

# Question 1: Indiscriminate Violence and Insurgent Attacks

In this problem, we will examine the data used by Jason Lyall in his 2009 paper “Does Indiscriminate Violence Incite Insurgent Attacks? Evidence from Chechnya,” *Journal of Conflict Resolution* 53 (3): 331-62. The paper is on Canvas and you should read it through. We will work with the matched data that he uses (**ArtilleryRepData.dta**). Some of the key variables in the dataset are:

## Variable Definitions:

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<b>pret</b>	Insurgent attacks in pre-treatment period
<b>post</b>	Insurgent attacks in post-treatment period
<b>diff</b>	<b>post - pret</b>
<b>treat</b>	=1 for treated villages, =0 otherwise
<b>lpop2000</b>	log of population in 2000
<b>poverty</b>	severity of need for humanitarian assistance
<b>tariq</b>	=1 if population dominated by Naqshbandi, =0 otherwise
<b>iso</b>	number of settlements within $5km^2$ of the swept village
<b>lnn</b>	log of distance to nearest village
<b>garrison</b>	=1 if Russian garrison stationed in village, =0 otherwise
<b>reb</b>	=1 if village controlled by rebels, =0 otherwise
<b>swept</b>	=1 if village swept, =0 otherwise
<b>lelev</b>	log of elevation of village

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- (a) Imagine that the data used in the paper had only two periods, and you estimate the equation:  $\ln(THS_{jt}) = \alpha_1 + \alpha_2 D_{jt} + \alpha_3 T_{jt} + \alpha_4 (D \cdot T) + \epsilon$  where  $D$  takes the value 1 for treated units (in both the pre- and post-treatment periods) and 0 otherwise, and  $T$  is 0 in the first pre-treatment time-period and 1 post-treatment. Interpret each coefficient in this equation and explain in words what each coefficient represents. Do this by writing out various conditional expectations of  $\ln(THS)$  (varying the levels of  $D$  and  $T$  in different ways) in terms of the coefficients.
- (b) Note that Lyall’s dataset is not in the standard long panel format. Write down the model that is actually estimated in the paper for Table 3. How could you recover the ATT from this model using the expression from (a)?
- (c) We replicate the first two columns of Table 3 in Lyall’s original paper. In Column (1), only the treatment variable and the intercept are included. In Column (2), Lyall additionally controls for the following covariates: **lpop2000**, **poverty**, **tariq**, **iso**, **lnn**, **garrison**, **reb**, **swept**, **lelev** and the pre-treatment outcome **pret**. Replicate Lyall’s results by running two regressions (don’t worry about the standard errors for the moment; see below).

	Treatment Only	Treatment with Covariates
	(1)	(2)
Treatment	-0.516** (0.214)	-0.506*** (0.177)
Constant	-0.101 (0.093)	-0.645 (0.834)

- (d) Try to replicate the standard errors in the above table. To do so, we need to use “clustered standard errors.” You may find the code `vcovCluster.r` useful for creating the standard errors. What are Lyall’s findings?
- (e) What are the key assumptions underlying Lyall’s difference in difference strategy? How plausible are they? What evidence does he marshal in support of them?
- (f) With the same observables that Lydall used to construct the matches, estimate the ATT using one to one matching instead of DID. How do the results compare? Use the same set of covariates in the regression analysis.
- (g) Check covariate balances before and after matching.

## Question 2: Money does equal access in Washington?

Read the article from the Washington Post (available as “Money\_equals\_access.pdf”, or online here) and answer the following questions:

- (a) In the experiment conducted by the two graduate students, what is the unit of analysis?
- (b) How large is the sample size?
- (c) What are the treatment conditions?
- (d) What are the probabilities of receiving each treatment?
- (e) An advisor of the two graduate students told them that she is worried that the Stable Unit Treatment Value Assumption (SUTVA) may be violated in this experiment. What does she mean? Do you think it is a legitimate concern for this experiment? Why or why not?
- (f) Do you think this experiment has external validity? In other words, do you think the results from this experiment can be extended beyond this particular study? Briefly explain (no more than 100 words).
- (g) A reporter from the Washington Post asked one of the graduate students: “This experiment sort of sounds like you were using members of Congress as guinea pigs. What do you think about the ethics of that?” If you were the graduate student, what would you say? (Be concise; no more than 100 words).