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The Opportunity Cost of Violence: An Analysis of the Relationship Between Foreign Aid and Terrorism in Sub-Saharan Africa

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The Opportunity Cost of Violence: An Analysis of the
Relationship Between Foreign Aid and Terrorism in
Sub-Saharan Africa

Senior Project Submitted to
The Division of Social Studies of
Bard College

By

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Annandale-on-Hudson, New York

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Dedication:

I would like to dedicate this project to my loving parents, brother, and dog. Thank you for your support, patience, and sacrifice. I would not be in this position without you. I will never be able to thank you enough for everything you have done for me.

Table of Contents

Acknowledgments.....	i
Dedication.....	iii
Ch.1 Introduction.....	1
Ch.2 Theoretical Argument.....	4
Ch.3 Empirical Analysis.....	12
Ch 4. Conclusion.....	28
Bibliography.....	35

Chapter I. Introduction:

"I can hear you, the rest of the world can hear you and the people who knocked these buildings down will hear all of us soon."—President George Bush, Address to Ground Zero Workers, Delivered September 14, 2001

The current Global War on Terrorism (GWOT) following the terrorist attacks of 9/11 has fundamentally shifted foreign policy of virtually every country. "This new enthusiasm is partly justified by the belief that aid can be a powerful instrument in a broader campaign against global terrorism. But foreign aid is also supposed to serve other purposes, such as helping the fight against global poverty."¹ In this paper, I argue that the two policy goals are not mutually exclusive. This link between fighting global poverty to combat terrorism insists that economic progress raises the opportunity cost of violence. Fighting global poverty spurs growth and creates economic opportunities that make the cost of taking up violence too high. For this reason, foreign aid can be a powerful instrument in the campaign against global terrorism, not unless it helps the fight against global poverty, but because it helps to fight against global poverty.

"Poverty does not make poor people into terrorists and murderers. Yet poverty, weak institutions, and corruption can make weak states vulnerable to terrorist networks and drug cartels within their borders."² This quote from the National Security Strategy of the United States of America explains the effect of poverty on the people of developing countries, it does not make people into terrorists but it creates an environment where the country is vulnerable to terrorism

¹ Moss, Todd, Roodman, David, and Standley, Scott. *The Global War on Terror and U.S. Development Assistance: USAID allocation by country, 1998-2005*. https://www.cgdev.org/sites/default/files/2863_file_WP62_1.pdf Center for Global Development. 2005

² The National Security Strategy of the United States of America. September 2002. <https://www.state.gov/documents/organization/63562.pdf>

becoming the only option for survival. It is important to define terrorism to understand the relationship between aid and terrorism, and terrorism and poverty. “Terrorism is the premeditated use or threat to use violence by individuals or subnational groups to obtain a political or social objective through the intimidation of a wide audience beyond the of the immediate victims”³ Within this definition they provided are two crucial elements that differentiates acts of terrorism from ordinary crimes or political or social protests; a political or social motive and the presence of violence (either in threat or in action). As explained in their work, these two elements are essential. Another element of terrorism is the facade of randomness applied to their targets. Their actions appear spontaneous and random to intimidate a broader audience by creating anxiety. However, unlike other crimes, acts of terror are not random, nor are they spontaneous. They are well-planned attacks that calculate possible risks, costs, and gains associated with the attack.⁴

In this paper, I will analyze the foreign aid data and instances of terrorism from 1990 to 2015 in sub-saharan Africa. Using the data I will establish the relationship between foreign aid and terrorism, explaining what factors increase and decrease the instances of terrorism. I will be looking at economic indicators such as Gross Domestic Product and growth rate to determine the effect of economic development on terrorism. I examine the effect pf military expenditure on the number of instances of terrorism because as the next chapter will explain there is a debate over the effect of increasing military spending on terrorism. I will also look at an index for democracy in a country to see if government types have an effect on terrorism. After the

³ Enders, Walter and Sandler, Todd. *The Political Economy of Terrorism*. 2005

⁴ Ibid.

economic regression I will analyze the and interpret the results. The results themselves are not as important as the effects that can come out of them. The results will dictate how policy should shift towards dealing with foreign aid, the war on terrorism and the war on poverty. After the global war on terror began, foreign aid policy shifted toward military aid at the expense of development aid. The model should show whether this policy is effective and if not, what the most effective policy would be.

Chapter II. Theoretical Argument:

In the aid-conflict debate there is generally two camps that have divided the issue into the effects foreign aid has on the probability of conflict within the host country (the country that receives the aid). The camps are as such; the foreign aid either raises the probability of domestic conflict or the foreign aid reduces the probability of civil war or domestic conflict. Domestic conflict in this instance is loosely described as the current government of the host country against a rebel group fundamentally opposed to the government in power. First, I will broadly lay out the two competing sides of the aid-conflict debate and describe the logical backing for either side. Second, I will go into detail on the conditions required for each. And lastly, I will describe in further detail special cases that have grown into their own study, though still being broadly identifiable by one of the two general camps.

However, prior to getting into the argument surrounding the effects of aid on conflict; there are a few general points about the nature of foreign aid made by those who write on this phenomenon. The first is made by Tahir in her paper on Pakistan, “While aid is allocated on the basis of trade and business opportunities, there is hardly any evidence that aid is associated with the promotion of human rights and democracy.”⁵ Too often aid is confused with giving money away or throwing money at a problem, like poverty, war, or hunger. As Nadia elaborates: aid is given to protect strategic and economic interests of the donor, such as the West’s target of aid to reduce terrorism rather than military intervention. Thinking of aid in these terms makes it less

⁵ Tahir, Nadia. 2017. “*Does Aid Cause Conflict in Pakistan?*”. Defense and Peace Economics, 28:1, 112-135,

about helping the people in the country and more about keeping the stability or continuity in power. Allowing those in power to control perceived threats to the donor countries and/or stabilize economic opportunities for the donor countries. Along the same lines Ree and Nillesen make the claim that foreign aid typically supports any leadership.⁶ Thus including leadership that is unwarranted by the majority of the population. Citing African regimes as being surprisingly durable despite economic stagnation and other problems on the whole that are associated with the continent. This durability is, in no small part, due to the large amount of foreign aid that is poured into African countries with leaders doing just enough reform to satisfy donors while using the rest to stay in power. Therefore the positive effects of reducing death and civil conflict may be outweighed by the negative effects of keeping the government in power. Does foreign aid give a dictator the ability to reduce liberties further?

