Lecture 20

11-05-2021

A Natural Experiment

Last time we discussed John Snow's natural experiment regarding the origin of cholera

We emphasized what David Freedman would refer to as "shoe leather" research.

Today we will continue showing the importance of shoe leather work

Occupation and Cooptation: A Natural Experiment

Political Devolution and Resistance to Foreign Rule: A Natural Experiment

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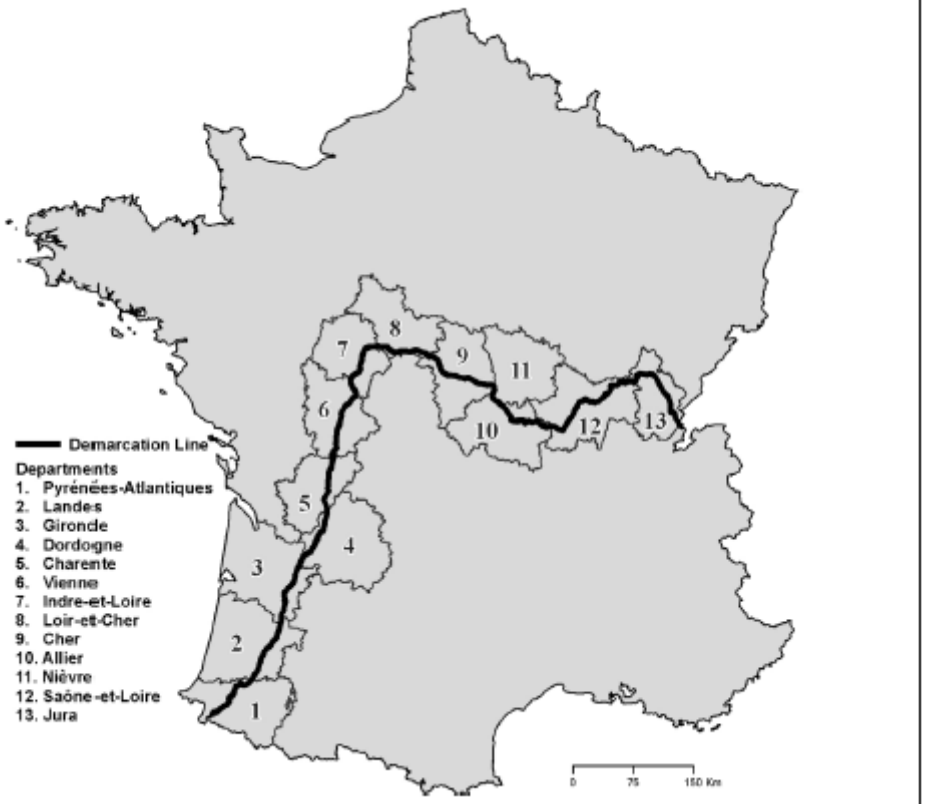
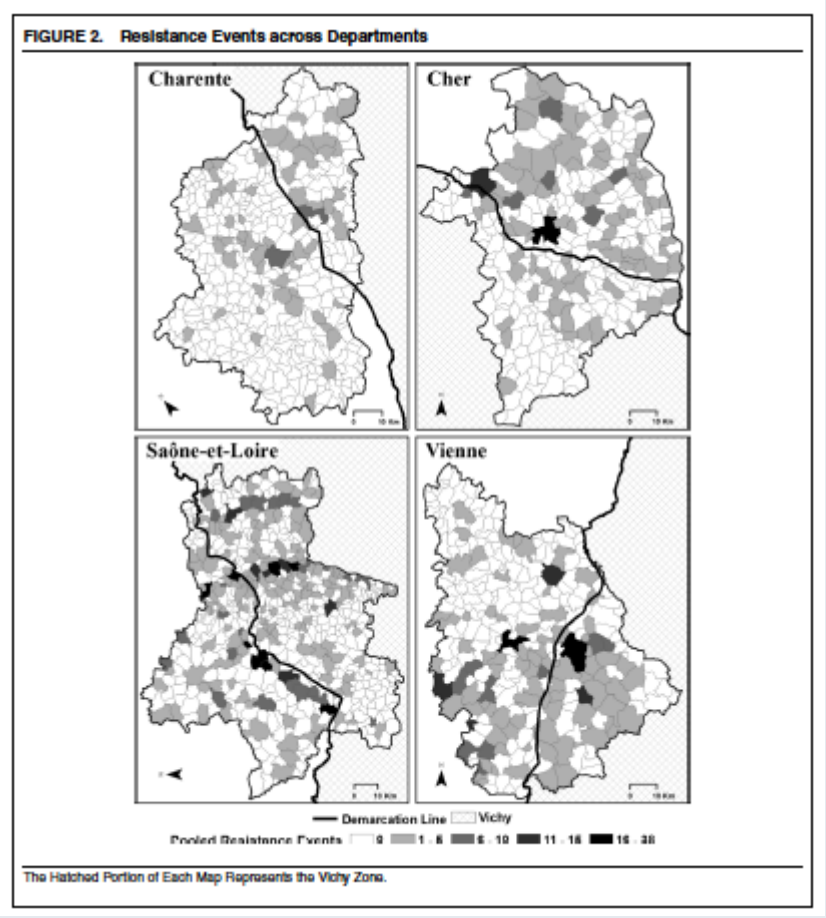
Do foreign occupiers face less resistance when they increase the level of native governing authority? Although this is a central question within the literature on foreign occupation and insurgency, it is difficult to answer because the relationship between resistance and political devolution is typically endogenous. To address this issue, we identify a natural experiment based on the locally arbitrary assignment of French municipalities into German or Vichy-governed zones during World War II. Using a regression discontinuity design, we conclude that devolving governing authority significantly lowered levels of resistance. We argue that this effect is driven by a process of political cooptation: domestic groups that were granted governing authority were less likely to engage in resistance activity, while violent resistance was heightened in regions dominated by groups excluded from the governing regime. This finding stands in contrast to work that primarily emphasizes structural factors or nationalist motivations for resistance.

