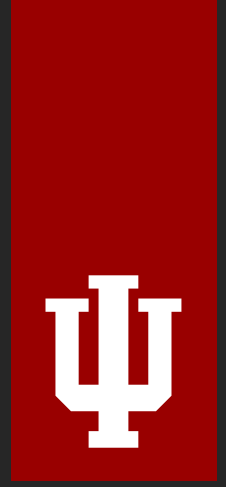


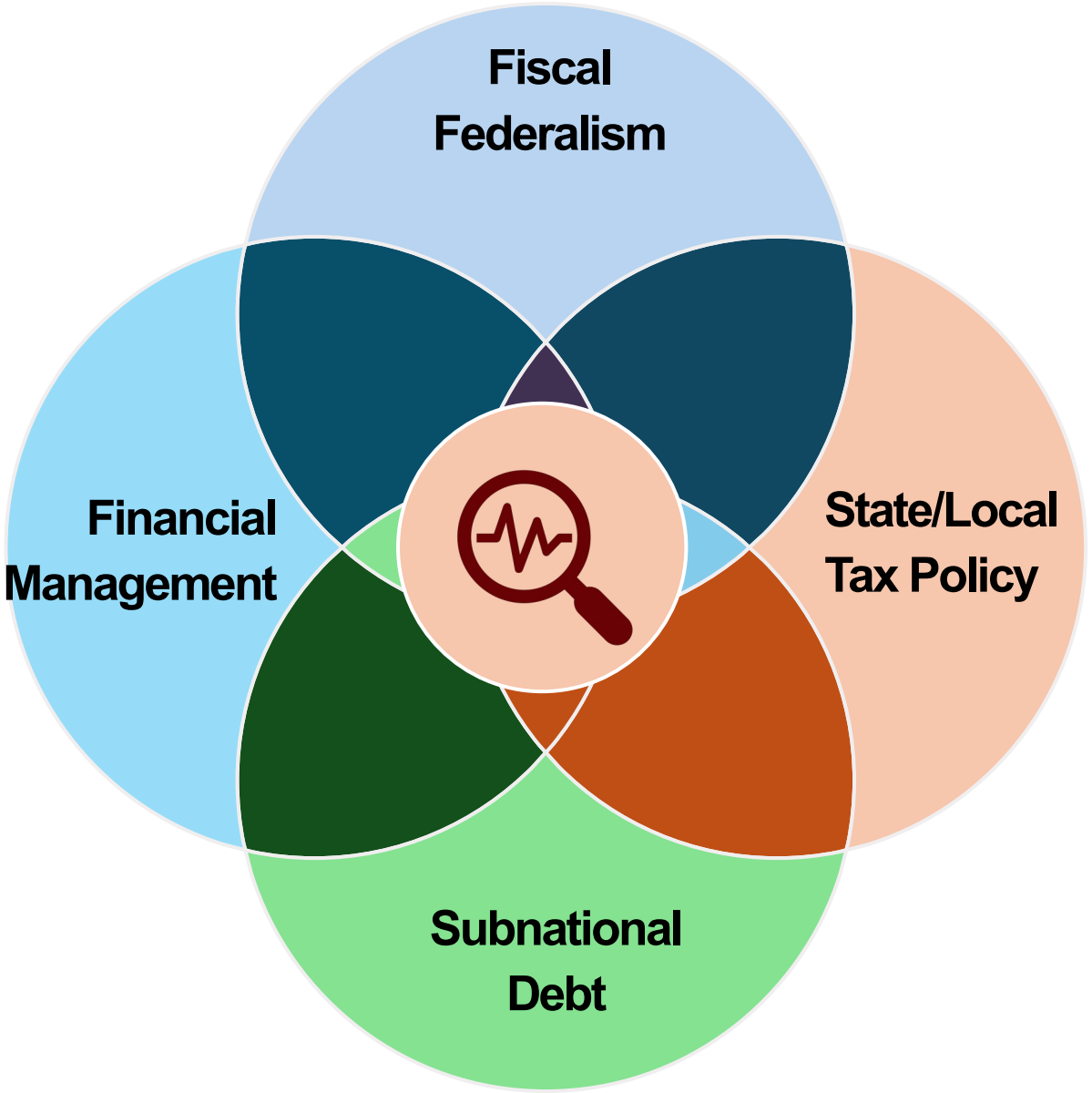
O’Neill School of Public and Environmental Affairs

Essays on Fiscal Federalism and Debt Management

Luis Navarro

Dissertation Defense
April 24, 2025

Research Interests



Outline

Dissertation Chapters

- **Chapter 1**: *Cash Reserves and Short-Term Borrowing under Liquidity Constraints.*
- **Chapter 2**: *Federal Assistance and Municipal Borrowing: Unpacking the effects of the CARES Act on Government Liquidity Management.* - *Curro Award, Best Graduate Student Paper, ABFM 2024*
- **Chapter 3**: *Preferences for Local Public Goods and the Gig Economy*

Ch1: Cash Reserves and Short-Term Debt under Liquidity Constraints

Research Question

My Research Question: how does the level of cash reserves influences the reliance on short-term borrowing to cope with revenue/expenditure uncertainty?

Theoretical Model: No Liquidity Constraints

FY is divided in 2 periods. The government chooses spending *(G)* across the FY and the amount of short-term debt *(D)* to issue to maximize social welfare. Cash reserves *(S)*, tax revenues *(T)* and the interest rate are *(r)* exogeneous. *C(T)* measures the excess burden induced by taxation.

$$\max_{G_1,G_2,D} \alpha \ln(G_1) - \gamma C(T_1) + \beta[\alpha \ln(G_2) - \gamma C(T_2)]$$

$$s.t. \quad G_1 = \mathrm{T}_1 + \mathrm{S} + \mathrm{D}$$
$$G_2 = \mathrm{T}_2 - (1 + \mathrm{r})\mathrm{D}$$

$$\frac{\mathrm{dD}}{\mathrm{dS}} = -\frac{\beta}{1+\beta} < 0$$

- **Model:** Cash only has an operational role. **Result:** Cash and debt behave like substitutes.
- **Intuition:** cash can only be used to finance spending (operational role). Government minimizes borrowing costs by choosing lowest level of D possible.