2.1 Foreign Aid Reduces Probability of Conflict

Foreign Aid decreases the likelihood of civil war indirectly, by spurring economic growth, reducing government reliance on primary commodity exports⁷, and by increasing government military expenditure through aid fungibility. Aid resources are a good place for rebels to capture and therefore feed instability, spurring economic growth create economic alternative for rebels. Aid predominately works in countries with good economic policies. When the country has good economic policies and institutions aid is expected to increase income per capita in the country and thus is expected to decrease the probability of conflict by allowing

⁶ Nillesen, Eleonora and Ree, Jopp de. 2009. “*Aiding Violence or Peace? The Impact of Foreign Aid on the Risk of Civil Conflict in Sub-Saharan Africa*”. Journal of Development Economics

⁷ Commodity exports encourage rent-seeking behavior and are often sources of rebel funding.

alternative economic opportunities to evolve and improve. For example Tahir (2017), says uses the success of the Marshall Plan as an example of aid working in good policy environment. She takes it a step further stating that it is the earliest evidence that aid works only in democratic and well-functioning societies.

Collier and Hoeffler were among the first to emphasize the relationship between civil conflict and economic factors. Within this relationship there are certain economic indicators; low per capita income, badly performing institutions, dependence on primary commodity exports that have been associated with higher risk of civil conflict. Increased income, not only creates economic alternatives for rebels, it also reduces countries dependency on primary commodity exports marginalizing looting opportunities for rebels reducing their survival chances.⁸ In theory the aid should also increase the performance and stability of institutions in the country, however this is not always the case.

According to Feyzioglu, the donor community has become increasingly concerned that aid intended for development progress in the economic and public sectors might be used directly or indirectly to increase military expenditures. Aid fungibility refers to the potential for aid to be diverted for purposes other than those intended by its donor, and is an important determinant in whether aid increases or decreases violence.⁹ Aid fungibility is a double-edged sword for the state. The negatives will be further discussed in the section describing how foreign aid can increase the probability of conflict, this section will focus on the major positive associated with the ability to divert aid—increased military expenditure. The intuition behind this concept of

⁸ Collier, Paul and Hoeffler, Anke. 1998. “*On Economic Causes of Civil War*” Oxford Economic Papers 563-573

⁹ Feyzioglu, Tarhan and Swaroop, Vinaya and Zhu, Min. 1998. “*A Panel Data Analysis of the Fungibility of Foreign Aid*” The World Bank Economic Review, Vol. 12 No. 1: 29-58

deterrence is that the larger the military of the state the less likely the chances of the rebels will have of winning. Therefore, there is a decreased risk of civil war breaking out because the risk to reward analysis is a deterrent to rebels trying to seize the government.

Based on Ree and Nillesen, foreign aid can also affect the the probability of civil conflict continuation both negatively and significantly.¹⁰ Using sub-Saharan Africa as the region of study aid flows were found to reduce the duration of civil conflicts. A 10% increase in foreign aid is estimated to decrease the probability of continuation by about 8 percentage points, the unconditional probability of conflict continuation is about 90%. They conclude the research saying “foreign aid flows may be an important tool to policy- makers and aid agencies in preventing future conflict.” This can mean that aid flows are more important than the actual aid itself, sudden and major increases in aid may reduce the risk of civil conflict, while sudden withdrawal causes more violent conflict.

2.2 Foreign Aid Increases Probability of Conflict

Foreign aid increases the probability of conflict because aid increases the prize to be won from rebellion. The government may use aid as a way of deterring the rebels from engaging in conflict, however deterrence is not always successful. The rebels may decide to go to war to win control of the aid rather than settle with what the government offers. The increased spoils for capturing the capital motivates the onset of rebellion and contributes to prolonging the conflict by changing the ongoing conflict dynamics. There is a comparison between foreign aid and natural resources, which I will address later on, however briefly aid like other resources trigger

¹⁰ Nillesen, Eleonora and Ree, Jopp de. 2009.

rent-seeking behavior to ensure the survival of rebellion once it has started. There is also the idea that rebels can gain from aid without capturing the state. Aid to government is a rent not income received through taxation. Rent arises from conditions of scarcity and is paid to the owner of the resource, such as profits from natural resources like oil. When rents rise through foreign aid it triggers rent seeking behavior to motivate rebellion and to ensure the survival of rebellion once the war has started.

Natural resources are a good comparison to foreign aid more than just their rent similarities, the two are also alike in their capacity to be both a blessing and a curse. The latter being the focus. The natural resource curse is defined as phenomenon that tries to understand why countries blessed with valuable resources within their borders have not been able to prosper and achieve a strong economy. Countries like Angola (diamonds), Venezuela (oil), and Democratic Republic of Congo (coltan) have have not been made rich by their valuable natural resources but rather trapped by them. In Harford and Klein, this resource curse is applied to foreign aid. Institutions interact with aid in much the same way as resources do. As found by research resource endowments more likely lead to weakened institutions so too does aid endowments lead to weakened institutions.¹¹ This creates a vicious circle because as Tahir mentioned aid works in good policy environments with strong institutions in place, or as she puts it democratic and well-functioning societies.¹²

Some arguments aid intensifies ethnic cleavages which can make conflict more likely or that foreign aid increases the payoffs to rebels initiating a civil war by increasing the value of

¹¹ Harford, Tim and Klein, Michael. 2005. “*Aid and the Resource Curse*”. The World Bank Group, Public Policy for the Private Sector.

¹² Tahir, Nadia. 2017.

capturing the state. Others argue that aid decrease the risk of civil war by promoting economic growth and strengthening state capabilities. However both assume that aid transfers are steady and predictable— aid flows are often unstable and uncertain up to 40% more volatile than gov revenue. Similar to resources and commodities aid flows are volatile and prone to what Nielsen describes as shocks—sever decreases in aid revenues that shift domestic balance of power and induce violence. Negative aid shocks significantly increase the probability of armed conflict.¹³ Using Mali as an example of conflict arising from aid shocks, shows how Mali became reliant on foreign assistance which accounted for more than 30% of its budget. The aid was used to broker peace in the Tuareg region but when aid flows were drastically reduced in 1989 the government was unable to provide the same level of assistance to the region. The following year the Tuareg region initiated its rebellion against the Mali government.