The Line of Demarcation

FIGURE 1. Map of the Demarcation Line across Intersected French Departments



Mapping Attacks



Let's check the Covariate Balance

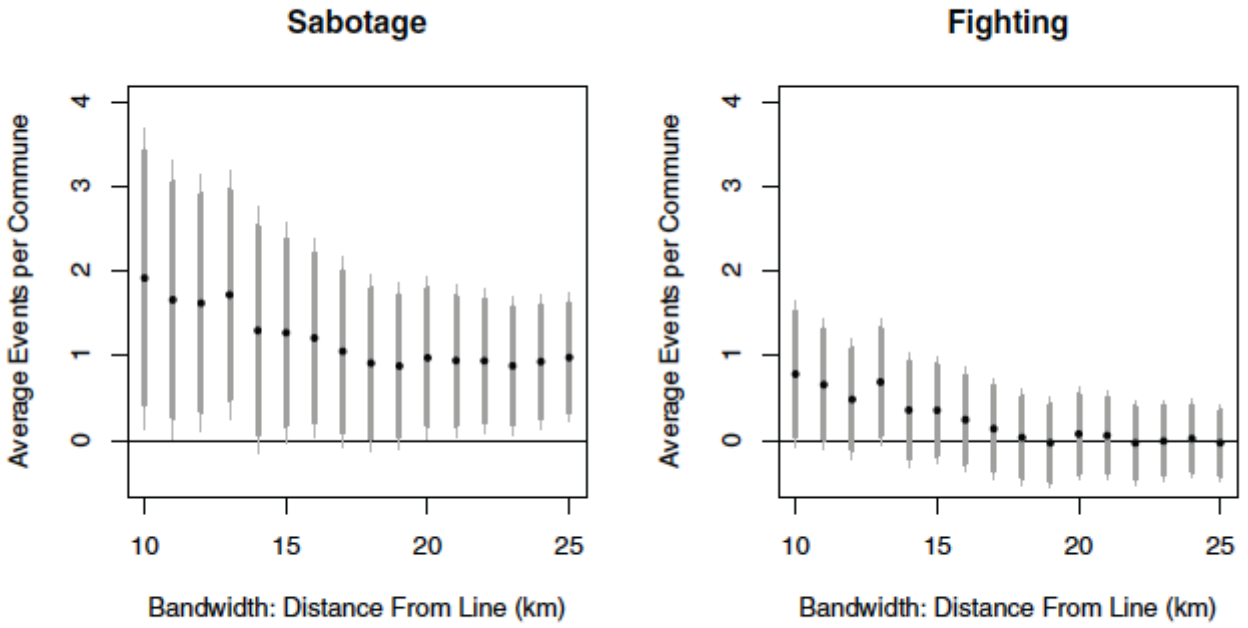
TABLE 2. Covariate Balance at Various Bandwidths

	Full Sample		<= 20 km		<= 10 km		<= 5 km	
	Diff	t	Diff	t	Diff	t	Diff	t
Train distance	−0.29	−1.37	−0.22	−0.76	−0.56	−1.36	−0.47	−0.69
Communications	0.04	0.55	0.11	1.02	0.14	0.88	0.08	0.27
Farmed area	11.58	6.26	5.66	1.85	6.95	1.88	6.69	1.03
Population	257	2.09	660	2.66	550	1.50	85	0.44
% Right	0.12	11.59	0.04	2.37	0.03	1.19	−0.01	−0.20
% Left	−0.14	−14.63	−0.08	−5.08	−0.05	−1.95	−0.01	−0.25
Ruggedness	−5.27	−5.24	−2.32	−2.01	−1.56	−0.97	−1.18	−0.44
Distance to line	4.08	5.70	−0.13	−0.34	−0.26	−1.01	−0.30	−1.81

Note: Difference-in-means calculated as (German zone–Vichy zone).

