Project: Can Individual Political Leaders Make a Difference?

Overview

In the year of the US presidential elections, the influence of individual political leaders on the course of a nation becomes a particularly relevant and pressing topic. The debate centers around whether leaders with differing ideologies and personalities can significantly impact national trajectories, or if they are largely constrained by historical contexts and institutional frameworks. Understanding the true extent of a leader's influence can inform public opinion, electoral strategies, and policy-making. Testing the influence of individual political leaders is inherently difficult. The ascent of political leaders is often influenced by preceding conditions and public sentiment, making it challenging to isolate their impact. Furthermore, there are many confounding factors to be adjusted for. In this context, natural experiments can provide valuable insights into causal relationships. The natural experiment framework refers to a research design or approach in which naturally occurring events or circumstances are leveraged to study the effects of an intervention, policy, or other factors on a population. In a natural experiment, researchers do not manipulate the independent variable; instead, they observe its effects as they occur in real-life settings. This approach is valuable when random assignment to control and experimental groups is not feasible or ethical.

Goal

The goal of this project is to leverage a natural experiment framework by examining instances where the success or failure of assassination attempts on political leaders is assumed to be essentially random. We will examine the effect of a leader assassination on institutions (measured by polity score) and war.

The Data

Each observation in the dataset includes detailed information about specific assassination attempts on political leaders, encompassing both successful and failed attempts. The dataset integrates multiple data sources from the Polity Project, which systematically documents and quantifies regime types of countries worldwide from 1800 to the present. The polity score is a 21-point scale ranging from -10, indicating a hereditary monarchy, to 10, representing a consolidated democracy. This score provides a comprehensive measure of the political regime characteristics of a country.

Acknowledgements
Based on Benjamin F. Jones and Benjamin A. Olken (2009) "Hit or miss? The effect of assassinations on institutions and war." *American Economic Journal: Macroeconomics*, vol. 1, no. 2, pp. 55-87.

(Dataset downloaded from http://press.princeton.edu)

Data Column Reference

Variable	Description
country	Name of the country
year	Year of the assassination attempt
leadername	Name of the leader target of the assassination attempt
age	Age of the targeted leader
politybefore	Average polity score of the country during the three-year period prior to the attempt
polityaf	Average polity score of the country during the three-year period after the attempt
civilwarbefore	1=the country was in civil war during the three-year period prior to the attempt; 0=otherwise
civilwaraf	1=the country was in civil war during the three-year period after the attempt; 0=otherwise
interwarbefore	1=the country was in international war during the three-year period prior to the attempt; 0=otherwise
interwaraf	1=the country was in international war during the three-year period after the attempt; 0=otherwise
result	Result of the assassination attempt

Imports

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import numpy as np
```

Get the data and display it

```
leaders = pd.read_csv('data/leaders.csv')
```

```
leaders.head()
```

Out[13]:

	year	country	leadername	age	politybefore	polityaf	interwarbefore	interwaraf	civilwarbefore	civilwaraf	result
0	1929	Afghanistan	Habibullah Ghazi	39	-9.0	-6.000000	0	0	1	0	not wounded
1	1933	Afghanistan	Nadir Shah	53	-6.0	-7.333333	0	0	0	0	dies within a day after the attack
2	1934	Afghanistan	Hashim Khan	50	-6.0	-9.000000	0	0	0	0	survives, whether wounded unknown
3	1924	Albania	Zogu	29	0.0	-9.000000	0	0	0	0	wounded lightly
4	1931	Albania	Zogu	36	-9.0	-9.000000	0	0	0	0	not wounded

Clean the data

Examine the data

```
leaders.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 250 entries, 0 to 249
Data columns (total 11 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   year           250 non-null    int64
 1   country        250 non-null    object
 2   leadername     250 non-null    object
 3   age            250 non-null    int64
 4   politybefore   250 non-null    float64
 5   polityaf       250 non-null    float64
 6   interwarbefore 250 non-null    int64
 7   interwaraf     250 non-null    int64
 8   civilwarbefore 250 non-null    int64
 9   civilwaraf     250 non-null    int64
 10  result         250 non-null    object
dtypes: float64(2), int64(6), object(3)
memory usage: 21.6+ KB
```

Potential problems:

- no null values
- change politybefore and polityafter type to integer

Change data types

```
leaders['politybefore'] = leaders['politybefore'].astype(int)
leaders['polityaf'] = leaders['polityaf'].astype(int)
```

```
leaders.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 250 entries, 0 to 249
Data columns (total 11 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   year           250 non-null    int64
 1   country        250 non-null    object
 2   leadername     250 non-null    object
 3   age            250 non-null    int64
 4   politybefore   250 non-null    int64
 5   polityaf       250 non-null    int64
 6   interwarbefore 250 non-null    int64
 7   interwaraf     250 non-null    int64
 8   civilwarbefore 250 non-null    int64
 9   civilwaraf     250 non-null    int64
 10  result         250 non-null    object
dtypes: int64(8), object(3)
memory usage: 21.6+ KB
```

Prepara the data

```
leaders['warbefore'] = leaders.apply(lambda row: 1 if row.civilwarbefore == 1 or row.interwarbefore == 1 else 0, axis=1)

leaders['warafter'] = leaders.apply(lambda row: 1 if row.civilwaraf == 1 or row.interwaraf == 1 else 0, axis=1)
```

```
leaders['result'].value_counts()
```

Out[17]:

```
not wounded                          96
dies within a day after the attack   66
plot stopped                         40
wounded lightly                      25
survives but permanent disability    21
survives, whether wounded unknown    14
dies, timing unknown                  4
dies between a week and a month       2
dies between a week and a month       2
survives but wounded severely         1
Name: result, dtype: int64
```

```
leaders['success'] = leaders.apply(lambda row: 1 if 'dies' in row.result else 0, axis=1)
```

Success of leader assassination as a natural experiment

We have already observed that the overall success rate of leader assassination is 21.6%. This result leads us to question the assumption that the success rate in an assassination attempt is randomly determined. Further exploration is warranted.

Effect on institutions (polity score)

Cross-section comparison between successful and failed assassination attempts.

