The Origin of Terror: Affluence, Political Freedom, and Ideology

An Empirical Study of the Risk Factors of International Terrorism

Caitlin Street
Economics Honors Thesis
College of the Holy Cross
Advisor: Prof. Anderton
Second Reader: Prof. Carter
Spring 2008

Abstract:
This paper investigates the political, economic, and social risk factors of international terrorism. This panel cross-country analysis uses a Poisson regression model to study terrorist events originating in 229 countries from 1980 to 2004. The dependent variable is the number of terrorist events originating from a country in a given five year period. Results show that civil conflict, education, income, and ethnic fractionalization have a significant positive effect on creating terrorism. The study also finds that religious factors, democracy, and different time periods also have significant effects on terrorism.

I would like to thank to my advisor, Professor Anderton, and my second reader, Professor Carter, for all of their generous time, support, and direction throughout the course of this study. I would also like to thank Professor Cahill for his guidance throughout the honors program.

I. INTRODUCTION

In the aftermath of the September 11, 2001 attacks on New York City, the Pentagon and Pennsylvania, scholars and politicians around the world hypothesized possible motives behind the violence. Since the terrorists struck New York City, the financial capital of the world, and destroyed the city's foremost symbol of capitalism and commercial success, the World Trade Center, economic disparity immediately came to the forefront of the dialogue. In a March 2002 speech at the U.N. conference in Mexico, President George W. Bush further rationalized this argument. He declared: "We fight against poverty because hope is an answer to terror…We will challenge the poverty and hopelessness and lack of education and failed government that too often allow conditions that terrorists can seize and try to turn to their advantage" (Bush 2002). Bush's speech implies three types of terrorist motives: economic, political, and social. This paper attempts to study these three types of risk factors, focusing in particular on economic motives which are proxied by income and education variables. The results of this paper have broad foreign and domestic policy implications. By helping to uncover the roots of terrorism, this study may help guide American leaders to employ more effective prevention policies.

This paper focuses exclusively on international and transnational terrorism. The exact definition for global terrorism differs from source to source. This paper will abide by the description of international and transnational terrorism set forth by Mickolus and Sandlers's data set, "International Terrorism: Attributes of Terrorist Events" (ITERATE). (ITERATE is the prime data source for this paper.) ITERATE defines international terrorism as

> 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. (Mickolus and Sandler 2)

The data set this study employs includes all terrorist events that fall into that description. ITERATE includes both international and transnational events. There is a subtle but important difference between the two, especially when it comes to looking at the economic motivation behind terrorism. International terrorism is controlled or endorsed by sovereign states, while transnational terrorism is not officially state sponsored.

II. LITERATURE REVEIW

Previous literature addresses the question of poverty and terrorism in a variety of ways. A number of papers examine public opinion surveys in Middle Eastern countries to measure the public support for terrorism in light of an individual's economic standing (Krueger and Maleckova (2003), Tessler and Robbins (2007)). Other studies investigate the economic status and level of educational attainment of terrorists themselves to test the hypothesis that poverty and ignorance drive men to violent professions. Berrebi (2003) and Krueger and Maleckova (2003) examine biographies of terrorists to asses their educational and economic background.

Cross Country Studies

Cross country studies look at a broad range of terrorist attacks around the world over a given time period. Generally, these papers run a regression with the dependent variable representing the frequency of attacks occurring in or originating from a country and various independent variables representing economic, political, and demographic variables for that country. They then look to see if there is a statistically significant relationship between the independent variables and the frequency of terrorist attacks. When the dependent variable is the number of terrorist events originating from a country, then this form of analysis goes one step beyond the survey and biographical study to take into account the possibility that even though terrorists may be wealthy they are actually acting on behalf of the economically deprived

majority of their country. In this sense, rich well-educated terrorists may still be engaging in international terrorist events out of broader economic or political motives.

Krueger and Maleckova (2003) is one of the more groundbreaking studies of this kind over the last five years. The paper investigates the relationship between a country's GDP per capita and the frequency of terrorist attacks coming from that country. The data come from the U.S. State Department's record of international terrorist events from 1997 to 2002. The dependent variable is the number of international terrorist events originating from each country. The paper employs a negative binomial regression with independent variables for three GDP quartiles, religion, illiteracy, and level of civil liberties. Krueger and Maleckova (2003) find little evidence that poorer countries have more terrorists than richer. However, the study does indicate that countries with greater civil liberties are more susceptible to originate terrorism. The study concludes that there is little reason to believe reduced poverty or improved schooling could decrease international terrorism. Krueger and Maleckova (2003) argue that terrorism is not a response to low market opportunities, but rather a manifestation of political turmoil and frustration. Furthermore, they assert that terrorist ambitions arise not from a desire for personal economic gain but rather from passionate support for the political movement. Therefore, policies that work to eliminate poverty and strengthen education are not likely to influence the terrorists' motives.

Testas (2004) also investigates terrorists' country of origin. The study focuses on 37 Muslim countries examining variables like educational attainment, political repression, GDP per capita, and a dummy variable for civil war in an attempt to unravel the risk factors behind terrorism. The results conclude that more education leads to more terrorism, and both low level and high levels of repression increase terrorist incidence (U-shaped relationship). Furthermore,

the study finds that the presence of civil war increases the risk of terrorism, while the income variable was not statistically significant.

Adding to previous studies, Krueger and Laitin (2003) takes into account both the terrorists' country of origin and the places they choose to attack. In two separate negative binomial regressions, the paper investigates the poverty level of both the country of origin and the target country as possible risk factors for terrorism. Like Krueger and Maleckova (2003) this paper uses U.S. State Department Data for 781 international terrorist events from 1997 to 2003. The paper expands on previous literature by adding new independent variables including indicators of political and civil liberties, ethnic fractionalization, GDP growth, infant mortality rate, and other demographic variables. The results show no positive correlation between economic deprivation and terrorism, discovering instead that terrorists are politically repressed and their targets are wealthy. Krueger and Laitin (2003) suggests that political repression rather than economic disparity are motivating factors behind international terrorism.