Theoretical Model: With Liquidity Constraints

Let θ be the proportion of cash spent for operational purposes (manage cash-flows). Hence $(1-\theta)S$ is the level of cash reserves. Suppose risk-averse lenders charge an interest rate r depending on cash savings. Risk aversion → $\mathrm{r}((1-\theta)\mathrm{S})$ with $r'\big((1-\theta)\mathrm{S}\big) < 0$

$$\max_{G_1,G_2,D} \alpha \ln(G_1) - \gamma C(T_1) + \beta[\alpha \ln(G_2) - \gamma C(T_2)]$$

$$s.t. \quad G_1 = \mathrm{T}_1 + \theta \mathrm{S} + \mathrm{D}$$
$$G_2 = \mathrm{T}_2 - (1 + \mathrm{r}((1-\theta)\mathrm{S})\mathrm{D}$$

$$\frac{\mathrm{dD}}{\mathrm{dS}} = -\frac{\beta}{1+\beta}\left[\frac{r' T_2 (1-\theta)}{\beta(1+r)^2} + \theta\right]$$

- **Model:** Cash has an operational and signaling role. **Result:** Cash and debt could behave like complements.

- **Intuition:** since cash signal solvency to lenders, an additional dollar of savings reduces the borrowing costs, albeit it increases the reliance on debt as it reduces available cash for operational purposes.

Theoretical Model: With Liquidity Constraints

If $\theta = 1$, states spend all cash reserves. Cash only has an operational role. Then, cash and debt behave like substitutes.

$$\frac{\mathrm{dD}}{\mathrm{dS}} = -\frac{\beta}{1+\beta}\left[\frac{r'T_2(1-\theta)}{\beta(1+r)^2} + \theta\right] \qquad \theta = 1 \rightarrow \frac{\mathrm{dD}}{\mathrm{dS}} = -\frac{\beta}{1+\beta} < 0$$

If $\theta = 0$, states save all cash reserves. Cash only has a signaling role. Then, cash and debt behave like complements.

$$\theta = 0 \rightarrow \frac{\mathrm{dD}}{\mathrm{dS}} = -\frac{1}{1+\beta}\left[\frac{r'T_2}{(1+r)^2}\right] > 0$$

Liquidity constraint: minimum level of cash required to avoid liquidity premiums on the bond market.

$$1-\theta < \frac{\beta(1+r)^2}{\beta(1+r)^2 - r'T_2}$$

Empirical Setting: State Governments in Mexico

- **Fiscal Federalism in Mexico:** shared-revenue system with centralized tax collection.
- States have spending discretion (in average) on 50% of their revenues: 40% discretionary grants + 10% own-source revenues.
- **General Participations Fund (FGP):** main discretionary grant/fund→ 75% of total discretionary revenues, 30% of total revenues.
- **Low fiscal flexibility:** i) 90% of revenues come from federal grants, ii) 90% of expenditures cover current spending and transfers to local governments, iii) persistent fiscal deficits: -3.5% of total revenues (avg, 2000-2022).
- **Short-Term (ST) Debt Fiscal Rules:** bank loans i) only for cash-flow management, ii) unsecured, iii) debt ceiling: 6% of total revenues; iv) ST debt = 0 at the end of the administration.

FGP and Revenue Shocks

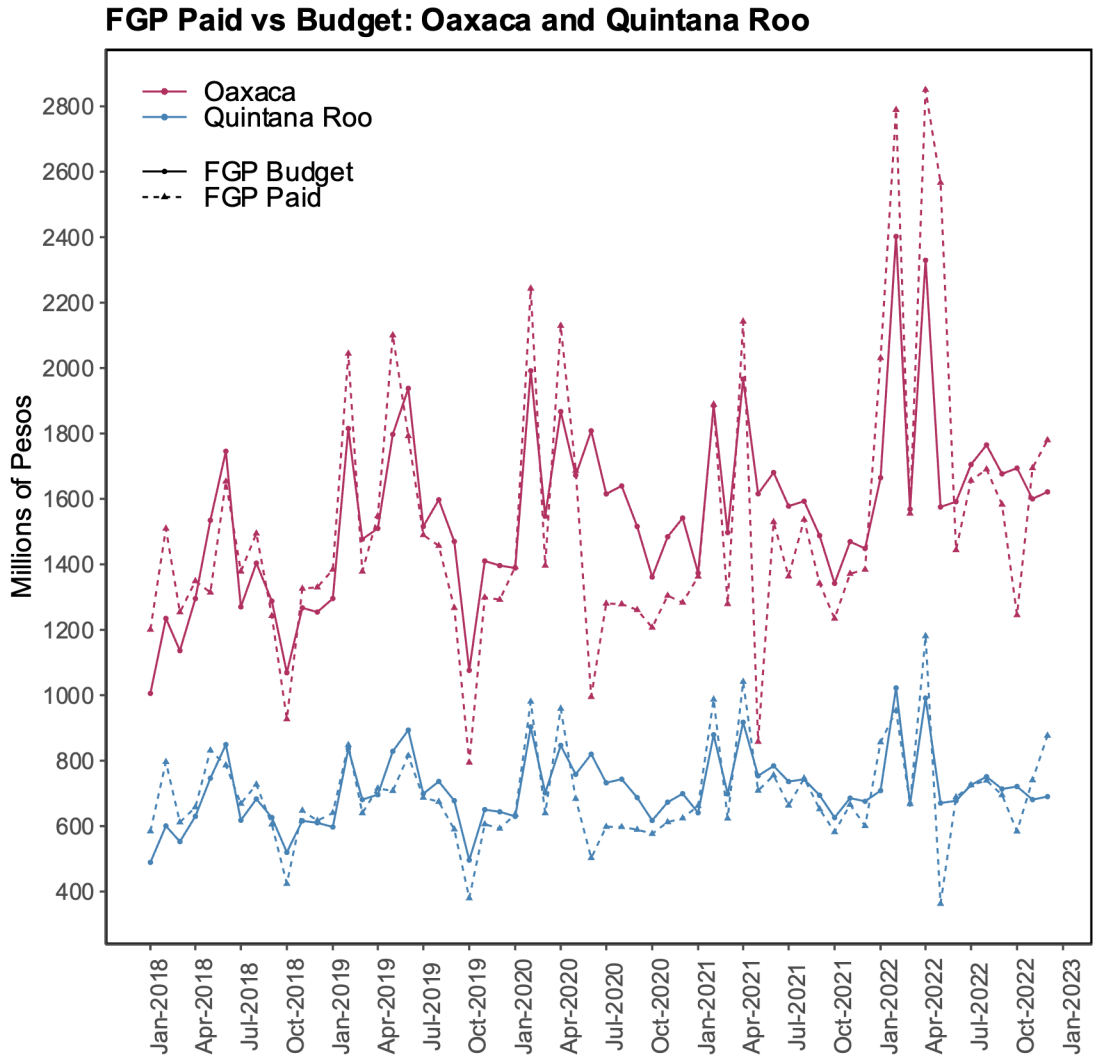
1. Before the FY begins, federal government estimates size of state grants, along with a monthly disbursement calendar. States have no say on this calendar.

