What Effect Does the War on Terror Have On Terrorism?

Final Project

Stewart Wilson

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I. Introduction

Following the unprecedented attack on the Twin Towers on 9/11, the USA declared a War on Terror. They passed laws such as the PATRIOT ACT, invaded two sovereign nations, expanded the surveillance apparatus, and cracked down domestically and abroad on any and all hints of terrorist action. 20 years later, however, and questions of its efficacy, cost, and morality loom large. Setting questions of morality aside momentarily, what effect has the War on Terror had on terrorism? The answer to this question is of severe import because it offers insight into how the US should continue to operate. If the tactics implemented are both costly and ineffective, it can hardly be justified to continue. Furthermore, this is a question pertaining to data science because, through analyzing data related to and influenced by War on Terror policies, we can determine the statistical effect that these policies have had on terrorism.

The following exploratory data analysis is meant to be a beginning towards answering some of these questions. It is by no means an exhaustive analysis. Indeed, as will be seen, as the data is explored, more questions are raised than are answered. Yet, while there are no definitive answers given in this analysis, several insights can be gained that could serve as signposts signalling the way for future data analysis.

The structure of this paper follows the pathway of my thinking through the problem of quantifying the effect the War on Terror has had on global terrorism rates. I will lay out the problem in more details, summarize how I addressed it, explain the insights I gained, the implications these insights raise, and the limitations inherent to my analysis. I hope the reader will find this analysis as interesting and impactful as I did.

II. The Problem at Hand (Step 1)

At first, I began by posing the problem as broadly as possible: did the War on Terror have a significant effect on terrorism worldwide and abroad. I immediately ran into difficulties trying to break that question into manageable parts. What exactly is the War on Terror? Can it be reduced to quantitative terms? How do you compare terrorism globally to terrorism domestically? How do you compare domestic responses to global ones?

In the first step of my research, I decided to split the problem in two. I would investigate domestic terror in relation to domestic responses and I would investigate global terror in relation to U.S. global response. Domestically, I would focus on the actions of Department of Homeland Security and globally on US military action.

However, when I began the second step of my analysis, I had to further restrict the problem. There just simply was not enough publicly available data to sufficiently investigate the domestic response to terrorism. Moreover, I could only find data related to troop deployment in the European Union, which while helpful leaves out West Asia where much of US troops were focused during the War on Terror.

As such, I limited my analysis to investigating the relationship between US Defense Budget and global terrorism rates, with the Defense Expenses being a proxy for the actions of the War on Terror. This problem was much more manageable for the scope of the project, though it came with many limitations, as I will expand on in Section VI.

III. Addressing the Problem

During the second step of my project, I imported data, cleaned it, and analyzed it.

Data Importing and Cleaning (Step 2)

I used 3 datasets during my analysis. The first was the Global Terrorism Database, which contained over 100 variables for each attack specifying things such as tactics, perpetrators, targets, and outcomes. I determined that the following variables were most relevant to my analysis:

- iyear: year attack conducted
- imonth: month attack conducted
- country_txt: country where attack took place
- region: region where attack took place
- success: whether the attack was successful
- nkill: number killed during attack

  As said in the pervious section, the Troop Deployment dataset proved less useful than anticipated, so I left it aside to streamline my research.

  The third dataset contained US Defense Spending between 1960 and 2020. I merged this dataset with Global Terrorism Database, made the variable names uniform, and limited the years between 1970 and 2019.

The final dataset can be seen below.

