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# The Impact Of Development On Terrorist Activity: Does Development Decrease Terrorism?

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THE IMPACT OF DEVELOPMENT ON TERRORIST ACTIVITY:  
DOES DEVELOPMENT DECREASE TERRORISM?

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Mark Daube

2011

THE IMPACT OF DEVELOPMENT ON TERRORIST ACTIVITY:  
DOES DEVELOPMENT DECREASE TERRORISM?

by

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THESIS

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## Table of Contents

	<b>Page</b>
Acknowledgements.....	iv
Table of Contents.....	v
List of Tables.....	vi
Chapter 1: Introduction.....	1
Chapter 2: Literature Review.....	5
Chapter 3: Theory and Hypotheses.....	17
Chapter 4: Research Design.....	24
Chapter 5: Results.....	29
Chapter 6: Conclusion.....	40
References.....	44
Appendix: Models .....	49
Appendix: List of Countries Used .....	52
Curriculum Vita.....	53

## **List of Tables**

	<b>Page</b>
Table 1: List of Control Variables used.....	26
Table 2: Effects of Development on Terrorist Incidents within Countries, 1970 – 2000.....	30
Table 3: Effects of Development on Terrorist Incidents within Countries, 1970 - 2000.....	32
Table 4: Changes in expected value of Terrorist Incidents given changes in X variables Terrorist Incident Count .....	33
Table 5: Effects of Development on Transnational Terrorist Incidents within Countries, 1967 - 2000 .....	35
Table 6: Effects of Development on Transnational Terrorist Incidents within Countries, 1967- 2000 .....	36
Table 7: Changes in expected value of International Terrorist Incidents given changes in X variables Terrorist Incident Count.....	38

## Chapter 1: Introduction

Does an increase in the level of development in a country decrease the likelihood of terrorist incidents occurring in that country? Is the relationship between development and terrorism a linear one? These are the questions that this thesis intends to answer. Based on the research by Quan Li (2005), and Boehmer and Sobek (2005, 2010), this research project aims to expand the existing research in the area of determining the likelihood of terrorist incidences. The first article that this thesis is based on (Li, 2005) focused around the impact of democracy on the likelihood of a terrorist incident occurring. In order to add to existing literature, this thesis looks for a curvilinear effect rather than a linear relationship between development and the likelihood of terrorist activity and at the difference between international terrorism versus terrorism as a whole. Some authors argue simply that as development in a country goes up, the likelihood of a terrorist incident goes down (Boehmer and Sobek, 2005). While this may be true as a general tendency, this thesis argues that a linear relationship is an oversimplified view of a more complex relationship. By using a combination of the regression methods of Boehmer and Sobek (2010) and Li (2005) this thesis will show a curvilinear (inverted-U) relationship between development and the likelihood of terrorist incidents. More specifically, I intend to establish that it is both those countries that are most and least developed that have a decreased amount of terrorist incidents compared to those countries at mid-level development. The reasons for this being two-fold: first, in relation to terrorism as a whole, this is based on the idea that those countries at the mid-level of development are experiencing a developmental transition which can cause social disruption that can potentially escalate into radicalized behavior such as terrorism. Those countries that are at the lowest levels of development are unlikely to experience terrorism because the status quo remains undisrupted, while those countries that are at the highest levels of

development are less likely than mid-level countries to experience terrorism since they have already transitioned into a fully developed society. The second reason, in relation to solely international terrorism, is that those countries at a mid-level of development are more likely to be a target of terrorism than those countries that are most and least developed.

While Li (2005) focused mainly on democracy, this thesis will in contrast research the effect of a country's level of development on the likelihood of terrorist incidents. This research project intends to measure development in four different ways. Foremost, this thesis will focus on using energy consumption per capita in order to measure development (Boehmer and Sobek, 2005), since there is a great degree of correlation between development and energy consumption and due to data issues that are involved with using other development indicators. However, in order to cover development as well as possible, GDP per capita, average life expectancy at birth, and income inequality were used as alternative measures of development.

Unfortunately terrorism is an elusive concept. However, having to create a definition, that might not describe a concept perfectly but is at least as close as possible, is part of the nature of the social sciences. Various different authors have defined terrorism in different ways and different researchers have created different criteria in order to add incidents to terrorism datasets. For the purpose of this thesis, there will be two different definitions for terrorism. The first definition reflects the criterion of the Global Terrorism Dataset (2010), and will apply to terrorism as a whole:

1. ***The incident must be intentional*** – the result of a conscious calculation on the part of a perpetrator.
  2. ***The incident must entail some level of violence or threat of violence*** –including property violence, as well as violence against people.
  3. ***The perpetrators of the incidents must be sub-national actors.*** - This database does not include acts of state terrorism.<sup>1</sup>
- (GDT Codebook 2010, 5)

The second definition of what terrorism is for the purpose of this thesis applies only to international terrorism incidents, and the same definition used in Mickolus et al. (2002):

The use, or threat of use, of anxiety-inducing, extra-normal violence for political purposes by any individual or group, whether acting for or in opposition to established governmental authority, when such action is intended to influence the attitudes and behavior of a target group wider than the immediate victims and when, through the nationality or foreign ties of its perpetrators, its location, the nature of its institutional or human victims, or the mechanics of its resolution, its ramifications transcend national boundaries. (2)

Determining the effect of the level of development on terrorist activity could help develop policies for both developed and developing countries. For developed countries, there might be an incentive to provide aid to those countries that might make suitable trading partners in the absence of terrorist activity. For developing countries, on the other hand, there might be an incentive to allocate more resources into development in order to decrease terrorist activity and increase stability, resulting in higher levels of trade with developed nations that otherwise might be apprehensive about trading with countries that suffer from terrorism.

A specific example of a country that applies to the theory of this thesis is India, which has made great strides in terms of economic development in the last forty years. India's squared and logged GDP has risen from 47.59 to 61.09 between 1968 and 2000, and the average life expectancy at birth in India has risen from 46.9 to 61.3. In the same time span terrorism as a

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<sup>1</sup> The three sub-criteria for a Terrorist act is discussed with the "Research Design" Chapter below.

whole has risen from practically no terrorist activity pre-1978 up to over 300 incidents per year in the late 80's and early 90's, and back down again to around 100 in the early 2000's.

This thesis is divided up into six chapters. The first chapter is the "Introduction". The second chapter is the "Literature Review" chapter that will analyze the literature that this thesis is based on, in addition to the literature by other authors that reviews possible factors that might have an impact on terrorist activity beyond development alone. The third chapter, "Theory and Hypotheses", explains the thought process used to arrive at the hypotheses of this thesis, and provides the specific hypotheses that this thesis intends to test. The fourth chapter is the "Research Design" chapter, which describes each one of the variables used in the quantitative research in detail, justifies and explains the method of analysis, and provides a list of the various models used to test the hypothesis. The fifth chapter will then show and discuss the results of the models described in chapter four. The results of the quantitative research of this thesis show support for the hypothesis that there is an inverted-U relation between terrorism and development. The "Conclusion" chapter will summarize the results from chapter five and discuss the implications of the findings.

## Chapter 2: Literature Review

The purpose of this chapter is to analyze the literature that this thesis is based on and the literature by other authors that reviews possible factors that might have an impact on terrorist activity beyond development alone. The articles that are discussed in the first part of this chapter deal mainly with terrorism and development, their definitions, and their relationship. The second part of this chapter then investigates factors beyond development that can have an impact on terrorism, such as press freedom, democracy, and total population, among others.

There has been a lot of research analyzing terrorist behavior and predicting the likelihood of terrorist activity within a country. Li (2005) created a model that focused on the aspects of democracy that affect the likelihood of terrorist incidents. Particularly, Li (2005) investigated both the positive and negative effects of democracy on the likelihood of a transnational terrorist incident. He found that various aspects of democracies will have different effects on the likelihood of international terrorism incidents, some deterring terrorists while others made democracies a more attractive target. However, his model failed to incorporate the impact of development on the likelihood of terrorist activity. Not having included development in his model is one of the shortcomings this thesis hopes to amend in the existing literature. In addition to including development, the thesis will hope to show a curvilinear relationship between development and terrorist activity as opposed to a linear relationship.

When analyzing development, it is important to first define development, because it is subject to different interpretations. While many authors in political science have studied development, many are guilty of never fully defining what it is they are analyzing. It is important to define development since various definitions of it can include a view that is on the one hand limited to only economic development while on the other hand some definitions would include

both economic and social aspects of a country. For the purpose of this thesis, the definition of the term “development” shall be restricted to only the economic aspect. The specific definition of development that this thesis will use is the definition by Remenyi (2004), which states that “Development is a process directed at outcomes encapsulating improved standards of living and greater capacity for self reliance in economics that are technically more complex and more dependent on global integration than before” (22). An important note here is that development is both a process and a goal of a country. Since economic wellbeing is highly correlated with social wellbeing (Diener, et al. 1995), it is expected that a quantitative analysis of non-economic indicators of development would show similar results as the economic indicators; however, in order to ensure the validity of this logic this thesis will include a few non-economic control variables that are discussed below.

