



The Effect of Terrorism on Foreign Direct Investment Inflows: A Cross-country Analysis over Time

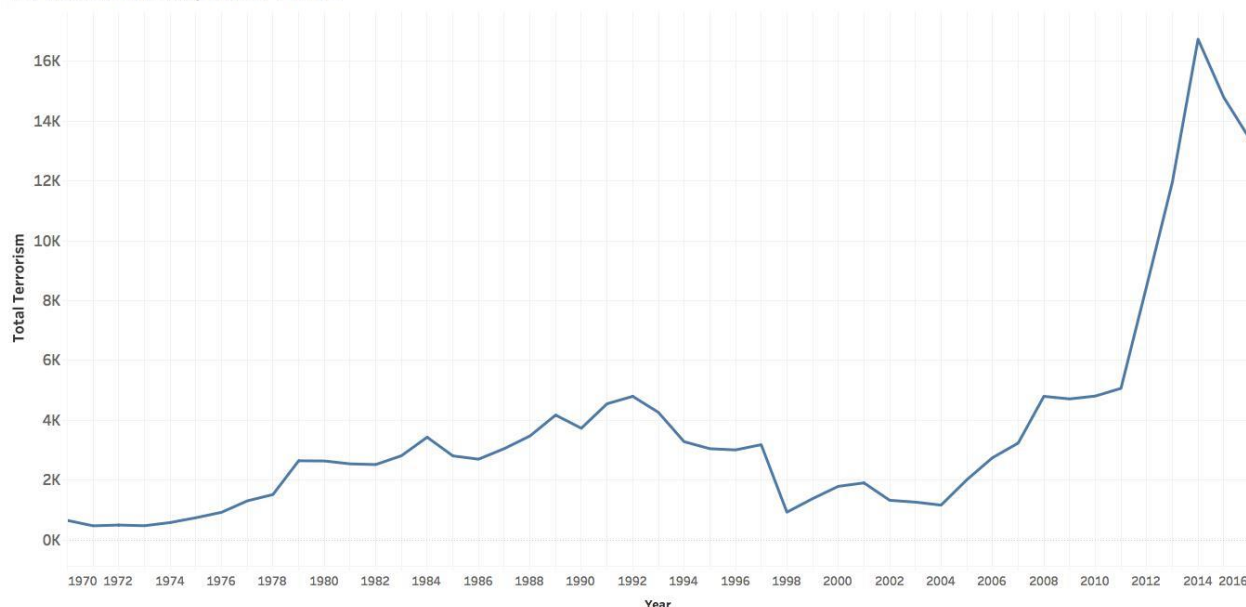
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I. Introduction

Terrorist incidents have been happening around the world throughout history. However, they became significantly more frequent within the past decade. As seen in figure 1, the number of terrorist incidents fluctuated between 1,000 and 5,000 per year in the entire world but started to increase drastically in 2011. The peak of terrorism incidents occurred in 2014 when the frequency of terrorist attacks almost quadrupled (over 16,000 attacks) compared to 2011.

Figure 1. Terrorism over time, 1970-2016

Terrorism Trend, 1970-2016



The trend of sum of Total Terrorism for Year.

Terrorism has both direct and indirect costs associated with it. Everyone is aware of its direct costs, such as human loss, suffering, and damage to property. However, apart from this, terrorism has significant indirect costs impacting different aspects of the economy, such as GDP per capita, unemployment rate (Ahern 2018), GDP growth rate, insurance payments, government expenditure (Gaibulboev & Sandler 2011), foreign direct investment (Bezic, Galovic & Misevic 2016) and trade (Rauf & Mehmood 2016).

Natural and technological disasters have similar direct and indirect costs. However, only terrorist attacks are intentionally committed violence by other people. This is why terrorism also has a psychological impact on economic outcomes. When a natural disaster takes place, investors do not necessarily expect a future increase in such disasters. However, when a terrorist incident happens, it increases fear and insecurity about future investments for the investors. Past research

showed that terrorism has a substantially larger impact on macroeconomic outcomes than do accidental disasters, even though on average, these accidental disasters have a higher number of fatalities. (Ahern 2018)

There are many potential ways to measure the macroeconomic impact of a disaster. Our paper specifically concentrates on one aspect of the economy, foreign direct investment inflows. Foreign direct investment (FDI) is an important input for economic growth because it exposes the host country to modern technology utilized by the investing firms while also introducing advanced managerial skills. In addition, it enables host countries to develop a stronger connection between their domestic economies and the global economies. FDI is critical for developing markets since these companies need multinational funding and experience in order to increase their sales and competitiveness. Borensztein (1997) tested the effect of foreign direct investment on the economic growth of 69 developing countries. The results show that FDI is a more important vehicle to transfer technology and an impact on the growth of economic than domestic investment. Through encouraging local diffusion of knowledge and innovation on the industry and technology, FDI can raise host countries' investments and capital production efficiently.

Throughout our study, the main research question that we try to answer is whether or not a relationship exists between terrorism incidents and foreign direct investment inflows. With the increased globalization and ease of transportation, competition for attracting foreign direct investment has increased drastically. Terrorism enhances uncertainty associated with investing in a particular country. It also increases the cost of doing business through higher wages, higher insurance and security costs, and decreases profits, productivity and growth. Therefore, terrorism might limit investment and divert it to safer locations. In addition, Terrorism can impact specific FDI sectors: tourism, business, transportation, etc.

This paper also addresses two sub-questions. First, does the impact of terrorist incidents on foreign direct investment inflows vary depending on what these incidents target? Second, do the different ways of measuring terrorism, such as property damage and the number of casualties, alter the results of the impact of terrorism on foreign direct investment inflows? Most of the literature written on this topic explores how the frequency of terrorist incidents impacts the level of foreign direct investment inflows into a country. Building upon this previous groundwork, our research uses panel data of all the countries in the world over the years 1980-2016 to further investigate the relationship between terrorism and foreign direct investment inflows. In addition to different control variables, our base regression includes fixed effects, time trend and time dummy variables. Their inclusion in our regression takes out country- and time-fixed effects and isolates the net impact from these other factors. The results of our analysis show a negative relationship between terrorism and foreign direct investment. In addition, business-targeted terrorist attacks have the largest impact on foreign direct investment inflows. Furthermore, different ways of measuring terrorism only slightly alter the extent to which terrorism decreases foreign direct investment inflows. Thus, results stay relatively similar despite how we measure terrorism: the number of casualties, the value of property damage or the frequency of terrorist attacks.