In the same way that aid fungibility allows the state to increase its' military expenditure in order to deter the rebels from starting conflict, but there is an unintended consequence from aid being easily diverted. Increasing military expenditure can create a stronger government military force that may deter rebels from attacking, or it may lead the rebels to strengthen their own forces creating an arms race. This arms race increases the instability in the country and raises the probability of conflict because of the rising stakes and strength of both sides. This is because gaining access to the increasing government aid rents may out weigh the cost of fighting for the rebels. Incentives created for rebellion and civil violence is likely caused, at least partially, by high levels of foreign aid.

¹³ Nielsen, Richard and Findley, Michael. 2011. "*Foreign Aid Shocks as a Cause of Violent Armed Conflict.*", American Journal of Political Science, Vol. 55, No. 2, pp. 219-232

2.3 Link Between Civil Conflict and Terrorism

In order to explain the links between civil conflict and terrorism, it is necessary to first define what each of these terms mean. James Fearon defines civil war as “a violent conflict within a country fought by organized groups that aim to take power at the center or in a region, or to change government policies. Everyday usage of the term "civil war" does not entail a clear threshold for how much violence is necessary to qualify a conflict as a civil war, as opposed to terrorism or low-level political strife.”¹⁴

Where Enders and Sandler define terrorism as “the premeditated use or threat to use violence by individuals or subnational groups to obtain a political or social objective through the intimidation of a wide audience beyond the of the immediate victims.”¹⁵ Within this definition they provided are two crucial elements that differentiates acts of terrorism from ordinary crimes or political or social protests; a political or social motive and the presence of violence (either in threat or in action). As explained in their work, these two elements are essential. Another element of terrorism is the facade of randomness applied to their targets. Their actions appear spontaneous and random to intimidate a broader audience by creating anxiety. However, unlike other crimes, acts of terror are not random, nor are they spontaneous. They are well-planned attacks that calculate possible risks, costs, and gains associated with the attack.¹⁶

The link between the two is clear. In both civil conflict and terrorism, an individual or group aim’s to change the government policies through violence or the threat of violence. The

¹⁴ Fearon, James. *Iraq's Civil War*. Foreign Affairs. March 2007. <https://www.foreignaffairs.com/articles/iraq/2007-03-01/iraqs-civil-war>

¹⁵ Enders, Walter and Sandler, Todd. *The Political Economy of Terrorism*.

¹⁶ Ibid.

extent to which the two concepts overlap proves that they should be thought of in similar ways, and that is the goal of this paper. It uses instances of terrorism as proxies for civil conflict, as they both are violent in nature and aim to change something in the government. Often times acts of terror are strategic actions within a civil war. Typically, insurgent groups are overpowered by the government in resources, man power, and capital; terrorism is a tactic to fight a superior opponent. Therefore because of the similarity, the debate over civil conflict relationship with foreign aid should have many overlaps with the relationship between terrorism and foreign aid.¹⁷

¹⁷ Butcher, Charity. *Civil War and Terrorism: A Call for Further Theory Building*. Oxford Research Encyclopedias. <http://politics.oxfordre.com/view/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-520>

Chapter III. Empirical Analysis:

“‘Data! Data! Data!’ he cried impatiently. ‘I can’t make bricks without clay.’”—Sherlock Holmes, The Adventure of the Cooper Beeches

This section undertakes a econometric analysis of the impact of foreign aid on the frequency of terrorism, using sub-saharan African countries as the area of interest. A cross-national, time-series data analysis of 43 countries for 1990–2015. Sub-Saharan Africa is an area of great interest and is the perfect area to study because of the amount of aid that the region annually receives, because of the varying levels of development, and because of the large amount of terroristic incidents. In order to study the area, it is first necessary to define it. There is some controversy and disagreement on which countries constitute Sub-Saharan Africa. Depending on what institution you look at or who you ask, the country list could vary slightly. For this paper, I based the definition of Sub-Saharan Africa on the United Nations Development Program¹⁸, which lists 46 countries constituting the region. I further dropped Cape Verde, Sao Tome and Principe, and South Sudan because of a lack of available information on the three countries; leaving 43 countries to be observed.

The next parameter to define is the time period. For this analysis, I decided on a twenty-six year period from 1990 to 2015. This time frame allowed the aid enough time to take effect and study the countries over a broad time period to get a more accurate sense of the region. It is also important to note that the period covers both the period before the global war on terror, the catalyst of the war (9/11), and the period following the global war on terror.

¹⁸ United Nations Development Programme. *About Sub-Saharan Africa*. <http://www.africa.undp.org/content/rba/en/home/regioninfo.html>

Of the three principle reasons this area is highly interesting; the sheer amount of aid it receives is incredible. The Organization for Economic Co-Operation and Development (OCED) is an organization that promotes policies that will improve the economic and social well-being of people around the world. It is also the organization that is responsible for the data on official development aid (ODA), which is the amount of aid each country received. The ODA money is provided by a network of donors called the Development Assistance Committee (DAC), a group of 30 countries that discusses issues surrounding aid, development, and poverty reduction in developing countries. It is the self-described “venue and voice” of the world’s major donor countries.¹⁹ Of the recipients ‘South of Sahara’ is the largest by region at 22.8% of total net ODA, ‘South and Central Asia’ is the next largest region at 11.8%.²⁰

3.1 Relationship between FA and Terror

As shown in chapter 2, the literature is split in the relationship between foreign aid and violent conflict, in this case terrorism. With the global war on terror causing shifts in foreign policy related to foreign aid; whether development or military aid yields better results and whether aid can still fight poverty in the shift toward fighting terror. The relationship between the two has never been more important to foreign policy. Therefore, it is of vital importance that there relationship be analyzed using data from the past in order to find whether development aid is effective in fighting terrorism, and whether the war on poverty and the war on terror may be more related than previously thought. In this paper, the assumption that will be put to the test is

¹⁹ Organization for Economic Co-operation and Development. *The History of OECD’s Development Assistance Committee*. <http://www.oecd.org/dac/1896808.pdf>

²⁰ Organization for Economic Co-operation and Development. https://public.tableau.com/views/AidAtAGlance/DACmembers?:embed=y&:display_count=no?&:showVizHome=no#1

that an increase, or high amount of foreign aid leads to a lower amount of terrorism. This is the assumption because development aid will increase economic activity in developing nations, such as the nations in sub saharan Africa, and with the increased economic activity will bring less reason to protest against government policies.

