the labor force in a country can influence its productivity. This model was also checked for the serial correlation[33] through the Durbin Watson Test. For this test, the Durbin Watson statistic was determined to be 1.18[34] for the first order of serial correlation. However, a second order of serial correlation was

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[30] The results of the VIF, or Variation Inflation Factor demonstrates that multicollinearity is among the independent variables. The threshold for the difference between a high and low VIF is between 5-8, where for small models the threshold can be 5 and 8 for larger models. Because this model is smaller, our threshold is 5, demonstrating that only two explanatory variables fall below that threshold. Although multicollinearity was found in this research, most of the variables still had significant t-statistics, which is why it wasn't shown to be a huge problem. Also, in preliminary regression tests, the VIF were significantly higher, which led to the elimination of certain variables. Prior to the variables that are in Table 5 there were other variables that were eliminated because they were deemed to be redundant and irrelevant variables, such as Human Capital Index and Economic Freedom. In fact, in some cases ODA could be considered redundant because it could be a part of the capital stock. However, both variables were kept because the CS variable is included in the Solow Model, while ODA is the explanatory variable that is being investigated.

[31] Prior to the variables that are in Table 5, there were other variables that were eliminated because they were deemed to be redundant and irrelevant variables, such as Human Capital Index and Economic Freedom. In fact, in some cases ODA could be considered redundant because it could be a part of the capital stock. However, both variables were kept because the CS variable is included in the Solow Model, while ODA is the explanatory variable that is being investigated.

[32] This demonstrates that LABF is linearly related to one of the other explanatory variables.

[33] Serial correlation is when the errors from one period is correlated to the error term from another period. The threshold for the Durbin-Watson Test is at 2. When the statistic is at 2 there is no serial correlation, when the statistic is less than 2 there is positive serial correlation, and when the statistic is greater than 2 there is negative serial correlation.

[34] Based on the critical values[34] for the Durbin Watson test, it is determined that for first order of serial correlation, whether there is serial correlation is inconclusive.

performed where the Durbin Watson statistic was at 1.88[35], which is greater than the upper

bound demonstrating that we can fail to reject[36] the null that there is no serial correlation in this

model.

According to the results of the adjusted R^2 shown above, there is a strong relationship

between the explanatory variables and the dependent variables. This means that the explanatory

variables explain 97%[37] of the variation in the model as it pertains to GDP levels. All variables

except for ODA were significant, as determined by the corrected t-statistics in Table 5. LABF,

CS, and TFP were statistically significant at the 1% significance level, while GE was found to be

significant at the 5% level of significance and ODA was statistically insignificant with a t-

statistic of 0.3120. The parameter estimates demonstrate that out of all the explanatory variables

listed, TFP has the greatest impact on GDP values. This estimate shows that an increase in total

factor productivity will increase the overall GDP by $3,962,182,672 USD. The impact of

productivity is not surprising because it aligns with the theoretical model of the Solow Model.

Although it was expected that productivity would have a significant impact on GDP, it was not

hypothesized that productivity would have this large of an impact on GDP. In fact, it was

hypothesized that capital stock may have a larger impact on GDP because of the theory that

initially the amount of capital a country received after a civil war would have a positive impact

on its GDP and economic growth because of the lack of capital due to war. Moreover, GE was

consistent with prior research; however, it played a much larger role than was assumed in the

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[35] This demonstrated that we can fail to reject[35] the null that there is no serial correlation in this model since the statistic was greater than the upper bound.

[36] This can also be done because of the proximity of the statistic to 2, there is no serial correlation.

[37] Could be inflated due to issues of multicollinearity, however, could also be because of the accuracy of the data. The variables of CS, TFP, and LABF were added in order to mirror the Solow Model, which has shown to have an impact on economic growth.

theoretical model. The parameter estimates suggest that government effectiveness can produce

an increase of $1,149,629,243USD on the GDP of Rwanda. This demonstrates the importance of

government effectiveness and indicates that the better the policies, the more likely that the GDP

in the country will increase, as it did in Rwanda.

One variable that was not consistent with prior research was LABF. This is because the

negative sign was unexpected. This variable essentially states that an increase in the labor force

will decrease the GDP of Rwanda by 784.935. However, this alludes to the idea that just because

the labor force has increased, not everyone in the labor force will necessarily work and

contribute to the economy. This is because the labor force calculation includes both employed

and unemployed persons, especially those who are looking for work. Therefore, this result does

not necessarily suggest that there is an increase in employment, but could also include those that

are unemployed.