While development has been analyzed by various other authors (Ehrlich and Liu, 2002; Kurrild-Klitgaard et al., 2006), this thesis looks at development in a different light than many others. Recently, measuring development is associated with the United Nations Human Development Index (HDI), which determines a country’s level of development by means of education, income per capita, and average life expectancy (Ranis and Steward, 2007). Yet, McGillivray and White (2006) found this measure to be insufficient. They specifically criticize the use of the income variable in HDI as inappropriate, therefore making the measurement as a whole inaccurate. Other authors (Islam and Clarke, 2001) have looked solely at economic indicators, but measuring development solely by economic indicators assumes that a country with a lot of wealth also uses that wealth for the development of the people, when in fact there might just be a small, and extremely wealthy elite that makes a country’s wealth appear higher than it is and in fact no substantial amount of money goes towards development of the general

population. Issues such as this one show the necessity for alternate measures of development. One of the examples of measuring development in a way that is less common, but not ineffective, in political science was presented by Boehmer and Sobek (2005) who used energy consumption per capita in order to show the level of economic development in a country. Ross E. Burkhardt and Michael S. Lewis-Beck (1994) also used this approach in order to measure the development levels of the countries that were analyzed. The details surround the reason for using energy consumption per capita as an indicator for economic development will be discussed below.

There has been much debate in literature about the impact of a country's economic status on terrorist activity. Li and Schaub (2004) have found that the economic capabilities of a country are a factor that can increase or decrease the likelihood of terrorism within a country. A similar argument was made by Alberto Abadie (2006) who, unlike Li and Schaub (2004), did not find support for this argument in his analysis. A high level of economic well being can make the domestic population less likely to engage in terrorist activity. A country that has a lot of resources to allocate to items such as welfare, education, and health, is less likely to suffer from domestic terrorism due to the population having fewer grievances. At the same time, however, a country with a lot of wealth may also be a target of transnational terrorism. This would be due to wealthy countries having a higher likelihood of being politically and militarily involved in foreign affairs in other countries. One could argue that wealth in and of itself may not be the cause for increased transnational terrorist activity, but instead the fact that wealthy countries are the ones that involve themselves in the affairs of other countries, potentially angering the populations of those countries (Stohl, 1988; Raphael, 2009).

Both, the reason for not using HDI as an indicator of development, and some of the problems surrounding economic capabilities have been discussed above. However, the lack of effectiveness of HDI and economic capabilities does not automatically warrant the use of energy consumption in their stead. The reason why energy consumption is used in this thesis, and is expected to show better results than the afore mentioned alternatives, is twofold: first, due to data availability and second, due to data accuracy. The data availability of energy consumption is superior to both the amount and quality of HDI data available. The data for HDI begins only in 1980 and between 1980 and 2005 reports were compiled only once every 5 years, which provides insufficient data for a time-series analysis. In relation to accuracy of the HDI data, many of the variables that were used in order to calculate a country's HDI score are unreliable and often unavailable. Before 2009, HDI was calculated by "health [which] was measured by life expectancy at birth; education or "knowledge" by a combination of the adult literacy rate and school enrolment rates (for primary through university years); and income or standard of living by GDP per capita adjusted for purchasing-power parity (PPP US\$)" (United Nations Development Programme, 2011). The data collected in order to calculate the HDI can be unreliable, especially in those countries that do not have the sufficient structure and resources to effectively gather a full estimate of their literacy, education, and income rates. Many Third World countries have to resort to giving estimates or plain not reporting on the data required to properly rank them in the HDI.

The problems with using GDP per capita as an indicator for development are similar to the problems with HDI discussed above. The first and foremost benefit of using energy consumption over GDP per capita is that there is less data missing in energy consumption than in GDP datasets.

Data are often systematically missing for some states over certain time periods. In the context of conflict studies, economic data are frequently unavailable for states involved in conflicts, undermining the ability to draw inferences of linkages between economic and political interactions. (Gleditsch, 2002, 712)

Using a variable that is very closely correlated to GDP per capita, but is more complete, will be likely to provide a fuller picture about the question at hand. There are also issues with GDP data that are not as pressing as data availability, but still need to be mentioned. First, unlike GDP per capita, countries are unlikely to provide false information of their yearly energy consumption values, since there is little benefit for countries to report energy consumption data that are false. There is however benefit in both over and under-reporting GDP data. There are some states such as China, who are suspected of artificially keeping their GDP low and under reporting their GDP value for economic purposes (Rui et al., 2010; Holz, 2004), while others may have an incentive to report very low GDP per capita levels in order to receive aid from more developed states. Other states could over report their GDP per capita in order to be more likely to be eligible to join certain Inter-Governmental Organizations such as the European Union. An example of this would be states that would like to join the EU but would not be able to live up to the EU's second joining criteria, which requires "the existence of a functioning market economy as well as the capacity to cope with competitive pressure and market forces within the Union" (European Commission, 2011). Turkey is just one example of a country that is a potential EU member, but does not yet live up to the EU's economic requirements and would hence have an incentive to falsify their GDP per capita data in order to improve their chances of acceptance into the EU. Hence, there are obvious reasons for countries to manipulate their GDP data in either direction and in many cases it would be very hard to prove such a manipulation. As mentioned above, there is little to no reason for a country to falsely report energy consumption data. As a matter of fact, energy consumption is one of the variables that were used by Chen and Chen

(2006) in order to show discrepancies with China's reported GDP and a value that is probably more accurate. An assumption that this thesis makes is that even though industrial consumption of energy is expected to go down over time in those countries with the highest levels of development, due to a shift from "smokestack industry" to service industry, this discrepancy is offset by an increase in consumer consumption of energy. To put this idea in simpler terms, while developed countries might have less manufacturing industry, they have also had a great increase in the use of consumer electronics including personal computers, cell phones and mp3 players, and stereos.

An important aspect of terrorism that needs to be addressed is the difference between terrorists and freedom fighters. What terrorism is exactly is already a rather elusive concept, due to the fact that there are several different definitions by various authors, each looking at terrorism in a slightly different way (Sambanis, 2008). Drawing the line between a terrorist group and "freedom fighters" often simply depends on perspective. One example of this is the Provisional Irish Republican Army (PIRA), who, to many of the Irish people, were considered to be freedom fighters, while the government of the U.K. considered them a terrorist organization (Sluka, 2009). The ambiguity of categorizing certain groups as terrorists or not can be harmful to the process of empirical study, since certain groups might be omitted that should be included and vice versa. Is a group that employs terrorist tactics against an oppressive regime a terrorist group or are they freedom fighters? What groups to include in the list of terrorists and who not to include is inherently political. This is why one of the benefits of the data that are used in this project is that they count terrorist incidents. Instead of trying to determine whether a group can be considered as a terrorist organization or not, one can look at all the incidents that occurred within a country (Li, 2005). That way, one includes those groups that can truly be considered

terrorist groups and those that on occasion resort to terrorist tactics, even though the true nature of the group might be unclear. Two examples of this would be, first the activities of the Animal Liberation Front, an organization that is generally non-violent towards people, but have in the past used violence against buildings and machinery, and second, the actions of the Provisional IRA, who to the British government were terrorists and who were freedom fighters to the people of Ireland. The count measure approach employed by the ITERATE and (a modified) GTD data sets, used in this thesis, are expected to provide a more comprehensive view of terrorist activity, as opposed to measuring how many terrorist groups are officially active within a given country.

In order to rule out any spuriousness in the results of this research, this project will also include a review of the literature that covers some of the other factors commonly associated with the economic success of a country. This will be included in order to justify the use of the control variables that were included in the models of this research project. The control variables that are reviewed here will include both those that apply to terrorism as a whole and solely international terrorism.

While those countries that are most developed are expected to have a low count of terrorist incidents, those countries that have the very lowest levels of development are expected to have an even lower number of terrorist incidents than highly developed countries. Those countries that have the lowest levels of development, many of which are in Africa and Asia, are less likely to experience terrorist incidents. This line of reasoning is an expansion of the findings that those states with the lowest caloric consumption rates are also amongst the least likely to be involved in civil war (Boehmer and Sobek, 2010). Boehmer and Sobek (2010) looked at the impact of food availability on “willingness” of people to act against the government. Due to the fact that there is a correlation between caloric consumption and development, it is logically

sound to assume that those countries with the lowest levels of development would also be less likely to experience terrorist activity, a concept that is discussed in further detail in the “Theory and Hypotheses” chapter below.

Overall, while the thesis expects to find similar results as Li and Schaub (2004), in that high levels of economic prosperity will reduce the likelihood of terrorist activity in a country, it is also expected to add a curvilinear relationship not shown in Li and Schaub (2004). This is due to the assumption that, in general, domestic terrorism is more likely to occur than transnational terrorism, implying that any efforts in reducing domestic terrorism will have a greater impact in reducing terrorist acts as a whole.

In relation to the regime type of a country, there has been a similar debate to the one about the economy of countries and its impact on terrorist activity. While on the one hand, people living in democracies are less likely to have the same level of social and political grievances as the inhabitants of non-democracies, on the other hand (Krueger and Maleckova 2003), democracies also provide a more attractive target for terrorists, due to easier access to information, improved communication, and an ease of obtaining funds (Li and Schaub, 2004). Furthermore, there is an abundance of accessible targets, the relative ease of movement both into and within democratic countries (Stohl, 1988).