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union

##    iyear imonth        country_txt region success nkill defensebudget      gdp
## 1   1970      7 Dominican Republic      2       1     1         83.41  1073.30
## 2   1970      0             Mexico      1       1     0         83.41  1073.30
## 3   1970      1        Philippines      5       1     1         83.41  1073.30
## 4   1970      1             Greece      8       1    NA         83.41  1073.30
## 5   1970      1              Japan      4       1    NA         83.41  1073.30
```

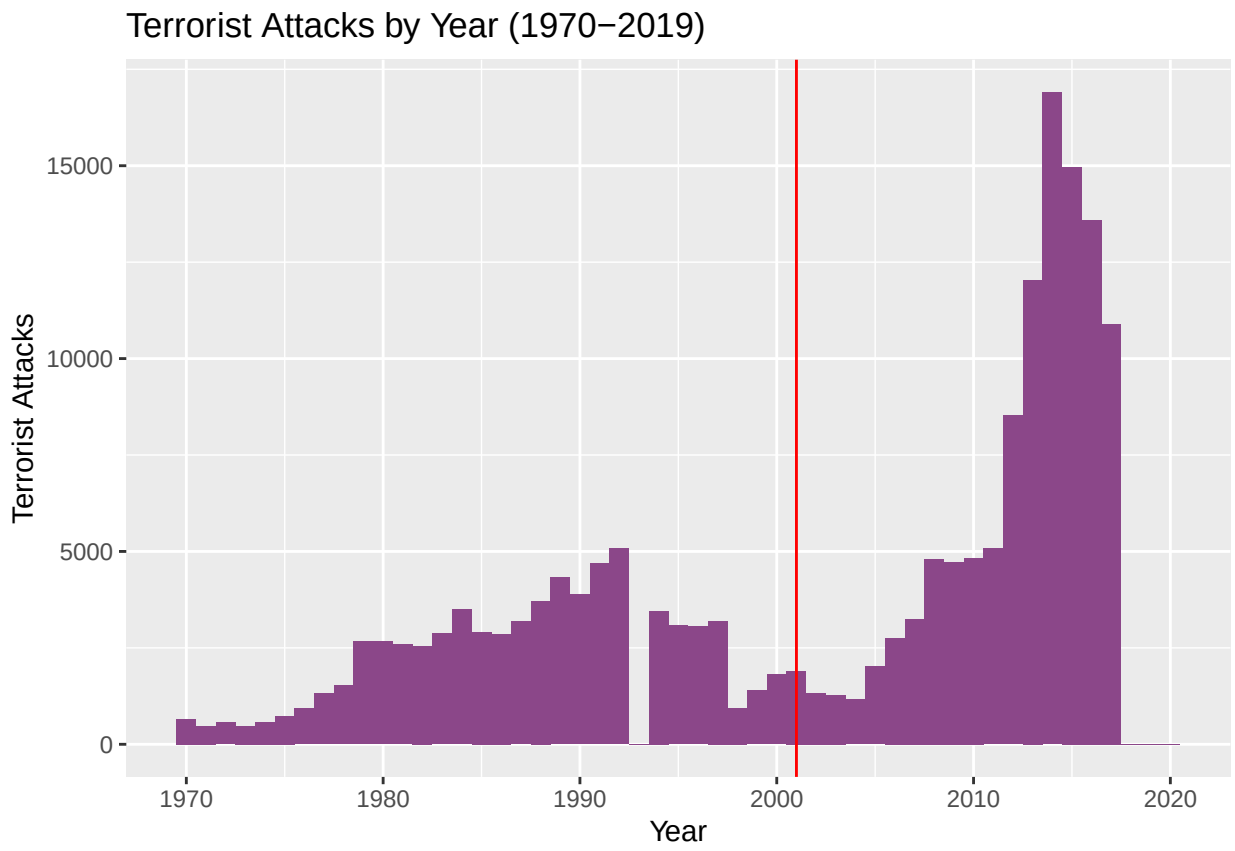
```
## 6   1992      1            Germany      8       1     3        325.03  6520.33
## 7   1992      1     United Kingdom      8       1     0        325.03  6520.33
## 8   1992      1     United Kingdom      8       1     0        325.03  6520.33
## 9   