As it pertains to this model, ODA is shown to have an insignificant role on GDP in

Rwanda. The parameter estimate suggest that for each unit increase in ODA, the aggregate level

of GDP in Rwanda increased by less than a dollar. However, this can be due to a number of

reasons. As shown in the discussion above, multicollinearity exists in this model, which states

that there is some form of linear relationship between the explanatory variables. This could be

the case for ODA and CS, because capital stock can include all forms of capital that enter a

country, which would technically include ODA. Therefore, it is difficult to interpret the ODA

due to its insignificance and relationship to GDP.

Table 6. Impact of Different Factors on Rwandan Economic Growth and Development (Years 1990-2014)-Model 2

VARIABLE	COEFFICIENTS	T-STAT		P-VALUE	VIF
ODA2[38]	-0.01695	-0.16		0.8774	4.49171
LABF2	-1.04451	-2.94	*	0.0084	9.61930
CS2	1.00975	4.31	*	0.0004	14.11763
TFP2	1.50715	7.17	*	<.0001	2.85055
GE	0.45748	2.43	**	0.0249	8.55822
INTERCEPT	28.88734	5.46	*	< .0001	0
N(OBSERVATIONS)	25				
DURBIN WATSON- 1ST ORDER	1.0469				
DURBIN WATSON- 2ND ORDER	1.7989				
ADJUSTED R-SQUARE	0.9601				
F-VALUE	4.53				

*, **, *** denotes the significance at the 1%, 5%, and 10% levels respectively.

The difference between this model and the model 1 is that this model was transformed from the aggregate values of the variables and data into logarithmic-linear form. Therefore, the parameter estimate is considered in the form of rates, rather than aggregate values. The same tests that were performed for model 1 were also performed for this model. For the purposes of this model, the same issues were also present as they were in model 1[39]. However, in this model CS has the highest VIF[40] than the rest of the variables. As it pertains to serial correlation, the Durbin-Watson statistic was still in the inconclusive area when compared to the upper and lower bounds of the Durbin-Watson test. Therefore, a second order serial correlation was performed[41].

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[38] Each of the variables in this model, have a 2 following its label because it was used in order to name and transform the data in SAS

[39] Compared to model 1, there was an increase in the VIF, still suggesting that there is multicollinearity in the variables. However, as stated before, the variables that were found to be redundant and insignificant were eliminated from the final regression, while still staying true to the purpose of this investigation.

[40] This was assumed to be a possibility due the fact that ODA could be considered a form of capital stock, therefore it was not a concern when this was observed.

[41] it was at that point that it demonstrated that we could fail to reject the null, suggesting that there is no serial correlation in this model

As shown in the data provided in Table 6, the adjusted R^2 is .96. This would suggest that the explanatory variables explain 96% of the variation in the model as it pertains to GDP. This model also shows that all of the variables were statistically significant except for ODA2. LABF2, CS2, and TFP2 were each statistically significant at the 1% significance level while GE was statistically significant at the 5% significance level. Based on the results in Table 6, we see that the components of the Solow Model have the most significant impact on GDP growth in Rwanda, which was expected. However, TFP2 once again has the most significant impact on the GDP2 growth in Rwanda. This means that a 1% increase in TFP will lead to a 1.5% increase in GDP2 growth. For this model, instead of GE having the second most significant impact on GDP2 growth in Rwanda, it is CS2. This parameter suggests that for a 1% increase in capital stock it will lead to a 1% increase in GDP2 growth. Moreover, for GE it demonstrates that government effectiveness will lead to a 0.45% increase in GDP2 growth. This was surprising because in model 1, GE had the second strongest impact on GDP2, whereas in this model it has the third largest impact on GDP2 growth. This could demonstrate that GE has a significant impact on GDP growth with its aggregate values. However, when looking at the percentage of GE's impact it is not as strong as some other factors. This model once again shows the statistical insignificance of ODA in GDP growth. Unlike in model 1, there was a sign change for this model, as model 2 suggests that ODA led to a decrease in GDP growth in Rwanda. As it pertains to this model, an increase of ODA should decrease GDP by 0.016%; however, because of the insignificance of the data, it cannot be necessarily interpreted as such.

Table 7. Impact of Different Factors on Rwandan Economic Growth and Development (Years 1990-2014)-Model 3

VARIABLE	COEFFICIENTS	T-STAT		P-VALUE	VIF
LABF2	-1.02934	-3.10	*	0.0056	8.93697
CS2	0.99349	5.51	*	<.0001	8.90450
TFP2	1.49890	7.95	*	<.0001	2.44072
GED	0.02285	2.60	**	0.0172	7.80850
INTERCEPT	28.46683	6.19	*	< .0001	0

N(OBSERVATIONS)	25
DURBIN WATSON-1ST ORDER	1.0590
DURBIN WATSON-2ND ORDER	1.8049
ADJUSTED R-SQUARE	0.9625
F-VALUE	4.36

*, **, *** denotes the significance at the 1%, 5%, and 10% levels respectively.