II. Literature Review

2.A. *Effects of Terrorism on Foreign Direct Investment*

There are several ways that past literature explores the effects of terrorism on foreign direct investment. A case study conducted by Sundas Rauf, Rashid Mehmood, Aisha Rauf, and Shafaqat Mehmood investigates this relationship in Pakistan using time series data for the years 1970 to 2013. Instead of taking into account all terrorism incidents during the specified time period, this research only counts the frequency of bombing activities in its terrorism variable. It also controls for three other variables which are openness to trade, political stability, and gross domestic product. The results of this study reveal that gross domestic product, trade openness, and political stability all have statistically significant and positive relationships with foreign direct investment inflows. Terrorism attacks (measured in bomb blasts) have a negative but statistically insignificant effect on foreign direct investment inflows. Though the results of this research suggest that terrorism and FDI inflows are unrelated, the authors mention several factors specific to this research that may be causing this outcome. Firstly, the fact that this literature is a case study may limit the extent to which the relationship can be tested. For example, bombing attacks have generally been carried out in areas that limited contributions to GDP and FDI in Pakistan. Consequently, these incidents may have trivial effects on FDI inflows, and adding a geographic dimension to the estimation in the study may help account for these factors.

Research conducted by Simplic Asongu, Uchenna Efobi, and Ibukun Beecroft examines the relationship between terrorism and foreign direct investment inflows particularly within the context of 78 developing countries during the time period of 1984 to 2008. The main independent variable is terrorism, which is measured as the frequency of all incidents occurring for each year and for each cross-sectional country, and the dependent variable is foreign direct investment inflows measured as a percentage of GDP. This literature includes many control variables, the most notable of which are gross domestic product, trade openness, infrastructure, and inflation. Results show that terrorism incidents and inflation have negative and statistically significant effects on FDI inflows while GDP, trade openness, and infrastructure have positive and statistically significant effects on FDI inflows. Similar research conducted by Heri Bezic, Tomislav Galovic, and Petar Misevic explores the relationship between terrorism and foreign direct investment inflows for 29 European Union and European Economic Area member countries for the time period between 2000 and 2013. This paper includes the frequency of all terrorism incidents into the main independent variable regardless of incident classification and assigns FDI inflows as a percentage of GDP to be the main dependent variable. It also includes gross domestic product per capita as a control variable which takes into account the standard of living for each cross-sectional country. The results of the research show that terrorism incidents have a negative and statistically significant effect on FDI inflows, and GDP per capita has a positive and statistically significant effect on FDI inflows. The authors suggest that the reason for the negative correlation between terrorism and FDI inflows exists where countries with consistent terrorist attacks must allocate their resources to security measures. Reallocation of resources to anti-terror efforts by the government results in reduced funding for government projects that promote economic growth, and this would eventually reduce the country's likelihood of attracting business investments. As expected, the majority of past research suggests a negative correlation between terrorism incidents and FDI inflows, yet there are certain aspects of these pieces of literature that could be expanded on. For instance, most of them exclude the

year 2014 in their data collection when 2014 was the peak of terrorism-related incidents across the world. Also, their data samples do not include as many countries as possible and neither do case studies or studies on subcategories of countries. The case study of Pakistan and the paper studying the effects of terrorism on FDI inflows for developing countries suggest including foreign assistance for security into the regression as a control variable. They believe that controlling for this variable would help illustrate how counter-terrorism measures would influence investment decision-making by firms. If this variable were to be statistically significant, this may further strengthen the argument that terrorism does in fact influence investment decision-making.

2.B. Other Determinants of Foreign Direct Investment

Most literature indicates that key factors of determining Foreign Direct Investment are market size, and riskiness of investment of host countries, both in terms of economic and political environment. Identifying additional variables will help us to develop a more comprehensive analysis of foreign direct investment. Therefore, we also conducted a literature review of other potential factors of foreign direct investment.

Market size, usually measured by GDP (gross domestic product) or GDP per capita, captures the productivity of a country. Most studies support the idea that FDI is a positive function of GDP. The market size hypothesis is mentioned by a lot of studies when examining the effect of foreign direct investment, such as the survey conducted by Jamuna, who suggests that the market size hypothesis is applicable at the macro level with the measurement of the market size being GDP or GNP. (Agarwal, Jamuna P.) The paper conducted by Shamsuddin examines the economic determinants of FDI for 36 least developed countries. It verifies the market size hypothesis, which suggests that the size of a market of a country is positively related to foreign direct investment. The regression uses both GDP growth rate and GDP per capita. The study found that the growth rate of GDP is not significant. (Shamsuddin, 1994) In addition, another study conducted by Aziz studies the determinants of foreign direct investment inflows for 16 Arab economies from 1984 to 2012. They found that market size and trade openness have a strong positive impact on foreign direct investment. (Aziz, 2015) What we can conclude from these studies, in spite of their differences regarding data and methodology, is that most of them support the idea that foreign direct investment depends on the market size of the host country.

When firms consider investing in a particular country, they take riskiness into consideration. They want to make sure that they will have sovereignty and security over their property. One way to measure this is by measuring the level of political stability in the country. In terms of the riskiness of the investment, there are many papers that use data on the corruption of the host country as a measurement of political stability. Corruption is defined as the abuse of public rights for private benefits (Tanzi, 1998). Most studies highlight the idea that corruption induces economic inefficiency (Mauro, 1995). The study by Zurawicki studies the impact of corruption on foreign direct investment. It first measures the level of corruption in a particular economy and then takes the absolute difference in the corruption level between host and home country. The analysis supports that there exists a negative relationship between corruption level and foreign direct investment. However, several countries show that their corruption levels have little to no effect on attracting foreign direct investment, such as China, Brazil, Thailand and Mexico, who are more likely to attract greater volumes of foreign direct investment due to their relatively large

market sizes. (Zurawicki, 2010) There exist some divisions on this topic. Some research did argue that corruption can remove the impediment posed by the government, by increasing efficiency when investing. (Huntington 1968) In summary, the recent research has not confirmed that a negative relationship between foreign direct investment and corruption exists, but most of them support the idea that high corruption has negative effects on foreign direct investment inflows.