3.1.1 Terror is Dependent Variable

One of the two most important variable in the model, the dependent variable of this regression is instances of terrorism sourced from the Global Terrorism Database (GTD).²¹ This is the variable everything will be based off of. The purpose of this study is to see what elements of an economy affect the number of terror instances. Terrorism, specifically acts of terrorism, is hard to definitively define. While the broad elements of terrorism are generally agreed on, there is often disagreement on the details. For this reason it is important to understand the definition used by the GTD in the construction of their database. Information on incidents are is drawn from publicly available, open sourced materials such as electronic news sources, existing data sets, books, journals and legal documents. Incidents were collected according to the following definition of terrorism: "the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation."²² This definition is linked to the earlier one mentioned by Enders and Sandler, where terrorism has three key elements; premeditated action by a non-state actor that threatens or directly uses violence to attain political change through intimidation and fear, conveying the

²¹ Global Terrorism Database. <http://www.start.umd.edu/gtd/>

²² Ibid.

message to a larger audience than the immediate victim. It is a direct action against the state of government in the country and often times fits within the context of civil war.

3.1.2 Foreign Aid is Variable of Interest

The question whether foreign aid enhances economic growth has long been debated. Jefferey Sachs and William Easterly represent the two sides of the debate. Sachs argues that foreign aid is an important tool for poverty reduction and development, while easterly suggests that foreign aid does not reach the poor.²³ This paper works on the conception proposed by Sachs, that aid is instrumental in reducing poverty and increasing economic development. In achieving these two goals, economic opportunity is created incentivizing away from violence in the form of terrorism. The DAC of the OCED defines foreign aid as a resource flows provided by official agencies with the intent to promote economic development.²⁴ The data for this variable is sourced from the OCED database.²⁵

3.2 Data and Methodology

At the broadest level there are two basic types of data; quantitative and qualitative. Quantitative data deals with things you can measure objectively. Qualitative deals with characteristics that cannot be easily measured, but subjectively observed. This data is quantitative.

²³ Acevedo, Ivonne. *Does Foreign Aid Have an Effect on Economic Growth?* <http://chicagopolicyreview.org/2016/06/15/does-foreign-aid-have-an-effect-on-economic-growth-new-research-adds-to-the-debate/> Chicago Policy Review. 2016.

²⁴ Apodaca, Clair. *Foreign Aid as a Foreign Policy Tool*. <http://politics.oxfordre.com/view/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-332> Oxford Research Encyclopedias. 2017

²⁵ Organization for Economic Co-operation and Development. <https://data.oecd.org>

Yet, the quantitative group can be further refined into two distinct groups; continuous and discrete. As a general rule counts are discrete and measurements are continuous. Data in this model is count data. It is not continuous, but a discrete number of instances every year for a twenty-six year period, for each of the forty-three countries observed.

3.2.1 Count Data

In count data the underlying variable in each case is discrete, taking a non-negative integer/number of values for a finite period of time. It can often be comprised of rare or infrequent occurrences, in many cases, taking zero for the majority of observations. The distribution is not normal but highly skewed because of the frequent number of years without a instance of terror, and the infrequent outbursts of terror instances. As shown by Figure 1 below, the visual representation of instances of terror shows that the distribution is highly skewed to the right and does not follow a normal distribution. The summary statistics (Table 1) of the variable confirm that the variance is incredibly high at 1136.55, normal variance is near zero. The kurtosis also shows a lack of symmetry in the tails, 208.8 is high when compared to a normal distribution having a value near three. A positive kurtosis value indicates a heavy-tailed with multiple outliers. The significant skewness and kurtosis indicate that the distribution of the data does not follow a normal distribution. Therefore, the ordinary least squares (OLS) model is not appropriate for count data.