This final model has eliminated ODA and GE as single variables and has combined them to be interaction variable. It is important to note the changes in the VIFs and Durbin-Watson statistics. These VIFs suggest that there still is multicollinearity in the data, which was explained above; however, the values show that the multicollinearity is not as severe as it was in the previous models. Once again, the first order of serial correlation proved to be inconclusive as it pertained to this model; however, with the second order of serial correlation it demonstrates that we can fail to reject the null hypothesis.

Just as in the second model, the adjusted R2 is .96, which suggests that the explanatory variables explain 96% of the variation in the model as it pertains to GDP. Additionally, there are some differences between this model and model 2 as it pertains to the parameter estimates[42]; however, they are slight differences that would not change the interpretation of the variables by much. Importantly, GED is statistically significant at the 5% significance level. Because it is statistically significant, it tells us that ODA has a positive relationship to GDP growth as

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[42] This is expected that there will be changes in the parameter estimates of LABF2, CS2, TFP2 because of the removal of 2 variables and the addition of an interaction variable.

compared to GE. It also indicates the positive effect that ODA has on GDP growth is different for certain values of GE. Therefore, a 1% increase in ODA will increase GDP growth by 0.0228% as pertains government effectiveness. From looking at the other two models the interaction variable has a greater impact on GDP growth than ODA alone. This result is significant because it demonstrates that with government effectiveness ODA has an impact on economic growth/development.

9. <u>Application to Rwanda</u>

With the results that have been provided, the research suggests that there are many different factors that contribute to economic growth and development in a developing country during the reconstruction phase that follows the end of violent conflict. In fact, the results show that the factors that play a significant part in economic growth and development are capital stock, total factor productivity, labor force and government effectiveness. Unfortunately, the results suggest that foreign aid, ODA, may not play a statistically significant part in the economic growth or development in Rwanda on its own. Rather, foreign aid was significant when interacted with government effectiveness. However, the results of this data will still support the fact that in the years immediately following the civil war, foreign aid, aggregately, has had a positive impact on Rwanda's economy.

It is important to note that Rwanda still receives billions of dollars in foreign aid annually from various sources. Although my quantitative analysis yielded ambiguous results with regards to the impact of foreign aid, it also shows the different kinds of effects the foreign aid can have on economic growth and development. In the first model[43], it shows that ODA has a positive

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[43] Although the model shows a positive relationship with economic growth, it also shows that the impact is quite insignificant.
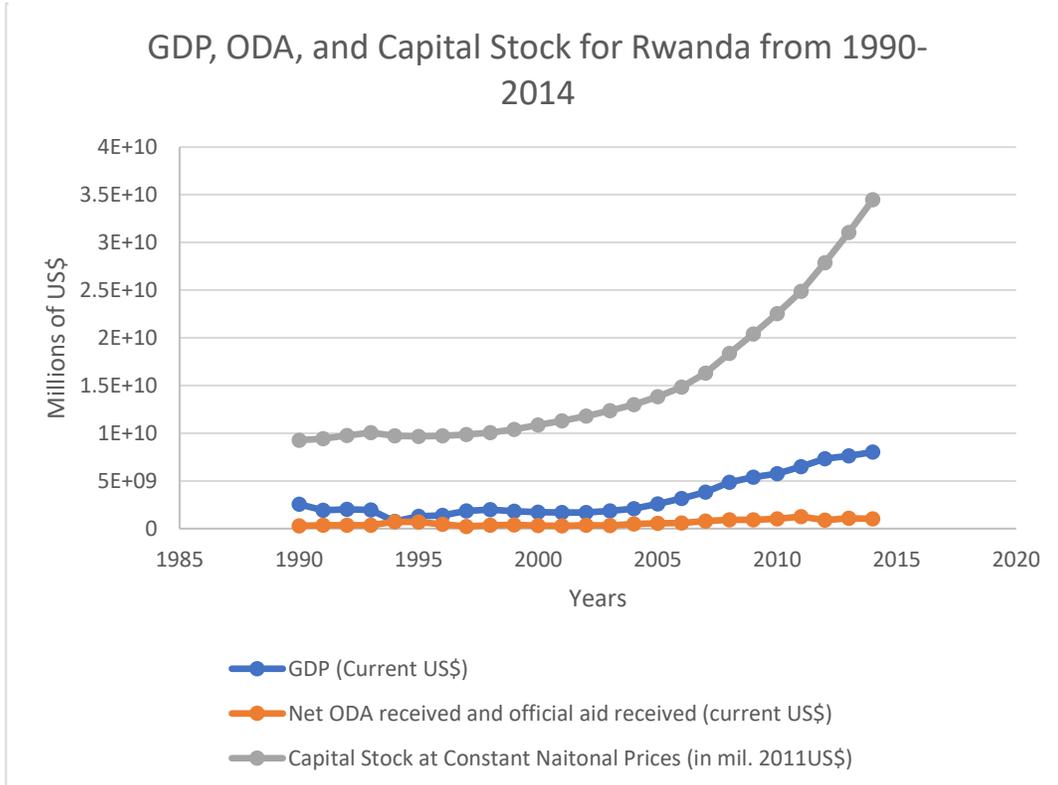
impact on economic growth. The second model[44] shows a negative impact on economic growth. Finally, the third model, the interaction model[45], shows a positive effect on economic growth. Although some of this data and research can be inconclusive, it could also suggest that foreign aid had varying effects on the economic growth and development in Rwanda. For example, based on the first model, it can be interpreted that when it comes to the aggregate amounts and levels of foreign aid, it seems to have a positive relationship with economic growth and development. This is demonstrated through a report entitled *Rebuilding Postwar Rwanda*: The Role of the International Community. The authors of this report stated that in the years immediately following the Rwandan genocide, over $206.9 million dollars were given to Rwanda through the Rwanda Recovery Program. It was through that program that Rwanda could gain control over its crumbling economy at the time (Kumar, et al., 1996). The aid Rwanda received after the war also helped to fund programs that helped farmers begin farming again in order to provide cheaper sources of food to themselves and the refugees at the time (Kumar, et al., 1996). Therefore, the amount of foreign aid that Rwanda had received at the time of the war had put money in their banks in order to have some kind of financial backing while also putting food in the bellies of their citizens (Kumar, et al., 1996).