Another study, Blomberg and Rosendorff (2006), also investigates both country of origin and target country to unravel terrorist motives. Using a gravity model, the paper concludes that, from 1968 to 2003, democratic institutions, high income and more political freedom reduce domestic conflict in a home country but these same variables increase a country's risk of being the target of international terrorists. However, this paper does not explicitly examine what risk factors in a home country drive people to turn to international terrorism. While the paper does find that high income in a home country reduces that country's risk of being a target of terrorism itself, it does not examine the whether or not that same high income level serves as a deterrent or an incentive for its own citizens to become terrorists.

Most of the remaining literature focuses on the countries where the terrorism occurs, instead of the countries from where the terrorists come. These studies help reveal what makes a country a target of terrorism, not what conditions generate a terrorist. For example, Li and Schaub (2004) investigates the effect of economic globalization on the number of transnational terrorist events occurring in a country. Examining 112 countries from 1975 to 1997, the results reveal no statistically significant positive direct association between trade, foreign direct investment (FDI), and portfolio investment on the amount of terrorist activity. However, the paper does uncover evidence that implies that increased economic development of a country and its trading partners does reduce the risk for terrorism in that country. The results suggest that variables such as trade and FDI may have an indirect negative effect on transnational terrorism. Tavares (2004) also uses country of occurrence to investigate the likelihood of terrorist attacks in democratic societies. The paper finds that rich countries are more likely to suffer attacks, but discovers no statistically significant coefficient to indicate that democracies are more or less prone to terrorist attacks than other countries.

Blomberg, Hess and Weerapana (2004) use country of occurrence to show that sharp economic changes may make a country more prone to an attack. Examining a sample from 1986 to 1991, the study finds that democratic high income countries that experience economic recessions or contractions are much more likely to experience a terrorist attack. Furthermore, Bravo and Dias (2006) finds that from 1997 to 2002 increased levels of development, literacy and ethnic fractionalization reduce the risk of terrorism. Furthermore, the study finds that terrorism occurrence is positively related to mineral reserves, non-democratic regimes and participation in international organizations. As evident from the results of the papers above,

studies have reached very different conclusions regarding the effect of income and economic development on international terrorism.

Most of the aforementioned papers used negative binomial regressions in their cross country analysis. Piazza (2006) extends the existing literature but uses an ordinary least squares estimation method. The paper employs a series of multiple regression analyses on terrorist incidents and casualties occurring in 96 countries from 1986 to 2002, including case studies of India, Israel, and Columbia. This study looks more closely at socio-economic variables, including poverty, malnutrition, inequality, unemployment, inflation, calories per capita, economic growth, HDI and GINI indexes, ethno-religious diversity, and political repression, than the previous literature. In particular, it adds a new dummy variable accounting for multiparty systems in an effort to test the social cleavage theory, which argues that political systems with more than two or three parties tend to be weaker and more vulnerable to upheaval and violence. Unlike Krueger and Laitin (2003) the paper finds no significant relationship between measures of economic development in the country where the incident occurs and terrorism. Instead it finds that population, ethno-religious diversity, increased state repression, and most significantly the structure of party politics are strong risk factors for terrorism. Piazza (2006) argues that the prevalence of multiparty systems is more likely to explain terrorist activity than economic factors.

Abadie (2006) also employs an ordinary least squares estimation method to study the relationship between poverty and terrorism. However, unlike previous studies, this paper uses Terrorist Risk Ratings from World Market Research Center's Global Terrorism Index for its dependent variable. The study looks at the risk ratings, on a scale from 10 to 100 (with 100 being the maximum risk), of 186 countries in the cross-sectional year 2003-2004. Distinct from the

earlier literature, this risk rating allows the paper to take into account both international and domestic terrorism. Employing similar economic, political, and demographic independent variables, this paper finds no significant correlation between economic factors and terrorism. However, the results do reveal that countries in transition from authoritarian to democratic governments are more susceptible to terrorism. Furthermore, Abadie (2006) finds that as political liberties expand, terrorist incidents increase. Very few studies focus on country of origin to unravel the home conditions that make people become terrorists. Those few studies that do, find conflicting evidence regarding the effect of political, social, and economic variables. After all of these studies, which employ different methodology and variables, in particular the effect of economic variables on terrorism is still unclear.

Civil War & Terrorism Studies

The number of empirical studies on the risk factors of terrorism is dwarfed by the number of comparable studies on interstate and intrastate conflict. For that reason, much of the existing research on conflict, particularly on civil war, can guide our study of terrorism. Political scientists and economists have recently begun exploring the complex connections between civil war and terrorism. As the terrorist insurrections around the world seem to coincide with civil conflict, these two distinct forms of political violence seem more interconnected than ever. Sambanis (2007) attempts to investigate these two distinct forms of violence theoretically and empirically. He defines civil war as

> an armed conflict between the government of a sovereign state and domestic, politically-organized groups that can mount effective resistance and engage the state in relatively continuous fighting that causes more than 1,000 deaths over a specified period. (Sambanis 2007, p. 4)

Typically definitions of civil war tend to focus on the magnitude of violence and require a certain threshold level of casualties, while terrorism definitions tend to focus on motivation and strategic purpose behind the violence.

Through an empirical cross-country analysis, Sambanis (2007) investigates the characteristics of countries where terrorism and civil war occur. On the whole, he finds that lower income and partially democratic countries (or countries in transition) are at a much greater risk for civil war. However, like most of the studies on the topic, Sambanis finds no significant relationship between income level and the occurrence of terrorism. The paper points out that national income level statistics might not reveal the local economic conditions that stimulate an individual to join a terrorist organization. However many studies that look on the micro-level for possible economic motives of terrorists (through interviews of family and friends) also find little evidence to suggest terrorists are motivated by poor economic conditions (Abadie 2006, Berrebi 2003, Krueger and Maleckova 2003).