As for other factors considered by different empirical studies when using foreign direct investment as the dependent variable, many researchers consider population, trade, exchange rate and natural resources. An empirical study conducted by Deichmann, based on data from 1990 to 1999, utilizes population, total trade volume (sum of export and import), the annual change in GDP, change in currency, and transport network, all of which are measured in average values. The study found that the single most important determinant for foreign direct investment in international trade. (Deichmann, 2001). The survey conducted by the World Trade Organization (WTO) examines the economic, institutional, and legal interlinkage between foreign direct investment and trade. By summarizing empirical studies, it indicates that there is a systematic relationship between FDI and home country exports, which is positive but not very pronounced. (WTO, 2017) Natural resource is also considered to be a determinant for foreign direct investment according to several studies. A study conducted by Elizabeth looks into the role of natural resources on foreign direct investment in Sub-Saharan Africa. It suggests that FDI is largely determined by uncontrollable factors, such as natural resources. A country poor in natural resources or small in geographic area will attract little to no FDI. In the paper, the author observes minerals and oils as a percentage of total exports in order to measure natural resource availability. (Elizabeth, 2006) We were able to take many of these variables into consideration when formulating our own model for the study.

III. Data

We collected country-level data from 1970 to 2016 on terrorism, foreign direct investment, gross domestic product (GDP), exchange rate, inflation, openness to trade, infrastructure, political stability, corruption index, corporate tax rate, and oil production. The data summary is shown in the Appendix, Table 1.1.

3.A. Foreign Direct Investment (FDI)

Data for our dependent variable was gathered from the World Bank. FDI in current US dollars data from 202 countries and regions from 1970 to 2016 was obtained. We generated a log function of FDI (*IFDI*) by taking the log of Foreign Direct Investment in current US dollars. Our data includes some negative values of FDI. In order to still contain them in our regression, we added the same constant (1) to all values to make them positive. This only affects the mean but not the variance. The data in *IFDI* contains 202 countries from 1970 to 2016; not every single country is included for all the years due to missing observations. We chose log FDI over FDI because in our research question we care more about the relative changes rather than the absolute changes. Hence, we incorporated Log FDI instead of linear-scale.

3.B. Terrorism

We gathered data on terrorism from the Global Terrorism Database (GTD) maintained at the University of Maryland by the National Consortium for the Study of Terrorism and Responses to Terrorism. This database offers daily statistics for terrorist attacks around the world and provides various dimensions, such as the location of the attack, the number of people injured, the amount of property damage, and attack type. In order for the incident to be included in this database, it must be intentional, must involve some level of threat of violence and perpetrators must be sub-national actors. In addition, two of the following criteria must be satisfied: have a social, economic, political or religious goal; intend to convey the message to a larger audience rather than immediate victims and be outside of legitimate warfare activities. We created several terrorism variables based on this information. We calculated the total number of terrorist attacks in a particular year for a particular country and generated our total terrorism variable. Furthermore, we grouped these attacks based on the target type of the incident. These target types include business, government (general & diplomatic), private citizens property, transportation, airports and aircraft, maritime, religious figures, violent political party, terrorists militia, telecommunication, utilities, NGO, journalists and media, education institution, food and water, tourist, abortion-related, military, police, unknown and other.

We regrouped these 22 target types into 9 categories, including business, government (general & diplomatic), private citizens' property, transportation (transportation, airports & aircraft and maritime), religious and political groups (religious figures, violent political party and terrorists militia), utilities (telecommunication and utilities), others (other, NGO, journalists and media, education institution, food and water, abortion-related and tourists), and unknown target type. (Table 1.2, in the Appendix) We did so to make our analysis more easily comprehensible. Incorporating target types in our regression, allows us to analyze the type of terrorist incidents about which investors are most concerned when making their decision to invest.

We also obtained information about the number of people injured and killed to create a new variable, the number of casualties. Additionally, we gathered data on the total value of property damaged in a particular country and year. Most research uses the frequency of terrorist incidents in their regression. We wanted to further look into these two variables - number of casualties and property value damaged - in order to see how different ways of measuring terrorism variable might impact the regression outcomes. These two variables provide a way to quantify the severity of terrorist incidents in a particular country and year rather than just giving the same weight to all incidents despite its outcomes. To illustrate, when looking at the frequency incidents, each incident is given a weight 1 in our regression. However, when considering these two other variables, we look at each incident from a perspective that considers how many people were killed or injured and what was the value of the property that got damaged. Hence, each incident is given a different value.

In our entire database, the frequency of terrorist incidents range from 0 to 3926. 3926 terrorist incidents took place in Iraq in 2014. However, only the range of 0 to 2849 is included in our base regression. Other observations were dropped because of missing data for FDI and/or other independent variables. For instance, Iraq in 2014 was dropped because of missing data for the exchange rate. Almost 50% of our sample has zero terrorist attacks in a given year. The standard

deviation of this variable is 109; this becomes important as we interpret the results of our regression.

Furthermore, the maximum number of casualties from the terrorist incidents is 29,874 (Iraq, 2014) and the maximum value of property damaged is \$ 2.7 billion (United Kingdom, 1992).

3.C. Gross Domestic Product (GDP)

When thinking about which GDP variables we want to include in our regression, we looked at GDP per capita, GDP in current dollars and GDP growth rate. Most literature mentioned GDP and GDP per capita as good measurements of the market size. Thus, we incorporated both of them. Also, GDP captures economic output while GDP per capita captures the productivity of a country's workforce. In addition, according to the research conducted by Shamsuddin, the GDP growth rate is not significant among other market size indicators. (Shamsuddin, 1994) Therefore, in our regression, we use GDP and GDP per capita as measurements of the market size of a country. We collected our Gross Domestic Product data from the World Bank for 202 countries from 1970-2016. The measurement of GDP used in our regression is total GDP and GDP per capita in current US dollars.

3.D. Other Economic variables

The data on the exchange rate, inflation rate, population and openness to trade are collected from the World Bank, available from 1970 - 2016 for 202 countries and regions. The exchange rate is calculated as the annual average according to the monthly average in current US dollars. The inflation rate, measured by the consumer price index, reflects the annual percentage change in the price. The data on population counts on the number of people in a country who either have legal status or citizenship. Openness to trade is measured by the sum of export and import divided by total GDP. We incorporate these variables into the forms that are usually used by previous literature on foreign direct investment. We collected all of this data from the World Bank.

3.E. Infrastructure

We used the measurement of percentage population accessing to electricity as a proxy variable for infrastructure. Electricity access refers to the percentage of the population in a given area who can enjoy stable access to electricity, which can be an indicator of the development level of a country. The data on percentage population accessing to electricity is collected from the World Bank, available from 1970-2016 for 202 countries and regions.