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[44] Although the model shows a negative relationship with economic growth, it also shows that the impact is quite insignificant.
[45] This model was statistically significant in the regression analysis.

The aid as well as other investments that Rwanda received also contributed to the overall

GDP growth in Rwanda immediately after the genocide. Figure 4 shows the aggregate

relationship between ODA and GDP growth. It is important to recognize how the amounts relate

to one another to understand the impact that foreign aid had/has on the growth and development

of Rwanda. One thing to note is that during 1994, which included the period of the civil war, the

GDP and ODA seem to be around the same amount. In fact, per data retrieved from the World

Bank, the GDP for Rwanda was $753,636,370.5 USD, while the ODA received was

$711,750,000 USD. This is only a difference of about 41 million USD. This shows that the ODA

that Rwanda was receiving in 1994 made up approximately 94% of its aggregate GDP. This not

only demonstrates the severity of the economic state of Rwanda, but it also shows the role that

foreign aid played in its economic growth during that time. In fact, from 1993 to 1994 the GDP

growth rate in Rwanda was at -50%, but then from 1994 to 1995 the GDP growth rate of Rwanda

was at 35%. The reason that so much growth was shown in Rwanda from 1994-1995 because it

Figure 3:GDP, ODA, and Capital Stock for Rwanda

GDP, ODA, and Capital Stock for Rwanda from 1990-2014

GDP (Current US$)

Net ODA received and official aid received (current US$)

Capital Stock at Constant Naitonal Prices (in mil. 2011US$)

was during that time that aid donors began to shift their focus towards rehabilitation and reconstruction of the country.

The authors of Rebuilding Postwar Rwanda: The Role of the International Community, discuss that the aid that was given to Rwanda after the war had helped the country to regain some control over its economy (Kumar, et al., 1996). However, the authors look directly at the aid that Rwanda received from different organizations like the World Bank and IMF, as well as individual countries. In fact, the UN Development Program (UNDP) designed a program in late 1994 that was to "mobilize resources for small-scale projects to build infrastructure and generate income" (Kumar, et al., 1996). Therefore, much of the aid that was given to Rwanda was designed not only to create projects to rebuild the country but also to rebuild the country economically, which would lead to economic growth. Additionally, since the foreign aid that Rwanda received was to be used for rebuilding infrastructure, it suggests that goods and services needed to be purchased in order for rebuilding to occur. Therefore, there needed to be a flow of capital to stimulate the economy.

The second model suggests that foreign aid can lead to negative impacts on the economy of Rwanda. According to the results, foreign aid has a negative relationship rate with economic growth. This means that for a 1% increase in ODA led to a 1% decrease in GDP growth. Although evidence could not be located on the effect of the rate of ODA influencing the GDP rate, evidence does suggest that there were times that the foreign aid that Rwanda was receiving had detrimental effects on its economic growth. This primarily has to do with the instability of aid and the dependence that Rwanda has on aid.