Results

FIGURE 4. Local Linear Regression: Difference in Resistance Activity



Notes: Local linear regression with a rectangular kernel and a land area covariate. Displays point estimates for each bandwidth, along with 90% (thick lines) and 95% (thin lines) confidence intervals.

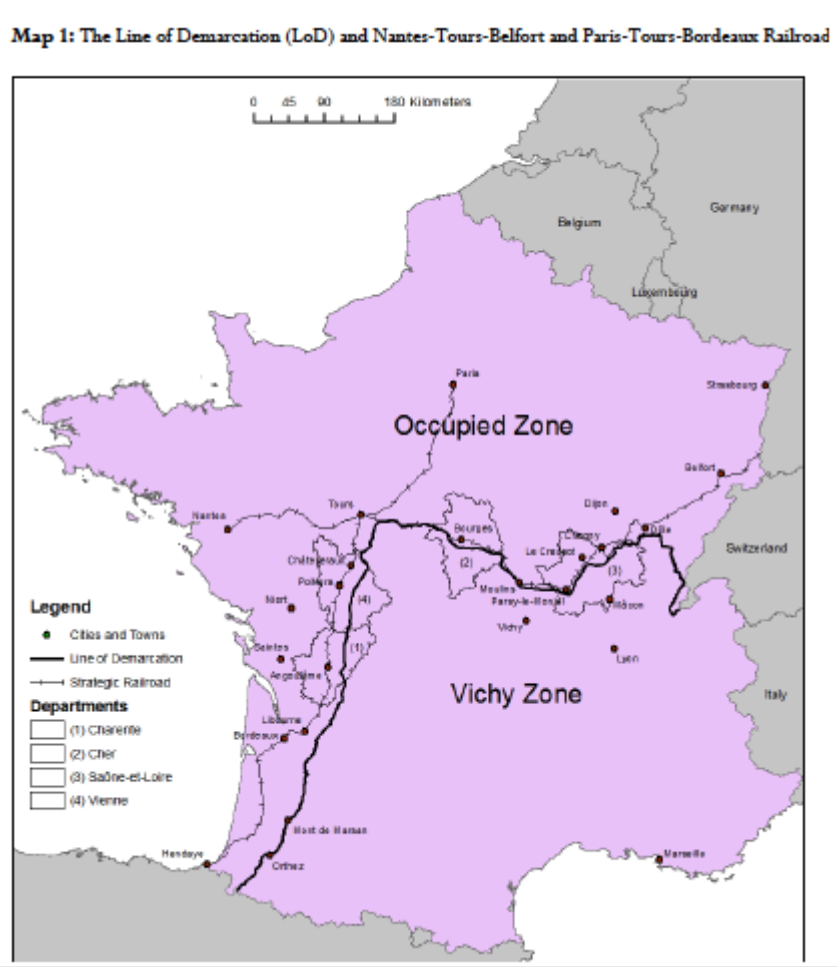
Is there a problem?

Unfortunately yes (Kocher and Monteiro 2015).

There is overwhelming evidence that the Line of Demarcation was not placed randomly at the local level.

Near the LoD the French resistance staged more attacks in the German zone because there were more targets there.

The effect of railroads



Conclusion

A natural experiment is still an observational study. Understanding the process of treatment assignment is therefore critical.

Observational studies are "harder" to do well than RCTs because we do not know the assignment mechanism

Designing natural experiments should consider a variety of challenges to inference

The remainder of the semester

1. Regression Discontinuity
2. Instrumental Variables
3. Difference in Differences

Regression Discontinuity

An RDD uses knowledge about selection into treatment in order estimate average treatment effects

We utilize the fact that treatment assignment changes discontinuously at some cutoff and compare units above and below the cutoff.

The estimand of interest here is a Local Average Treatment Effect (LATE)

RDD Examples

We just went over an example of a regression discontinuity design

Here are some others:

- Electronic voting in Brazil (Hidalgo 2016)
- Representation under term limits (KLAŠNJA and Titiunik)
- Discrimination and performance among legislatures (Anzia and Berry 2011)

Instrumental Variables

A variable that is correlated with the causal variable of interest but uncorrelated with any other determinants of the dependent variable.

We have seen them before when we discussed one sided and two sided non compliance

By far the most popular observational study design in the design based inference toolbox

Instrumental Variables Examples

- The relationship between collective action and representation in autocracies (Dower et al 2017)
- The value of committee services to legislators (Cirone and Van Coppenolle 2018)
- Segregation and inequality in public goods in the US (Trounstine 2016)

Difference in Differences

A quasi-experimental approach that compares changes in outcomes over time between a treatment group and a control group

Requires "parallel trends" between the two groups in order to isolate the effect of a treatment

We saw a version of these when discussing fixed effects. The first differenced and the TWFE estimator for two periods in a difference in differences design.

Difference in Differences Examples

- Does public education benefit autocracies (Paglayan 2020)
- The effect of police officers on crime (Mello 2019)