The other side of this argument is that even though democracies make “easier” targets, the real level of impact that a terrorist organization can have on a country is usually relatively small, since terrorist activity usually targets only small parts of an economy (Becker and Murphy, 2001). Unless attacks of the magnitude of 9/11/2001 were to become a regular occurrence, terrorist organizations, in the grand scheme of things, do not have the necessary leverage to effectively sway the actions of highly developed nations. However, in a country with

a very low level of development, an attack with a similar magnitude as the 9/11 attacks could shake the foundations of some already unstable governments to the point of collapse.

As a whole, democracies have been generally associated with higher levels of development (Hadenius, 1992; Przeworski 2006), which would indicate that despite the fact that some authors argue that democracies make attractive targets for terrorists, this thesis expects to find that democracies will be less likely to see terrorist incidents than non-democracies in lieu of the assumption that terrorist activities in developed countries are unlikely to have as large of an impact as they do in developing countries (Becker and Murphy (2001).

The impact of the freedom of the press can be a factor that increases the likelihood of terrorist incidents. Li (2005) makes an argument that since terrorists derive their power from the population being terrorized by their acts, and a free press can actually contribute to the terrorists achieving their goal. It is only when the media has the freedom to report terrorist incidences that a big part of the population will even know about them. This makes countries that have a relatively free press (which are generally democratic countries) a more attractive target for terrorists. Taking whether a country has a free press, or not, into account is also important in order to determine the specific way that terrorist incidents were counted in the data that are used in this research project.

Since data on terrorist incidents are collected from open sources, one is likely to conclude that democracies have more terrorist incidents. Even if nondemocratic countries experience the same number of incidents, observers may never find out, using data collected from open sources. The reporting bias may falsely cause one to observe a positive correlation between the level of civil liberties and the number of terrorist events. (Li 2005, 282)

Considering the argument by Li, one would expect that those countries that have freedom of the press might either be more likely to suffer from terrorist incidences, or at least one would expect that they would appear that way.

When it comes to population, authors generally agree that the more people there are, the more likely a country is to experience terrorist activity (Li and Schaub, 2004). This is expected to occur for multiple reasons. First, having a lot of people in a country makes for a higher likelihood of there also being racial or cultural divisions within a country. Having cultural or ethnic cleavages within a country makes terrorist activity more likely, especially if the groups are not treated equally by the government. Second, higher levels of population might increase the likelihood of terrorist activity due to public discontent stemming from a lack of resources, especially food (Boehmer and Sobek, 2010).

Third, while a larger population can affect the likelihood of terrorist activity, having a very high population within a very small area could add to the risk. Highly populated urban areas have a high number of potential targets and places to hide, while also causing tensions amongst the population who compete for jobs and places to live, which makes them attractive for terrorists (Merari, 1993). This would indicate that countries with a lot of highly populated urban areas would have a higher level of risk of terrorist incidents. Overall, in regard to population, whether it be urban or total, the higher the population of a country, the higher the expected amount of terrorist incidences.

Income inequality has also been found by a variety of authors (Kayaoglu, 2007; Koseli, 2007) to be of importance when determining the likelihood of people resorting to terrorism. Koseli (2007) looked at various root causes for terrorism including income inequality and tried to connect high levels of poverty to crime, and social unrest, which in turn would create a more

conducive environment for terrorist activity. The results of this test were not only statistically insignificant, but surprisingly, the results that he did get showed a relationship that was opposite from what was expected. His regression results showed a negative relationship between income inequality and terrorism, implying that when income inequality goes up, the likelihood of a terrorism incident goes down. This surprising result will be retested in one of the models of this thesis that will be discussed below. Despite severe data limitations, this thesis will use Gini data in order to measure the impact of income inequality on the likelihood of terrorist activity.

Military expenditure growth is a factor that has been shown to be indicative of an increase in the likelihood of international terrorist activity in two different ways. The key word here is growth. Those countries with the highest military expenditure growth are usually those countries that do not already have a strong/established military. Even though it has been shown by Trager and Zagorcheva (2005) that military deterrence can work in respect to terrorism when the potential costs outweigh the benefits of an attack, that does not mean that a growing military will have the same effect. As a matter of fact, a country that decides to increase the strength of its military can cause it to become a target for terrorism because it becomes a perceived threat. An increase in military expenditure growth is therefore only going to decrease the likelihood of a terrorist incident if it occurs in a country that already has a strong military. The second reason military expenditure growth can be indicative of an increase in terrorist activity, is due to the fact that in many countries military expenditure growth increases after they were a victim of terrorist attacks (Gupta et al., 2004).

Rebellion is another factor that can have an impact on the likelihood of an international terrorist incident. While the relationship between terrorism as a whole and rebellion may be murky, the relationship between purely international terrorism and a state that suffers from

repeated acts of rebellion is very straight forward. A country that suffers from frequent attacks from actors within its own borders is a very easy target for transnational terrorism (Ors and Cetin, 2007).

By addressing a variety of different aspects that can influence the terrorist incidents, this research project hopes to capture both domestic and international influences in order to establish a well rounded set of factors that show the relationship between development and the likelihood of terrorist activity within a country.

### **Chapter 3: Theory and Hypotheses**

The purpose of this chapter is to lay out the basic thought process that leads to the establishment of the hypothesis of this thesis. Since the literature discussed above showed that most terrorist incidents are internal in nature, this chapter discusses what development means in relation to its affect on terrorism, and how the economic aspect of development is related to societal change, which leads to the first hypothesis of this thesis. Simply put, the theory of this thesis is that there is a relationship between the level of a country's development and the likelihood of terrorist incidents occurring in that country. In addition to the theory about the impact of development on terrorism by means of energy consumption per capita, it is theorized that the aforementioned impact of development on terrorist incidents is not a linear one, but rather a curvilinear inverted-U.

First, I will attempt to illustrate how the development of a country can be used as an indicator of the population's level of satisfaction, which is reflected by the number of terrorist incidents a country suffers within a year in the GTD dataset. The theory applied here is that when countries go through the process of development, they go through a transitional stage where they are neither underdeveloped nor developed (Rostow, 1960). It is assumed that those countries that are in that stage of transition are more likely to experience terrorist incidents based on the idea that social change will bring about social unrest. "For Huntington [1968], it is not modernization itself that causes grievances but instead the efforts to achieve it, where social disorder is rooted in rising expectations and the frustrations that arise with growing differentials between social income groups" (Boehmer and Sobek, 2004). Hence, an increase in development is expected to initially cause an increase in terrorism, due to the fact that development causes changes in society, which in turn act as a destabilizing force (Olson, 1963). It is also expected to

peak with those countries that are at a mid-level of development since the effect of social disruption would be at its highest during that period. Continued development in a country is then expected to decrease the likelihood of terrorist incidents once a country has fully transitioned into a developed country. While the exact reasons for the effects of development may vary from simple resistance to change, to violent retaliation to the pressures that industrialization brings with it, or the increase in the gap between income groups, the simple fact that development as a process can increase terrorism is what is focused on here. The level of dissatisfaction discussed here might also escalate from terrorist acts to full civil war. The difference between the two is largely in relation to the kinds of acts that are performed by the militarized groups and the scale is usually larger in civil wars. This implies that if a population sticks with terrorism to pursue their goals, then there are not enough people “dissatisfied” to the point of being able to sustain civil war.

Second, it is expected that continued development past the mid-level will eventually begin to decrease the likelihood of a terrorist incident. The assumption is that once a country is done with the transition period between undeveloped to developed there will be less social disruption, which in turn would mean less terrorist activity. Once countries are fully developed, a new “status quo” is established, just as there was at the lowest levels of development; the country becomes more stable, due to a decrease in social disruption (Rostow, 1960). However, unlike the least developed countries, developed countries will still see some level of terrorist activity due to post-industrial issues such as animal rights, abortion, or protection of the environment, which can spark violent acts. It is still expected though that the number of terrorist incidents caused by post-industrial issues will be far lower than in countries that are in the middle of a developmental transition, since there will be few issues and they will be less serious

to the population as a whole. While the issues that people in developed countries resort to terrorism over can be important/controversial issues, the issues that they might become radical about will rarely include a lack of food, oppression, tyranny, or lack of freedom of speech, since those are things that are not usually issues in developed countries. Therefore it is expected that after a decrease in terrorism post-development it will then level off in the number of terrorist incidents in a country somewhere between underdeveloped and mid-development countries.

The second theory of this thesis is that purely international terrorism (as measured by the ITERATE data set) is affected by development in a similar way to terrorism as a whole but for a different reason. While the first hypothesis focuses on the impact of development on society within a given country, the second hypothesis looks at the impact of development on the likelihood of international terrorism incidents. The question here is whether the aforementioned transitional period is likely to make countries more likely targets for international terrorism. This thesis expects to find that those countries at a mid-level of development are more likely to experience international terrorism than other countries. The following will first discuss why other countries are inherently less likely to experience international terrorism, and then why countries at the mid-level of development are more likely to experience international terrorism.

Those countries that are at the lowest levels of development are often of little importance to those countries that are at medium to high levels of development because they are far less connected, both politically and economically, than other countries. There is little reason for any actors to engage in terrorist activity in countries at the lowest levels of development because they are simply not important enough to other countries. While there may be some exceptions to this general rule, such as actors of one country performing terrorist acts on an undeveloped country based on cultural, or religious differences, in general such occurrences are relatively rare,

compared to terrorist acts on moderately to highly developed countries. The governments of countries that are undeveloped are also less likely to interfere in the activities of other countries, usually because they have other priorities or not enough resources to do so. These factors make countries at the lower end of development far less likely to be a target of international terrorism. In short, if one were to terrorize an undeveloped country, the real question is: to what end?