In the years following the genocide, there were several aid donors that made pledges to loan Rwanda large sums of aid (Kumar, et al., 1996). However, many of these countries failed to

payout. Because of the lack of commitment to their pledges, it led to a lag in Rwanda's economic

growth and development (Kumar, et al., 1996). This was detrimental to Rwanda's economic

growth because it led to inconsistency and instability of aid-reliant growth (Africa, 2015). This

reliance on foreign aid led to a false sense of a steady income, which also promoted a false sense

of economic growth, as it is measured in economic theory. In fact, because there was no steady

income, the country was unable to respond to shocks to its economy which caused it to rely even

more on aid, generating the foreign aid cycle.

Additionally, it gives a false sense of true growth in the country. The true economic

growth in the country is not shown because economic growth should not be determined by the

change in a country's income but rather by its productivity in the way it is able to produce goods

and services with that capital. Therefore, when a country heavily relies on aid, it may seem as if

it is growing economically with an increase in foreign aid each year, when that might not be the

case. One thing to note is the idea of foreign aid in itself. Most of the time, foreign aid is a loan

to countries, therefore, even if the aid produces economic growth, it is temporarily because

eventually the aid has to be paid back, which demonstrates some of the problems associated with

reliance on foreign aid long-term. Rwanda's reliance on aid in the years after the genocide has

also led to negative effects on its tax efforts as well as public investment.

Kene Ezemenari, Ephraim Kebede, and Sajal Lahiri, authors of The Fiscal Impact of

Foreign Aid in Rwanda, discuss the negative effects that foreign aid had on the development of a

tax system in Rwanda and well as the decline in public investments which could contribute to

economic growth. The authors found that "A 1 percentage point increase in aid to GDP ratio has

reduced the rate of taxation by only 0.05 percentage point" (Ezemenari, Kebede, & Lahiri,

2008).[46] This affects the economic growth of a country because if the tax rate continues to decline, the government is unable to generate revenue from the taxes that its citizens pay. The authors also found that ODA, "had a negative effect on the proportion of public expenditure allocated to public investment" (Ezemenari, Kebede, & Lahiri, 2008)[47]. This is could be because the government does not use the foreign aid towards public spending rather towards private spending. This would make it difficult for Rwanda's government to provide public services to its citizens. This is especially related to economic growth because if public investment declines, it decreases the money that the government is able spend on services like education and health for its citizens, which could promote more economic growth. However, if public investment declines, it could have reversing effects on economic growth because the amount of money spent on services like health and education would decline, which means that the quality of health and education would decline and the citizens of Rwanda would be less productive and Rwanda therefore would not reach its optimal level of growth and development.

Finally, according to the third model that was conducted for this research, foreign aid has a positive relationship with economic growth, at least when it is associated with an effective government. This can be demonstrated in Rwanda through the policies and the institutions that have been set in place by the government. This idea stems from research that suggests that foreign aid can be effective in developing countries if paired with good institutions as well as effective governance. This can be seen to a certain extent with Rwanda's president of 18 years as well as the establishment of the Vision 2020 plan for Rwanda.

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[46] The authors found that the magnitude of these levels were overall small
[47] the authors found that the magnitude of this level was overall small

In April 2000, Paul Kagame was sworn into presidency after the resignation of Rwanda's previous president, Pasteur Bizimungu. Since then he has been the leader of Rwanda. However, it has been under his presidency that Rwanda has experienced economic growth and development. Prior to the civil war, Rwanda's income per person was around $150 USD; however, currently it is $700 USD per person (Paul Kagame, feted and feared, 2017). Throughout his presidency he has created centralized policies and institutions that focus on promoting economic growth and development. Rather than creating an economic market that allows for all types of goods and services to be produced, the Rwandan government has focused its economy primarily on increased agricultural productivity and tourism (Davis, 2014). The government also focuses on technological growth and intense government spending on infrastructure through establishing deals and policies with corporations that will benefit the country (Davis, 2014). For example, Kagame recently signed a deal with a South Korean firm that will create a 4G network that will make high-speed internet available to about 95% of Rwandans (Davis, 2014).