Sambanis (2007) also finds that terrorism tends to thrive in more democratic societies. As Kalyvas (2000) notes, emerging democracies leave a power vacuum which provides an opportunity for rebel or terrorist movements to take control. However, long standing democracies also appeal to terrorists, perhaps because terrorists are more likely to successfully influence policy in states that emphasize the importance of public opinion. Another theory argues that in democratic states terrorists have more access to media resources that are necessary to spread their opinions and publicize their agenda. However, democratic states are more likely to adapt their policy to public opinion. Therefore, theoretically there should be fewer political grievances to motivate terrorism (Sambanis 2007). Extending on Piazza's (2006) and Abadie's (2006) findings that instability, whether through weak political systems or government upheaval, is a strong risk factor for terrorism, Sambanis (2007) adds a variable for civil conflict to account for state breakdown.

Researching the factors behind other types of conflict, like civil wars, can offer a helpful parallel to terrorism. Fearon and Laitin (2003) suggests that the risk factors for civil war do not include ethnic or religious factors but rather poverty, political instability, rough terrain and populous countries. Boehmer and Sobek (2005) investigate the effect of economic development on interstate conflict. Unlike previous research, the study estimates a non-linear relationship, in which both extreme wealth and extreme impoverishment have a negative impact on violence. The paper argues that countries at a middle level of economic development are more likely to seek land or territorial claims by means of military force. Poorer countries do not have the means or the opportunity to engage in territorial fights, while highly developed countries are more focused on internal services for economic growth. A statistical analysis of all states from 1870 to 1992 confirms the hypothesis. This paper provides useful insight when looking at the influence of a country's economic development on violence in non-linear terms.

III. METHODOLOGY

Hypothesis

To investigate the determinants of terrorism, I postulate a model in which the number of events is a function of country-level economic, political, social, and religious factors. I then estimate the model using a Poisson regression for a broad panel of countries. The observations are quinquennial and pan the five periods, 1980-84, 1985-89, 1990-94, 1995-99, and 2000-04. This study expands Krueger and Maleckova's hypothesis using a larger and more comprehensive data set. While most studies examine what makes a country a target of terrorism, (e.g. Li and Schaub 2004, Abadie 2006, and Piazza 2006), this paper studies the countries where terrorists originate in order to unravel the conditions that create terrorists. Therefore, the results of this

study help to explain what circumstances in a home country can lead individuals to engage in terrorism, and, moreover, what situations might foster terrorist planning and recruitment.

As clear from the existing body of literature, papers have found conflicting relationships between terrorism and the various social, political, and economic variables. This paper uses an improved data set and new statistical methods in order to see if we can uncover significant relationships between these variables. The study places a particular emphasis on economic risk factors, gauged by education and income levels, in order to unravel this puzzling relationship. By attempting to further unravel the motivation behind terrorism, this paper attempts to better equip people with essential knowledge to aid counter-terrorism efforts all around the globe.

Model

This study uses a Poisson panel estimation method. The dependent variable is a count variable for the number of terrorist incidents originating from a country over a five year period. Thus, for each country there are five observations over the 25 year period from 1980 to 2004. The original sample consisted of a panel of 229 countries and territories. However, data limitations reduced the final sample. The 229 countries were those for which ITERATE provided data on the number of terrorist events originating from that country. The periods were 1980-84, 1985-89, 1990-94, 1995-99, and 2000-2004. With a few exceptions, observations for the dependent variables were taken from the first year of the five year period (1980, 1985, 1990, 1995, and 2000).

Other studies, like Wade and Reiter (2007), which tests the hypothesis that democracies are more prone to suicide terrorism than other forms of government, use the nation-year as the sole unit of analysis from 1980 to 2003. However, using year by year observations can cause problems with lags. For example, assume a terrorist group is stimulated by some political or

economic event that occurred in a given year and they begin to plan an attack motivated by that incident. They may plan for years before the attack actually happens. In this case, for example, an economic event in 1990 may stimulate an attack that doesn't occur until 1994. Therefore, the independent variables representing possible risk factors for the year of the attack would not account for the actual risk factors from years earlier.

On the opposite end of the spectrum, Krueger and Maleckova (2003) take the total number of terrorist incidents that occur from 1997 to 2002 in a country as the dependent variable. However, using one six year period, does not reveal how the changes in independent variables over time, such as GDP per capita and measures of political freedom, change the number of events originating from a country. Therefore, using multiple five-year periods as the units of analysis could provide a good middle ground between the two extremes.

The dependent variable is the number of terrorist incidents originating from a given country over a five year period. Data are collected from International Terrorism: Attributes of Terrorist Events (ITERATE) data set from 1980 to 2004 (Mickolus and Sandler 2003). The variable used is what ITERATE calls the "first nationality of terrorists in attack force". For this variable, ITERATE labels each terrorist event that occurs with a 3-digit code representing the dominate country of origin of the terrorists. For each year, I organized a chart and counted the number of terrorist events originating from each country. Then, the number of events originating from a country each year was summed with the other events occurring in the five year interval to find the dependent variable. See Enders and Sandler (2006) for a detailed discussion of ITERATE data.

The two independent variables accounting for the economic risk factors are the income and educational levels in a given country. I used real GDP per capita in year 2000 dollars, scaled

in thousands, to account for the average income. The data are from the Penn World Tables 6.2 (Heston 2006). The time series "cgdp" data was converted into the panel format by recording the observation for the first year of the five year periods (e.g., for the period from 1980 to 1984 the real GDP per capita for 1980 is used). To measure the educational standards of a given country, I used Barro and Lee's (2001) data on average years of schooling. These data measure the average years of schooling attained by individuals 25 years and older for each country during each five year period. Once again the first year of each of the five year periods is used.