Highly developed countries on the other hand are very “meddlesome” so to speak. Highly developed countries usually have invested interests in many countries around the world. These interests may be economic, political or military in nature. In general, the more developed a country becomes, the more connected it becomes with other countries. These invested interests by highly developed countries therefore increase the likelihood of that country interfering in the political affairs of other countries. For instance, the tensions between North and South Korea might be of little concern to a country such as Zambia, while to the U.S., those tensions could pose a threat to their investments, hence warranting becoming involved in a conflict that is technically not their own. The involvement of developed countries in the affairs of others could make them a target of terrorism.

Boehmer and Sobek (2005) discussed the possibility that the most interstate conflict prone countries are those countries at an intermediate level of development. While interstate conflict and international terrorism are obviously not the same, the reasons for it are often similar. The causes that interstate conflict and international terrorism have in common may include, culture, proximity, resources, religion, and the aforementioned meddling of one country in another country’s affairs. It is therefore expected international terrorism can be a function of interstate conflict, and that international terrorism reflects the occurrence between international conflict between states at an intermediate level of development.

In addition to the reasons discussed above, as to why undeveloped and developed targets make unattractive targets, one must also consider why countries in transition make more attractive targets to some international terrorist organizations. Countries that are that at the aforementioned stage of transition often become more connected into the world system (both economically and politically) and therefore start to have similar interests in the affairs of other countries. This implies that moderately developed countries have an incentive to interfere in the affairs of the countries, which might due to investment issues or rivalry. The difference between highly developed countries and those countries in transition is that they do not have the same military capabilities or the same number of capable allies as highly developed countries. This means that countries at a mid-level of development make themselves targets of terrorism by interfering in the affairs of other countries while not having the same level of deterrence of highly developed countries that prevents them from being targeted by international terrorism more frequently. The concept of the inverted U-shaped effect of development on terrorism also applies to those developing countries that are “westernizing”, and aligning themselves with western states as a result of development. Countries that are developing and choose to align themselves with western countries might initially make themselves targets of anti-western terrorism groups. Those countries that seek to become allies of western countries, but have not yet achieved that status leave themselves open to attack by those terrorist groups that oppose the spread of western ideology and culture. It is assumed that once developing countries achieve the status of a full ally, those attacks might decrease, but until that time, developing countries are an “easy” target.

The assumption that the effect of development on terrorism changes depending on the stage of developmental transition that a country is going through supports the theory that the

impact of development on terrorism incidents is not a linear one, but rather a curvilinear inverted-U. The expected U-shaped relationship between development and terrorism is portrayed in Figure 1 below.

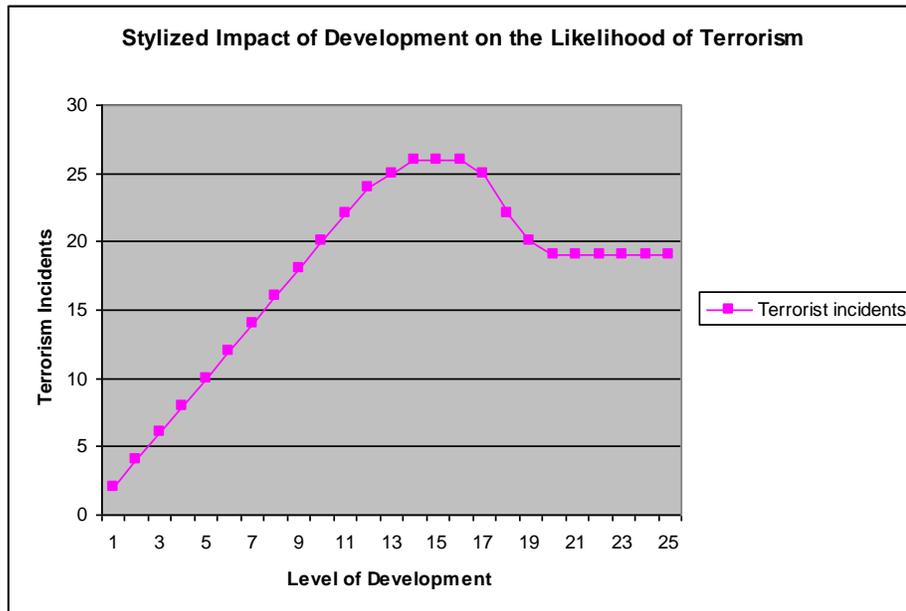


Figure 1. Source: Author<sup>2</sup>

The “Introduction” chapter provided a definition of development for the purpose of this thesis. In addition to the definition provided, it is assumed that development is conceptualized in absolute terms. This means that it is expected that any country that breaches a certain threshold of development will eventually see a decrease in the likelihood of a terrorist incident occurring compared to the period of developmental transition that a country had to go through.

Unfortunately, it would be highly difficult to operationalize development in a way that would enable someone to find the exact threshold of development from which point on terrorism is likely to decrease. This is mostly due to the fact that development as a whole is somewhat of an elusive concept that can obviously be operationalized in many different ways, as discussed in the

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<sup>2</sup> Note that Figure 1 is a purely stylized representation, and does not reflect actual values in the data. The area where terrorism incidents level off may be anywhere between the peak and the lowest point.

“Literature Review” chapter above, and the “Research Design” chapter below. Considering that finding such a threshold could be a whole separate project in an of itself, this thesis will only attempt to show that such a theoretical point exists, as opposed to determining exactly where it lies.

The first hypothesis of this research project is that as the level of development of a country increases, it becomes more and then less likely for a country to experience incidents of terrorist activity (both domestic and international) in the form of an inverted-U-shape. The second hypothesis is that countries at a mid-level of development are more likely to experience international terrorist activity than countries at the highest and lowest levels of development. The null-hypothesis is that there is no relationship between the development of a country and the likelihood of terrorist incidents.

## Chapter 4: Research Design

This chapter will review each one of the variables used in the quantitative research in detail, by providing definitions and explanations as to how they were quantified. In addition to analyzing the variables, I will be justifying and explaining the use of negative binomial regression for the purpose of detecting the relationship between deployment and terrorist incident count.

The unit of analysis is country-year and the countries covered in this analysis include 119 countries from 1968 to 2000. This thesis will use two different dependant variables in order to measure terrorism. The first dataset that was used is the Global Terrorism Dataset. This dataset includes 65,956 incidents in the form of 2,161 observations. The individual events recorded in this dataset were converted to the country-year unit of analysis and combined them into an event count variable. The three main criteria that an event has to meet in order to be included in the GTD were discussed in the “Introduction” Chapter. In addition to the three initial criteria that have to be met, there is a subset of criteria where two out of three have to apply to the event in order for the event to be recorded. The three sub-criteria are that “the act must be aimed at attaining a political, economic, religious, or social goal.... There must be evidence of an intention to coerce, intimidate, or convey some other message to a larger audience (or audiences) than the immediate victims.... The action must be outside the context of legitimate warfare activities.”(GTD Codebook 2010, 5)

I also measure international terrorism incidents separately by using the ITERATE database includes 12,104 incidents (which results in 5160 observations) from 1968 to 2001. The sample used in the actual regressions is smaller due to data availability of the independent and control variables. The dataset used for the dependant variable in this thesis is the “International

Terrorism: Attributes of Terrorist Events” (ITERATE) dataset from Mickolus et al. (2002). The reason for using this dataset as opposed to the State Department data or the RAND-St Andrew’s Chronology of International Terrorist Incidents is simply because it covers a larger set of countries and a greater time span than other datasets and differentiates between violent and nonviolent incidents. Terrorism is defined in the ITERATE dataset as “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” (Mickolus et al., 2002). Put more simply, a terrorist incident is defined as “having a political purpose to influence a wider target group on an international scale” (Blomberg and Hess, 2006, 90).

The independent variable for this thesis is development. Development is measured in energy consumption per capita, more specifically this was measured in joules consumed in any given year, divided by total population.

The control variables for this thesis include *Democracy*, *GDP Per Capita*, *Population*, *Urban Population*, *Freedom of Press*, *Income Inequality*, *Power Capability*, *Regime Durability*, *Military Expenditure Growth*, *Number of Borders*, *Number of Allies*, *Rebellion* and *Region*. Most of the control variables above and the *Terrorism Incident Count* (dependant) variable came from the dataset that was provided by Quan Li (2005). The other four variables that were provided by Boehmer and included the (independent) development variable, the democracy, number of allies, rebellion, and number of borders (control) variables.

Total population was measured as the total population of a country logged (World Bank, 2002). Urban population was coded as the percentage of a country’s total population living in urban areas. Freedom of press was coded as a dummy variable as created by Van Belle (1997, 2000). Regime durability shows years since the last regime change (Marshall and Jagers, 2000).

Democracy was coded on a scale from 0-21 with 0 being a totalitarian autocracy and 21 being the highest level of democracy. Number of borders is simply the total number of borders of a country (Boehmer, 2008). Similarly, number of allies is the total number of military allies that a country has (Boehmer). The rebellion variable was created through factor analysis and is a continuous variable measuring the amount of guerrilla warfare, major crises, and revolutions in a state (Boehmer, 2010). Military growth expenditure is measured by the percentage increase in military expenditures from one year to another. This variable was lagged by one year in order to show a causal effect in the variable. Power capability was measured as the “logged annual composite percentage index of a state's share of the world's total population, total GDP, GDP per unit of energy, military manpower, and military expenditures” (Li and Schaub, 2004). The five different regions used in this thesis were all coded in dummy variables (Li, 2005).

Table 1: List of Control Variables used

Control Variable	Definition	Source
GDP per capita	Real gross domestic product (GDP) per capita, adjusted for purchasing power parity (PPP), logged	Heston, Summers, and Aten (2002)
Size	Total population in real values	Sarkees and Wayman (2010)
Urban Population	Percentage of total population living in urban areas	
Region Dummies	Europe, Africa, Asia, and America (relative to the Middle East)	Singer (1987)
Press Freedom Dummy	Press Freedom “1” No Press Freedom “0”	Van Belle (1997, 2000).
Democracy	Democracy ranked on a scale from 1-21	Marshall and Jagers (2000)
Urban Population	Percentage of population living in urban areas	Singer (1987)
Power Capability	Logged annual composite percentage index of a state's share of the world's total	Li and Schaub (2004)

	population, GDP, GDP per unit of energy, military manpower, and military expenditures	
Income Inequality	Gini ranging from 0 to 100 (missing values are filled following Feng and Zak 1999; Li and Reuveny 2003)	Deininger and Squire (1996)
Average Life Expectancy	Value of Average Life Expectancy at birth	Human Development Reports (2011)
Regime Durability	The number of years since the most recent regime change, logged	Marshall and Jaggers (2000)
Military Expenditure Growth	Percentage of growth in military expenditures	Boehmer (2010)
Number of Borders	Total Number of Borders of a country	Boehmer (2008)
Number of Allies	Total Number of Military Allies of a country	Boehmer
Rebellion	Scaled from factor analysis and is a continuous variable measuring the amount of guerrilla warfare, major crises, and revolutions in a state.	Boehmer (2010)

As additional robustness tests, three models replaced energy consumption per capita with other alternatives for measuring development. The first variable is *Average Life Expectancy at Birth* (ALE), which was used as opposed to the Human Development Index (HDI) because of HDI's severe data limitations. The other two variables used for this purpose are *GDP per Capita* and *Income Inequality* (Gini). Real gross domestic product (GDP) per capita, was adjusted for purchasing power parity (PPP), and measured in its actual value and then logged (Heston et al., 2002). Income inequality was measured by use of the Generalized Inequality Index (Gini) ranging from 0 to 100. This is done in order to determine whether alternative methods of measuring development will show the same results as those models that use energy consumption per capita to measure development.

A high number of different models were used in order to support the hypothesis of this thesis in order to provide the highest level of analytical accuracy and explain the relationship between development and the likelihood of terrorist incidents as well as possible.<sup>3</sup> Models one and two serve to establish the most basic relationship between the dependant and independent variables comparing the impact of development with and without control variables. Models three and four also show the impact of development on terrorist incidents, this time with the development squared variable included. The fifth and sixth models investigate what kind of an impact various different control variables can have on the independent variables. The last model controls for different regions in order to establish whether the hypothesis of this thesis hold true for every continent. The way this was done was by running the models and including only those countries that belong to different regions.

Li found, in relation to interpreting terrorism incidents, that since the “dependent variable is event count, ordinary least squares (OLS) estimates can be inefficient, inconsistent, and biased” (2005, 286). This problem originates from the fact that the dependant variable is a “count” variable which could throw off the distribution. When dealing with analyzing a count variable the Poisson regression model is often used. However, according to Long (1997) the Poisson regression model rarely fits in practice since there could be several problems surrounding this method including over-dispersion, the standard errors from the Poisson regression could be biased downwards and the z values would be spuriously large (230). This is why a negative binomial regression was used for this research project. This finding applies to both, those models that use the GTD dataset and the ITERATE dataset.

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<sup>3</sup> The exact Models that were used can be found in the appendix.

## **Chapter 5: Results**

In this chapter I will summarize the results from the various models that were discussed in the “Research Design” chapter. The models up to Model 10.4 all look at terrorism as a whole (they include both domestic and international terrorist incidents). The rest of the models (Models 11-19.4) look at solely international terrorism. Table 2 below shows the results of the first five models. Model 1 shows the basic relationship between development and terrorist incidents without the squared term and any control variables. The effect of development is statistically significant and negative. Model 2 includes control variables and in this model one can see the effects of various control variables on terrorist activity without the squared development variable. This model is intended to establish the most impact of the control variables. In this model, Democracy is the variable with the highest statistical significance and is positive. Model 3 serves a similar purpose as Model 1, which is setting a baseline for the relationship between development and terrorist incidents. The difference between this model and Model 1 is that this model includes the squared development term. In this model both the development and development squared variable were statistically significant and negative which does not support the first hypothesis of this thesis. Models four and five showed the same results in relation to the development variable. This means that the first five models do not show support for the first hypothesis of this thesis. Development measured by means of energy consumption shows that development only decreases terrorist incidents. The results of the Democracy variable in models two and four, and the press freedom variable from

Table 2  
*Effects of Development on Terrorist Incidents within Countries, 1970 - 2000*  
*Models 1 – 5*

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>
<i>Development</i>	-0.116 (-2.64)	-0.203 (-4.46)	-0.168 (-5.42)	-0.207 (-6.03)	-0.31 (-7.59)
<i>Development logged Squared</i>			-0.109 (-14)	-0.093 (-10.31)	-0.11 (-14.15)
<i>Total Population</i>		1.29E-06 (4.56)		1.37E-06 (4.53)	
<i>Regime Durability</i>		-0.134 (-3.2)		-0.101 (-2.59)	-0.141 (-2.92)
<i>Democracy</i>		0.081 (9.54)		0.075 (9.27)	
<i>Freedom of Press</i>					0.493 (4.09)
<i>Urban Population</i>					0.025 (7.18)
<i>Observations</i>	2039	1890	2039	1890	1618
<i>Prob&gt;Chi2</i>	0.0083	0.0000	0.0000	0.0000	0.0000

Note: The non-parenthesized numbers are the coefficient values and the parenthesized numbers are z-scores. All models were created using Robust s.e.

Model 5 also appear to support the finding that development decreases the likelihood of terrorism as a whole. Regime durability is the only variable, other than development, that showed a decrease in the likelihood of terrorism in these models.

The region specific models all showed similar results as models one through five.<sup>4</sup> The results showed themselves to be either statistically insignificant or both development variables were positive showing that an increase in development also increased the likelihood of terrorism.

While the first five models and the region specific models do not support the first hypothesis of this thesis, this does not mean that the hypothesis has to be rejected. Models six through eight (found in Table 3 below), which used alternative measurements of development, supported the first hypothesis of this thesis. Average life expectancy at birth and GDP per capita showed themselves to be statistically significant and were positive on the non-squared term and negative on the squared term. What this means for this thesis is that measuring development by means of energy consumption per capita appears to be inadequate when looking at terrorism as a whole. Considering that two out of the three alternative measurements for development are consistent with each other, but not with the main independent variable that was tested indicates that the data concerning energy consumption is inadequate when looking at both domestic and international terrorism.

Table 4 below shows the results of models 10.1 through 10.4, and they too support the findings above, in that GDP per capita and average life expectancy show support for the first hypothesis. The model shows that the development variable has a greater increase in the

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<sup>4</sup> Models 9.1-9.5 were not included as tables since they failed to contribute anything of interest.

*Table 3*  
*Effects of Development on Terrorist Incidents within Countries, 1970 - 2000*  
*Models 6 – 8*

	<i>Model 6</i>	<i>Model 7</i>	<i>Model 8</i>
<i>Average Life Expectancy</i>	0.226 (5.00)		
<i>Average Life Expectancy Squared</i>	-0.001 (-4.9)		
<i>Real GDP Per Capita logged</i>		7.975 (10.81)	
<i>Real GDP Per Capita logged Squared</i>		-0.484 (-11.05)	
<i>GINI</i>			0.448 (7.02)
<i>GINI Squared</i>			-0.005 (-6.24)
<i>Total Population</i>	1.05E-06 (3.67)	1.50E-06 (4.53)	1.58E-06 (5.10)
<i>Regime Durability</i>	-0.157 (-3.85)	-0.078 (-1.84)	-0.091 (-2.20)
<i>Democracy</i>	0.08 (6.96)	0.076 (7.28)	0.091 (9.86)
<i>Observations</i>	1788	1701	1679
<i>Prob&gt;Chi2</i>	0.0000	0.0000	0.0000

Note: The non-parenthesized numbers are the coefficient values and the parenthesized numbers are z-scores. All models were created using Robust s.e.

