

POL304 Assignment 1

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The code and data associated with the completion of this assignment can be accessed via [my GitHub repository](#).

```
## loading packages
# install.packages("tidyverse")
# install.packages("janitor")
# install.packages("dplyr")
# install.packages("knitr")
library(tidyverse)
library(janitor)
library(dplyr)
library(knitr)

## load the data
chechen_data <- read_csv("chechen.csv")

## a sample from the data
kable(head(chechen_data))
```

village	groznyy	fire	deaths	preattack	postattack
Elistanzhi	0	0	NA	4	3
Malye Shuani	0	1	0	0	1
Belgatoy	0	1	34	1	0
Oktya'brskoe	0	0	NA	0	0
Chiri-Yurt	0	0	NA	4	5
Gansolchu	0	1	0	0	0

Question 1

The research question that this paper investigates is what the relationship is between a state's use of indiscriminate violence and insurgent attacks.

Question 2

What is the theory used in the article? [Word limit: 150 words] Do not simply copy/paste from the article. Instead, think carefully what is the set of logically consistent assumptions that lead to the article's main prediction. Focus on the broad strokes rather than the details. Ask yourself what are the most basic relationships/conditions that must hold in order to derive the article's main prediction. List these assumptions and the relationship among them. For example, if the first assumption is that the Earth is flat and the second assumption is that the edge of the Earth is in the ocean, then a logically consistent prediction would be that we should observe water pouring off of the edge of the Earth into the void. Notice that neither the assumptions nor the prediction need to be true. The assumptions are simplifications of the world; the only requirement is that they are logically consistent with one another.

Question 3

The central research hypothesis is...

Question 4

Table 2 shows the number of villages that were shelled at least once by Russian Artillery and the number of villages that were not shelled during the period of interest. A total of 125 unique villages appear in the data set. Of those 125 villages, 75 were shelled at least once, and 50 were not shelled.

```
# count how many unique villages in the data set
num_villages <- length(unique(chechen_data$village))

# subset to only include the villages that were shelled at least once
shelled_observations<- chechen_data |>
  filter(fire == 1)

# count the number of unique villages that were shelled
num_shelled = length(unique(shelled_observations$village))

# get the number of unique villages that were not shelled
```

```

num_not_shelled = num_villages - num_shelled

# create a data frame
q4 <- data.frame(VillagesShelled = num_shelled,
                 VillagesNotShelled = num_not_shelled)

# print the table for reference
kable(q4)

```

Table 2: The Number of Villages in the Data Set that Were and Were Not Shelled

VillagesShelled	VillagesNotShelled
75	50

Question 5

Start with a cross-sectional design. What is the average number of insurgent attacks for shelled vs. non-shelled villages? Would you conclude that indiscriminate violence reduces insurgent attacks? Why or why not?

```

# Subset the data into observations that do not describe a shelled village
not_shelled_observations <- chechen_data |>
  filter(fire == 0)

# Already have the shelled observations from Question 4

# shelled villages
Y_shelled_after = mean(shelled_observations$postattack)

# non-shelled villages
Y_nonshelled_after = mean(not_shelled_observations$postattack)

q5 <- data.frame(
  ShelledAfter = Y_shelled_after,
  NonShelledAfter = Y_nonshelled_after,
  # compute the mean number of insurgent attacks after the fires
  SATE = Y_shelled_after - Y_nonshelled_after
)

kable(q5)

```

Table 3: The Number of Villages in the Data Set that Were and Were Not Shelled

ShelledAfter	NonShelledAfter	SATE
1.496855	2.050314	-0.5534591

Question 6

Considering only the pre-shelling periods, what is the difference between the average number of insurgent attacks for observations describing a shelled village and observations that do not? What does this suggest to you about the validity of comparison used for the previous question?

As seen in Table 4, the average number of insurgent attacks in the pre-shelling period (a pre-treatment variable for each of the treatment and control groups) for observations describing a shelling and for observations that do not are nearly identical, at 2.11 and 2.15, respectively. There is very little difference between this pre-treatment variable in the treatment and control groups, which suggests that the comparison in the previous question exhibits strong internal validity. Therefore, it is reasonable to believe that the treatment and control groups are identical on average in terms of all confounders (Chyzh, Lecture 2, Slide 15).

```
# Compute the mean number of insurgent attacks for observations that describe a shelled vi
# and observations that do not during only the pre-shelling periods
avg_pre_shelled <- mean(shelled_observations$preattack)
avg_pre_not_shelled <- mean(not_shelled_observations$preattack)

# Create a data frame
q6 <- data.frame(
  Shelled = avg_pre_shelled,
  NotShelled = avg_pre_not_shelled
)

# Print the table using knitr
kable(q6)
```

Table 4: Average Number of Insurgent Attacks during Pre-Shelling Periods in Shelled Village vs Non-Shelled Village Observations

Shelled	NotShelled
2.113208	2.150943

Question 7

Among observations in the data set that describe villages that were shelled, the number of insurgent attacks decreased after being fired on. Table 5 shows the mean number of insurgent attacks in the pre- and post-shelling periods for observations that were shelled; the mean number of insurgent attacks decreased from ~2.11 before being fired on to ~1.5 after being fired on.

```
# Compare villages that were shelled before and after
q7 <- data.frame(
  mean_before=mean(shelled_observations$preattack),
  mean_after=mean(shelled_observations$postattack)
)

# Print the table for reference
kable(q7)
```

Table 5: Mean Number of Insurgent Attacks in Villages that Were Shelled, Before and After Being Fired On

mean_before	mean_after
2.113208	1.496855

Question 8

This analysis supports the claim that indiscriminate violence reduces insurgency attacks. Table 6 shows the mean difference in the difference between insurgency attacks in the pre- and post-shelling periods for villages that were shelled and for villages that were not shelled. The mean difference between the pre- and post-shelling periods for villages that were shelled is ~0.616, while the mean difference in the pre- and post-shelling periods for villages that were not shelled is ~0.1. Therefore, the difference-in-difference analysis shows that villages that were shelled saw a greater reduction in insurgency attacks between the pre- and post-shelling periods than villages that were not shelled, which supports the claim that indiscriminate violence reduces insurgency attacks.

```
# mean shelled before - mean shelled after
shelled_difference = mean(shelled_observations$preattack) -
  mean(shelled_observations$postattack)

# mean not shelled before - mean not shelled after
```

```

not_shelled_difference = mean(not_shelled_observations$preattack) -
  mean(not_shelled_observations$postattack)

# Compute the sample average treatment effect for the treated
satt = shelled_difference - not_shelled_difference

# create a data frame with these numbers
q8 <- data.frame(
  MeanDiffShelled = shelled_difference,
  MeanDiffNotShelled = not_shelled_difference,
  SATT = satt
)

# print the table to use for reference
kable(q8)

```

Table 6: Mean Difference in Difference Between Pre- and Post-Shelling Villages for Villages that were Shelled vs Villages that were not

MeanDiffShelled	MeanDiffNotShelled	SATT
0.6163522	0.1006289	0.5157233

Question 9

Which of the three designs—cross-sectional, temporal, or difference-in-difference—is the most appropriate, given whether or not the data meet the assumptions for each?

References