Figure 1. Histogram of Instances of Terror

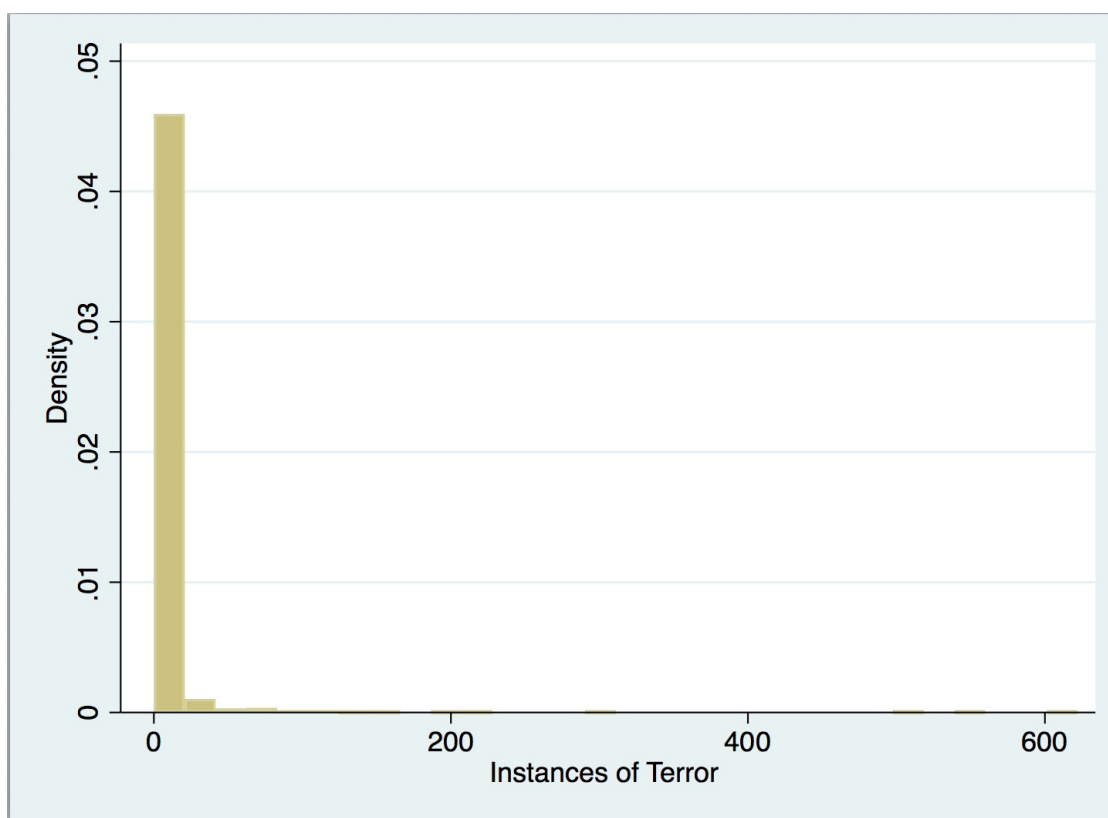


Table 1. Summary Statistics of Instances of Terror

Instances of Terror				
Percentiles		Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	1,118
25%	0	0	Sum of Wgt.	1,118
50%	0		Mean	5.824687
		Largest	Std. Dev.	33.71277
75%	2	291		
90%	9	508	Variance	1136.551
95%	18	541	Skewness	13.25496
99%	95	622	Kurtosis	208.8055

3.2.2 Count Data Modeling Options

To model this phenomenon a probability distribution is needed to take into account the unique features of count data. There are two options to model this type of data; the Poisson Regression Model (PRM) and the Negative Binomial Regression Model (NBRM). The model often used to model count data is the PRM. However, a restrictive feature of the PRM is that it requires equal dispersion; where the mean and the variance are equal. In practice the variance is usually higher than the mean, over dispersion. For this reason the results of a PRM should not be accepted at face value. The assumption of the Poisson distribution underlying the estimated model needs to be tested. According to Table 1, the variance is nearly 200 times larger than the mean, meaning there is over dispersion. There are two ways of correcting the standard error correcting for over dispersion: one by the method of quasi-maximum likelihood estimation (QMLE) and the other by the method of generalized linear model (GLM). However, if the assumption of equal dispersion underlying the PRM cannot be sustained, alternative models need to be sought out. Before we can run a Poisson regression, even though we believe that the Poisson distribution is not correct. The regression can be followed up with the ‘poisgof’ command which tests the poisson goodness-of-fit (gof). This sequence is shown below in Table 2. The large value of chi-squared in the gof and a significant ($p < 0.05$) test statistic both indicate that the poisson model is inappropriate.²⁶

²⁶ Gujarati, Damodar. *Econometrics by Example, second edition*.

Table 2. Poisson Regression Model

. poisson instancesofterror odapercapita						
Iteration 0: log likelihood = -14726.221						
Iteration 1: log likelihood = -14644.902						
Iteration 2: log likelihood = -14644.79						
Iteration 3: log likelihood = -14644.79						
Poisson regression						
				Number of obs	=	1,111
				LR chi2(1)	=	2925.93
				Prob > chi2	=	0.0000
Log likelihood = -14644.79				Pseudo R2	=	0.0908
instancesofterror	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
odapercapita	-.0395116	.0008459	-46.71	0.000	-.0411696	-.0378536
_cons	2.711839	.0209611	129.37	0.000	2.670756	2.752922
. poisgof						
Deviance goodness-of-fit = 27915.24						
Prob > chi2(1109) = 0.0000						
Pearson goodness-of-fit = 126553.9						
Prob > chi2(1109) = 0.0000						

After definitively proving that the PRM is not appropriate for this data, an alternative model is needed. One alternative is the NBRM which is based of the Negative Binomial Regression Distribution (NBRD) and is often more appropriate in cases of over dispersion. In this regression distribution it can be shown that

$$\sigma^2 = \mu + (\mu^2/r); \mu > 0, r > 0$$

where σ^2 is the variance, μ is the mean and r is the parameter of the model.²⁷ As shown by the equation above, the variance is always larger than the mean in the NBPD, in contrast with the Poisson PDF where the variance equals mean. For this reason the NBPD is more appropriate to use for count data than the PPD. It is also to note that as r approaches ∞ and p (the probability of success) approaches 1, the NBPD approaches the Poisson PDF, assuming mean μ stays constant.²⁸ Table 3 below shows that the PRM greatly underestimated the values because of the over dispersion, for example the z scores, coefficient, and standard error are all significantly lower in the Poisson model than in the NBRM. The log likelihood in the NBRM is also greater than the poisson model, and the LR chi score is much lower in the NBRM; all indicators of the negative binomial regression model being the more appropriate model to use for this type of data.

Table 3. Negative Binomial Regression

Negative binomial regression				Number of obs	=	1,111
				LR chi2(1)	=	59.36
Dispersion = mean				Prob > chi2	=	0.0000
Log likelihood = -1992.3184				Pseudo R2	=	0.0147
instancesofterror	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
odapercapita _cons	-.0238248	.0028002	-8.51	0.000	-.029313	-.0183365
	2.314709	.1264944	18.30	0.000	2.066785	2.562634
/lnalpha	2.070839	.0588669			1.955462	2.186216
alpha	7.931478	.4669014			7.067187	8.90147
LR test of alpha=0: chibar2(01) = 2.5e+04				Prob >= chibar2 = 0.000		

²⁷ For NBPD the parameters are p , the probability of success, and r , the number of successes.

²⁸ Ibid.

3.4 Controls

3.4.1 Real GDP per Capita

Real Gross Domestic Product (GDP) per Capita represents the level of development in the country adjusted for inflation. It is the broadest quantitative measure of a nation's total economic activity, representing the monetary value of all goods and services produced within a nation's borders. GDP per capita is the national income per person, calculated by dividing a country's GDP by its total population. This is important when doing cross country comparisons like the one this paper presents. It is a direct measure of productivity and an indirect measure of living standards, the higher the GDP per capita the higher, theoretically, the standard of living of the people of the country. It is theoretically because there can be income inequality as not everyone makes the exact same share. Inequality varies by country, however as a broad figure it is often cited as assessing the standard of living and that will be how it is used in this paper. It is important to use real GDP because of the comparisons between different years as it is adjusted for inflation. This data is sourced from the World Bank.²⁹

3.4.2 Annual Growth Rate

Economic growth can be considered among the most crucial indicators of the overall state of an economy. Bringing in Annual Growth Rate of the country accounts for the pace of development in the country. An economic growth rate is a measure of economic growth from one period to another in the form of a percentage. In practice, the measure is usually the rate of

²⁹ The World Bank Group. <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?end=2016&start=1967>.

change that a nation's GDP goes through from year to year. The growth rate provides insight as to the direction and extent of growth for the overall economy. Also, the stage of development of an economy is important to know when comparing two economies; because growth rates of developing countries are on average higher than those in developed countries. Comparisons between countries like the United States and China will not be accurate, but comparing countries in the same stage of development, in the same region, can provide a clearer picture. This data is also sourced from the World Bank.³⁰

3.5.3 Trade Openness

The majority of papers use the trade ratio as a measure of trade policy, that is trade openness is represented by the equation exports plus imports as a share of GDP multiplied by one hundred. Integration in the global economy is an important determinant in both of the variables above. Although there are arguments against developing countries opening up to international trade, it is generally considered effective to spurring economic growth and innovation. Economic theory has identified just how trade is believed to promote economic progress; “trade is believed to promote the efficient allocation of resources, allow a country to realize economies of scale and scope, facilitate the diffusion of knowledge, foster technological progress, and encourage competition both in domestic and international markets that leads to an

³⁰ Ibid.

optimization of the production processes and to the development of new products.”³¹ This data was also from the World Bank database.³²

3.5.4 Military Expenditure

A crucial element to bring into the model because of the literature and theory involved in using increased military expenditure as a deterrent to violence. The idea of deterrence in the conflict literature is the larger the military of the state the less likely the chances of the rebels will have of winning. Terrorism is similar in that the risk reward of achieving their political or economical objectives diminishes when the military power is overwhelming. The allocation of funds toward high increases in military expenditure also usually come at the cost of development expenditure. The opportunity cost between military spending and economic development spring is also important because it is the concept of preemptive vs reactionary measures. Increasing military spending fights against the terrorists, economic development creates opportunities that make the conditions forcing people into taking up violence. This study aims to examine whether this idea the increased allocation of resources for military spending is helpful in reducing the number of terrorist incidents. This variable is formulated by taking military expenditure as a percentage of GDP, the data is from the World Bank.³³

³¹ Busse, Matthias & Königer, Jens. *Trade and Economic Growth: A Re-examination of the Empirical Evidence*. Hamburg Institute of International Economics. http://www.hwwi.org/uploads/tx_wilpubdb/HWWI_Research_Paper-123_Trade-and-Growth.pdf

³² The World Bank Group.

³³ Ibid.

3.5.5 Polity Index

This control variable is interesting because it is one the only one that more qualitative than quantitative. The polity data series is widely used in political science research. The data contains information on the level of democracy in independent states with populations greater than 500,000 and covers a time period of 1800 to the present. The index is based on an evaluation of that state's elections for competitiveness and openness, the nature of political participation in general, and the extent of checks on executive authority. These indicators create a “polity score” that ranges from -10 to 10; -10 to -6 corresponding to autocracies, -5 to 5 corresponding to anocracies, and 6-10 corresponding to democracies. This variable is important because it describes the environment in the country, and the environment for dissent against the government. The data and polity scores were sourced from the Polity Project.³⁴

3.5.6 Population

The final control variable is total population of a country. The amount of people in a country is an important because the more people the more the GDP is divided to find individual income, the more people there are that need economic opportunity, and the more people who may turn to terrorism if that economic opportunity is not there. This variable is important because it puts the country in context and is important for comparing countries of different sizes together. The data was sourced from the World Bank.³⁵

³⁴ Polity Project. <http://www.systemicpeace.org/polityproject.html>

³⁵ The World Bank Group.

3.5 Discuss the Results

Table 3 shows the results of the negative binomial regression of all the variables; instances of terror, ODA per capita, real GDP per capita, annual growth rate, trade openness, military expenditure, polity index, and population. The regression results show that there is a negative relationship between aid and conflict, how increased amount of foreign aid has led to a decrease in the instances of terrorism.

ODA per capita, real GDP per capita, annual growth rate, and trade openness all had negative coefficients and were statistically significant. This means that as these variables increased the instances of terrorism decreased by their respective coefficient. It is interesting because aside from the variable of interest, ODA per capita, all of these variables are related to economic development. Real GDP the level of development, growth rate representing the pace of development, and trade openness representing the integration into the global economy. This is an indication that spurring economic growth and opportunities increases the cost of taking up violence, a point that will be expanded upon in the next section.

The other variables have the opposite relationship with instances of terror. Military expenditure, polity index, and population all show that as their value increases, so do the instances of terror. These prove counter to the claims that increasing military expenditure decreases the risk of terrorism, it does not seem to act as a deterrent. The population variable is not surprising as the population increases it is understandable that the instances of terror could increase because there is less opportunities and more of an incentive to take up violence. The interesting point is the polity index, showing that as a country was more democratic it had more

instances of terror. This might seem counterintuitive, but there are logical reasons why this may be the case that will be explained in the next section.

Table 3. Terrorism and Aid Relationship based on GTD (Negative Binomial Regression)

Variables	InstancesOf Terror	InstancesOf Terror	InstancesOf Terror	InstancesOf Terror	InstancesOf Terror	InstancesOf Terror
ODA per Capita	-0.0238248*** (.0028002)	-0.0258209*** (.0029462)	-0.0279772*** (.003117)	-0.0229597*** (.0032189)	-0.024479*** (.0035372)	-0.0219564*** (.0035881)
Real GDP per Capita		-0.0001292** (.0000575)	-0.0001268** (.0000577)	-0.0001368** (.000051)	-0.0000992* (.0000602)	-0.0000967 (.0000676)
AnnualGrowth Rate			-0.0241716** (.0098076)	-0.0229151** (.0110982)	-0.0233961* (.0123184)	-0.0271916** (.0117076)
Trade Openness				-0.0204698*** (.0022723)	-0.023396*** (.0028095)	-0.0227834*** (.0027283)
Military Expenditure					0.0864617** (.0401483)	0.1318725*** (.0445151)
PolityIndex						0.0656795*** (.0208224)
Population						1.102847*** (.080108)
Observations	1,111	1,108	1,107	1,046	872	847

Note: Standard errors in parenthesis.