Table 4  
*Changes in expected value of Terrorist Incidents given changes in X variables Terrorist Incident Count*  
*Models 10.1-10.4*

	Model 10.1	Model 10.2	Model 10.3	Model 10.4
Max Value				
E (Y)	2.11976	24.37254	24.30746	24.83646
X Variables	Energy	ALE	GINI	GDP per Capita
Development	5.7549	771.4247	1621812	4.78E+07
Development Squared	1.471591	-39004.36	-21719.35	-8.81E+09
Total Population	117.2696	72.62998	155.1815	149.2348
Regime Durability	-1.772321	-19.35283	-10.64527	-9.256956
Democracy	3.348667	35.14765	38.35021	31.12752

Note: FD (Min to Max) is the first difference change in the expected value of Y given the changes in each X variable holding the others constant.  
 Values calculated by using Clarify 2.1 software by Tomz, Wittenberg, and King (2003).

average number of terrorist incidents per year than the decrease of the development squared variable. This means that the impact of development is similar to the stylized impact of development presented in Figure 1 in the theory and hypothesis chapter above.

Models 11 through 18 (the results of which can be seen in tables 5 and 6) show the results of the models that looked solely at international terrorism in order to determine whether those countries at a mid-level of development are more likely to be targets of international terrorism.

The results of these models as a whole strongly support the second hypothesis of this thesis. While all of the models showed that while development as a whole appears to increase the likelihood of an international terrorist incident, those models that included the development squared terms showed that development will eventually start to decrease the likelihood of international terrorism after first increasing it. The exception to this was Model 16, which looked at the curvilinear relationship between income inequality and the likelihood of international terrorist incidents. This variable showed to have the opposite effect of what was expected. As opposed to showing a curvilinear U-shaped relationship, Models 8, 10.3, and 16 all showed an inverted U-shaped relationship between income inequality and the likelihood of terrorist incidents.

An increase in the number of borders at one country shares with other countries increases the likelihood of a terrorist incident and an increase in military expenditures decreases the likelihood of terrorist incidents. Rebellion also showed itself to be positive and statistically significant, which is expected since a state that experiences internal turmoil is also an easy target for international terrorists to interfere. While some of the results of the control variables were in line with the expected effects that they would have, there were also some results that were surprising.

Table 5

Effects of Development on Transnational Terrorist Incidents within Countries, 1967 – 2000

	Models 11 – 14			
	<i>Model 11</i> <i>Energy</i>	<i>Model 12</i> <i>Energy</i>	<i>Model 13</i> <i>ALE</i>	<i>Model 14</i> <i>ALE</i>
<i>Development</i>	0.1706645 (5.33)	0.1382009 (4.2)	0.0522275 (9.37)	0.2297258 (4.15)
<i>Development logged Squared</i>		-0.019195 (-2.32)		-0.0014953 (-3.34)
<i>Power Capability</i>	9.68467 (6.27)	10.38952 (6.58)	9.934547 (6.29)	9.957472 (6.41)
<i>Democracy</i>	0.068026 (12.97)	0.067443 (12.90)	0.0389281 (5.98)	0.0447222 (6.79)
<i>Military Expenditure Growth</i>	-1.15E-06 (-2.34)	-1.39E-06 (-2.81)	-4.89E-06 (-7.99)	-3.83E-06 (-5.94)
<i>Borders</i>	0.130274 (7.88)	0.134099 (8.21)	0.1378543 (7.97)	0.151465 (8.45)
<i>Allies</i>	0.008199 (2.67)	0.008747 (2.82)	0.0117794 (3.43)	0.0118282 (3.34)
<i>Rebellion</i>	0.314634 (11.5)	0.311046 (11.4)	0.346095 (11.78)	0.3355957 (11.25)
<i>Observations</i>	3523	3523	3298	3298
<i>Prob&gt;Chi2</i>	0.0000	0.0000	0.0000	0.0000

Note: The non-parenthesized numbers are the coefficient values and the parenthesized numbers are z-scores. All models were created using Robust s.e.

Table 6  
*Effects of Development on Transnational Terrorist Incidents within Countries, 1967 - 2000*  
*Models 15 – 18*

	<i>Model 15</i>	<i>Model 16</i>	<i>Model 17</i>	<i>Model 18</i>
	<i>GINI</i>	<i>GINI</i>	<i>GDP per Capita</i>	<i>GDP per Capita</i>
<i>Development</i>	-0.0273898 (-4.11)	0.460121 (7.31)	0.5721183 (9.48)	4.600283 (7.56)
<i>Development logged Squared</i>		-0.005634 (-7.26)		-0.2445529 (-6.71)
<i>Power Capability</i>	10.4247 (7.35)	10.58088 (7.18)	8.228353 (4.88)	10.63552 (6.1)
<i>Democracy</i>	0.05745 (9.13)	0.057744 (8.96)	0.0297402 (4.27)	0.0340858 (4.78)
<i>Military Expenditure Growth</i>	-9.05E-04 (-1.01)	-0.000671 (-0.69)	-3.36E-06 (-6.1)	-4.53E-06 (-7.56)
<i>Borders</i>	0.13874 (8.33)	0.167701 (9.84)	0.1347938 (7.67)	0.1588841 (8.64)
<i>Allies</i>	0.006431 (2.09)	0.008363 (2.65)	0.0060219 (1.72)	0.0072189 (1.98)
<i>Rebellion</i>	0.291952 (10.85)	0.266575 (10.44)	0.3194628 (11.03)	0.3018464 (10.35)
<i>Observations</i>	3156	3156	2892	2892
<i>Prob&gt;Chi2</i>	0.0000	0.0000	0.0000	0.0000

Note: The non-parenthesized numbers are the coefficient values and the parenthesized numbers are z-scores. All models were created using Robust s.e.

An increase in the number of allies a country has and an increase in power capability both increase the number of terrorist incidents. This result is in line with the theory of this thesis that those countries that are most conflict prone will also be those that experience the most international terrorism. The reason that this particular variable reflects this assumption is due to the fact that there is a correlation between those countries that are conflict prone and an increase in the number of military allies that a country has.

The predictive models for international terrorism (Models 19.1-19.4 in Table 7 below) also show support for the second hypothesis in regards to the relationship between the variables measuring development. However, the results of the control variables were surprising. Unlike models 11 through 18, the predictive model results show that almost all of the control variables indicate an increase in the likelihood of terrorist activity in the future. The only variable that was not positive was military expenditure growth, and this was only the case in Model 19.3, where income inequality was used as the development indicator, and military expenditure showed itself to be statistically insignificant.

While the results of the various models show support for the hypotheses of this thesis, there is obvious room for improvement since there are many more variables that could be included in these models that could help to paint a more fully developed picture of the relationship between development and terrorism. The Chi-squared for all the models was 0.000 which shows that the results of the models are highly unlikely to have been random. The variance inflation factor (VIF) was used in order to check for multicollinearity.

*Table 7*  
*Changes in expected value of International Terrorist Incidents given changes in X variables Terrorist Incident Count*  
*Models 19.1-19.4*

	<i>Model 19.1</i>	<i>Model 19.2</i>	<i>Model 19.3</i>	<i>Model 19.4</i>
<i>Max Value</i>	180	180	180	180
<i>E (Y)</i>	1.889568	1.767399	2.014908	2.051707
<i>X Variables</i>	<i>Energy</i>	<i>ALE</i>	<i>FD (Min to Max)</i> <i>GINI</i>	<i>GDP per Capita</i>
<i>Development</i>	2.916942	151.4265	1325083	122854.1
<i>Development Squared</i>	-1.3997	-342.595	-59229.3	-15760.19
<i>Power Capability</i>	14.33312	12.11018	14.94452	15.2404
<i>Democracy</i>	2.769187	1.651196	2.370021	1.368369
<i>Militracy Expenditure Growth</i>	12.31981	3.0294	-0.6795	1.676281
<i>Borders</i>	14.92708	8.186712	28.97471	24.87506
<i>Allies</i>	0.79613	1.022783	0.805425	0.6953256
<i>Rebellion</i>	1117.867	1729.783	485.6872	1015.72

*Note: FD (Min to Max) is the first difference change in the expected value of Y given the changes in each X variable holding the others constant. Values calculated by using Clarify 2.1 software by Tomz, Wittenberg, and King (2003).*

The tests showed that the results for each one of the variables do not exceed the threshold of 10 for serious multicollinearity, in fact none of them crossed above 2.5 individually and the average for each one of the models never crosses 2. This shows that multicollinearity does not appear to be a problem with the models used in this thesis.

## Chapter 6: Conclusion

In this chapter I summarize the findings from the previous chapters and determine the accuracy of the predictions and assumptions that were made. The purpose of this thesis was on the one hand to expand on the findings about terrorism by Li (2005) and on the other hand, to examine the relationship between development and terrorism and to argue that there is a more complex relationship between the two than is commonly perceived. This is important because oversimplifying, and therefore misunderstanding, the relationship between development and terrorism can lead to policy decisions that can be counterproductive to the cause of decreasing the likelihood of terrorist incidents.

The results of models discussed in chapters four and five enable us to reject the null hypothesis of this research project, and generally support the hypotheses of this thesis. Development appears to have a relationship with terrorism that resembles an inverted-U, meaning that development first increases and then decreases terrorism depending on what stage of development a country is going through.

While the attempt to measure development by means of energy consumption per capita failed in relation to terrorism as a whole, it showed the same results as the alternative development variables in relation to purely international terrorism. This implies that those countries that are at a transitional stage of development do indeed make for more attractive targets for international terrorism. Even though the exact reasons why countries become more attractive targets could not be determined conclusively from the results chapter, it did manage to establish that the relationship is there.