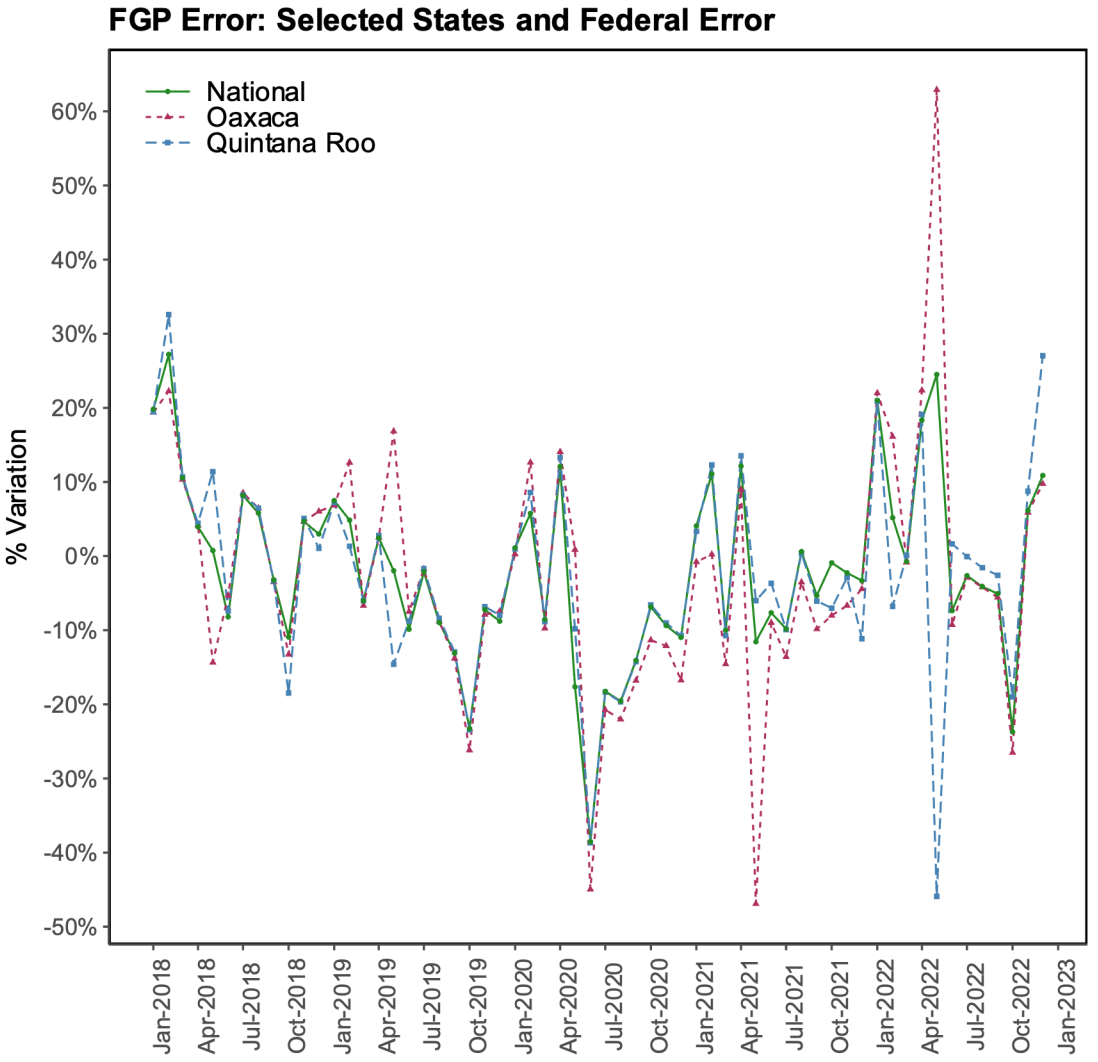
2. Actual disbursements depend on the observed level of centralized tax collection.

3. Each month states could observe deviations from their budgeted transfers.

4. **Key:** direction and magnitude of these deviations mimics a lottery. For some states, deviations could be positive/negative, regardless of the difference observed at the national level.

Across states there is variation between budgeted and actual FGP transfers.

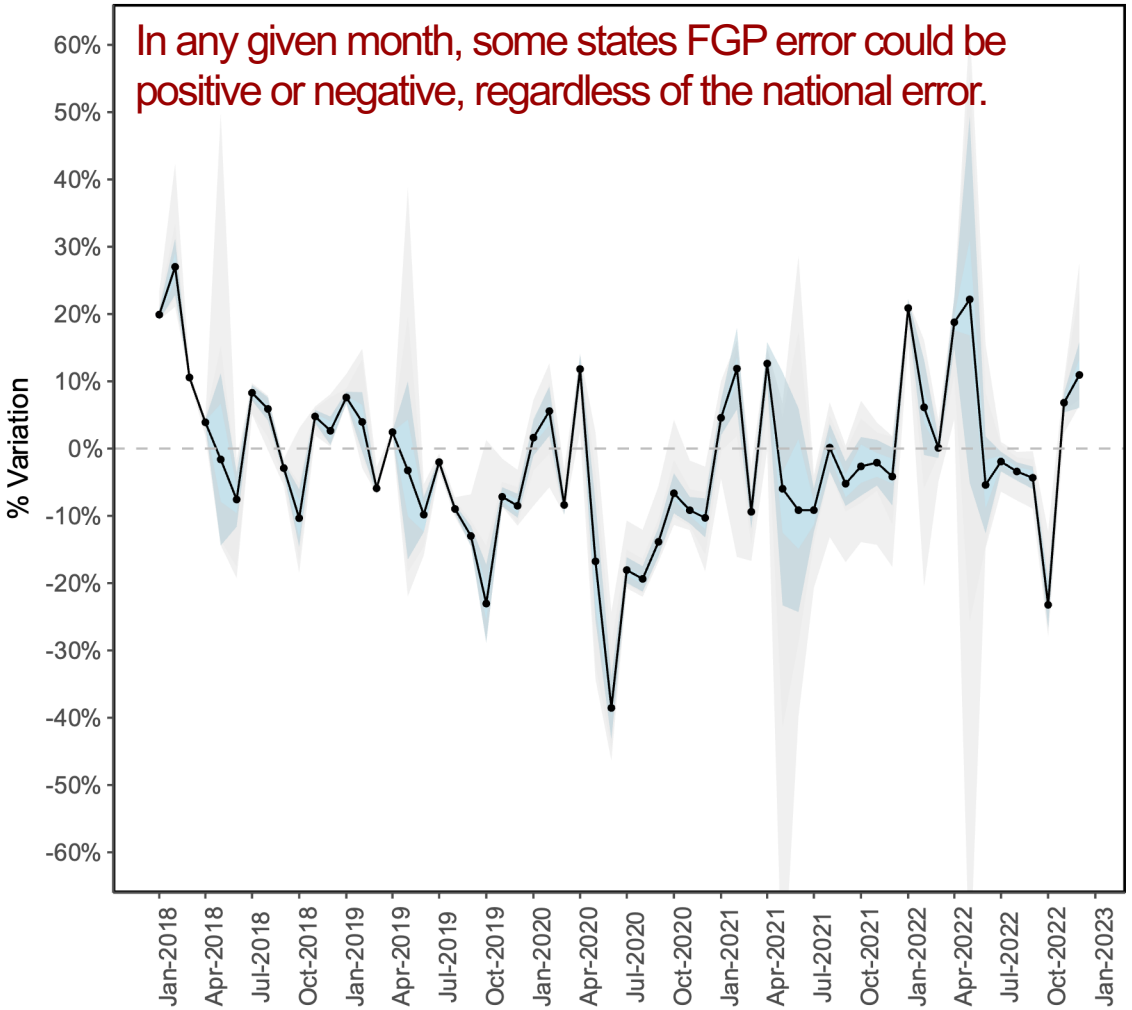




FGP Error Distribution Over Time, 2018-2022

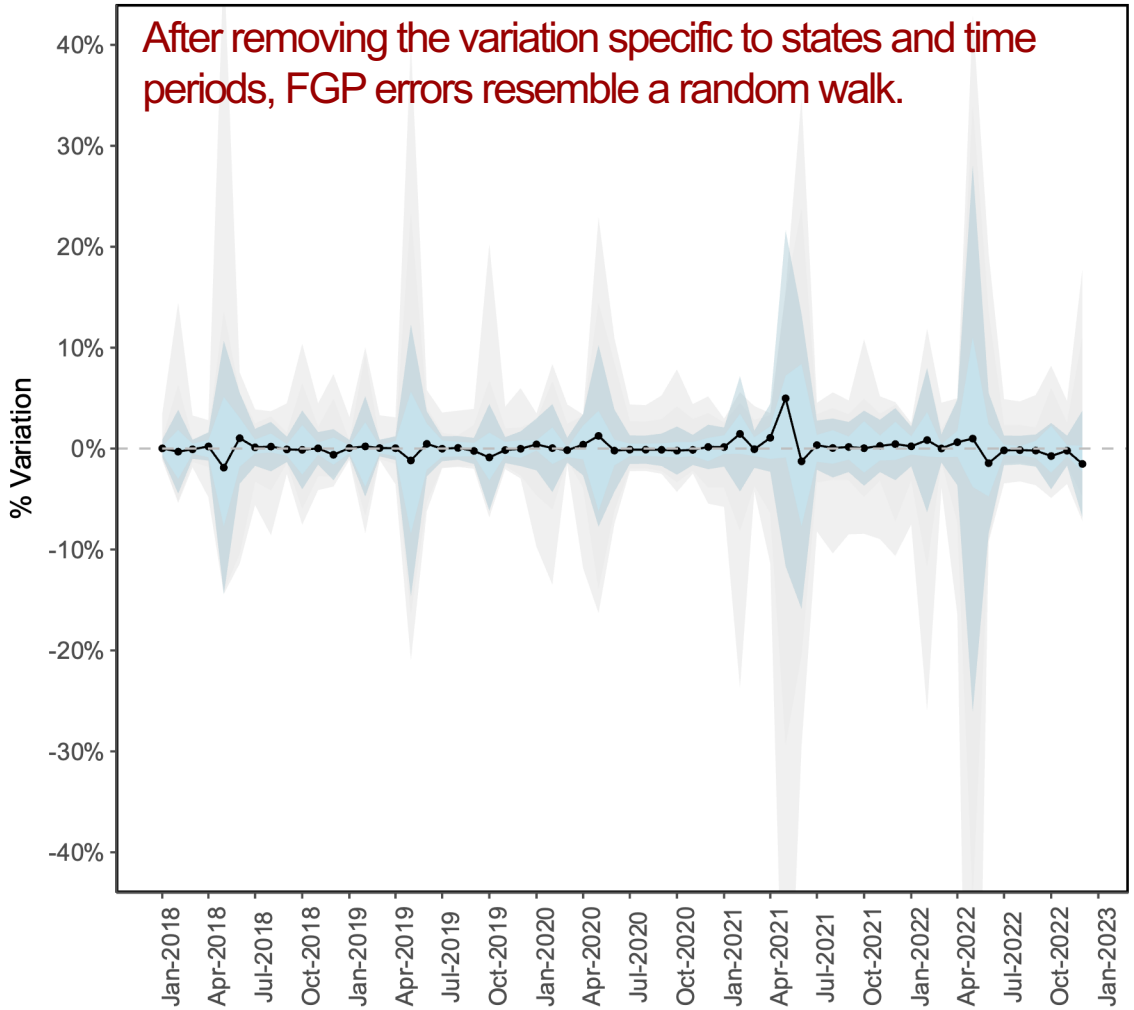
FGP Error Across States

Distribution of State-Month Sample: Median, IQ Range, and 5-95% Percentiles



Unexplained Variation in FGP Error by FE

Distribution of Residuals from Regression of FGP Errors on state and time FE



Notes: The panel on the left shows the distribution of the FGP timing error across time. The panel on the right shows the distribution of the residuals from running a linear model of FGP errors regressed on month-by-year and state fixed effects. The solid line represents the mean across states by month-year. The dark-shaded area shows the percentiles between 25%-75%, as well as the area within one standard deviation form the mean.

Research Design

IV Design: Fixed-Effects 2SLS Estimator + Robust-Clustered Standard Errors (State Level)

First Stage:

$$CashReserves_{it} = \beta FGPError_{it} + \alpha X_{it} + a_i + b_t + \epsilon_{it}$$

Second Stage:

$$OutShortTermDebt_{it} = \boldsymbol{\delta}\, \widehat{CashReserves}_{it} + \alpha X_{it} + a_i + b_t + \upsilon_{it}$$

Variable Scaling and Coefficient Interpretation

- Variables measured as stocks. Outstanding short-term debt and cash-holdings at end-of-Q.
- Dependent, endogenous, and instrumental variables expressed as % of average level of DR (2009-2016). Strongly balanced panel state by quarter.

Identification: Exclusion Restriction

FGP Errors only influence short-term debt through cash reserves

- FGP annual shares had been historically stable. Determined mainly by population.
- Tax collection done by the federal government with no intervention of the states.
- Monthly calendar is determined by the federal government with no clear rules.
- No systematic pass-through of national FGP error to states FGP error.
- FGP errors do not explain state economic activity (and vice-versa).

IV Validity: FGP Errors do not predict state economic activity.

Table 6: Instrument Validity: Effect of FGP Errors on Local Economic Activity

Dependent Variable	(1)	(2)	(3)	(4)
Unemployment Rate	0.084	0.044	0.031	0.006
	(0.076)	(0.036)	(0.023)	(0.024)
Active Taxpayers (% Population)	0.067	0.158	-0.024	0.000
	(0.460)	(0.226)	(0.041)	(0.031)
Industrial Activity Index	0.067	0.158	-0.024	0.000
	(0.460)	(0.226)	(0.041)	(0.031)
Quarterly Economic Activity Index	0.475**	0.381**	0.140	0.133
	(0.178)	(0.169)	(0.237)	(0.199)
Informal Labor (% Population)	-0.063	0.002	0.006	0.005
	(0.048)	(0.040)	(0.022)	(0.018)
Num.Obs.	597	597	597	597
Controls	No	Yes	No	Yes
State FE	No	No	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

Notes: This table show the results of estimating Equation 1.7 using an OLS estimator. The independent variable is the FGP error expressed as percentage of discretionary revenues. Each row shows the estimates for different predictors of local economic activity as dependent variables. Time FE = Quarter-Year FE. Standard errors clustered by state. Significance level: *$p < 0.10$, **$p < 0.05$, *** $p < 0.01$

Exclusion Restriction:
FGP errors only influence short-term debt via cash-reserves.