```
# compute the difference-in-means for wars AFTER

leaders_1['politydiff'].mean() - leaders_0['politydiff'].mean()
```

```
1.1317092289510086
```

Countries where a leader died have an average polity score over a 3-year period after the assassination attempt that is higher (1.13 points) than those with a failed attempt. Successful assassinations lead to greater democratization compared to failed attempts.

Effect on civil and international wars

Cross-section comparison between successful and failed assassination attempts.

```
# compute the difference-in-means for wars AFTER

round((leaders_1['warafter'].mean() - leaders_0['warafter'].mean()) * 100, 2)
```

Out[155]:

```
-9.22
```

The difference between the proportion of countries at war after a successful assassination attempt and the proportion of countries at war after a failed assassination is -9.22 percentage points. We can conclude that successful assassination attempts lead to a lower likelihood of war compared to failed attempts, on average.

In conclusion, this project has provided compelling evidence to support the notion that successful assassination attempts on leaders are associated with outcomes that promote democracy and reduce instances of war. This finding underscores the significant impact that individual political leaders can have.

Is the assumption that the success of assassination attempts is randomly determined a valid assumption?

```
leaders_0['age'].agg(['mean','median','min','max'])
```

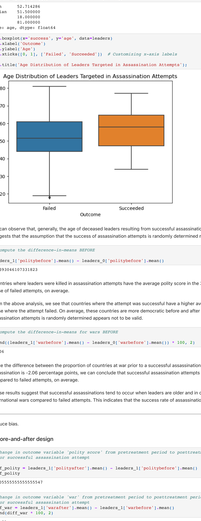
```
mean      56.462963
median    56.000000
min       34.000000
max       77.000000
Name: age, dtype: float64
```

```
leaders_0['age'].agg(['mean','median','min','max'])
```

```
mean      52.714286
median    53.000000
min       26.000000
max       81.000000
Name: age, dtype: float64
```

```
sns.boxplot(x='success', y='age', data=leaders)
plt.xlabel('Outcome')
plt.ylabel('Age')
plt.xticks([0, 1], ['Failed', 'Succeeded']) # Customizing x-axis labels

plt.title('Age Distribution of Leaders Targeted in Assassination Attempts')
```



We can observe that, generally, the age of deceased leaders resulting from successful assassination attempts is higher than that of those who survived. This suggests that the assumption that the success of assassination attempts is randomly determined may not be valid.

```
# compute the difference-in-means BEFORE

leaders_1['politybefore'].mean() - leaders_0['politybefore'].mean()
```

```
1.4391564137131821
```

Countries where leaders were killed in assassination attempts have the average polity score in the 3-year period prior to the assassination 1.04 points higher than those of failed attempts, on average.

From the above analysis, we see that countries where the attempt was successful have a higher average polity score both before and after the attempt compared to those where the attempt failed. On average, these countries are more democratic before and after the attempt. Again, the assumption that the success of assassination attempts is randomly determined appears not to be valid.

```
# compute the difference-in-means for wars BEFORE

round((leaders_1['warbefore'].mean() - leaders_0['warbefore'].mean()) * 100, 2)
```

Out[164]:

```
-2.06
```

Since the difference between the proportion of countries at war prior to a successful assassination attempt and the proportion of countries at war prior to a failed assassination is -2.06 percentage points, we can conclude that successful assassination attempts are associated with countries with a lower likelihood of war compared to failed attempts, on average.

These results suggest that successful assassinations tend to occur when leaders are older and in countries that are more democratic and less prone to civil or international wars compared to failed attempts. This indicates that the success rate of assassination attempts may not be randomly determined.

Reduce bias.

Before-and-after design

```
# change in outcome variable 'polity score' from pretreatment period to posttreatment period
# for successful assassination attempt

diff_polity = leaders_1['politydiff'].mean() - leaders_1['politybefore'].mean()
diff_polity
```

Out[154]:

```
-0.055555555555555547
```

```
# change in outcome variable 'war' from pretreatment period to posttreatment period
# for successful assassination attempt

diff_war = leaders_1['warafter'].mean() - leaders_1['warbefore'].mean()
round(diff_war * 100, 2)
```

Out[156]:

```
-16.67
```

When using the before-and-after design, we observe that in countries where attempts are successful, the polity score decreases by an average of 0.056 after the assassination. This result contradicts the previous cross-sectional analysis, which showed an increase in the polity score.

Regarding involvement in wars, the previous cross-sectional analysis indicated a decrease of -9.22 percentage points. However, with the before-and-after design, we now see a decrease of close to -15 percentage points, indicating a stronger effect.

Difference-in-differences design (DiD)

```
diff_0_polity = leaders_0['politydiff'].mean() - leaders_0['politybefore'].mean()

diff_polity - diff_0_polity
```

Out[28]:

```
0.8924638281179138
```

```
diff_0_war = leaders_0['warafter'].mean() - leaders_0['warbefore'].mean()

round((diff_war - diff_0_war) * 100, 2)
```

Out[29]:

```
-7.16
```

When applying the Difference-in-Differences (DiD) design, we find that successful assassinations might have led to a slight increase in the polity score and a decrease in the countries' involvement in wars. The DiD results are smaller than those from the cross-sectional analysis, but comparable.

In [ ]: