Exploring the link between Alcohol Access and Domestic Violence – An Application of the CSDID Estimator in STATA

Dr. Vijetha Koppa

Assistant Professor of Economics

Zayed University, Dubai

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DOMESTIC VIOLENCE – A SERIOUS SOCIAL, ECONOMIC, AND PUBLIC HEALTH PROBLEM

- One in three women becomes a victim of intimate partner violence in their lifetime (CDC 2010; WHO Fact Sheet 2017)
- Costs: Loss of life, medical costs, lost productivity, long-term effects on children from abusive homes
- Alcohol is considered an important determinant!

Koppa: Alcohol Access and Domestic Violence - Evidence from Local Option Elections in TX, USA

ALCOHOL AND DOMESTIC VIOLENCE – WHAT DOES THE LITERATURE SAY?

Non-experimental Evidence

- Grossman & Markowitz (2000)– Increasing Beer Taxes reduces violence meted out to children
  - Cross-sectional comparison with a host of control variables
- Studies from sociology and criminology linking alcohol consumption to different measures of DV
  - Some use survey data and do a cross-sectional comparison
- **Big question:** Do people with a propensity towards risky behaviors like alcohol abuse also lack self-control and end up abusing their family members? OR…. Does drinking cause the abuse?

Quasi-experimental Evidence (mostly from USA)

- Markowitz (2000) – An Increase in the price of pure alcohol reduces violence towards wives
  - TWFE based DiD

Effects of alcohol on crime in general:

- Carpenter & Dobkin (2015) – Increase in alcohol access at the MLDA increases crime
  - Regression Discontinuity Design at age 21
- Anderson, Crost & Rees (2016) – Increase in alcohol establishments increases violent crime
  - Use wet status changes in **local option elections** as an instrument for the number of alcohol establishments

LOCAL OPTION ELECTIONS (IN TEXAS, USA)

What are they?

- Citizens vote to change local alcohol laws at County, City, or Justice of Peace Precinct levels
- Process initiated by a petition with a minimum number of signatures from registered voters
- Rules for getting signatures verified relaxed in 2003 → 50 to 70 elections annually
- Between 1995 to 2011, 31 cities became wet
- Most common jump: Allowing sale of beer and wine off-premises and sale of mixed beverages in restaurants

Literature on them

- Brown, Jewell & Richer (1996) – Drunk driving
- Baughmana, et al. (2001) – Alcohol-related accidents
- Conlin, Conlin & Pepper (2005) – Illicit drug-related crimes
  - ✓ Use the TWFE-based DiD approach
  - ✓ Assume treatment occurs at the county level – less precise
- Anderson, Crost & Rees (2016) – 10% increase in alcohol establishments increases violent crime by 4%
  - ✓ Use wet status changes in local option elections in Kansas as an instrument for the number of alcohol establishments

This paper: Use the **plausibly exogenous variation in local alcohol access** through city-level **local option elections in TX from 1995 to 2011** to tease out the causal link between alcohol and domestic violence

DATA

- Treatment Data – Results of Local Option Elections
  - Source: Texas Alcoholic Beverage Commission
  - Date Range: 1994 to 2011
  - Changes to availability of beer, wine and distilled spirits on (Bars and restaurants) and off-premises (grocery and liquor stores)
- Sample restricted to cities that were dry in 1995, with a population > 10,000 and a single change in alcohol access status
  - 42 cities, 31 change status from dry to wet, first status change in 2003
- Outcome data – Annual details of family violence incidents at the level of individual law enforcement agencies
  - Source: Texas Dept. of Public Safety
  - Date Range: 1994 to 2011
  - Number of incidents - total, and by types of victim, crime, injury, and weapons used
- Control variables – at the county level
  - Demographic data – Surveillance, Epidemiology, and End Results (SEER) Program
  - Unemployment rate – Bureau of Labor Statistics
  - Poverty rate and median income - Small Area Income and Poverty Estimates (SAIPE)
  - Police officers per capita – Uniform Crime Reporting (UCR)

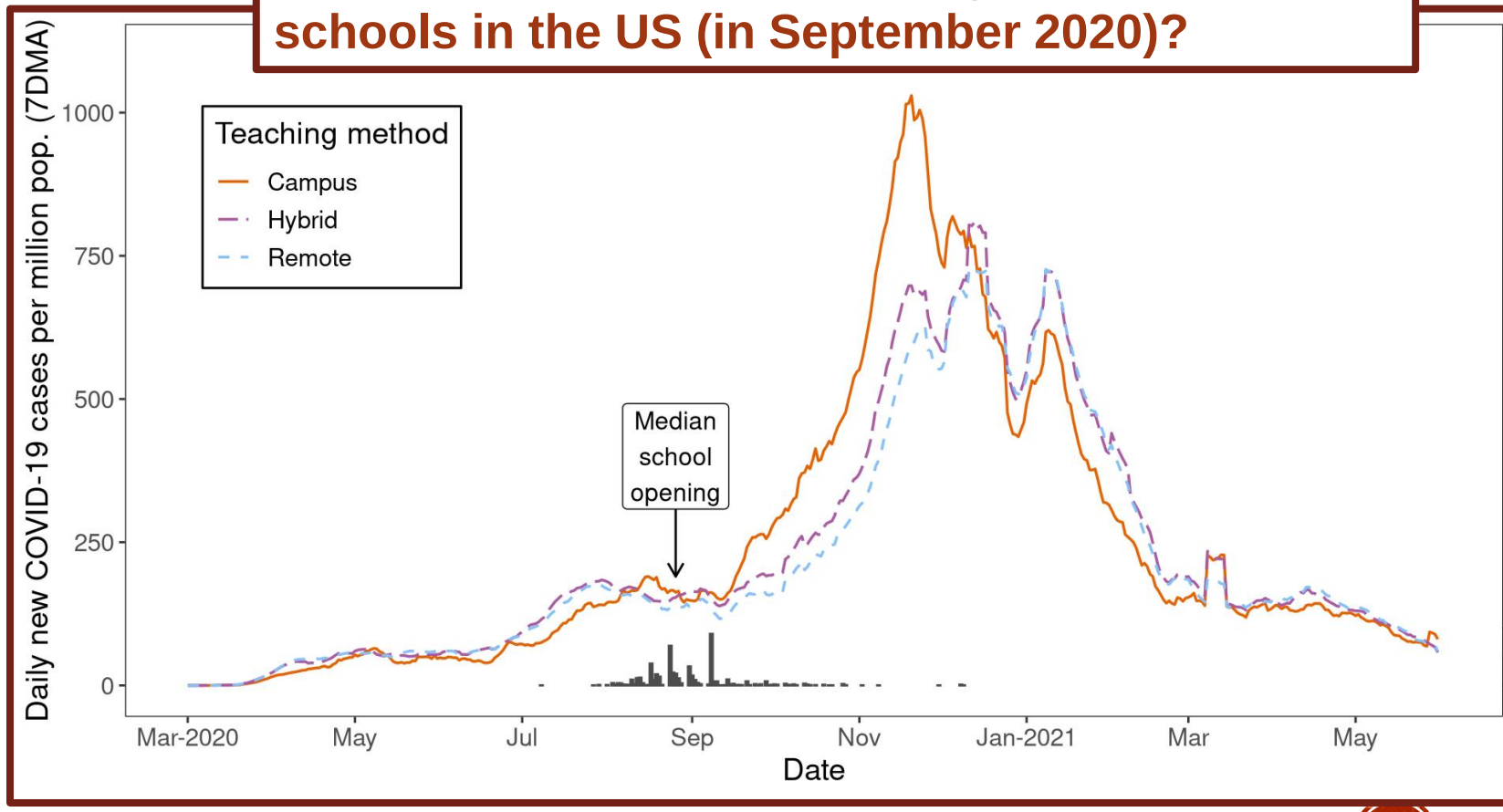
Final Panel data – 714 observations from 42 cities across 17 years (1995 – 2011)

EMPIRICAL APPROACH – DIFFERENCE-IN-DIFFERENCES

- Cities that are not treated (the dry ones) serve as counterfactuals for the treated cities after treatment

- **Parallel trend assumption:**
  If we can demonstrate that the *outcomes in treated and control cities were trending parallelly* to each other before treatment, we assume that they will have *continued to do so in the absence of treatment.*

What was the effect of opening in-person schools in the US (in September 2020)?



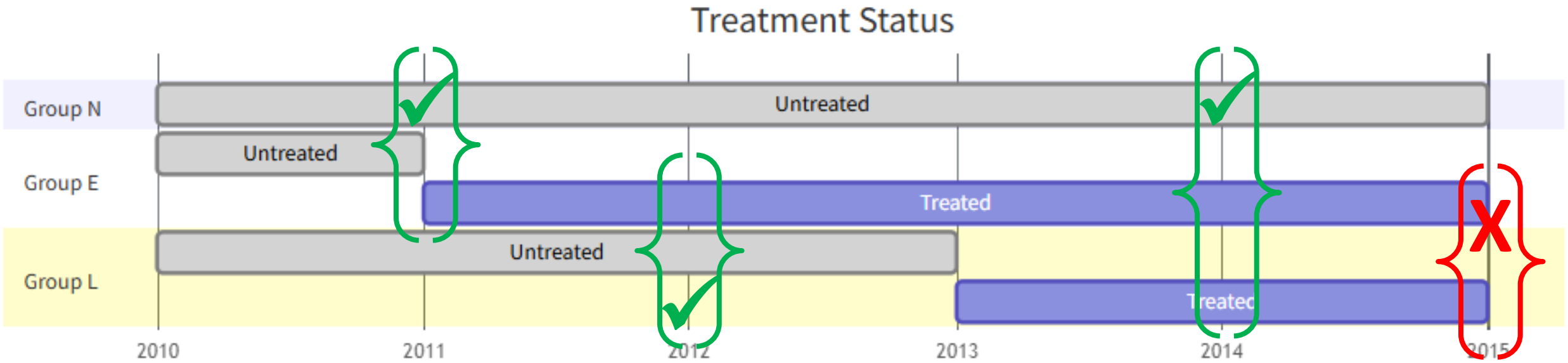
EMPIRICAL APPROACH – DIFFERENCE-IN-DIFFERENCES WITH STAGGERED TREATMENT

- **Two-way Fixed Effects Model:** Estimate the effect of a city turning wet on the outcome of interest by controlling for City and Year Fixed Effects

$$Y_{ct} = \beta . WET_{ct} + \alpha_c + \theta_t + \delta . X_{ct} + \varepsilon_{ct}$$

- β captures the difference in outcomes before and after treatment within each treated unit with general temporal variation controlled for with the help of control units in the model

Or… so we thought!

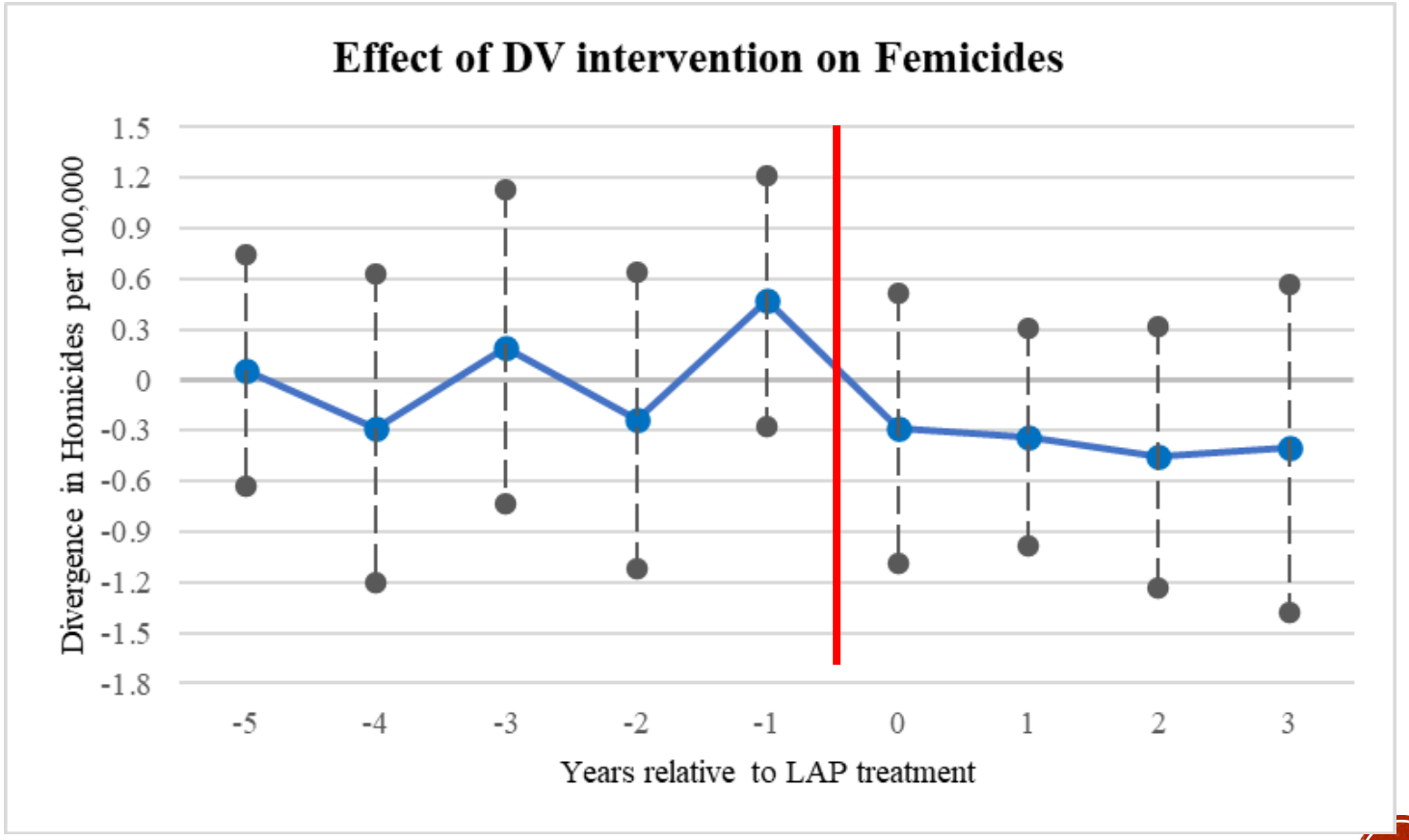


EMPIRICAL APPROACH – DIFFERENCE-IN-DIFFERENCES WITH STAGGERED TREATMENT

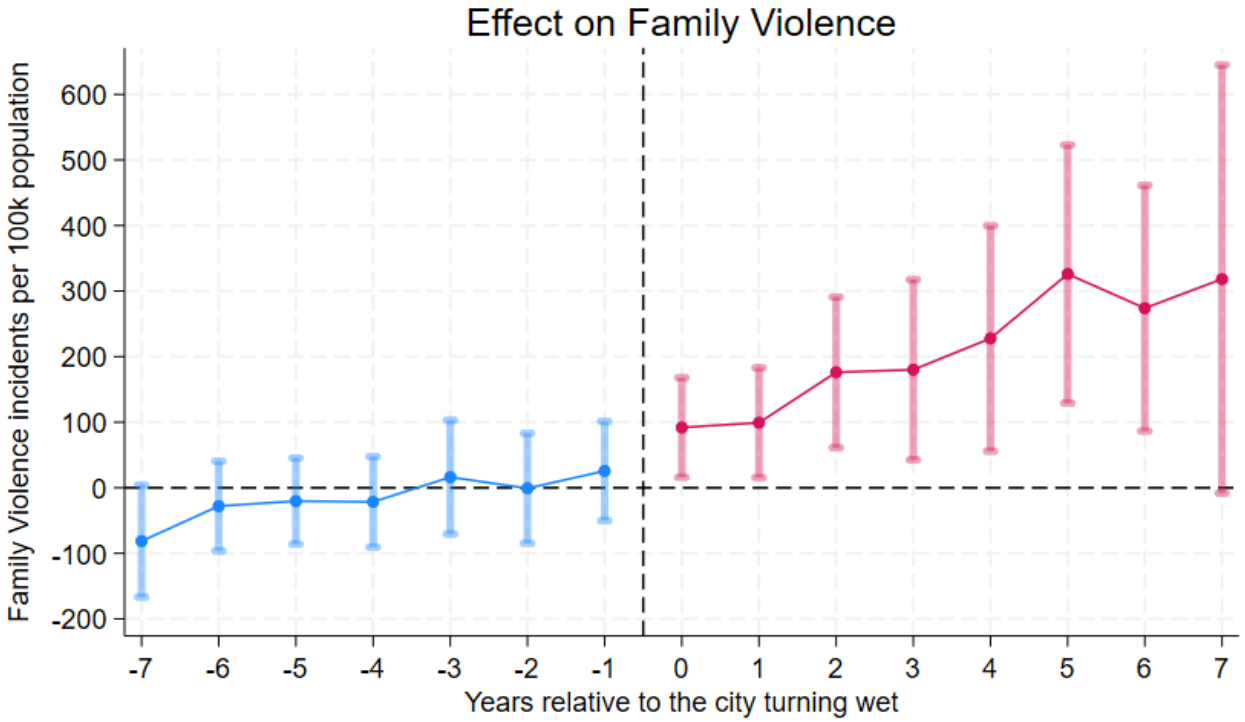
- Goodman-Bacon (2021), Borusyak, Jaravel, and Spiess (2022), etc.: If we use the TWFE model, we implicitly *assume parallel trends not only pre-treatment but also post-treatment!*

- This is not a problem in case of
  - Single timing of treatment
  - No heterogeneous or dynamic effects of treatment →

- Solution – **CSDID estimator** (Rios-Avila, Sant'Anna, and Callaway 2022)
  - Ensures the model is estimated without the 'problematic' comparisons



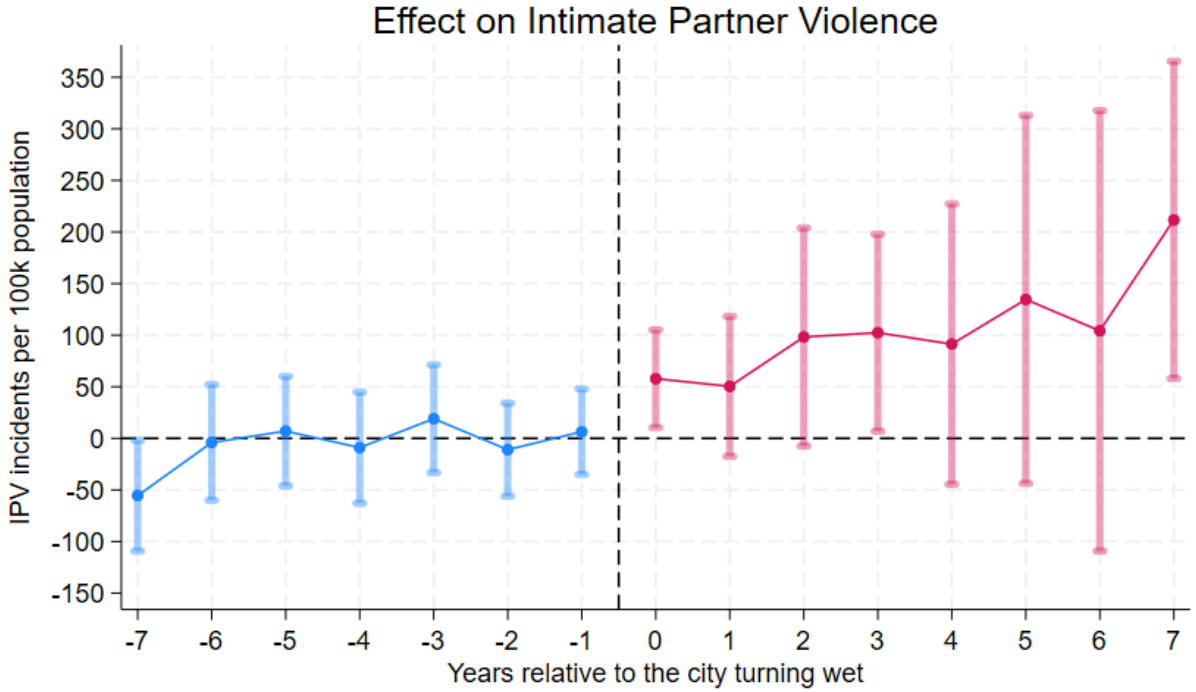
EVENT STUDY ANALYSIS



- No visible difference in outcomes between dry and soon-to-be wet cities before the passage of the ordinances
- Marked divergence after the city turning wet - Introduction of alcohol access increases FV incidents
- The effect increases over time

→ Grounds for disqualification of the use of TWFE

- Generated using built-in commands in the CSDID package
  - estat event – generates the event study coefficients and confidence intervals
  - csdid_plot (rcap) generates the graphs



EFFECT OF ALCOHOL ACCESS ON DOMESTIC VIOLENCE

		Victim		Crime Type			Severity and MO	
Outcomes per 100k pop:	FV incidents	IPV incidents	Child Abuse	Assaults	Homicides	Sexual Crime	Any injury	Firearm
Pre-treatment means:	957	653	81.8	1062	1.01	12.5	590	16.1
Panel A: Results from TWFE Estimation								
Wet status	-21.23	-142.7***	-11.47*	-104.2	-0.231	7.413**	-56.64	-3.083*
	(61.73)	(45.73)	(6.108)	(76.57)	(0.180)	(2.990)	(40.13)	(1.617)
City and year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: Results from CSDID Estimation								
Wet status	192.51***	97.51**	2.96	142.28*	-0.27	4.95	47.25	-0.66
	(60.04)	(46.91)	(8.96)	(85.21)	(0.82)	(3.27)	(48.73)	(2.21)
Percentage effect	20.1%	14.9%	3.6%	13.4%	-26.9%	39.7%	8.0%	-4.1%
Observations	714	714	714	714	714	714	714	714
Cities	42	42	42	42	42	42	42	42

RESULTS AND POSSIBLE MECHANISMS

- When a city changes its status from dry to wet through a local option election,
  - Incidents of *family violence increase by 20% annually*
  - Incidents of *intimate partner violence increase by 15% annually*
- These are average treatment effects over the study period
- The effects increase over time, with family violence *incidents increasing by 10% from the pre-treatment levels every 2 to 3 years*
- Probable explanations: evolution over time of
  - People's drinking/alcohol purchase habits
  - Procurement of liquor licenses by existing businesses (grocery stores and restaurants)
  - Opening up of new businesses (liquor stores)
  - Setting up of the necessary supply chains and permits

FUTURE WORK

- Bacon Decomposition – Check to test the level to which TWFE is problematic in each setting
- Estimate the (dynamic) first stage – Treatment effect on the issuance of liquor licenses and sales of alcohol
- Other related outcomes to proxy consumption – Changes in alcohol-related arrests
- Falsification – Changes in unrelated crimes like auto theft
- Dosage Effect/Continuous treatment – Account for possible heterogeneous treatment sizes depending on the distance to the nearest wet city prior to treatment

Thank you!