3.F. Control of Corruption

We collected a measurement of corruption from the World Bank, available for the years 1996, 1998, 2000, 2002-2016 for 202 countries and regions. The measurement of corruption is the control of corruption, which captures the perceptiveness of extending to which public power is used for private gain, in a unit of standard normal distribution, from -1.87 to 2.47. The more negative the index score is, the more likely that public power is used for private gain. For instance, Afghanistan has control of corruption index score at -1.67 and the United States has the score at 1.3 in 2016.

3.G. Political Stability

We collected a measure of political stability from the World Bank, available for the years 1996, 1998, 2000, 2002-2016 for 202 countries and regions. The political stability captures the perceptiveness of the likelihood of political instability or politically related violence, including terrorism, in a unit of a standard normal distribution, from -3.31 to 1.76. The more negative index score a country has, the more unstable its political environment is. For example, Afghanistan has the score at -2.7 and the United States has the score at 0.4 in 2016.

3.H. Corporate Tax

The data on corporate tax was collected from KPMG, available from 2003-2018 for 202 countries and regions. Since it largely limits our sample size, we reserved it for robustness check.

3.I. Oil production

This variable is a measurement of production of fossil fuel source within a given country. The data on oil production is collected from Energy Information Administration, available from 1980 - 2016 for 202 countries. This variable is measured by total petroleum and liquid production in thousands of Barrels per day. The petroleum production is calculated as a refinery or blending plant. It equals to refinery production minus refinery input. Therefore, the data has some negative numbers that occur when the amount of petroleum is less than the amount that is inputted.

IV. Methodology

Our final regression model (1) captures how terrorist attacks affect foreign direct investment inflows, controlling for other economic variables. In addition, what differs from previous research is that we controlled for year dummy variables, time trend, and country fixed-effects.

$$(1) \quad \log FDI_{it} = \beta_0 + \beta_1 TotalTerrorism_{it} + \beta_2 GDP_{it} + \beta_3 GDPpc_{it} + \beta_4 Population_{it} + \beta_5 Trade_{it} + \beta_6 ExchangeRates_{it} + \beta_7 Inflation_{it} + \beta_8 OilProduction_{it} + \mu_t + t + a_i + u_{it}$$

The regression is run on a panel dataset of 202 countries from the year 1981 to 2015 which yields a sample size of 4,524. Our regression includes the number of terrorist attacks, GDP in current dollars, GDP per capita, population, openness of trade, exchange rate, inflation rate and oil production. The variable t controls for time trend, and a_i controls for unobserved time-invariant individual effects. The dummy variable μ denotes year dummy variables from the year 1981 to 2015.

4.A. Formation of the Base Regression Model

Our main independent variable of interest is the terrorism variable. Based on the previous literature, the main way of measuring it is the frequency of terrorist incidents. Hence, this is the measure we include in our base regression.

Since our data is a panel data, we were carefully considering whether or not we should include time trend, year dummies, and country fixed effects. Most previous research used multiple linear

regression. Thus, we wanted to explore how incorporating the fixed effects and time dummy variables could change the results as they take out any unobservable factors that may be making the impact of terrorism on foreign direct investment significant. Their inclusion will help decrease omitted variable bias and will separate the net effect of terrorism on foreign direct investment by controlling for the average differences across countries and years.

Furthermore, based on the previous literature, we identified control variables that are important to include as independent variables when analyzing a foreign direct investment. These variables are GDP (Enders, Sachida & Sandler 2006), GDP per capita (Shah & Faiz 2015), Population (Shah & Faiz 2015), Trade openness (Rauf, Mehmood & Mehmood 2016), Exchange Rates (Shah & Faiz 2015), Inflation (Asongu, Efobi & Beecroft 2015), and Oil Production (Lee 2016).

We expect the market size measured by GDP and the purchasing power of the country's citizens measured by GDP per capita to be positively correlated with FDI. Furthermore, trade openness seems to have a positive relationship with FDI as well since it shows the country's willingness to participate in the global market. We expect the size of the population to be positively related to the inflow of FDI as countries with large population provide large market of products and services, larger labor force and a vast skill set. Additionally, exchange rate volatility and inflation are thought to be negatively related to FDI.

The results of this regression showed that the terrorism variable is statistically significant at the 95% significance level and has a negative impact on foreign direct investment inflows. When the total number of terrorism increases by 100 incidents which is roughly a one standard deviation increase, foreign direct investment inflows decrease by 0.437%. This percentage might not seem a lot but as soon as we interpret it in the number of dollars lost in foreign direct investment, it becomes economically significant. A 0.437% decrease in foreign direct investment inflows translates into roughly \$21.8 million loss in foreign direct investment, on average. With the exception of *ExchangeRates* and *Inflation*, all of the control variables were statistically significant at the 99th percentile. The variables representing exchange rates and inflation were also the only variables that were negatively correlated with FDI inflows. Gross domestic product, gross domestic product per capita, population, trade, oil production, and time trend variables were all positively related to FDI inflows. The results are shown in the Appendix, Table 2.

Looking at the summary statistics for the variables included in the base regression (Table 1.1 of the Appendix), the maximum value for total terrorism is 2,849. This means that for that particular country-year observation, terrorism incidents caused over a 12% decrease in FDI inflows which is economically significant. The regression has a high adjusted R-squared value of 0.762 which shows that the multilinear model does a good job at explaining the variability of our observations. Considering that the total terrorism variable was economically and statistically significant after adding country fixed effects, time trend, and year dummy variables in the regression, the regression results make a strong case that terrorism incidents may very well divert investment from foreign firms.

4.B. Target types in regression model

We were also interested in whether certain terrorist target types affect the investment decision differently. Hence, we wanted to explore if there are target types that result in significantly

higher losses in foreign direct investment inflows. The Global Terrorism Database assigns each incident into 22 target type categories. In order to test if certain terrorism incidents target types serve to impact FDI inflows more than others, we divided total terrorism into nine different target type categories as mentioned in our data section: Private Citizen Property, Government, Business, Police and Military, Transportation, Religious, Utilities, Other and Unknown target type. The sum of total incidents, after categorization, remains unchanged. (Table 1.2, in the Appendix)

(2)

$$\begin{aligned} \log FDI = & \beta_0 + \beta_1 \text{PrivateCitizenProperty}_{it} + \beta_2 \text{Government}_{it} + \beta_3 \text{Business}_{it} + \beta_4 \text{PoliceMilitary}_{it} \\ & + \beta_5 \text{Transportation}_{it} + \beta_6 \text{Religious}_{it} + \beta_7 \text{Utilities}_{it} + \beta_8 \text{Other}_{it} + \beta_9 \text{Unknown}_{it} + \beta_{10} \text{GDP}_{it} + \\ & \beta_{11} \text{GDPpc}_{it} + \beta_{12} \text{Population}_{it} + \beta_{13} \text{Trade}_{it} + \beta_{14} \text{ExchangeRates}_{it} + \beta_{15} \text{Inflation}_{it} + \\ & \beta_{16} \text{OilProduction}_{it} + \mu_t + t + a_i + u_{it} \end{aligned}$$

We used different target types to replace total terrorism in our second regression (2) in order to see whether a terrorist attack on different target will have a distinctive influence on foreign direct investment. The results are shown in the Appendix, Table 3.