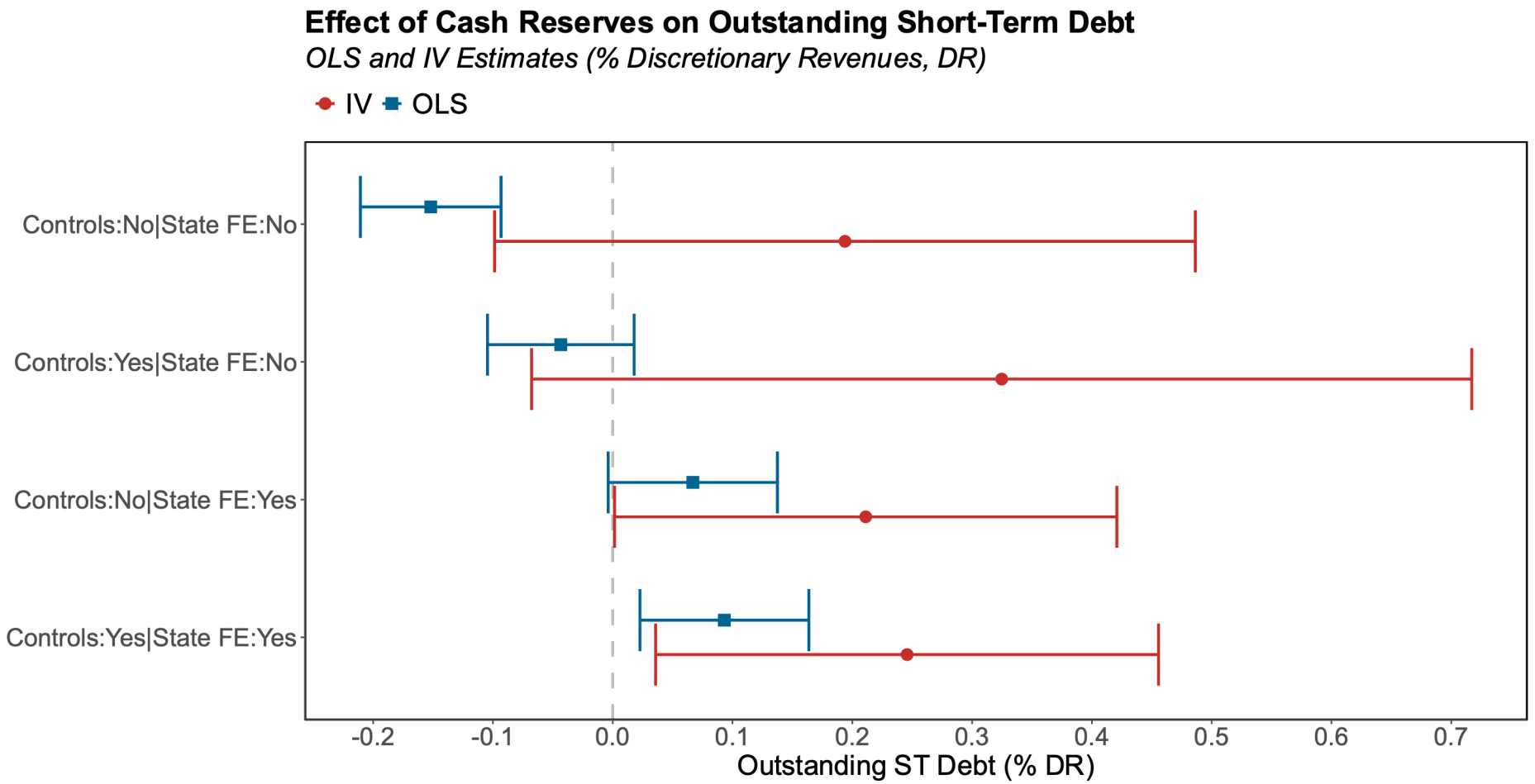
Results

If cash reserves ⬆ 1 SD_{cash} , then outstanding short-term debt:

IV : ⬆ 3.80% DR: **Eff Size:** 0.60 SD_{debt}

Implied Elasticity	First Stage F-Stat
0.47	7.41
0.79	6.95
0.51*	30.06
0.60**	**24.20**

Significance level: *p < 0.10 , ** p < 0.05 , *** p < 0.01



Mechanisms and Robustness Checks

Research Design: sample partition by specific strata (cash reserves quartiles, credit rating categories, quarter of the FY) and model estimation in independent samples.

Specification	⬆️ in ST Debt for a 1 SD ⬆️ in Cash Reserves	Implied Elasticity
Baseline	3.8% of DR	0.60**
Cash Reserves < Median	5.3% of DR	0.77*
Lower Rated Governments	8.3% of DR	1.33**
End-of-Year (Q4) Sample	6.7% of DR	0.85*

*Significance level: *p < 0.10 , ** p < 0.05 , *** p < 0.01*

More stringent liquidity constraints lead to stronger complementarity effects.

Policy Implications

- Underline the relevance of liquidity management tools (e.g., rainy day funds) and access to debt markets for cash-flow management.

- Liquidity-constrained governments might prefer to manage cash-flows via short-term debt , even if they face a high interest rate. These governments might benefit from credit-enhancing policies/strategies (e.g., collateralized bonds, debt guarantees).

- **Optimal level of cash reserves:** minimum required to avoid liquidity premiums on the bond market.

Relation with the Literature

- **Theoretical Extension:** This paper provides a model that shows the moderating role of cash reserves on the complementarity-substitutability of cash and debt.

- **New Empirical Evidence:** Contrasting evidence to literature on US local governments that find cash and debt are substitutes (Su and Hildreth 2018; Lofton and Kioko, 2021).

Why I find cash and debt behave like complements?

- **Institutional setting amplifies the stringency of liquidity constraints:** Fiscal rules limit ability to generate excess cash and use long-term debt for liquidity management.

Is this only present in developing or centralized economies like Mexico?

- **No!** In my second dissertation chapter I document **similar evidence for U.S. local governments during the pandemic.**

Ch2: Cash Reserves and Short-Term Debt under Liquidity Constraints

Research Question

This paper: examines the effect of federal aid on local government borrowing during macroeconomic crises.