This study also includes a wide range of political and demographic variables to account for other possible risk factors for terrorism. To account for political freedom and regime type, I used a variable from the Polity IV project to gauge the level of democracy of a state (Marshall and Jaggers 2007). A combined polity score for any country can range from +10 (strongly democratic) to -10 (strongly autocratic). I used a modified version of the polity score, known as Polity 2, which fills in missing data during periods of government transition and foreign interruption by taking into account the polity score of the preceding and following years. Once again, I converted the time series polity data into the panel format by recording the polity score for the first year of each five year period.

Another contribution this study makes to the existing literature is the addition of a dummy variable for civil conflict. Although Li and Schaub (2004) took into account the presence of interstate conflict, few studies (Testas 2004) have examined the relationship between intrastate conflict and terrorism. This variable is derived from the UCDP/PRIO Armed Conflict Dataset from the International Peace Research Institute, Oslo and Uppsala Conflict Data Program (Gleditsch et al. 2002). This dummy variable codes 1 for the presence of either minor or war levels of civil conflict using PRIO's variables for "Type" and "Intensity". Since we are

looking only at civil conflict, this variable is 1 only when a type 3 or 4 event occurred in a given year. Type 3 events are "internal armed conflicts" or conflicts that occur between a state and one or more internal groups without intervention from other states. Type 4 events are classified as "internationalized internal armed conflicts" or conflicts that occur between the government of a state and one or more internal groups with intervention from other states. PRIO's Intensity variable codes two categories of intensity. The first are minor events that result in 25-999 battle-related deaths in a year. The second is the war category which requires a threshold of at least 1000 battle related deaths per year. The dummy variable in this study indicates the presence of either minor or full war civil conflict or both with the dummy variable 1. If neither form of conflict is present in a given year it is coded with a 0. To minimize any simultaneity issues the civil conflict dummy variable is lagged. For example, the observation for a given country from 1980-84 is coded as 1 if there was any conflict in the previous period (1975-79).

This study also takes into account the level of ethnic fractionalization in a country. Fearon (2003) defines ethnic fractionalization as the probability that two people randomly selected from a country will be from two different ethnic groups. The data used are from Fearon's data set for his paper "Ethnicity, Insurgency, and Civil War" (2003). The level of fractionalization ranges from 0 to 1, with 1 being the most fractionalized society and 0 being the least. Because of data restrictions, the level of ethnic fractionalization Fearon calculates for each country is the same for each of my five time periods. However, it is reasonable to assume that the ethnic, cultural, and religious fractionalization variables do not change dramatically over the five periods.

Since we have taken into account the level of ethnic diversity of a country, it is also important to account for religious trends. This paper includes variables for Islam, Christianity,

Buddhism, Judaism, and Hinduism, using the data set from Alesina (2003). The variable records the percent of the population that is Islam, Christian, Buddhist, Jewish, and Hindu, ranging from 0 to 100. Once again, because of data limitations, the same percentages are used for each of the five time periods. Sample statistics for all the variables can be found in Table 1.

Estimation

Let Y equal the terrorist event count. Then Y is distributed as a Poisson random variable with expected value:

Eq. (1) $$E(Y) = e^{\beta_1 + \beta_2 Income + \beta_3 Education + \beta_4 Democracy + \beta_5 CivilConflict + \beta_6 EthnicFrac + \sum_{j=7}^{11} \beta_j \,\mathrm{Re}\,ligion_j + \sum_{j=12}^{16} \beta_j Time_j}$$

Using a Poisson count model is a new approach in the study of terrorism risk factors. Most studies use a negative binomial, while a few use ordinary least squares. However, when the dependent variable is a count, OLS estimates can be inefficient, inconsistent, and biased. I used a Poisson model because this count estimation method has robustness qualities that make it desirable. Furthermore, since this study found similar results with panel least squares, Poisson, and negative binomial methods, it seems fair to say that the Poisson Model is an accurate way to model this investigation.

The coefficients in this non-linear model are percentages. The interpretation of coefficients follows that of any log-linear specification. For example, from Equation (1), a 1 unit change in the income variable will lead to an estimated β_2*(100) percent increase or decrease in Y, the number of expected terrorist events. All of the continuous variables can be interpreted in this fashion. Interpreting dummy variables, however, requires special recalculation. The percent change in the conditional mean when the dummy variable, like civil conflict, increases from 0 to 1, is equal to 100[e^{∂}-1]% (Eq. (2)), where δ equals the coefficient the Poisson regression

produces for our dummy variable. For a more in depth explanation on how to derive the dummy variable coefficients algebraically see Hill (p. 439).

V. RESULTS

This section presents the regression analyses showing the relationship between the number of terrorist events originating in a given country and each of the independent variables. Table 1 offers basic sample statistics about the dependent and independent variables. The sample mean number of terrorist events originating from a country in a given five year period is around 7 with a standard deviation of around 18. This is clearly a skewed distribution. Table 2 provides the statistical results for the full time period regressions with income and education together (Column 1) and individually (Columns 2 and 3).

Income and Education

The key variables of interest are average years of schooling and income. This study runs two separate regressions including each variable alone with all of the other independent variables. Isolating education and income in two separate regressions avoids the issue of high multicollinearity, suggested in Column 1 by the insignificant coefficient on income and the slightly significant coefficient on education. Looking at the regression results in Columns 2 and 3 of Table 2, we find that the coefficients on both variables are positive, statistically significant, and larger in magnitude. In addition there are lower standard errors when education and income are separated.

The results of Regression 2 reveal that a $1000 increase in average GDP per capita in a country leads to an estimated 2.8% increase in the number of terrorist events originating from this country. Like previous research, this study cannot validate the argument that poverty stimulates terrorism. In fact, like Krueger and Maleckova (2003), we find the opposite is true.