The effectiveness of the government of Rwanda can also be seen through the success of its Vision 2020 plan. Vision 2020 is a collective foreign aid project established by the Rwandan government in 2000. The purpose of Vision 2020 is to further develop Rwanda after the genocide by the year 2020. As stated by Donald Kaberuka, the Minister for Finance and Economic Planning in Rwanda, "Vision 2020 is a framework for Rwanda's development, presenting the key priorities and providing Rwandans with a guiding tool for the future. It supports a clear Rwandan identity, whilst showing ambition and imagination in overcoming poverty and division" (Kaberuka, 2000). This program hopes to transform Rwanda on the foundation of six pillars. Those pillars are good governance, human resource development and a

knowledge-based economy, a private sector-led economy, infrastructure development, productive and market oriented agriculture, and regional and international economic integration (Kebongo, 2011).

Figure 4:Rwanda's Export Goods 2000. Source-OEC Atlas

The transformation of Rwanda since the establishment of this program can be seen when looking a data during the establishment of this policy as well as current data, especially as it pertains to the last pillar: regional and international economic integration. In the Vision 2020 plan, Rwanda has expressed its desire to participate more in international trade. However, in order to do that, Rwanda has shifted its focus of agricultural productivity of coffee into other natural resources as

Figure 6: Rwanda's Export Goods 2016. Source-OEC Atlas

well, which is expressed in Figure 5. In fact, it shows that in 2000[48], 57% of Rwanda's exports was from natural resources such as coffee, gold, and tin (Rwanda, 2017). However, currently, in 2016, Rwanda exports other natural resources such as refined petroleum and niobium to other countries (Rwanda, 2017). According to the Observatory for Economic Complexity (OEC), Rwanda still mainly exports natural resources; however, the amount that is exported is more diverse, which is shown in Figure 6. In VISION 2020, it is also expressed that Rwanda would want to participate in more regional trade partnerships with surrounding countries (Kaberuka, 2000). In 2000, Rwanda primarily exported primary commodities to European countries, as

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[48] the year that the program was established

shown in Figure 7. In contrast, as shown in Figure 8, Rwanda's current top export destination partners are regional, meaning they include countries that surround Rwanda, such as the Democratic Republic of Congo, Kenya, and Burundi (Rwanda, 2017). These statistics demonstrate that the Vision 2020 program that Rwanda has implemented is proven to be

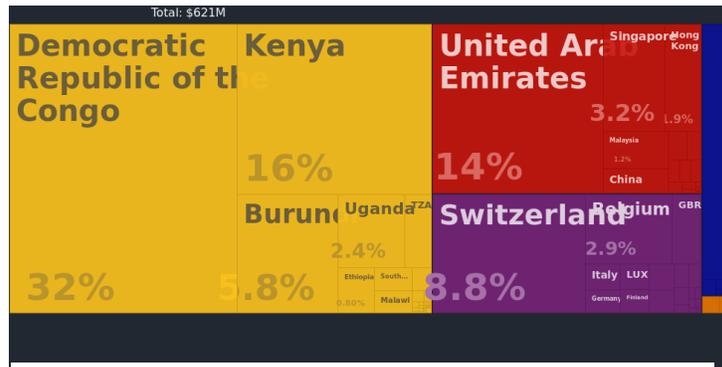*Figure 7: Rwanda's Export Goods 2000. Source-OEC Atlas*

successful thus far. However, the success of this project funded by foreign aid can be attributed to the effectiveness of its government. This is because this is a policy that was established by the government of Rwanda and continues to be upheld in the country. In fact, the Vision 2020 plan not only focuses on economic growth and development but it also works to successfully implement policies that will help ensure that foreign aid is used effectively. However, it is important to note that it is easier for a government to be effective when the same political leaders in power have been

Figure 8: Rwanda's Export Goods 2000. Source-OEC Atlas

serving for over 20 years. In Rwanda, most the leaders that are in power are Tutsi, therefore, they share similar ideals with Paul Kagame. Although Rwanda has a parliamentary system and a form of checks and balances, Paul Kagame still makes the ultimate decisions when it comes to laws and policies in the country. Therefore, it is easy to have an effective and efficient government when the President is able to be in office for twenty years. This is since Paul Kagame pressed for constitutional reform to end term limits, which allowed him to run for president for 3 terms.

10. <u>Limitations</u>

Although this research suggests that there are many other variables that can lead to economic development and growth in a developing country, there were limitations that made it difficult to provide specific and detailed results. The dataset that was used for this research was limited and inconsistent. For each of the five variables that was observed, there were only 25 observations. This could have caused the parameter estimates for certain variables to be inflated due to the lack of observations. This limitation could have also been a result of not being able find an abundance of information for developing countries or having to rely on databases that are not necessarily always updated in a timely fashion for users. In addition, some of the data was inconsistent and missing, such as in the case for government effectiveness, so a 3-year moving average[49] had to be computed for the government effectiveness. Apart from missing values for the data, it was also hard to locate the measurements of some variables. Some of the variables used did not share the same unit of measurement across all databases, which at times makes it difficult to compare the data of one variable to another.