***p<0.01, **p<0.05, *p<0.1.

Chapter IV. Conclusion:

“You can never win a war against terror as long as there are conditions in the world that make people desperate — poverty, disease, ignorance.”
—Archbishop Desmond Tutu

The data and econometric modeling used in this paper was to examine the relationship between foreign aid and terrorism in sub-saharan Africa. It was to identify the factors that decreased instances of terror and the factors that increased terrorism. The model was successful in identifying this factors and putting a numeric value on its effectiveness, which makes for a great table but should not be the end goal of the analysis. The objective of this analysis is to have policy implications for foreign aid donors, specifically the United Staes because it is the largest donor in the DAC and the leader in the war on terror. In the GWOT we have been fighting what seems to be a losing battle since it's inception in 2001, which can be attributed to not knowing the most effective way to combat terrorism. At the beginning of a new war the effective practices are not known immediately, there is a period of trial and error. A period that yields data to be analyzed and investigated to find which practices are effective and which are not. This period of trial and error should be come more narrow, focusing on what has worked in the past or what has worked in specific areas; namely how foreign aid and the economic development associated with it have been effective in reducing instances of terror in sub-saharan Africa. As shown in regression model (Table 3), foreign aid is working as a factor in reducing terrorism in sub-saharan Africa. This section explains why foreign aid is working in sub-saharan Africa, what is not working, and how policy should be adjusted to fight terrorism more efficiently.

4.1 Economic Development is Good

As shown in table 3, economic development is factor in the fight against terrorism that has been effective at reducing the instances of terror in sub-saharan Africa. The two indicators of economic development, real GDP per capita and annual growth rate, both had negative relations with terrorism meaning that when they rose instances of terror fell. Instances of terror falling can be, at the very least, partial attributed to the increased economic opportunity that economic development creates. The work of Nobel Prize winning economist Amartya Sen “emphasizes the need for meaningful choice as the end and the means of development. Choice is powerful and opens the door to hope, opportunity, change, and a better future.”³⁶ Without choice people are put into desperate situations and forces people to commit desperate actions.

Relative deprivation theory is a theory in sociology that focuses on social change and movements, which could be loosely applied to acts of terrorism. The theory is that people take action for social change in order to acquire something that others possess and which they believe they should have too. This can be applied to economic opportunities and opportunity cost. When there are no economic opportunities, the opportunity cost of violence is not very high because it is really the only option for survival. According to the deprivation theory, people will take up action to acquire economic opportunities. This action will often times be violent in nature and can result in terrorism if dealing with an overwhelming state. However, if there are economic opportunities the opportunity cost of becoming violent is significantly higher because they would have to forfeit the opportunity to make money to take up violence. When economic development increases the opportunity cost of violence increases to the point where it is no longer an option.

³⁶ Harriman, Jake. Linking Extreme Poverty and Global Terrorism. The New York Times. March 13, 2012.

Economic development also reduces grievances of the people. Acts of terror have a motivations and goals, they are not random acts of violence for violence sake. This is a crucial element of terrorism, they aim to change a policy whether it is; social, political, economical or otherwise. In this way acts of terror are often times embodiments of public grievances. Increasing military expenditure to suppress terrorism is the same as suppressing the public grievances which will only create more grievances. From this standpoint, increasing military power to suppress can have the opposite of the desired effect. Economic development on the other hand can reduce economic grievances, or the underlying cause of some acts of terrorism.

4.2 Trade is Good

Integration into the global market creates positive economic results. Countries that are open to trade benefit from increased efficiency, access to more products and larger markets, and exposure to new technology and innovation. These benefits international trade provides directly contribute to the economic development of developing countries, so the results from the regression in table 3 make sense. When a country is more open to trade they experience less terrorism. Terrorism can also be detrimental to trade raising the cost of doing business with terror-affected countries. This can have a spiraling effect as prices rise reducing the amount of exports and imports of a country, making it less open for trade and increasing the amount of terrorism instances.³⁷

³⁷ Federal Reserve Bank of St. Louis. *The Economic Impact of Terrorism on Developing Countries*. <https://www.stlouisfed.org/on-the-economy/2018/january/economic-impact-terrorism-developing-countries>

4.3 Military Expenditure

Even though there are reasons to doubt the reliability of these results, related to the principles of causality, where increased military expenditure could be a response to increased terrorism. An argument could be made that the effect of terrorism could be a cause for increased military expenditure. However it seems that raising the military expenditure does not have much of an effect on the number of terrorism instances. The data from table 3 shows that instances of terror actually increase as military expenditure increases. This is contrary to the argument that increased military spending acts as deterrent to violence. Taking this into account foreign aid for development should be prioritized over military aid, rather than the other way around. Increasing military expenditure is a reactionary response to terrorism, attempting to increase the ability to suppress it rather than stopping its development in the first place. In a war it is not easy to win when you are merely reacting to what the enemy is doing, this strategy requires time and sacrifice to have a chance at succeeding. Instead of reacting, efforts could be made to attack before terrorism is fully developed, this is the point of economic development.

4.5 Polity index

American policymakers have consistently advanced the idea that creating democracies out of autocracies will reduce terrorism. It has become part of security policy, democracy has become the solution to terrorism in the eyes of policy makers. The idea that people will be satisfied with the more free and economically prosperous form of government. Many scholars have pushed back on this idea, citing multiple historical examples of democracy actually bringing more terrorism. The global spread of democracy will not end global terrorism because

democracies may be more susceptible to terrorism than other forms of government. How this isn't actually a bad thing or a call for more authoritative regimes. "There are five primary groups of explanations for this phenomenon, including the openness of democratic systems, organizational pressures resulting from democratic competition, the problem of underreporting in authoritarian regimes, gridlock resulting from multiparty institutions, and the coercive effectiveness of terrorism against democracies."³⁸ This explains why there is an increase in instances of terror as the polity index increases. This is also not an argument against democracy, as many of the explanations for the phenomenon benefit the people of the country more than terrorism harms them, it is simply an explanation for the data. It also shows that democracy is not the silver bullet policy makers make it out to be, the end of global terrorism will not be because democracy has been spread to every government.

4.7 Conclusion

The evils of economic destitution are contributing to the global war on terror. A country that lacks economic opportunity, is populated by a people who lack basic needs and the ability to make choices that will improve their lives. The concept that increasing military expenditure to combat terrorism in sub-Saharan Africa is not working in practice. It is a reactionary measure that aims to suppress terrorism rather than remove the root causes of it. Foreign aid for development creates economic opportunity that reduces the need to take up violence and makes the opportunity cost of terrorism too high. Terrorism is political in nature and seeks to change something the people have grievances towards, in this case it is lack of economic opportunity.