Instead, it seems that wealthier countries are more likely to generate terrorism than poorer countries. Furthermore, looking at Regression 3 we find that increasing the average years of schooling by one year leads to an increase in estimated terrorist events by 12.4%. It seems that more educated countries are much more likely to generate terrorists. Clearly, these results contradict the assumption that terrorism is a manifestation of poverty and ignorance. However, these variables do not take into account the qualitative factors associated with education and income level. While it seems as though terrorists come from more educated countries, the quality of education varies from country to country. In some countries, education is more like indoctrination that promotes an extremist ideological perspective that may make an individual more likely to support terror. Regardless of the constraints of the quantitative data, looking at the remaining variables can help reveal other possible sources of terror.

Trends

From this point on, to simplify, my discussion will focus on Regression 2 which has a larger sample size. The regression includes time period dummy variables for 1980-84, 1985-89, 1990-94, 1995-99, and 2000-04. The first time period variable has been dropped to prevent multicollinearity. Therefore, all the time period coefficients are relative to the sample from 1980 to 1984. The coefficients on these variables parallel the overall trends in terrorism over the last 25 years. ITERATE reports international terrorist incidents peaked in the 1980s and then have steadily declined into the 1990s and early 2000s. In Regression 2, the estimated affect of the statistically significant coefficients on the 1995-99 and 2000-04 time periods is calculated by Equation 2 above. The results suggests that from 1980-84 to 1995-99 there was a 64.9% decrease in the number of terrorist events per five year period originating from an average country, other things equal. Similarly from 1980-84 to 2000-04 there was a 76.4% decrease in

the number of events. The negative decreasing coefficients on the time dummies in reflect the downward trend of international terrorism throughout the 1990s.

Civil Conflict

One of the largest effects of this study is the relationship between terrorism and civil conflict. As Table 2 shows, the coefficients on civil conflict in all three regressions are positive and statistically significant at .0001 level. Once again, since these are dummy variables, the estimated effect of the coefficients must be calculated. The new values are extremely large in magnitude. We find in Regression 2 moving from no civil conflict to any type of civil violence leads to an estimated 410.2% increase in the number of expected terrorist events originating from that country. Clearly, these results suggest that civil conflict in a state is a very strong risk factor for international terrorism. States that are broken down by years of civil conflict provide safe havens for terrorist operations. Here they can plan and fund their attacks with little fear of government intervention. In a broken down state, there is also a better labor market to recruit terrorists, since individuals have fewer market opportunities. As Collier's (2007) feasibility theory and Sambanis (2007) argue civil conflict makes terrorism more feasible. Terrorists come out of countries where there is civil conflict and then attack targets outside of their home country. This result has strong policy implications. It suggests that cutting down on civil conflict could be an indirect way to prevent terrorism at its roots.

Ethnic Diversity

The coefficient on ethnic fractionalization in Regression 2 is statistically significant and negative. It suggests that as a society becomes more ethnically diverse, there is a reduced risk of terrorists originating from that country. Perhaps more diverse countries produce more tolerant people who are less likely to engage in extreme political violence. Since ethnic fractionalization

is also on a scale from 0 to 1, this coefficient's estimated effect was calculated using equation 2. The data suggests that a one unit increase in ethnic fractionalization, meaning moving from a completely homogeneous society to a fully fractionalized society leads to an estimated 68.1% decrease in the estimated number of terrorist events originating from that country. This result parallels Collier's argument in ""Beyond Greed and Grievance: Feasibility and Civil War" (2007) that highly fractionalized societies are less likely to have civil war. In very diverse societies, it is harder to mobilize people under one ideology. As Sandler (2003) points out there is clearly a collective action problem, in which rebel leaders in fractionalized societies are less likely to persuade a majority to join their cause. The results of this study imply that this civil conflict analysis may also be applied to terrorism.

Democracy

The regressions in Table 2 model democracy linearly. Therefore, I have chosen to include only the linear term. The small coefficient in regression 2 offers some evidence that democracy may be risk factor for terrorism. The results suggest that if a country becomes more democratic (increase their polity score by 1 point), then terrorist events are expected to increase by 3.37%. These results indicate that as political rights increase in a country that country tends to generate terrorism. Previous versions of this study included a non-linear democracy squared term. The results offered some weak evidence of diminishing returns. The results indicated that the rate of increase in terrorist events, as countries become more democratic, is greatest in more autocratic countries. In addition, increasing freedom in highly democratic countries seems to reduce the number of terrorist events that country produces. However, since the evidence of this was not statistically significant, I chose to include only the linear term.

These results parallel much of the existing literature that suggests that countries with more political freedom have a harder time tracking and preventing terrorists from organizing. However, these results highlight the effect of the previous regime. In countries where freedom has been a way of life, more freedom does not produce more terror. However, when highly autocratic or repressive countries increase political freedom, there is a strong risk for an increase in terror. In these countries, governments lose their ability to police and control their populations to prevent terrorism. Therefore, as the evidence seems to suggest, as highly autocratic governments transition to democracy they tend to produce more terrorists.

Religion

The coefficients for Christianity and Islam in all three regressions are positive and statistically significant. Regression 2 suggests that a one percentage point increase in the proportion of Christians in a country leads to an estimated 1.30% increase in the number of terrorist events. Furthermore a one percentage point increase in Islam leads to a 1.6% increase in the number of terrorist event originating from that country. The coefficient on the percent of Jewish residents of a country is negative and significant at a .1 level. The result implies that a one percentage point increase in the Jewish population will lead to an estimated 1.11% decrease in the number of terrorist events originating from that country.

Time Periods

Since different risk factors for terrorism can be more prevalent during some time periods than others, this study split up the data between the Cold War and Post Cold War periods to see whether the risk factors change over time. The first regression, in Column 1 of Table 3, examined the sample from 1980 to 1989 (periods 1 and 2). Column 2 shows the results for the second regression which looks at the remaining three time periods from 1990 to 2004. Once

again, these regressions employ only income as the variable of interest to avoid multicollinearity issues. Political science and historical scholars have argued that terrorism evolved from more political roots in the 1970s and the 1980s to more religion oriented form of violence in the 1990s to 2000s. During the Cold War, the most prominent terrorist groups were left wing communist protest groups who targeted commercial interests. However, the post Cold War period saw the rise of religious extremist terrorism, including Christian groups like the IRA and Muslim organizations like Al-Qaeda. This study separates these two decades in an attempt to test the historical assumption of the changing nature of terrorism.