Introduction

- While federal aid alleviates liquidity pressures, it could also signal the market the recipient government is more prone to experience larger economic dislocations. Empirical question!

- **Empirical Analysis:** The Coronavirus Relief Fund (CRF) creates a quasi-experimental setting in which some governments received direct assistance from the Treasury. Population threshold of 500K for eligibility.

- **This paper:** county governments on the primary and secondary market (Apr20-Dec21). Outcomes: borrowing costs (bond spreads) and per-capita debt issuance/traded.

Findings Preview

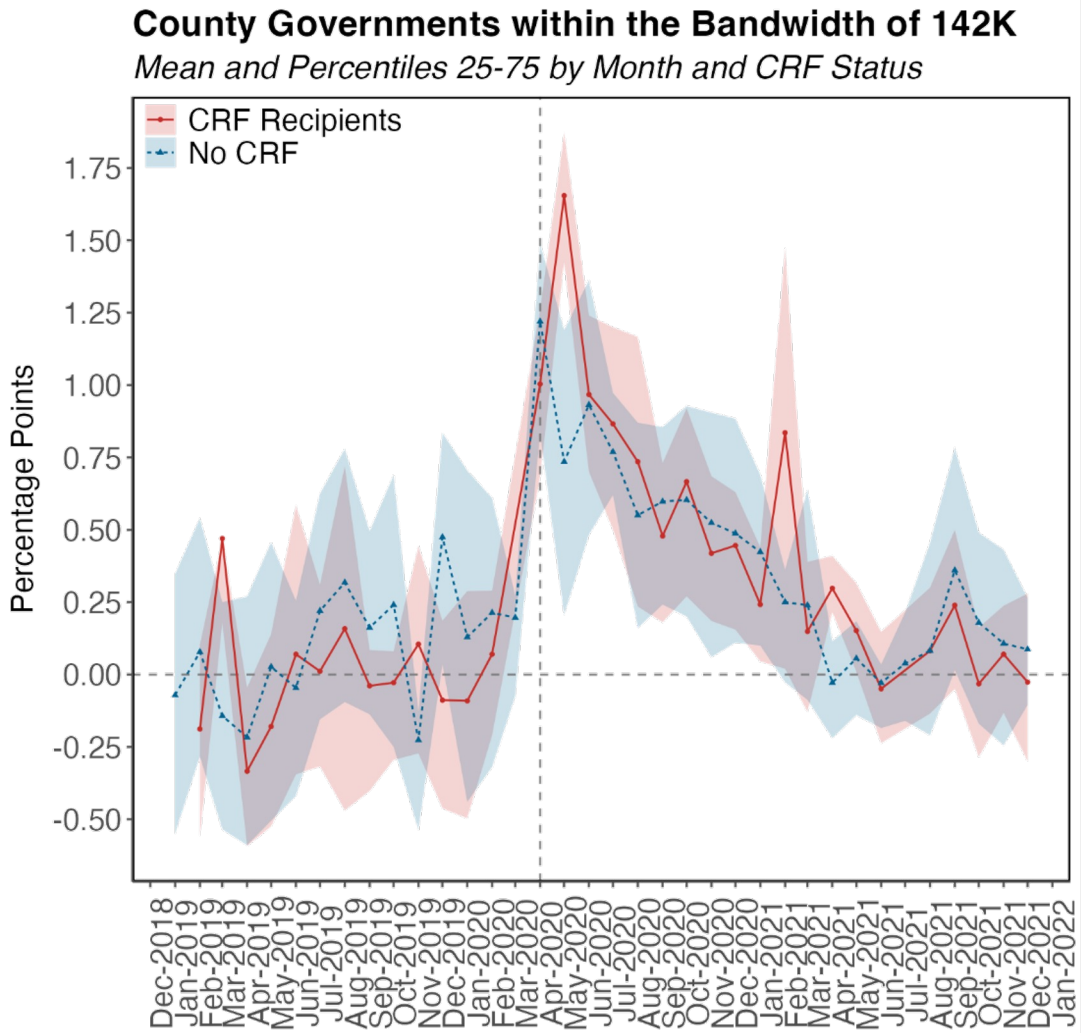
Results

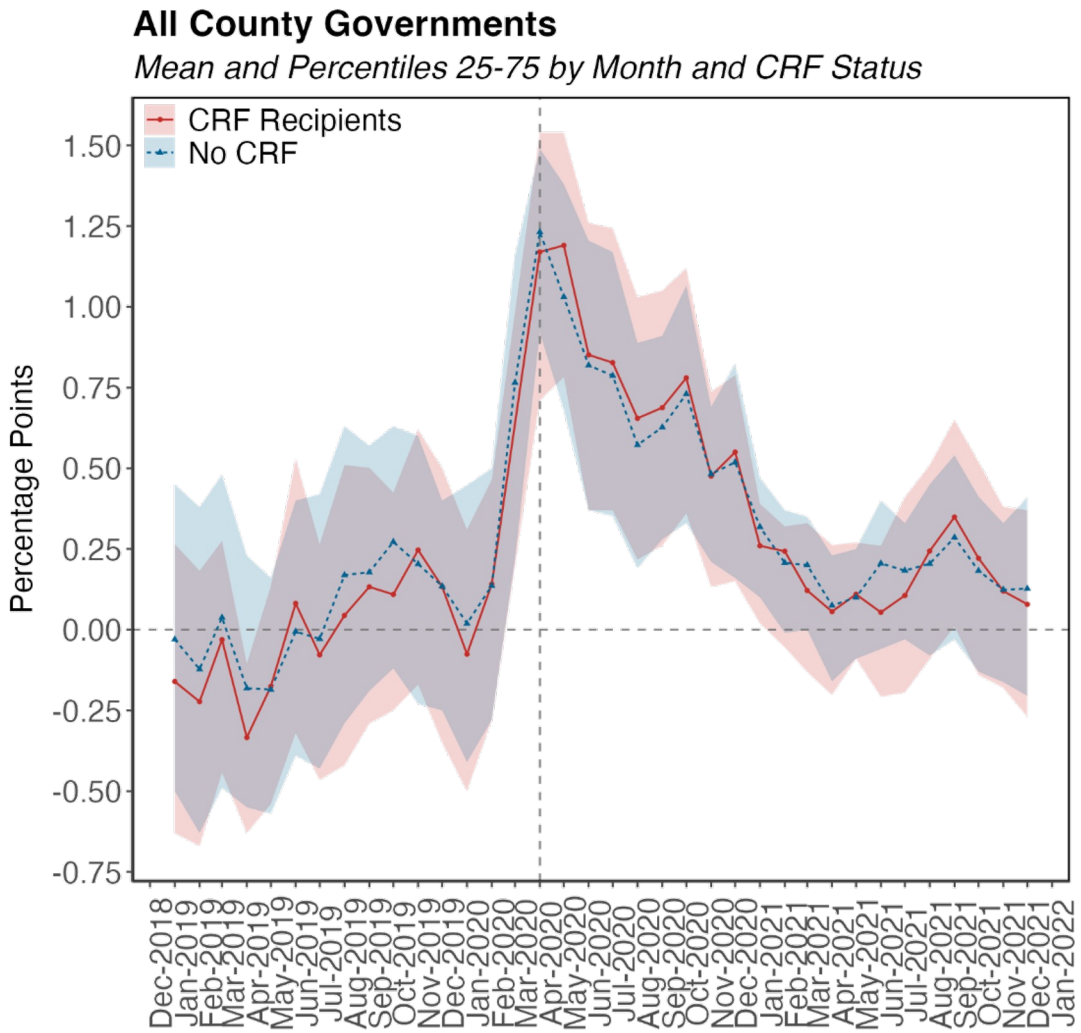
- **Primary Market Bond Spreads:** ≈ ⬇️ 7−9 bps, 0.12-0.17 SD
- **Primary Market Debt Issuance:** ≈ ⬆️ $1.7- $5.0, 0.13-0.39 SD
- **Secondary Market:** results mixed and inconclusive.

Mechanisms and Liquidity Management

- **Credit risk:** in the margin, lower rated governments observed larger spread reductions).
- **Maturity:** substitution of longer-term debt towards shorter-term instruments.

Primary Market Spreads: At the onset of the pandemic spreads spiked and returned to pre-pandemic levels until 2Q-2021.





Notes: This graph shows the distribution of primary market spreads for each month between Jan-2019 and Dec-2021. The lines show the average for both treatment and control groups. The shaded areas show the inter-quartile range (i.e. distribution between the 25th and the 75th percentiles). Vertical dashed lines show the intervention month and separate the pre-intervention period from the post-intervention one. Horizontal gray dashed lines depict baseline comparisons. Panel on the left shows the primary market spreads for the bonds considered for the empirical analysis. The panel on the right shows the primary market spreads for all the outstanding bonds issued by county governments.

Econometric Analysis

Regression Discontinuity Design:

$$y_{igst} = \alpha + \boldsymbol{\theta} CRF_{gs} + \sum_p \beta_p Pop_{gs}^p + \gamma X_{igst} + a_s + b_t + e_{igst}$$

- Bond i issued by government g from state s on date t.