Another limitation that was apparent in the beginning stages of this research was independent variables. Many of the variables that were initially chosen for this research could not be used because there was a likely chance that they could be correlated with one another. For example, two of the initial variables to be used were an index for economic freedom and corruption; however, the economic freedom index was calculated based on an index of corruption and government effectiveness. Therefore, in order to combat such redundancy, the

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[49] This is where I took the average of the three previous years to fill in for the data for government effectiveness. This variable was missing data for 1990-1995 and 1997, 1999, 2001.

variables for economic freedom and corruption were taken out. However, the need to eliminate redundancy could have led to omitted variables as well.

11. <u>Conclusion and Implications</u>

Through this research, I was able to examine the relationship between foreign aid and economic growth and development in Rwanda. Although foreign aid was not as statistically significant as other variables, such a productivity, it was still statistically significant when interacted/paired with government effectiveness. This research also showed that total factor productivity, capital stock, labor force and government effectiveness played a more significant role in economic growth and development in Rwanda. Therefore, it would reasonable to suggest that countries that are going through post-war reconstruction should focus on such factors when trying to promote economic growth and development. Additionally, if countries do receive foreign aid, it is important that good policies, institutions, and governance are implemented in order for foreign to impact economic growth. This research also demonstrated the relevance and importance of the Solow Model to economic growth and development of developing countries. It also further supported that the components of the Solow model, capital stock, productivity, and labor force have statistical significance with regards to their impact on economic growth in developing countries. Although the importance of the Solow Model is widely recognized by many scholars to contribute to economic growth and development, the application of this model to post-war Rwanda further exemplified its importance.

The Solow model has been applied to many other countries to test the important factors that lead to economic growth and development in developing countries. However, there is lack of literature that directly relates the Solow Model with foreign aid through a case study of a post-war country like Rwanda. It was due to such a gap in the literature that this research was

conducted. However, the research also looked to provide recommendations on policy based on the implications of the results. Based on the results, policy makers in Rwanda should move from receiving large amounts of aid and focus more on economic policies that will stimulate growth through an increase in sustainable capital. This means that Rwanda should continue to focus on aspects of their economy in which they have a comparative advantage. As discussed in the Vision 2020 plan that would include the production of agricultural goods. Rwanda should then continue to use the revenue from that production towards more economic growth and development initiatives, such as technological growth and education. Other implications that this research has for policy makers of Rwanda is the importance of productivity in a country. As noted in the results, total factor productivity showed to have the most statistical significance on GDP growth in this research, so Rwanda should focus on increasing its productivity. This shows that if Rwanda is able to make use of its resources more productively it will lead to better and more efficient economic growth. One resource that would also contribute more to Rwanda's productivity would be its labor force. Therefore, polices should be implemented that encourage further innovation and education in Rwanda. Instead of simply attempting to provide basic education to its citizens, Rwanda should find other means in making sure that the basic education that its citizens receive is of quality. It is through a quality education that research and innovation becomes apparent in countries like Rwanda, which will ultimately contribute to its productivity.

Government effectiveness is also extremely important to consider with regards to the implications that it has for economic policy. The results even suggest that foreign aid can be effective when paired with government effectiveness. Therefore, when foreign aid is in conjunction with credible political and economic institution, then foreign aid will have a favorable impact on economic growth. Although Rwanda's government has made great strides

towards economic growth and development post-war, especially with the initial help of foreign aid, it is still important that there are policies that will continue to promote economic growth and development along with holding the government accountable for its actions. Additionally, while, the true impact of foreign aid in economic growth and development are inconclusive, it is still important to recognize that it was through the foreign aid that Rwanda received immediately after its civil war that led to the initial growth and development of its economy post-conflict. Therefore, it would be irrational to suggest that foreign aid has entirely negative effects on the promotion of economic growth and development in post-conflict countries. However, it is still important to note that when foreign aid is paired with good policies, institutions, and government effectiveness, it appears as if foreign has positive impacts on economic growth and development. In order to promote positive effects of foreign aid on economic growth and development, one recommendation would be for Rwanda to establish an independent body that would investigate the usage of foreign aid in Rwanda. This body would also hold the government accountable for the effective or ineffective usages of foreign aid. This would also help to curtail issues of corruption in Rwanda.