The regressions represented by columns 2 through 11 show each of the nine target types separately in the base multilinear model while column 12 includes all of the target types together. Column 1, the base multilinear regression with the total terrorism variable, was included as a frame of reference. The variable *Business* was the only target type variable that was statistically significant both when it was grouped with the other target types as well as when it was included individually in the regression as shown in columns 4 and 12. The coefficient on *Business* was negative and statistically significant at the 99th percentile in both regressions with the inclusion of fixed effects, time trend, and year dummy variables, and this makes a strong case that business targeting terrorism incidents especially affect investment decisions by firms. When there is one additional terrorist incident targeting business, there will be 0.123% loss in foreign direct investment. Since the mean value of the foreign direct investment is \$4.99 billion, we would predict that one additional business target terrorist incident would result in a \$6.137 million loss in foreign direct investment, on average. Also, the statistical significance of the control variables did not change from the base multilinear regression for columns 4 and 12.

V. Robustness Checks

5.A. First Robustness check - Number of Casualties & Property Value

In our base regression, we used the frequency of terrorist incidents in a given country and year as the measure of terrorism. Thus, even if a terrorist attack did not have significant damage, it is still included in our regression as an additional incident. To verify the accuracy of our results, we conducted a robustness check by trying to quantify the impact of the terrorist incidents. To do this, we gathered data from GTD on the number of people injured, the number of people killed and the value of property damaged. The number of casualties (number of people killed plus the number of people injured) and the property value were created as two new measures of terrorism and then used in two additional regressions. The results showed that 0.93 million increase in the property value that got damaged due to terrorist incidents, which is a 1 standard deviation increase of this variable, decreases foreign direct investment inflows by 0.0122 percent. On the

other hand, 100 additional casualties, which is a 1 standard deviation increase, decreases foreign direct investment inflows by 0.0181 percent. However, the number of casualties turned out to be statistically insignificant. Hence, despite the measure we use, the impact of terrorism on foreign direct investment stays negative with small differences in coefficients. Therefore, the frequency of terrorism is a good measure for terrorism variable. The results for these regressions may be found in the Appendix, in Table 4.

5.B. Second Robustness check - Corporate Tax Rate

Our base regression excludes the corporate tax rate as it significantly decreases the sample size. However, previous literature includes the corporate tax rate as a control variable. Thus, as a robustness check, we ran a separate regression with the corporate tax rate in it and compared it to the base regression that was run on the same sample as the latter one. These two regressions were very similar to each other, notably showing that the corporate tax rate and terrorism variables were statistically insignificant. This makes us conclude that not including the corporate tax rate in our base regression likely didn't introduce much bias in our regression. The regression outputs may be found in the Appendix, in Table 5.

5.C. Third Robustness check - Political Stability, Control of Corruption & Infrastructure

Most previous literature included at least one of the following variables: political stability, control of corruption and infrastructure. Including these variables into our regression was limiting the sample size from 4,524 to 2,305. Therefore, we ran a robustness check to see if excluding these variables was causing an omitted variable bias into our regression. We ran two additional regressions. First, we added these variables to our base regression. Second, we ran our base regression on the same sample size (2,305). These two regressions showed that including these variables in our regression was not changing our outcomes. In addition, the F test showed that political stability, control of corruption and infrastructure were not jointly significant. Next, we ran just multiple linear version of our base regression without controlling for time dummy variables, time trend and fixed effects. In this case, these variables were statistically significant. Therefore, political stability, control of corruption and infrastructure could be important to include when running multiple linear regression as shown in past literature. However, it is statistically insignificant in our regression because the fixed effects and time trend might already be controlling for them. The regression outputs may be found in the Appendix, in Table 6.

5.D. Fourth Robustness check - Recession

As a final robustness check, we ran separate regressions pre- and post-2008 to see if our regression results were somehow impacted by the recession. The results showed that terrorism had a much more significant negative effect on foreign direct investment inflows before the recession. If 100 additional terrorist incidents were decreasing foreign direct investment inflows by 0.437 percent over the 1980-2016 period, this decrease was 0.936 percent over the 1980-2007 time period. Furthermore, the terrorism variable turned out to be positive but statistically insignificant over the 2009-2016 time period. This might mean that during the "good" times, investors pay attention to terrorist incidents when deciding where to invest. However, during the recession, they put less emphasis on this and invest wherever they can indifferent of terrorist incidents. The other explanation might be connected to the increasing trend of terrorism incidents

since 2004. When terrorism is a rare phenomenon, investors do care about it as they choose the country to invest. However, as it becomes more common around the world, they pay less attention to it. The regression results may be found in the Appendix, in Table 6.

VI. Conclusion

This research sought to explore whether or not terrorism incidents impact foreign direct inflows using panel data. Looking at the base regression, it is evident that terrorism incidents and FDI inflows are negatively correlated within the restrictions of the sample size of our model. One standard deviation increase in total incidents of terrorism decreases FDI inflows by \$21.8 million on average, and this finding is statistically significant at the 95th percentile. More specifically, our regression results suggest that terrorism incidents that target businesses especially decrease FDI inflows, and this finding is statistically significant at the 99th percentile. Also, we conducted a robustness check to see if accounting for the extent of the damage caused by terrorism incidents alter the results of the relationships found in the base regression. This was accomplished by replacing total terrorism with two variables that account for the magnitude of damage: property value and casualties. The results show that one standard deviation increase of the property value variable decreases FDI inflows by 0.0122% and is statistically significant, and one standard deviation increase in the casualties variable decreases FDI inflows by 0.0181% and is not statistically significant. The robustness check shows that the regressions with property value and casualties have results that resemble the base regression with the total terrorism variable.