³⁸ Chenoweth, Erica, "Is Terrorism Still a Democratic Phenomenon?", *Uluslararası İlişkiler*, Volume 8, No 32 (Winter 2012), p. 85-100

Development aid sets its aim at the root cause of terrorism; the destitute people who have no other option than to take up violence. Like former secretary of state general Collin Powell said “We can’t just stop with a single terrorist or a single terrorist organization; we have to go and root out the whole system. We have to go after poverty.” The data proves that it is more effective to decrease the reason the people are disillusioned, rather than increase the ability of the state to suppress it. Which makes sense, it is better to reduce the effect of a future problem than to try to suppress a current problem. This should have major implications to United States foreign policy and in the strategy on the war against terror. The United States leads the charge against global terrorism because of the reality altering attack on 9/11. If the United States changes its foreign policy in regards to development aid rather than military support it would change how other countries approached the problem too. The United States is a leader if we fight terror more efficiently, the rest of the world will follow suit.

It is important to conclude with a note that this will not eradicate terrorism, even if the link between economic development and terrorism, demonstrated here by the NBRM, is an effective way of combating terrorism it will not stop it all together. However, it will reduce the instances as shown by the model. This is because the links between poverty and terrorism are not the only factors that go into why acts of terrorism happen, the perpetrators of 9/11 were not poor, nor were they uneducated. Terrorism is not a new phenomenon, it existed prior to 9/11 and will exist long beyond it. The reduction will come from the people who are desperate because of the lack of opportunity that terrorism becomes a means to survival. The opportunity cost of taking up violence to acquire opportunity is high when there is nothing else, this is where economic development comes in. Economic opportunity, that stems from growth, creates an

alternative to violence raising the opportunity cost of violence to a point where it is not sustainable. It is true not all developing countries have problems with terrorism, however the ones that do could benefit from foreign aid policies that prioritize economic development over raising military expenditure.

Bibliography

- Acevedo, Ivonne. *Does Foreign Aid Have an Effect on Economic Growth?* <http://chicagopolicyreview.org/2016/06/15/does-foreign-aid-have-an-effect-on-economic-growth-new-research-adds-to-the-debate/> Chicago Policy Review. 2016.
- Apodaca, Clair. *Foreign Aid as a Foreign Policy Tool.* <http://politics.oxfordre.com/view/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-332> Oxford Research Encyclopedias. 2017
- Busse, Matthias & Königer, Jens. *Trade and Economic Growth: A Re-examination of the Empirical Evidence.* Hamburg Institute of International Economics. http://www.hwwi.org/uploads/tx_wilpubdb/HWWI_Research_Paper-123_Trade-and-Growth.pdf
- Butcher, Charity. *Civil War and Terrorism: A Call for Further Theory Building.* Oxford Research Encyclopedias. <http://politics.oxfordre.com/view/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-520>
- Center for Systematic Peace. *Polity Project.* <http://www.systemicpeace.org/polityproject.html>
- Chenoweth, Erica, "Is Terrorism Still a Democratic Phenomenon?", *Uluslararası İlişkiler*, Volume 8, No 32 (Winter 2012), p. 85-100
- Collier, Paul and Hoeffler, Anke. 1998. "On Economic Causes of Civil War" Oxford Economic Papers 563-573

- Collier, Paul and Hoeffler, Anke. 2007. “*Unintended Consequences: Does Aid Promote Arms Races?*”. Oxford Bulletin of Economics and Statistics, Vol. 69, No. 1, pp. 1-27, February 2007
- Enders, Walter and Sandler, Todd. *The Political Economy of Terrorism*. 2005
- Fearon, James. *Iraq's Civil War*. Foreign Affairs. March 2007. <https://www.foreignaffairs.com/articles/iraq/2007-03-01/iraqs-civil-war>
- Federal Reserve Bank of St. Louis. *The Economic Impact of Terrorism on Developing Countries*. <https://www.stlouisfed.org/on-the-economy/2018/january/economic-impact-terrorism-developing-countries>
- Feyzioglu, Tarhan and Swaroop, Vinaya and Zhu, Min. 1998. “*A Panel Data Analysis of the Fungibility of Foreign Aid*” The World Bank Economic Review, Vol. 12 No. 1: 29-58
- Global Terrorism Database. <http://www.start.umd.edu/gtd/>
- Gujarati, Damodar. *Econometrics by Example, second edition*. 2014
- Harford, Tim and Klein, Michael. 2005. “*Aid and the Resource Curse*”. The World Bank Group, Public Policy for the Private Sector.
- Harriman, Jake. Linking Extreme Poverty and Global Terrorism. The New York Times. March 13, 2012. <https://kristof.blogs.nytimes.com/2012/03/13/linking-extreme-poverty-and-global-terrorism/>
- Moss, Todd, Roodman, David, and Standley, Scott. *The Global War on Terror and U.S. Development Assistance: USAID allocation by country, 1998-2005*. https://www.cgdev.org/sites/default/files/2863_file_WP62_1.pdf Center for Global Development. 2005

The National Security Strategy of the United States of America.

<https://www.state.gov/documents/organization/63562.pdf>. September 2002.

Nielsen, Richard and Findley, Michael. 2011. “*Foreign Aid Shocks as a Cause of Violent Armed Conflict.*”, American Journal of Political Science, Vol. 55, No. 2, pp. 219-232

Nillesen, Eleonora and Ree, Jopp de. 2009. “*Aiding Violence or Peace? The Impact of Foreign Aid on the Risk of Civil Conflict in Sub-Saharan Africa*”. Journal of Development Economics

Organization for Economic Co-operation and Development. <https://data.oecd.org>

Organization for Economic Co-operation and Development. *The History of OECD's Development Assistance Committee*. <http://www.oecd.org/dac/1896808.pdf>

Organization for Economic Co-operation and Development. https://public.tableau.com/views/AidAtAGlance/DACmembers?:embed=y&:display_count=no?&:showVizHome=no#1

Tahir, Nadia. 2017. “*Does Aid Cause Conflict in Pakistan?*”. Defense and Peace Economics, 28:1, 112-135,

United Nations Development Programme. *About Sub-Saharan Africa*. <http://www.africa.undp.org/content/rba/en/home/regioninfo.html>

The World Bank Group. <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?end=2016&start=1967>.