1992      1     United Kingdom      8       1     0        325.03  6520.33
## 10  1992      1        Philippines      5       1     0        325.03  6520.33
## 11  1992      1             Panama      2       1     0        325.03  6520.33
## 12  2017      5               Iraq     10       0     0        646.75 19542.98
## 13  2017      5               Iraq     10       0     0        646.75 19542.98
## 14  2017      5               Iraq     10       0     1        646.75 19542.98
## 15  2017      5               Iraq     10       0     0        646.75 19542.98
## 16  2017      5               Iraq     10       1     0        646.75 19542.98
## 17  2017      5               Iraq     10       1    12        646.75 19542.98
##    population
## 1      205.05
## 2      205.05
## 3      205.05
## 4      205.05
## 5      205.05
## 6      256.51
## 7      256.51
## 8      256.51
## 9      256.51
## 10     256.51
## 11     256.51
## 12     324.99
## 13     324.99
## 14     324.99
## 15     324.99
## 16     324.99
## 17     324.99
```

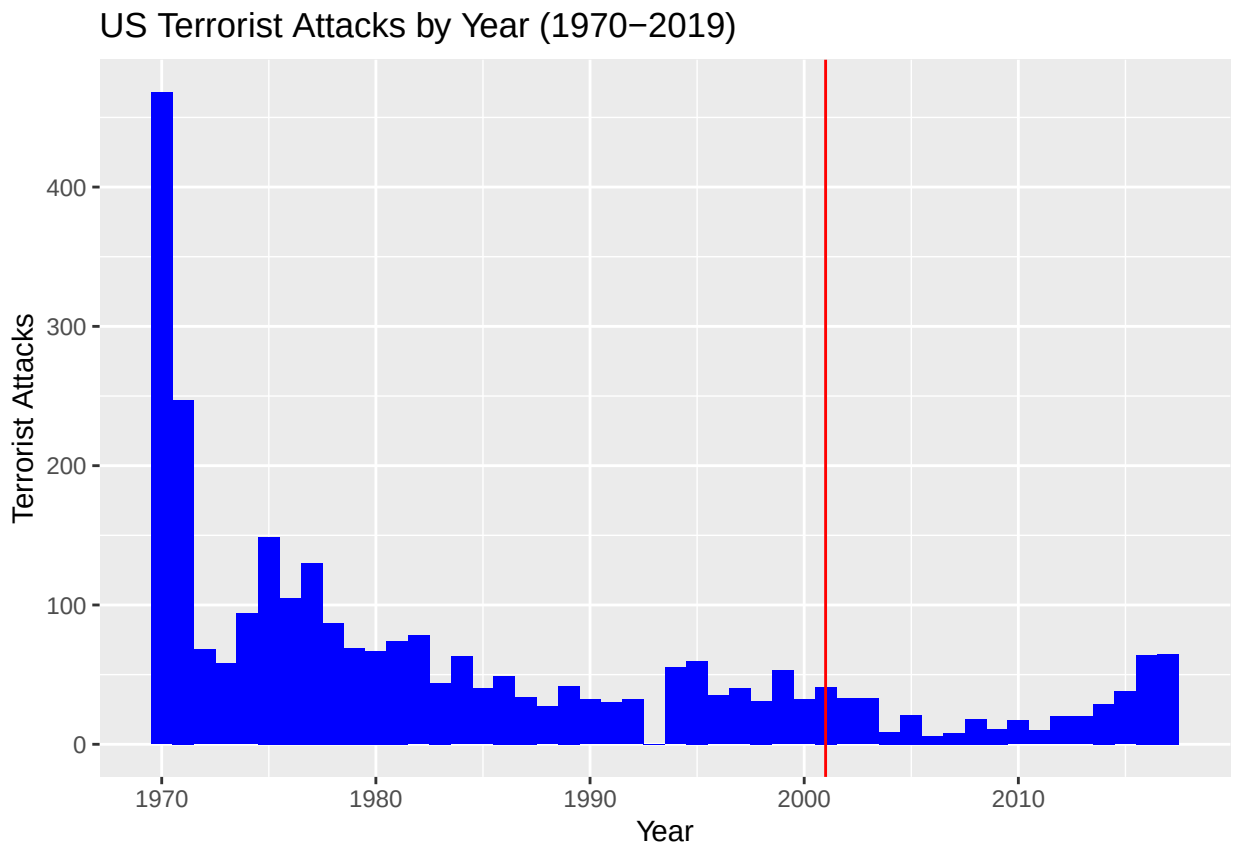
Data Analysis (Step 2)

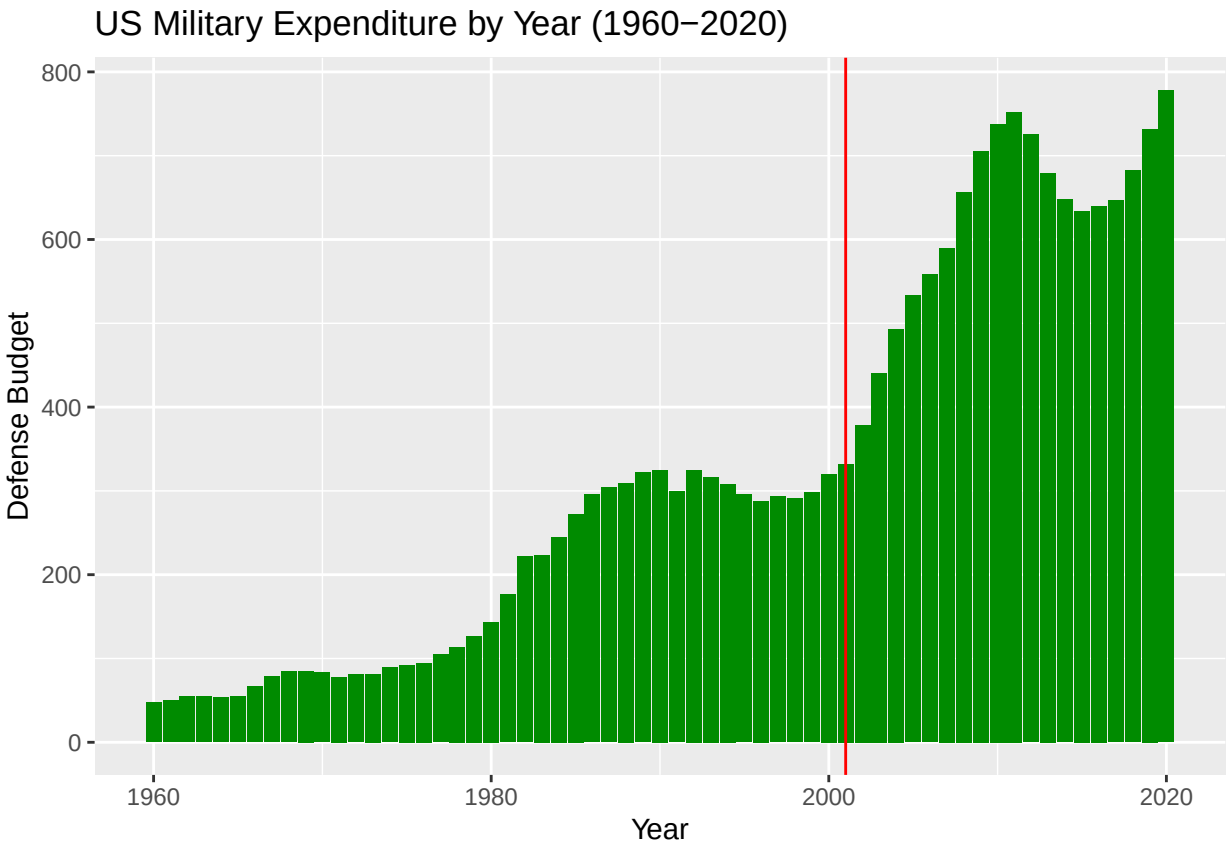
Now that the dataset had been imported and cleaned, I could begin my analysis. The plan was first to slice the data into attacks before 9/11 and after 9/11. Then, observe comparative statistical characteristics between the slices. Finally, perform correlation analysis on the Defense Spending and Number of Terrorist Attacks.

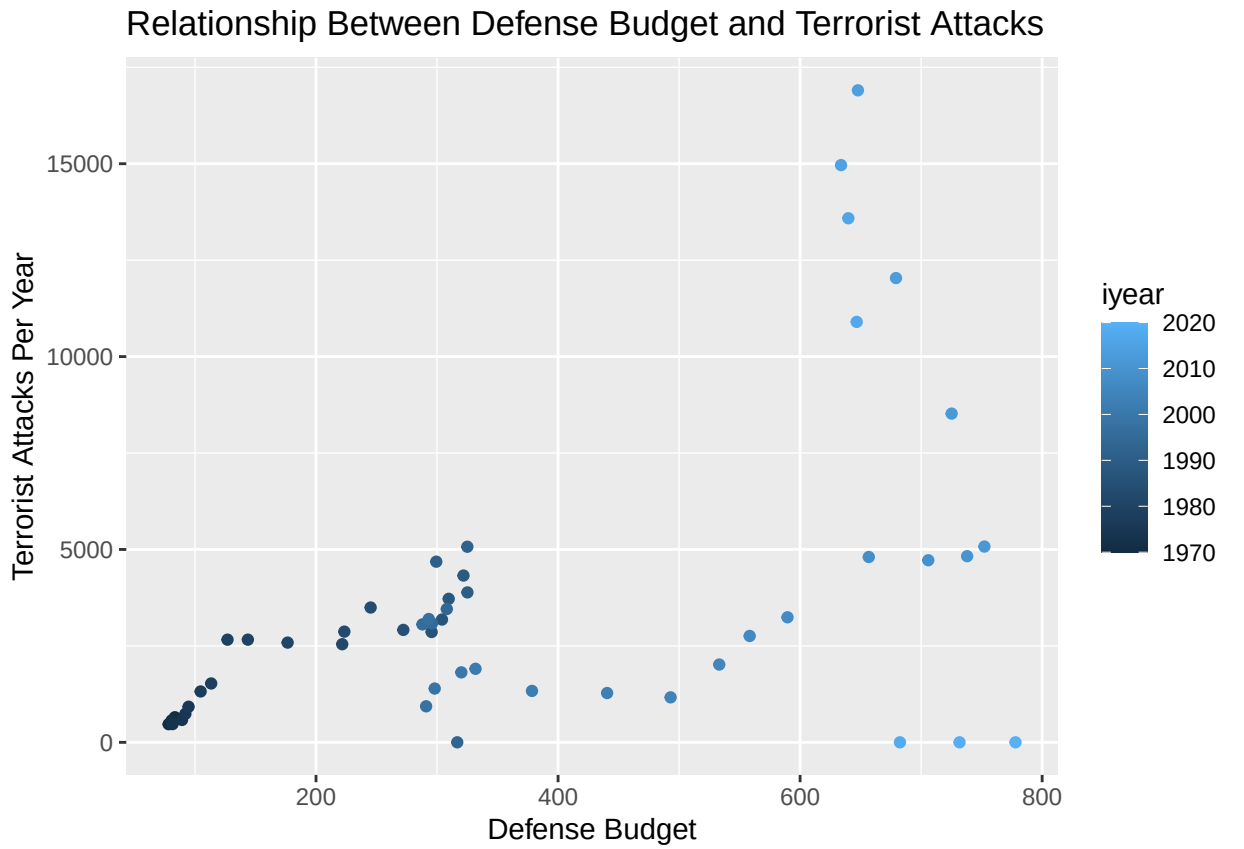
One problem I ran into at this stage was meaningfully comparing variables to one another. Given that the defense spending values were repeated multiple times (more terrorist attacks per year than