The empirical results seem to support this historical explanation of the evolution of terror. The 1980 to 1989 regression in Column 1 finds that income level is not statistically significant. In addition, all of the religion variables are also statistically insignificant. However, we do find that ethnic fractionalization and democracy are more significant than was found for the period as a whole. In Column 1 in Table 3, for example, the estimated effect of ethnic diversity suggests that moving from a completely homogeneous society to a fully diverse society leads to an estimated 74.39% decrease in estimated terrorist events originating from that country. During this period, lack of diversity was clearly a motivating force behind terrorism. Because of the homogeneity in states, radical left-wing organizations were able to rally people under one extreme ideology to achieve their goals

Democracy is also is statistically significant and positive. The coefficient on democracy implies that as a country becomes more democratic, increasing their polity score by 1, the number of terrorist events originating from that country increase by 4.35%. The level of democracy seems to be a stronger risk factor for terrorism in the 1980s than during the period as a whole. During the Cold War period, political and social demographics played a strong

motivating role for terrorism. Terrorism during this period was driven by political ideology and social collective action.

Regression results for the second period 1990 to 2004 are available in Column 2 of Table 3. During this period income is statistically significant and positive, and has a larger magnitude than the period alone. The coefficient on income implies that a $1,000 increase in the average GDP of a country will lead to a 4.9% increase in terrorism. During this period ethnic fractionalization is no longer a significant risk factor. However, this period does see the rise of religious terrorism, with coefficients on Christianity and Islam becoming positive and highly significant. They also are of a larger magnitude than the period as a whole. If Christianity grows in a country by 1 percentage point, then the estimated number of terrorist events from that country increase by 2%. In addition, increasing the Muslim population by one percentage point leads to an increase in terrorism by 2.5%. Like the full time period sample, Jewish is also significant and negative.

These results suggest that the transition from the 1980s to the 1990s coincides with a change in the type of terrorism, and thus its risk factors. Terror in the 1980s was more issue related and depended on collective social action, while the 1990s was the dawn of religious terrorism. It is important to note that over both of these periods the variable for civil conflict is positive, very large in magnitude, and highly statistically significant. Clearly, regardless of the trends in terrorist motives, states in civil conflict have provided a breeding ground for terrorism throughout the last 25 years. However, we also must note that by limiting the sample, we lose a number of observations and thus some precision. In the future, this study will run a Chow-F test or a Wald test to formally test for the change in effects.

VI. CONCLUSION

Using a broader based sample, country of origin data, and new statistical methods this study finds that economic, social, and political variables all play a significant role in producing or preventing terrorism. First of all, terrorist events are more likely to originate from more educated and higher income countries. Secondly, states in civil conflict have an extremely high risk of generating internationally terrorists. Furthermore, countries with large proportions of Muslims or Christians are also more likely to produce terrorism, while more ethnically fractionalized societies seem to reduce terrorism. As more autocratic countries increase political liberties, their people are more likely to generate terrorist events. The study also seems to find evidence supporting the evolution from political terror during the Cold War to religious oriented terror in the 1990s and 2000s.

However, like any empirical study, this paper has some weaknesses associated with data. Because of the secret nature of terrorism, oftentimes data are not available on the origin of terrorist events. In this study, many terrorist events dropped out because they were classified as originating from unidentified Arab countries. This very likely could have affected the results of the study. In addition, data limitations forced us to use the same values for ethnic fractionalization and religious proportions for all of the time periods. However, most studies of this nature face the same problems with data coding.

While this study offers many interesting results, there is a lot more work to be done. I plan to eventually add a variable to account for a nation's population. Many other studies have found that larger countries are more likely to produce terrorists. Furthermore, other interesting variables to consider include the level of humanitarian funding in a given country or the strength of their domestic welfare programs. Burgoon (2006) argues that increased social welfare policies

reduce international terrorism by easing economic inequality and poverty. Looking at the level of humanitarian support, however, Azam (2006) finds a statistically significant positive connection between the level of foreign aid a country receives and the number of terrorist attacks that stem from that country. Azam (2006) implies that countries that receive more funding actually engage in more terrorism. Adding these variables to my regression could further test the theory that terrorism can be fought with economic humanitarian public policy. As mentioned earlier, a stability test should be run to test the true difference between the Cold War and post Cold War periods.

The results presented here support Krueger and Maleckova's (2004) findings with a much larger sample. Unlike previous studies, these results tell us what types of countries terrorists come from. It does not reveal what countries they attack or the individual characteristics of the terrorists themselves. This study has strong policy implications, suggesting that increasing education and poverty may not be the key to fighting terrorism as many politicians suggest. However, if education does increase terrorism perhaps changing the quality of education in these countries could result in significant changes. Furthermore, promoting more ethnically and religiously diverse societies could help reduce the amount of political violence stemming from that country. However, the real key to reducing terrorism may lie in reducing civil conflict. If the international community works to prevent civil wars they simultaneously work to eliminate terrorist safe havens and terrorist recruitment opportunities. Since states in civil conflict seem to produce four times more terrorist events than states in relative peace, eliminating intrastate conflict could be the key to combating terror. The results of this study imply that acknowledging these social, economic, and political risk factors is a key component to winning the global war on terrorism.