Although the results of this research are consistent with past literature in that terrorism incidents are negatively correlated with FDI inflows, this research differs from past studies in its usage of panel data for all available countries for the years 1981 to 2016. Furthermore, our research incorporates country fixed effects, time trend, and year dummy variables in the regression and still yields statistically significant results. We incorporated these variables in our model to capture a more accurate representation of the relationship between terrorism incidents and FDI inflows. The fact that the results were statistically and economically significant even with the utilization of these additions strengthens the argument that it is important to further explore the relationship between terrorism and FDI. In an era where many of the global issues such as poverty, starvation, and diseases can be reduced by tackling economic underdevelopment, this research sheds light on the notion that terrorism incidents may play a crucial role in allocating business investment which is so pivotal to economic growth. It is all the more important to expand upon these findings because alarmingly enough, terrorism has exponentially increased in the world just within the past decade.

There are questions left to be answered and potential steps to build upon this study. It may be of interest to see how long the effects of terrorist incidents on FDI inflows last through the study of psychological variables associated with terrorism or business decision-making patterns over time. It may also be of interest to see how the development level of a country alters the effects of terrorism on FDI inflows since past pieces of literature have studied developed and developing countries separately but not together when it comes to the topic of terrorism and FDI. Since location could also possibly be an important factor when it comes to how much an incident impacts FDI, it may be helpful to build upon the results of this study by including a geographical

component through the use of spatial regressions. For example, there are several outlier countries when it comes to the level of terrorism incidents such as Iraq, Afghanistan and Pakistan. How likely is it that the terrorist incidents occurring in this part of the world directly affect their foreign direct investments? Is it possible that the high levels of terrorism incidents occurring in Iraq would also impact investment decisions toward other Middle East countries? Incorporating spatial regression in this research may help answer these questions.

The results of our paper also suggest that countries looking to attract more foreign direct investment inflows may benefit from taking action to increase security within their borders against terrorism incidents, especially during recessions. In particular, our results show that business targeted terrorism incidents specifically work to deter FDI inflows. Further research on counterterrorism efforts may show that policies implemented to protect businesses from these attacks may increase foreign direct investment. The effort to combat terrorism incidents not only protects innocent people and valuable property, but it also helps countries attract foreign direct investments. This would, in turn, promote economic growth, especially in developing countries, and aid the cause to reduce global issues such as poverty, starvation, and diseases.

VII. Appendix**Table 1.1: Summary Data**

Variable	Source	Description	Time Period
Foreign direct investment	The World Bank	Foreign direct investment, net flows, in current dollars	1960-2016
Total terrorism	Global Terrorism DataBase	Each terrorism incidents; Terrorism attack types	1970-2017
GDP per Capita	The World Bank	GDP per Capita	1960-2016
GDP current US dollar	The World Bank	GDP in current US dollars	1960-2016
Population	The World Bank	All residents of legal status or citizenship	1960-2016
Exchange rate	The World Bank	Exchange rate, LCU per US\$, period average	1960-2016
Openness to trade	The World Bank	The consumer price index (%)	1960-2016
Corporate tax rate	KPMG	Corporate tax rate	2003-2018
Oil production	Energy Information Administration	Total petroleum and liquid production, thousand barrels per day.	1980-2018
Control of corruption	The World Bank	The perception of the extent to which public power is exercised for private gain, in units of a standard normal distribution,	1996,1998,2000,2002-2016
Political Stability	The World Bank	The likelihood of political instability and politically-motivated violence, including terrorism. In units of a standard normal distribution.	1996,1998,2000,2002-2016
Infrastructure	The World Bank	Access to electricity, % of population	1960-2016

Table 1.2: Target Types Regrouped

Regrouped Target Types	Original Target Types
Military and Police	Military and Police
Private Citizen's Property	Private Citizen's Property
Government	Government General; Government Diplomatic
Business	Business
Transportation	Transportation, Airports & Aircraft and Maritime
Religious / Political Groups	Religious Figures, Violent Political Party and Terrorists Militia
Utilities	Telecommunication and Utilities
Other	Other, NGO, Journalists and Media, Education Institution, Food and Water, Abortion Related and Tourists
Unknown	Unknown

Table 1.3: Summary Statistics (if in regression)

Variable	Mean	Standard Deviation	Minimum	Maximum	Observation
Log Foreign Direct Investment	24.49	0.24	23.02	27.03	4,524
Total Terrorism Incidence	24.24	108.71	0.00	2,849.00	4,524
Gross Domestic Product per Capita	7,844.60	13,156.41	94.27	119,225.40	4,524
Gross Domestic Product current dollars in Billions	258.83	1,152.72	0.04	18,624.47	4,524
Population in Millions	41.30	145.35	0.06	1,378.67	4,524
Trade	80.96	52.53	0.17	531.74	4,524
Exchange Rates	409.11	1,786.42	0.00	25,000.00	4524
Inflation	35.82	485.32	-31.57	26,762.02	4524
Oil Production	516.21	1,559.13	-24.00	15,116.66	4524

Table 1.4: Summary Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum	Observation
Foreign Direct Investment Net Inflow(Current US Dollar in Billion)	4.99	25.4	-29.9	734	6,815
Log Foreign Direct Investment	24.48	0.24	23.02	27.37	6,815
Total Terrorism Incidence	19.9	115.74	0.00	3,926	8,663
Total Number of Casualties	100.49	819.52	0.00	29,874	8,661
Poverty Value in Millions	0.93	34	0.00	2,720	8,661
Gross Domestic Product per Capita	7,575.48	13,073.84	57.64	119,225.40	7,100
Gross Domestic Product current dollars in Billions	200.72	946.39	0.02	18,624.47	7,142
Population in Millions	30.43	115.68	0.02	1378.67	8,412
Trade	80.1	52.67	0.021	531.74	6,693
Exchange Rates	308.14	1514.91	0.00	25000	6,911
Inflation	39.09	481.27	-31.9	26,762.02	7,018
Oil Production	435.89	1,445.95	-24	15,116.66	4524
Political Stability	-0.1	0.98	-3.31	1.76	3,224
Control of Corruption	-0.05	1.02	-1.87	2.47	3,239
Infrastructure	73.6	34.93	0.0	100	4,810
Corporate Tax	24.95	9.23	0.0	55	1,551

Table 2: Regression Results

Base Regression with Fixed Effects and Time trend	
VARIABLES	(1) Log(FDI)
TotalTerrorism	-4.37e-05** (-2.041)
GDPinBillions	0.000129** *
GDPperCapita	5.15e-06*** (14.87)
PopulationinMillions	0.00121*** (12.31)
Trade	0.000584** *
ExchangeRates	-1.35e-06 (-0.839)
Inflation	-2.76e-06 (-0.730)
OilProduction_n	3.05e-05*** (5.988)
Year	0.00204*** (3.343)
Constant	20.30*** (16.68)
Observations	4,524
Adjusted R-squared	0.762
Time Trend & Year Dummies	Yes
Fixed Effects	Yes

t-statistics in parentheses

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

Table 3: Terrorism by Target Type

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	IFDI	IFDI	IFDI	IFDI	IFDI	IFDI	IFDI	IFDI	IFDI	IFDI	IFDI
Total Terrorism	-4.37e-05** (-2.041)										
Private Citizens											
Property		-0.000112 (-1.423)									1.35e-05 (0.0814)
Government			-0.000286* (-1.782)								0.000263 (0.911)
Business				-	0.000659*** (-3.635)						-0.00123*** (-3.937)
Transportation					-0.000431 (-1.047)						0.000687 (1.144)
Religious						-0.000320 (-1.244)					-4.38e-05 (-0.0892)
Utilities							-0.000205 (-0.883)				0.000117 (0.422)
Other								-0.000370 (-1.234)			0.000239 (0.528)
Unknown									5.95e-05 (0.135)		0.000879 (1.562)
Police and Military										-8.65e-05	-7.08e-05
Year	0.00204*** (3.343)	0.00205*** (3.348)	0.00200*** (3.279)	0.00193*** (3.154)	0.00201*** (3.289)	0.00205*** (3.358)	0.00202*** (3.309)	0.00203*** (3.330)	0.00202*** (3.300)	0.00205*** (3.357)	0.00183*** (2.977)
Constant	20.30*** (16.68)	20.28*** (16.66)	20.38*** (16.74)	20.52*** (16.86)	20.34*** (16.71)	20.26*** (16.63)	20.32*** (16.69)	20.30*** (16.68)	20.32*** (16.66)	20.28*** (16.66)	20.70*** (16.92)
Observations	4,524	4,524	4,524	4,524	4,524	4,524	4,524	4,524	4,524	4,524	4,524
R-squared	0.773	0.773	0.773	0.773	0.773	0.773	0.773	0.773	0.773	0.773	0.774
Adjusted R-squared	0.762	0.762	0.762	0.762	0.762	0.762	0.762	0.762	0.762	0.762	0.762

Table 4: First Robustness Check - Number of Casualties & Property Value

Robustness Check 1: Number of Casualties & Property Value			
VARIABLES	(1) Log(FDI)	(2) Log(FDI)	(3) Log(FDI)
TotalTerrorism	-4.37e-05** (2.14e-05)		
Casualties		-1.81e-06 (2.82e-06)	
Propvalue			-1.31e-10*** (0)
GDPinBillions	0.000129*** (3.62e-06)	0.000130*** (3.61e-06)	0.000129*** (3.61e-06)
GDPperCapita	5.15e-06*** (3.47e-07)	5.17e-06*** (3.47e-07)	5.16e-06*** (3.46e-07)
PopulationinMillions	0.00121*** (9.86e-05)	0.00117*** (9.61e-05)	0.00117*** (9.58e-05)
Trade	0.000584*** (8.60e-05)	0.000589*** (8.60e-05)	0.000590*** (8.59e-05)
ExchangeRates	-1.35e-06 (1.61e-06)	-1.32e-06 (1.61e-06)	-1.31e-06 (1.61e-06)
Inflation	-2.76e-06 (3.77e-06)	-2.92e-06 (3.77e-06)	-2.95e-06 (3.77e-06)
OilProduction_n	3.05e-05*** (5.10e-06)	3.01e-05*** (5.09e-06)	3.04e-05*** (5.09e-06)
Year	0.00204*** (0.000611)	0.00203*** (0.000611)	0.00203*** (0.000610)
Constant	20.30*** (1.217)	20.30*** (1.218)	20.30*** (1.216)
Observations	4,524	4,524	4,524
Adjusted R-squared	0.762	0.762	0.762
Time Trend & Year Dummies	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes

Standard errors in parentheses

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

Table 5: Second Robustness Check - Corporate Tax Rate

Robustness check 2: Corporate Tax Rate			
VARIABLES	(1) Log(FDI)	(2) Log(FDI)	(3) Log(FDI)
TotalTerrorism	-4.37e-05** (2.14e-05)	7.22e-06 (6.35e-05)	7.22e-06 (6.35e-05)
GDPinBillions	0.000129*** (3.62e-06)	9.54e-05*** (1.57e-05)	9.54e-05*** (1.57e-05)
GDPperCapita	5.15e-06*** (3.47e-07)	4.32e-06*** (1.27e-06)	4.32e-06*** (1.27e-06)
PopulationinMillions	0.00121*** (9.86e-05)	0.00189** (0.000804)	0.00189** (0.000804)
Trade	0.000584*** (8.60e-05)	0.000339 (0.000480)	0.000339 (0.000480)
ExchangeRates	-1.35e-06 (1.61e-06)	9.27e-06 (1.43e-05)	9.27e-06 (1.43e-05)
Inflation	-2.76e-06 (3.77e-06)	0.000775 (0.000869)	0.000775 (0.000869)
OilProduction_n	3.05e-05*** (5.10e-06)	2.27e-05 (1.93e-05)	2.27e-05 (1.93e-05)
CorporateTax		-0.000213 (0.00151)	-0.000213 (0.00151)
Year	0.00204*** (0.000611)	0.00551** (0.00278)	0.00551** (0.00278)
Constant	20.30*** (1.217)	13.23** (5.571)	13.23** (5.571)
Adjusted R-squared	0.762	0.811	0.811
Time Trend & Year Dummies	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes

Standard errors in parentheses

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

Table 6: Third Robustness Check - Political Stability, Control of Corruption and Infrastructure

Robustness check 3: Political Stability, Control of Corruption & Infrastructure			
VARIABLES	(1) Log(FDI)	(2) Log(FDI)	(3) Log(FDI)
TotalTerrorism	-4.37e-05** (2.14e-05)	1.27e-05 (3.75e-05)	8.56e-07 (3.69e-05)
GDPinBillions	0.000129*** (3.62e-06)	9.09e-05*** (8.69e-06)	9.04e-05*** (8.64e-06)
GDPperCapita	5.15e-06*** (3.47e-07)	4.19e-06*** (6.92e-07)	4.30e-06*** (6.61e-07)
PopulationinMillions	0.00121*** (9.86e-05)	0.00186*** (0.000352)	0.00186*** (0.000349)
Trade	0.000584*** (8.60e-05)	0.000490*** (0.000150)	0.000477*** (0.000148)
ExchangeRates	-1.35e-06 (1.61e-06)	-6.14e-07 (3.88e-06)	-6.49e-07 (3.88e-06)
Inflation	-2.76e-06 (3.77e-06)	1.29e-05 (5.00e-05)	7.15e-06 (4.99e-05)
OilProduction_n	3.05e-05*** (5.10e-06)	3.90e-05*** (1.14e-05)	4.14e-05*** (1.13e-05)
PoliticalStability_n		0.0187* (0.0100)	
ControlofCorruptionEstimate_n		-0.00765 (0.0173)	
InfrastructureElectricity		-0.000468 (0.000768)	
Year	0.00204*** (0.000611)	0.00402*** (0.00127)	0.00372*** (0.00122)
Constant	20.30*** (1.217)	16.30*** (2.540)	16.87*** (2.446)
Observations	4,524	2,305	2,305
Adjusted R-squared	0.762	0.809	0.809
Time Trend & Year Dummies	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes

Standard errors in parentheses

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

Table 7: Fourth Robustness Check - Recession

Robustness check 4: Recession			
VARIABLES	(1) Log(FDI)	(2) Log(FDI)	(3) Log(FDI)
TotalTerrorism	-4.37e-05** (2.14e-05)	-9.36e-05*** (2.87e-05)	5.99e-05 (6.59e-05)
GDPinBillions	0.000129*** (3.62e-06)	0.000157*** (4.78e-06)	6.03e-05** (2.70e-05)
GDPperCapita	5.15e-06*** (3.47e-07)	6.22e-06*** (4.29e-07)	2.18e-06 (2.09e-06)
PopulationinMillions	0.00121*** (9.86e-05)	0.00105*** (9.55e-05)	-0.000485 (0.00161)
Trade	0.000584*** (8.60e-05)	0.000438*** (7.33e-05)	0.00103 (0.000747)
ExchangeRates	-1.35e-06 (1.61e-06)	-2.37e-06* (1.30e-06)	-6.99e-06 (1.45e-05)
Inflation	-2.76e-06 (3.77e-06)	-1.17e-06 (2.70e-06)	-1.38e-05 (0.000877)
OilProduction_n	3.05e-05*** (5.10e-06)	3.51e-05*** (5.15e-06)	2.92e-05 (2.66e-05)
Year	0.00204*** (0.000611)	0.00179*** (0.000447)	0.0118*** (0.00440)
Constant	20.30*** (1.217)	20.81*** (0.893)	0.578 (8.829)
Observations	4,524	3,516	864
Adjusted R-squared	0.762	0.774	0.836
Time Trend & Year Dummies	Yes	Yes	Yes
Fixed Effects	Yes	Yes	Yes
Years included	1980-2016	<2008	>2008

Standard errors in parentheses

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

VIII. References

Ahern, Kenneth. "The Importance of Psychology in Economic Activity: Evidence from Terrorist Attacks." 2018. doi:10.3386/w24331

Agarwal, Jamuna P. "Determinants of Foreign Direct Investment: A Survey." *Weltwirtschaftliches Archiv* 116, no. 4 (1980): 739-73. doi:10.1007/bf02696547.

Asongu, Simplice A., Uchenna Efobi, and Ibukun Beecroft. "FDI, Aid, Terrorism: Conditional Threshold Evidence from Developing Countries." *SSRN Electronic Journal*, 2015. doi:10.2139/ssrn.2612413

Aziz, Omar G., and Anil V. Mishra. "Determinants of FDI Inflows to Arab Economies." *The Journal of International Trade & Economic Development* 25, no. 3 (2015): 325-56. doi:10.1080/09638199.2015.1057610.

Bendix, Reinhard, and Samuel P. Huntington. "Political Order in Changing Societies." *Political Science Quarterly* 86, no. 1 (1971): 168. doi:10.2307/2147388.

Bezić, Heri, Tomislav Galović, and Petar Mišević. "The Impact of Terrorism on the FDI of the EU and EEA Countries." *Zbornik Radova Ekonomskog Fakulteta U Rijeci: časopis Za Ekonomsku Teoriju I Praksu/Proceedings of Rijeka Faculty of Economics: Journal of Economics and Business* 34, no. 2 (2016): 333-62. doi:10.18045/zbefri.2016.2.333

Borensztein, E., J.D. Gregorio, and J.-W. Lee. 1998. "How Does Foreign Direct Investment Affect Economic Growth?" *Journal of International Economics* 45: 115–135.

Mello, L. De. "Foreign Direct Investment-led Growth: Evidence from Time Series and Panel Data." *Oxford Economic Papers* 51, no. 1 (1999): 133-51. doi:10.1093/oep/51.1.133.

Deichmann, Joel I. "Distribution of Foreign Direct Investment among Transition Economies in Central and Eastern Europe." *Post-Soviet Geography and Economics* 42, no. 2 (2001): 142-52. doi:10.1080/10889388.2001.10641167.

Elizabeth, A, "Foreign Direct Investment in Africa: The Role of Natural Resources, Market Size, Government Policy, Institutions and Political Instability" *United Nations University* (2006), pp.66-77.

Gaibulloev, Khusrav, and Todd Sandler. "The Adverse Effect of Transnational and Domestic Terrorism on Growth in Africa." *Journal of Peace Research* 48, no. 3 (2011): 355-71. doi:10.1177/0022343310395798

Harms, Philipp and Ursprung, Heinrich (2002), Do Civil and Political Repression Really Boost Foreign Direct Investment?, *Economic Inquiry*, Vol. 40, No. 4, pp. 651-663.

The World Bank. "Population." Accessed July 8th, 2018.
<https://data.worldbank.org/indicator/SP.POP.TOTL>

The World Bank. "Trade." Accessed July 8th, 2018.
<https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS>

Wei, Shang-Jin (2000), How Taxing is Corruption on International Investors?, *Review of Economics and Statistics*, Vol. 82, No. 1, pp. 1-11.

"WORLD TRADE ORGANIZATION." WTO | Trade Statistics - World Trade Statistical Review 2017. Accessed September 23, 2018.
https://www.wto.org/english/news_e/pres96_e/pr057_e.htm.

Zurawicki, Leon, and Mohsin Habib. "Corruption And Foreign Direct Investment: What Have We Learned?" *International Business & Economics Research Journal (IBER)*9, no. 7 (2010). doi:10.19030/iber.v9i7.593.

IX: Endnotes

¹ This research was conducted through the Hollingsworth Research Program under the advisement of Dr. Nathaniel Cook and Dr. Jessica Hennessey

² For Appendix Table 3, the control variables are taken out of the table to improve visibility of the coefficients on the terrorism target type variables