The income inequality variable used above showed the most perplexing results of the analysis. The fact that it not only deviate from the expected results, but actually showed the exact opposite, leaves many questions unanswered. The reasons for these results might lie with missing data or an error in the theory of this thesis as to the assumptions about the relationship between income inequality and development. Either way, the results of income inequality warrant further investigation in future research projects.

The results here show also that any previous assumption of a purely linear relationship between development and terrorism is an oversimplification of a much more complex relationship. In relation to domestic terrorism, one can see that people living in countries at different stages of development naturally have different grievances. This leads to a difference in the likelihood of the population resorting to terrorism to achieve their goals. Seeing how development in many countries is a process that is already occurring and is unlikely to come to an end, the results of this research are positive. The idea that the results are positive is due to the fact that they show evidence that continued development in a country will eventually lead to a decrease in the likelihood of terrorist incidents. This is true for both domestic and international terrorism. While the results here have also shown that initially development is more likely to increase terrorism than decrease it, assuming that development in most countries is inevitable, it is comforting to know that the impact that development has on terrorism is not purely negative.

The results of the analysis provided in this thesis appear to provide at least one aspect of the trend of terrorism in India that was discussed in the “Introduction” chapter above. The continued economic development in appears to have had an impact in reducing terrorism by a long shot. This implies that if those countries that are at an intermediate level of development

and experience a lot of terrorism, such as Peru or Colombia, continue to develop and break through the transitional stage, they will see a decrease in the overall number of terrorist incidents

Future research can apply the methods used in this thesis in order to further untangle the question of what factors have an impact on terrorism, whether they are positive or negative. In this research project I have only looked at a small group of variables that could have an impact on terrorism, and many are still left to be tested. In addition to discovering the impact of more variables, a further improvement to this research project is testing a greater period of time. For this thesis, only those terrorist incidents between 1967 and 2000 were available to the author. Investigating whether there was a change in the general trend in terrorism pre- and post-9/11, and whether the role of development has changed would shed further light on the true relationship between development and terrorism. Being able to establish how the development process will influence terrorism could provide governments with the necessary information to take preemptive steps to keep at least some terrorism from occurring, by means of the appropriate policy decisions. Further improvement could also come comparing all three of the different ways that terrorism can be grouped. This thesis has only examined purely international terrorism and terrorism as a whole (including both domestic and international incidents). By including a third dependent variable that includes only domestic terrorism one could obtain an even better picture of the relationship between terrorism and development.

Overall, we can see that while development is only one of many factors that have an impact on the likelihood of terrorist activity, it nonetheless plays an important role in determining whether the population of a country is likely to resort to terrorism. Since development has an impact on every aspect of society, it is important to determine what kind of

an impact it will have on people. As mentioned above, the results of this research provide a sense of optimism since development, by a long shot, decreases the likelihood of terrorism.

## References

- Abadie, Alberto. 2006. "Poverty, Political Freedom, and the Roots of Terrorism." *The American Economic Review* 96.2: 50-56.
- Becker, Gary S., and Kevin M. Murphy. 2001. "Prosperity Will Rise out of the Ashes." *Wall Street Journal* October.29: 22.
- Boehmer, Charles, and David Sobek. 2004. "Prosperity or Sprawl: Economic Development and the Source of Civil War".
- Boehmer, Charles, and David Sobek. 2005. "Violent Adolescence: State Development and the Propensity for Militarized Interstate Conflict." *Journal of Peace Research* 42.1: 5-26.
- Boehmer, Charles, and David Sobek. 2010. "If They Only Had Cake: The Effect Of Food Supply On Civil War Onset, 1960-1999." University of Texas at El Paso. 1-39. Manuscript.
- Burkhart, Ross E., and Michael S. Lewis-Beck. 1994. "Comparative Democracy: The Economic Development Thesis." *The American Political Science Review* 88.4: 903-10.
- Diener, Ed, Marissa Diener, and Carol Diener. 1995. "Factors Predicting the Subjective Well-Being of Nations." *Journal of Personality and Social Psychology* 69.5: 851- 864.
- Deininger, Klaus, and Lyn Squire. 1996. "A New Dataset Measuring Income Inequality." *World Bank Economic Review* 10:565-91.
- Ehrlich, Paul R., and Jianguo Liu. 1994. "Some Roots of Terrorism." *Population and Environment* 12.2 : 183-92.
- European Commission. 2011. "Accession criteria".  
[http://ec.europa.eu/enlargement/enlargement\\_process/accession\\_process/criteria/index\\_en.htm](http://ec.europa.eu/enlargement/enlargement_process/accession_process/criteria/index_en.htm) (March 8, 2011)

- Gleditsch, Kristian S. 2002. "Expanded Trade and GDP data," *Journal of Conflict Resolution* 46:712-724
- Global Terrorism Database, START, accessed on 05/02/2011
- Hadenius, Axel. 1992. *Democracy and Development*. Cambridge: Cambridge University Press.
- Heston, Alan, Robert Summers, and Bettina Aten. 2002. *Penn world table version 6.1*. Philadelphia: Center for International Comparisons at the University of Pennsylvania (CICUP)
- Hewitt, J. Joseph. 2010. *Peace and Conflict 2010*. Boulder: Paradigm.
- Holz, Carsten A. 2004. *China's Economic Growth Statistics : Trustworthy In The Long Run, Less So In The Short Run*. APARC Dispatches, October.
- Islam, Sardar M N, and Matthew Clarke. 2002. "The Relationship between Economic Development and Social Welfare: A New Adjusted GDP Measure of Welfare." *Social Indicators Research* 57.2: 201-28.
- Kayaoglu, Mustafa. 2007. "Does Inequality Trigger Terrorism?" *In Understanding Terrorism: Analysis Of Sociological And Psychological Aspects*, eds. Ozeren, Suleyman, Ismail Dincer Gunes, and Diab M. Al-Badayneh. V.A.: IOS Press Inc.
- King, Gary, Michael Tomz and Jason Wittenberg (2003). "Making the Most of Statistical Analyses: Improving Interpretation and Presentation." *American Journal of Political Science*, Vol. 44, No. 2, 347-361.
- Koseli, Mutlu. 2007. "The Poverty, Inequality and Terrorism Relationship: AN Empirical Analysis of Some Root Causes of Terrorism" in *Understanding Terrorism: Analysis Of Sociological And Psychological Aspects*, eds. Ozeren, Suleyman, Ismail Dincer Gunes, and Diab M. Al-Badayneh. V.A.: IOS Press Inc.

- Krueger, Alan B., and Jitka Maleckova. 2003. "Education, Poverty and Terrorism: Is There a Causal Connection?" *The Journal of Economic Perspectives* 17.4: 119-44.
- Kurrild-Klitgaard, Peter, Mogens K. Justesen, and Robert Klemmensen. 2006. "The Political Economy of Freedom, Democracy and Transnational Terrorism." *The Political Economy of Terrorism* 128: 289-315.
- Li, Quan. 2005. "Does Democracy Promote or Reduce Transnational Terrorist Incidents?" *The Journal of Conflict Resolution* 49.2: 278-97.
- Li, Quan, and Drew Schaub. 2004 "Economic Globalization and Transnational Terrorism: A Pooled Time-Series Analysis." *The Journal of Conflict Resolution* 48.2: 230-58.
- Long, Scott J. 1997. *Regression Models for Categorical and Limited Dependant Variables*. California: Sage Publications Inc.
- Marshall, Monty G. and Keith Jaggers. 2002. *Polity IV Project: Political Regime Characteristics and Transitions, 1800-2002*. Version p4v2002e. College Park, MD: Center for International Development and Conflict Management, University of Maryland.  
<http://www.cidcm.umd.edu/inscr/polity/index.htm>.
- McGillivray, Mark, and Howard White. 2006. "Measuring Development? The UNDP's Human Development Index." *Journal of International Development* 5.2: 183-92.
- Merari, Ariel. 1993. "Terrorism as a Strategy of Insurgency." *Terrorism and Political Violence* 5.4: 213-51.
- Mickolus, Edward, Todd Sandler, Jean Murdock, and Peter Flemming. 2002. "International Terrorism: Attributes of Terrorist Events (ITERATE)." Vinyard Software, code-book.
- Olson, Manur, Jr. 1963. "Rapid Growth as a Destabilizing Force." *The Journal of Economic History*. 23.4: 529-552.