VII. TABLES

Table 1 Variable definitions, sample statistics, and sources

Variable	Definition	Mean (Std. Dev.)	Minimum	Maximum	Source
Terror	Number of Terrorist Events originating from a given country over the five year period	6.995406 (18.33085)	0	192	Mickolus and Sandler (2003)
Per Capita Income	Real GDP per capital in 1000s of 2000 dollars	6.107752 (6.747171)	0.15748	34.3645	Summers and Aten (2006)
Years of Education	Average Years of schooling in total population ages 25 and over	5.28 (2.958263)	0.37	12.25	Barro and Lee (2001)
Civil Conflict	Lagged dummy variable coding 1 for either minor or war levels of civil conflict	0.274962 (0.446838)	0	1	Gleditsch et al. (2002)
Ethnic Fractionalization	Probability that two people from a country will be from two different ethnic groups	0.479524 (0.269994)	0	1	Fearon (2003)
Democracy	Polity Score (-10 = strongly autocratic, 10 = strongly democratic)	1.371914 (7.425193)	-10	10	Marshall and Jaggers (2005)
Buddhism	Percent of population that is Buddhist	3.87596 (15.8266)	0	95.83	Alesina (2003)
Christianity	Percent of population that is Christian	46.0478 (36.74485)	0	97.71	Alesina (2003)
Hinduism	Percent of population that is Hindu	2.967896 (12.67272)	0	92.52	Alesina (2003)
Islam	Percent of population that is Muslim	26.27673 (37.27009)	0	99.93	Alesina (2003)
Judaism	Percent of population that is Jewish	0.654409 (6.920159)	0	79.21	Alesina (2003)

Notes: Summary Statistics are for the pooled sample of 144 countries and 653 observations (Except for Years of Education which includes 508 observations.)

Table 2 Regression results for alternative terrorism risk factor models

Variable	(1)	(2)	(3)
Constant	0.320810	0.859631	0.315382
	(0.600851)	(0.532752)	(0.576899)
Per Capita Income	0.015186	0.027967	
	(0.022891)	(0.016203) •	
Years of Education	0.106228		0.124199
	(0.051107)*		(0.040034)***
1985-1989	-0.225114	-0.134880	-0.204561
	(0.255491)	(0.256661)	(0.249172)
1990-1994	-0.288104	-0.113259	-0.279141
	(0.255606)	(0.253938)	(0.257885)
1995-1999	-1.226458	-1.046121	-1.195569
	(0.369973)***	(0.328353)***	(0.365088)***
2000-04	-1.625876	-1.444441	-1.565247
	(0.332131)***	(0.300727)***	(0.304778)***
Civil Conflict	1.731060	1.629627	1.680039
	(0.247653)***	(0.216627)***	(0.232892)***
Ethnic Fractionalization	-0.678355	-1.143939	-0.689128
	(0.381858) •	(0.372885)**	(0.374344) •
Democracy	0.024321	0.033703	0.025053
	(0.013887) •	(0.013022)**	(0.013759) •
Buddhism	-0.002746	0.006072	-0.002862
	(0.006534)	(0.006618)	(0.005704)
Christianity	0.012283	0.013047	0.012411
	(0.005782)*	(0.005277)*	(0.005388)*
Hinduism	-0.002813	-0.002953	-0.003206
	(0.007668)	(0.007804)	(0.007640)
Islam	0.017763	0.016122	0.018238
	(0.005931)**	(0.005304)**	(0.005647)***
Judaism	-0.017140	-0.011111	-0.016449
	(0.006996)*	(0.006551) •	(0.006655)*
N	508	653	527
R squared	0.233760	0.210267	0.227406
Mean Terrorist Events	7.998031	6.995406	7.888046
S.D. of Terrorist Events	19.88929	18.33085	19.57138
Standard Error of Regression	17.65559	16.45493	17.41932

Notes: Estimation is by Panel Poisson Count Estimation with White's panel-robust standard errors (in parentheses). Column (1) includes both income and education, while Columns (2) and (3) contains just income and education respectively. *Statistically significant at .05 level. **Statistically significant at .01 level. ***Statistically significant at .002 level. •Statistically significant at .1 level.

Table 3 Cold War and Post Cold War Regressions

Variable	(1)	(2)
Constant	1.551045	-0.275321
	(0.633850)*	(0.803759)
Per Capita Income	0.019605	0.048998
	(0.032369)	(0.018003)**
1985-1989	-0.128736	
	(0.253245)	
1990-1994		
1995-1999		-0.945535
		(0.334737)**
2000-04		-1.385812
		(0.304827)***
Civil Conflict	1.607568	1.791503
	(0.336887)***	(0.018003)***
Ethnic Fractionalization	-1.362226	-0.847927
	(0.491610)**	(0.549774)
Democracy	0.043543	0.017004
	(0.017825)**	(0.014817)
Buddhism	-0.007441	0.018337
	(0.007562)	(0.008435)*
Christianity	0.007860	0.020086
	(0.007168)	(0.007409)**
Hinduism	-0.012640	0.008503
	(0.013160)	(0.008837)
Islam	0.008208	0.025311
	(0.008913)	(0.006305)***
Judaism	-0.012104	-0.014243
	(0.008741)	(0.008071) •
R squared	0.197074	0.238905
N	237	416
Mean dependent variable	9.198312	5.740385
SD of dependent variable	19.82377	17.32301
Standard Error of Regression	18.15205	15.31709

Notes: Estimation is by Poisson Count Estimation with White's panel-robust standard errors (in parentheses). Column (1) includes only observations from 1980-84 and 1985-89, while Column (2) includes 1990-94, 1995-99, and 2000-04. *Statistically significant at .05 level. **Statistically significant at .01 level. ***Statistically significant at .002 level. •Statistically significant at .1 level.

Works Cited

Abadie, Alberto (2006). "Poverty, Political Freedom, and the Roots of Terrorism." *The American Economic Review*, 96(2) (May): 50-56.

Alesina, Alberto et al. (2003). "Fractionalization." *Journal of Economic Growth*, 8: 155-194.