Because some these recommendations have already been implemented in Rwanda and have shown to be a success, these recommendations can also be implemented in other countries that are currently going through post-war reconstruction. One country for example that this research could also be applied to is Myanmar. Even though it has only been post-conflict for about 2 years it would provide me with concrete observational data to show the effect of foreign aid in post-conflict societies. It would also allow for a longitudinal study. In fact, areas for further research would include more countries that are currently going through reconstruction from a conflict. However, I would not limit the selection of countries to just post-conflict

countries, I would also incorporate countries that have not gone through significant conflict in order to observe the difference of the impact of aid in post-conflict countries and non-conflict countries.

Rwanda has seen significant economic growth and development since the end of its civil war in 1994. It is one of the cleanest countries in Africa since the banning of plastic bags in its country (Carver, 2013). In addition, it is a leader among its African neighbors in promoting sustainable development in it political, economic, and social sectors. Some of this development can be attributed to the initial effect of foreign aid immediately after the genocide, but it can also be related to the effectiveness of the government, its productivity, capital stock and labor force. Rwanda still has many goals to achieve, however, it continues to outshine its African counterparts in promoting economic growth and development.

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13. __Appendix: SAS Code__

SAS Code for Non-Linear Equation (Model 1)

```
PROC IMPORT Out = work.Rwanda1
            DATAFILE = "S:\Private\maattadakwa\Rwanda_Data.xls"
                   DBMS=XLS REPLACE;
                   GETNAMES= YES;
RUN;
DATA Rwanda2;
      SET Rwanda1;

* This programing is used to transform the variables into a logarithmic form;

Proc reg;
model GDP=LAB TFP CS GE ODA;
run;

Proc reg;
model GDP=LAB TFP CS GE ODA/VIF;
run;

proc autoreg;
model GDP=LAB TFP CS GE ODA/NLAG=1 DWprob;

proc autoreg;
model GDP=LAB TFP CS GE ODA/dw=2 DWprob;
output out=resid r=resGDP;

DATA Rwanda2;
      set resid;

lagresGDP=lag1(resGDP);
lagGDP=lag1(GDP);

Proc reg;
model resGDP= lagresGDP;
test lagresGDP=1;

Proc Sort;
      by years;

PROC MEANS;
      RUN;
```

SAS Code for Double Log Equation (Model 2)

```
PROC IMPORT Out = work.Rwanda1
            DATAFILE = "S:\Private\maattadakwa\Rwanda_Data.xls"
                  DBMS=XLS REPLACE;
                  GETNAMES= YES;
RUN;
DATA Rwanda2;
      SET Rwanda1;

* This programing is used to transform the variables into a logarithmic form;

GDP2=log(GDP);
ODA2=log(ODA);
LABF2=log(LABF);
CS2=log(CS);
TFP2=log(TFP);
GED=GE*ODA2;

Proc reg;
model GDP2=LAB2 TFP2 CS2 GE ODA2;
run;

Proc reg;
model GDP2=LAB2 TFP2 CS2 GE ODA2/VIF;
run;

proc autoreg;
model GDP2=LAB2 TFP2 CS2 GE ODA2/NLAG=1 DWprob;

proc autoreg;
model GDP2=LAB2 TFP2 CS2 GE ODA2/dw=2 DWprob;
output out=resid r=resGDP2;

DATA Rwanda2;
      set resid;

lagresGDP2=lag1(resGDP2);
lagGDP2=lag1(GDP2);

Proc reg;
model resGDP2= lagresGDP2;
test lagresGDP2=1;

Proc Sort;
      by years;

PROC MEANS;
      RUN;
```

SAS Code for Interaction Equation (Model 3)

```
PROC IMPORT Out = work.Rwanda1
            DATAFILE = "S:\Private\maattadakwa\Rwanda_Data.xls"
                   DBMS=XLS REPLACE;
                   GETNAMES= YES;
RUN;
DATA Rwanda2;
      SET Rwanda1;

* This programing is used to transform the variables into a logarithmic form;

GDP2=log(GDP);
ODA2=log(ODA);
LABF2=log(LABF);
CS2=log(CS);
TFP2=log(TFP);
GED=GE*ODA2;

Proc reg;
model GDP2=LAB2 TFP2 CS2 GED;
run;


Proc reg;
model GDP2=LAB2 TFP2 CS2 GED/VIF;
run;


proc autoreg;
model GDP2=LAB2 TFP2 CS2 GED/NLAG=1 DWprob;

proc autoreg;
model GDP2=LAB2 TFP2 CS2 GED/dw=2 DWprob;
output out=resid r=resGDP2;

DATA Rwanda2;
      set resid;

lagresGDP2=lag1(resGDP2);
lagGDP2=lag1(GDP2);

Proc reg;
model resGDP2= lagresGDP2;
test lagresGDP2=1;

Proc Sort;
      by years;

PROC MEANS;
      RUN;
```