number of defense budgets naturally), the effect of spending was vastly overstated. To correct for this, I created a new dataset that contained one column for defense spending, and one for total attacks per year. This allowed me a greater ability to see the general relationship between attacks and spending.

I created the following tables/graphs to visualize the results of my analysis. Please note that the red line in the first three graphs mark 9/11.


Terrorist Attacks by Year (1970−2019)
Terrorist Attacks
15000
10000
5000
0
1970
1980
1990
2000
2010
2020
Year


US Terrorist Attacks by Year (1970−2019)
Terrorist Attacks
400
300
200
100
0
1970
1980
1990
2000
2010
Year


US Military Expenditure by Year (1960−2020)
Defense Budget
800
600
400
200
0
1960
1980
2000
2020
Year



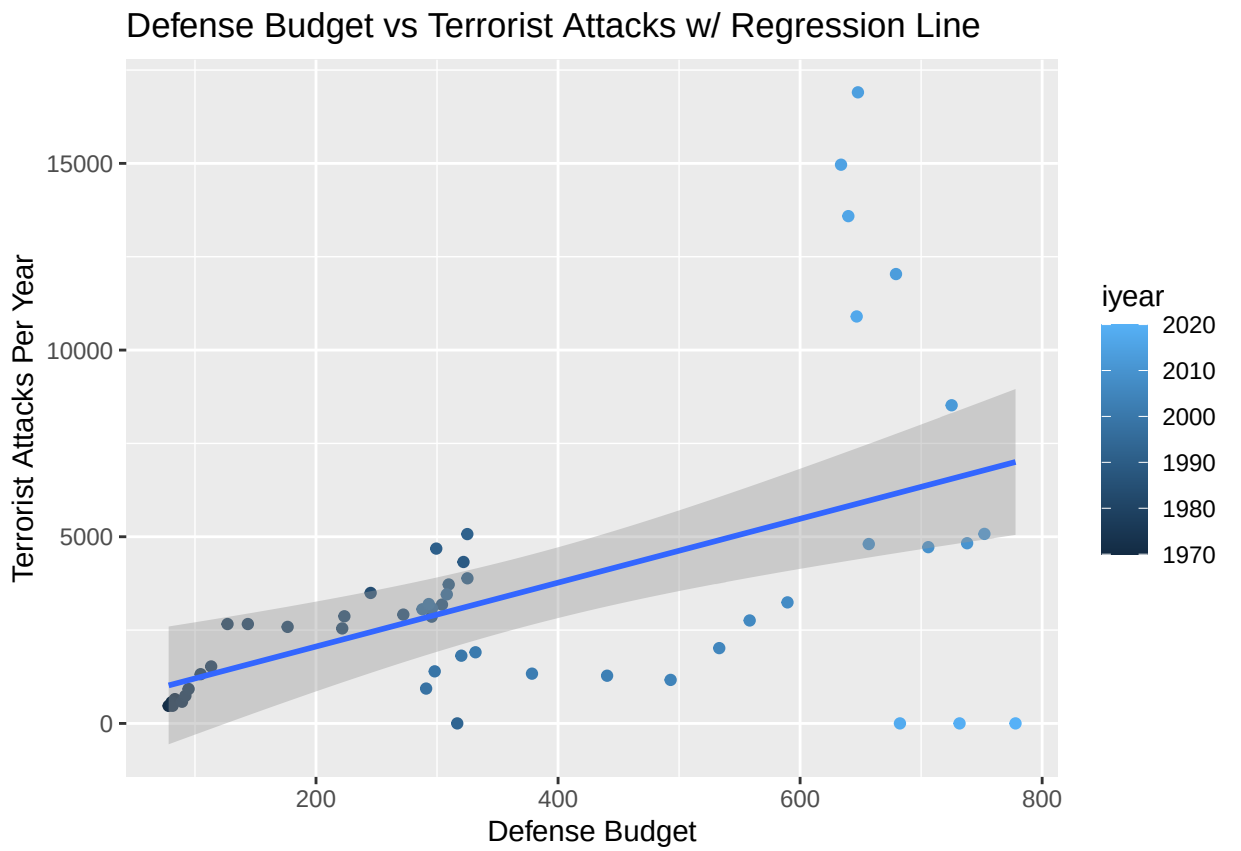
And here is a correlation table of GDP, US Population, # of Attacks, and Defense Budget in order to place the correlation of defense budget and attacks into context.

	Year	Attacks	DefenseBudget	GDP	Population
Year	1.0000000	0.3900066	0.9494118	0.9996380	1.0000000
Attacks	0.3900066	1.0000000	0.4499763	0.3894635	0.3900066
DefenseBudget	0.9494118	0.4499763	1.0000000	0.9481448	0.9494118
GDP	0.9996380	0.3894635	0.9481448	1.0000000	0.9996380
Population	1.0000000	0.3900066	0.9494118	0.9996380	1.0000000

Regression Analysis

Observing the scatterplot above, it appears the Defense Budget and Attacks Per Year follow a linear relationship. This motivated me to do a simple regression analysis. The below graph is the scatterplot above with a regression line fitted to it. One can see that it is a fairly good fit, though there are some outliers in the 600 billion dollar spending domain.