Azam, Jean-Paul and Alexandra Delacroix (2006). "Aid and the Delegated Fight Against Terrorism." *Review of Development Economics*, 10(2): 330-344.

Barro, R.J. and Lee, J.W. (2001). "International data on educational attainment: updates and implications." *Oxford Economic Papers*, 53 (July): 541-563. Data available at http://www.economics.harvard.edu/faculty/barro/data.html.

Berrebi, Claude (2003). "Evidence About the Link Between Education, Poverty and Terrorism among Palestinians." Available at http://www.irs.princeton.edu/pubs/ working_papers.html

Blomberg, S. Brock, Gregory D. Hess and Akila Weerapana (2004). "Economic Conditions and Terrorism." *European Journal of Political Economy*, 20: 463-78.

Blomberg, S. Brock and B. Peter Rosendorff (2006). "A Gravity Model of Globalization, Democracy and Transnational Terrorism." USC Center in Law, Economics and Organization Research Paper No. C06-6, January 2006.

Boehmer, Charles R. and David Sobek (2005). "Violent Adolescence: State Development and the Propensity for Militarized Interstate Conflict." *Journal of Peace Research*, 42(1) (Jan.): 5-26.

Bravo, Ana Bela Santos and Carlos Manuel Mendes Dias (2006). "An Empirical Analysis of Terrorism: Deprivation, Islamism and Geopolitical Factors." *Defence and Peace Economics*, 17(4): 329-341.

Bush, George W. U.N. Address. International Conference on Financing for Development. Monterrey, Mexico. 22 March 2002. http://www.un.org/ffd/statements/usaE.htm

Burgoon, Brian (2006). "On Welfare and Terror: Social Welfare Policies and Political-Economic Roots of Terrorism." *Journal of Conflict Resolution,* 50(2) (April): 176-203.

Collier, Paul, Anke Hoeffler and Dominic Rohner (2007). "Beyond Greed and Grievance: Feasibility and Civil War" *The Centre for the Study of African Economies Working Paper Series.* Working Paper 254. http://www.bepress.com/csae/paper254

Enders, Walter and Todd Sandler (2006). *The Political Economy of Terrorism*. (New York: Cambridge University Press).

Fearon, James D. and David D. Laitin (2003). "Ethnicity, Insurgency, and Civil War." *The American Political Science Review*, 97(1) (Feb.): 75-90. Data is available at http://www.stanford.edu/~jfearon/.

Gleditsch et al. (2002). "The UCDP/PRIO Armed Conflict Dataset, Version 4-2006." Uppsala Conflict Data Program, International Peace Research Institute, Oslo. Data available at www.prio.no/cscw/armedconflict.

Heston, A., Summers, R., and Aten, B. (2006). "Penn World Table Version 6.2. Philidelphia: Center for International Comparisions at the University of Pennsylvania (CICUP). Data available at http://pwt.econ.upenn.edu/php_site/pwt_index.php.

Hill, R.C. et al. (2007). *Principles of Econometrics.* John Wiley & Sons, Inc. Third Edition. New York: 437-440

Kalyvas, Stathis N. (2000). "Commitment Problems in Emerging Democracies: The Case of Religious Parties." *Comparative Politics*, 32(4) (July): 379-398.

Krueger, Alan B. and David D. Laitin (2003). "Kto Kogo? A Cross-Country Study of the Origins and Targets of Terrorism." Available at http://www.krueger.princeton.edu/terrorism3.pdf.

Krueger, Alan B. and Jitka Maleckova (2003). "Education, Poverty and Terrorism: Is There a Causal Connection?" *Journal of Economic Perspectives*, 17(4) (Fall): 119-144.

Li, Quan and Drew Schaub (2004). "Economic Globalization and Transnational Terrorism: A Pooled Time-Series Analysis." *Journal of Conflict Resolution*, 48(2) (April): 230-258.

Marshall, M. and Jaggers, K. (2007). "Polity IV Project: Political Regime Characteristics and Transitions, 1800-2006." Center for Global Policy, School of Public Policy, George Mason Univeristy and Center for Systemic Peace. Available at www.systemicpeace.org/polity4.

Mickolus, E.F and Sandler, T. (2006). International Terrorism: Attributes of Terrorist Events: 1968-2004 (ITERATE 3-4). [Computer file]. Dunn Loring, VA: Vinyard Software [producer and distributor].

Piazza, James A. (2006). "Rooted in Poverty: Terrorism, Poor Economic Development, and Social Cleavages," *Journal of Terrorism and Political Violence*, 18(1) (Spring): 159-177.

Sambanis, Nicholas (2005). "Poverty and the Organization of Political Violence: A Review and Some Conjectures," in Susan M. Collins and Carol Graham (eds.), *Brookings Trade Forum 2004* (Washington, DC: Brookings Institution), 165-222.

Sambanis, Nicholas (2007). "Terrorism and Civil War," forthcoming in Phillip Keefer and Norman Loayza (eds.), *Terrorism and Development* (Cambridge: Cambridge University Press).

Sandler, Todd (2003). "Collective Action and Transnational Terrorism," *World Economy,* 26: 779-802.

Tavares, José (2004). "The Open Society Assesses Its Enemies: Shocks, Disasters and Terrorist Attacks." *Journal of Monetary Economics*, 51(5) (July): 1030-1070.

Tessler, Mark and Michael D. H. Robbins (2007). "What Leads Some Ordinary Arab Men and Women to Approve of Terrorist Attacks Against the United States?" *Journal of Conflict Resolution*, 51(2) (April): 305-328.

Testas, Abdelaziz (2004). "Determinants of Terrorism in the Muslim World: An Empirical Cross-Sectional Analysis." *Terrorism and Political Violence,* 16(2) (Summer): 253-273.

Wade, Sarah Jackson and Dan Reiter (2007). "Does Democracy Matter? Regime Type and Suicide Terrorism." *Journal of Conflict Resolution*, 51(2) (April): 329-348.