- Ors, Huseyin, and Hakam Cam Cetin. 2007. "Characteristics of Global Terrorism." In *Understanding Terrorism: Analysis Of Sociological And Psychological Aspects*, eds. Ozeren, Suleyman, Ismail Dincer Gunes, and Diab M. Al-Badayneh. V.A.: IOS Press Inc.
- Przeworski, Adam. 2006. *Democracy and Development: Political Institutions and Well-being in the World, 1950-1990*. New York: Cambridge University Press.
- Ranis, Gustav, and Frances Stewart. 2007. "'Dynamic Links between the Economy and Human Development.'" In *Policy Matters: Economic and Social Policies to Sustain Equitable Development*, eds. José Ocampo, Jomo K.S. and Sarbuland Khan. 32-52. UK: Zed Book Limited.
- Raphael, Sam. 2009. "In the Service of Power: Terrorism Studies and the US Intervention in the Global South." In *Critical Terrorism Studies: a New Research Agenda*, eds. Richard Jackson, Marie Smyth, and Jeroen Gunning. New York: Routledge.
- Remenyi, Joseph. 2004. "What is development?," in *Key Issues in Development*, eds. Damien Kingsbury, Joe Remenyi, John McKay and Janet Hunt. 22-44. New York: Palgrave MacMillan.
- Rostow, Walt W. 1960. *The Stages of Economic Growth: A Non-Communist Manifesto*. London: Cambridge Press.
- Rui, Oliver M., Michael Firth, and Wenfeng Wu. *Cooking the Books: Recipes and Costs of Falsified Financial Statements in China* (November 12, 2010). (Working Paper)
- Sambanis, Nicholas. 2008. "Terrorism and Civil War" In *Terrorism, Economic Development, and Political Openness*, Philip Keefer and Norman Loayza. New York: Cambridge University Press.

- Singer, David J. 1987. "Reconstructing the Correlates of War Dataset on Material Capabilities of States, 1816-1985." *International Interactions* 14: 115-32.
- Stohl, Michael. 1988 *The Politics of Terrorism*. New York: M. Dekker.
- Sluka, J., 2009. "The Contribution of Anthropology to Critical Terrorism Studies", in Jackson, R., Gunning, J., and Breen Smyth, M., eds., *Critical Terrorism Studies: A New Research Agenda*, Abingdon: Routledge, pp. 138-55.
- United Nations Development Programme. 2011. "Development Indices".  
<http://hdr.undp.org/en/humandev/indices/> (March 8, 2011)
- Van Belle, Douglas. 1997. Press freedom and the democratic peace. *Journal of Peace Research* 34 (4): 405-14.
- Van Belle, Douglas 2000. Press freedom and global politics. Westport, CT: Praeger.
- World Bank. 2002. The 2002 world development indicators CD-ROM. Washington, D.C.: World Bank.

## Appendix:

### Models

#### *Terrorism as a whole Models:*

Model 1:

$$\textit{Terrorist Incidents} = B0 + \textit{Development logged} + E$$

Model 2:

$$\textit{Terrorist Incidents} = B0 + \textit{Development logged} + \textit{Total Population} + \textit{Regime Durability logged} + \textit{Democracy} + E$$

Model 3:

$$\textit{Terrorist Incidents} = B0 + \textit{Development logged} + \textit{Development logged}^2 + E$$

Model 4:

$$\textit{Terrorist Incidents} = B0 + \textit{Development logged} + \textit{Development logged}^2 + \textit{Democracy} + \textit{Total Population} + \textit{Regime Durability logged} + E$$

Model 5:

$$\textit{Terrorist Incidents} = B0 + \textit{Development logged} + \textit{Development logged}^2 + \textit{Freedom of Press} + \textit{Urban Population} + \textit{Regime Durability logged} + E$$

Model 6:

$$\textit{Terrorist Incidents} = B0 + \textit{ALE} + \textit{ALE}^2 + \textit{Total Population} + \textit{Regime Durability logged} + \textit{Democracy} + E$$

Model 7:

$$\textit{Terrorist Incidents} = B0 + \textit{Real GDP Per Capita logged} + \textit{Real GDP Per Capita Logged}^2 + \textit{Total Population} + \textit{Regime Durability logged} + \textit{Democracy} + E$$

Model 8:

$$\textit{Terrorist Incidents} = B0 + \textit{GINI} + \textit{GINI}^2 + \textit{Total Population} + \textit{Total Population} + \textit{Regime Durability logged} + \textit{Democracy} + E$$

Model 9:

*Terrorist Incidents by Region = B0 + Development logged + Development logged<sup>2</sup> + Population + Regime Durability logged + Democracy + E*

Model 10:

*Terrorist Incident Prediction = B0 + Development logged + Development logged<sup>2</sup> + Total Population + Regime Durability logged + Democracy + E*  
(Repeated with ALE, GINI, and GDP Per Capita logged and their respective squared terms)

***International Terrorism Models:***

Model 11:

*International Terrorist Incidents = B0 + Development logged + Power Capability logged + Regime Durability logged + Democracy + Military Expenditure Growth + Number of Borders + Number of Allies + Rebellion + E*

Model 12:

*International Terrorist Incidents = B0 + Development logged + Development logged<sup>2</sup> + Power Capability logged + Regime Durability logged + Democracy + Military Expenditure Growth + Number of Borders + Number of Allies + Rebellion + E*

Model 13:

*International Terrorist Incidents = B0 + ALE + Power Capability logged + Regime Durability logged + Democracy + Military Expenditure Growth + Number of Borders + Number of Allies + Rebellion + E*

Model 14:

*International Terrorist Incidents = B0 + ALE + ALE<sup>2</sup> + Power Capability logged + Regime Durability logged + Democracy + Military Expenditure Growth + Number of Borders + Number of Allies + Rebellion + E*

Model 15:

*International Terrorist Incidents = B0 + GINI + Power Capability logged + Regime Durability logged + Military Expenditure Growth + Number of Borders + Number of Allies + Rebellion + E*

Model 16:

*International Terrorist Incidents = B0 + GINI + GINI<sup>2</sup> + Power Capability logged + Regime Durability logged + Democracy + Military Expenditure Growth + Number of Borders + Number of Allies + Rebellion + E*

Model 17:

*International Terrorist Incidents = B0 + GDP Per Capita Logged + Power Capability logged + Regime Durability logged + Democracy + Military Expenditure Growth + Number of Borders + Number of Allies + Rebellion + E*

Model 18:

*International Terrorist Incidents = B0 + GDP Per Capita Logged + GDP Per Capita Logged<sup>2</sup> + Power Capability logged + Regime Durability logged + Democracy + Military Expenditure Growth + Number of Borders + Number of Allies + Rebellion + E*

Model 19:

*International Terrorist Incident Prediction = B0 + Development logged + Development logged<sup>2</sup> + Power Capability logged + Regime Durability logged + Military Expenditure Growth + Number of Borders + Number of Allies + Rebellion + E*  
(Repeated with ALE, GINI, and GDP Per Capita logged and their respective squared terms)

## List of Countries Included

Afghanistan	El Salvador	Malta	Syria
Albania	Eritrea	Mauritania	Taiwan
Algeria	Estonia	Mexico	Tanzania
Angola	Ethiopia	Morocco	Thailand
Antigua and Barbuda	Fiji	Mozambique	Togo
Argentina	France	Myanmar(Burma)	Trinidad and Tobago
Armenia	Gabon	Namibia	Tunisia
Australia	Germany	Nepal	Turkey
Austria	Germany, East	Netherlands	Uganda
Bahamas	Ghana	New Zealand	Ukraine
Bahrain	Greece	Nicaragua	Ukraine
Barbados	Grenada	Niger	United Kingdom
Belarus	Guatemala	Nigeria	United States
Belgium	Guinea	Norway	Uruguay
Bolivia	Guyana	Oman	Venezuela
Bosnia and Herzegovina	Haiti	Pakistan	Vietnam
Botswana	Honduras	Panama	Yemen, North
Brazil	Hungary	Papua New Guinea	Yemen, South
Bulgaria	Iceland	Paraguay	Yugoslavia
Burkina Faso	India	Peru	Zambia
Burundi	Indonesia	Philippines	Zimbabwe
Cambodia	Iran	Poland	
Cameroon	Iraq	Portugal	
Canada	Ireland	Qatar	
Central African Rep	Israel	Romania	
Chad	Italy	Russian Federation	
Chile	Ivory Coast	Rwanda	
China	Jamaica	S. Korea	
Colombia	Japan	Saudi Arabia	
Congo	Jordan	Senegal	
Costa Rica	Kenya	Seychelles	
Cote d'Ivoire	Korea, Rep.	Sierra Leone	
Cuba	Kuwait	Singapore	
Cyprus	Laos	Slovenia	
Czech Republic	Latvia	Somalia	
Denmark	Lebanon	South Africa	
Djibouti	Lesotho	Soviet Union	
Dominica	Liberia	Spain	
Dominican Republic	Libya	Sri Lanka	
Ecuador	Lithuania	Sudan	
Egypt	Luxemburg	Suriname	
	Malawi	Swaziland	
	Malaysia	Sweden	
	Mali	Switzerland	

## **Curriculum Vita**

Mark Daube was born in Ludwigsburg, Germany. The only son of Frank and Christina Daube, he graduated from Franklin High School, El Paso, Texas, in spring of 2004, and began attending the University of Texas at El Paso in the fall of that year. While pursuing a bachelor's degree in Political Science, Mark earned the German Abitur, attended the Law School Preparation Institute one summer, and worked for the Law School Preparation Institute as a teaching assistant for logic and LSAT prep for half a year. Mark was placed on the Dean's List from spring of 2005 to spring of 2008. He graduated cum laude from the University of Texas at El Paso in the spring of 2009. Upon graduation he entered the Master of Arts program in Political Science at the University of Texas at El Paso. During his two years there he worked as a departmental teaching and research assistant. Mark was also chosen as recipient of UTEP's Allien and Paul C. Davidson Scholarship for the 2010-2011 academic year.

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