```
## `geom_smooth()` using formula 'y ~ x'
```



Recommendation for Models

I would recommend doing time series analysis and building a time series model of terrorist attacks per year. This would help in identifying if there are other reasons for rising terrorist attacks outside of Defense Spending. For instance, if particular years correlate with increased terrorist attacks the next year, one could investigate events that may have occurred that explain that rise. In this way, we can begin to build a more robust idea of the relationship between US military action and terror.

The model would be useful in trying to predict the amount of terrorist attacks in future years. This model could be compared to the regression model to see which is more accurate. If the time series model is more accurate than the regression model, it is again likely there is a third (or more) relation with changing terrorist rates.

IV. Insights Gained

There were a number of insights gained from the preceding analysis. Military expenditure skyrocketed post 9/11, which is suggestive of an increase in military action in accordance with the War on Terror. Terrorist attacks too, increased after 2001, though they decreased domestically in the US.

The most striking insight gained by far from the analysis is the positive correlation between US defense spending and terrorist attacks per year. This implies that as defense spending rose, so too did the number of terrorist attacks. The analysis also showed that this relation is not likely due to chance, meaning that the effect of spending on terrorist attacks is statistically significant. The regression analysis confirms this effect, with defense spending being an excellent predictor of terrorist attacks.

V. Implications

This last insight has remarkable implications for those wishing to understand the effect of the War on Terror. If it is assumed that defense spending is a good proxy for military action and that military action is the foremost feature of the War on Terror, then the fact that increasing military spending has a positive relation to terrorist attacks seems to suggest that the War on Terror is having the opposite effect! If such an account is true, then the implication is that there needs to be some serious re-evaluation towards the means the US has taken to try and curb terrorism.

Of course, one could point out that correlation has no say in the direction of the relation. It is equally plausible that the increased terrorist attacks cause more to be spent on the military. This is possible, yet if it is true it does not mean therefore that the War on Terror has been effective. That there has not been a consistent decrease in terrorist attacks in the 20 years since 9/11 even when military spending has nearly quadrupled still indicates that these methods are not working well. The question remains, how much more money should continue to be put towards a war that has not made much progress towards victory.

VI. Limitations

There are several limitations to my analysis that temper these implications. I mentioned that we should assume that defense spending is a good proxy for military action and therefor the War on Terror. This assumption may not hold. If the increase in defense spending was spent more on research than on actual troop deployment, then defense spending is not a perfect proxy for the War on Terror and thus the preceding implications hold little water.

In addition, given that the data spans the course of 50 years, the standards for data collection probably shifted a large amount in that time. If data collection was not consistent, then we cannot be sure that the data analysis was valid. There remains the possibility that the reason terrorist attacks increased post 9/11 was because data on those attacks were better collected in the the 2000s than the 1970s.

If one wanted to improve this analysis, they would definitely need to gather more data. If they could find datasets on troop deployment in West Asia, technology changes as a result of the War on Terror, quantitative or qualitative impact of policies implemented post 9/11 then one would gain a more holistic knowledge of what constitutes the War on Terror. One could do a similar analysis to what I did above but zooming in on individual regions and seeing what impact the War on Terror had there. This would also aid in accounting for the data collection possibility, since one would be able to just look at data after 2001.

Another way to improve the analysis would be

VII. Concluding Remarks

In spite of these limitations—or perhaps because of them—the analsyis conducted above provided new insights into future research possibilities. It offers the possibility of determining the statistical effects of the past 20 years of the War on Terror. It opens up new avenues for understanding the relationship between U.S. foreign policy and acts of terror.

On a final note, one should take care not to become too enraptured by the data to forget that what is at stake here is not just the answer to a statistical question. The choices that are made when it comes to the War on Terror and addressing terrorism have tangible effects. These effects are felt in lives lost, buildings destroyed, and communities upended. A true measure of the effects of the War on Terror should not just consider whether the War on Terror accounts for a sufficient amount of variance in global terrorist rates, but also whether that effect outweighs the secondary effects it has on the places and people it turns its attention towards.