- X_{igst}: coupon rate, credit rating, years to maturity, and dummies for offering type, GO bond, and central government issuer. Economic control: monthly unemployment rate. State a_s , and month-by-year b_t fixed effects.
- **Estimators:** parametric (OLS) and non-parametric (Calonico et.al (2014)). Linear and quadratic polynomial specifications.
- **Identification:** McCrary tests for primary and secondary market provide evidence of no systematic manipulation of the running variable at the cutoff.

Results

Table 2: LATE Estimates of the CRF on the Municipal Bond Market

Model	Spread Issue	Amount Issued	Spread Trade	Amount Traded
Panel A: Non-Parametric				
Linear	-0.066**	1.751**	0.0857***	0.0139
	(0.0297)	(0.7711)	(0.0106)	(0.0109)
Quadratic	-0.4711**	-10.0827	-2.6375***	-0.2932***
	(0.1887)	(7.0314)	(0.0721)	(0.072)
Panel B: Parametric Estimation				
Linear	-0.0913	5.0732**	-0.4129	0.074*
	(0.0553)	(2.0702)	(0.3179)	(0.043)
Quadratic	-0.0907	4.8842**	-0.4045	0.0736*
	(0.0579)	(2.0338)	(0.3115)	(0.0429)
Mean Dep Var	0.3772	6.7051	0.5438	0.2543
SD Dep Var	0.5295	12.9271	0.9406	0.7897
Obs (Left Cutoff)	1619	1619	115698	115698
Obs (Right Cutoff)	1440	1440	82082	82082

Note: This table shows the coefficient estimates of the Local Average Treatment Effect for the dependent variables of interest. Each column shows the estimations from the non-parametric and parametric estimations, for both linear and quadratic polynomial specifications on the data during the post-intervention period. For the non-parametric estimation, bias corrected estimates with robust standard errors are reported. Parametric estimation reports standard errors clustered at the county level. All econometric specifications include control variables, state and month-by-year fixed effects. Spreads at issue and trade are expressed in percentage points and amount issued and traded are expressed in dollars per capita. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

- **Primary Spreads:** ≈ ⬇️ 7–9 bps, 0.12-0.17x SD. Upper bound: 47 bps (0.9xSD).
- **Primary Debt Iss:** ⬆️ $1.7-5.0, 0.13-0.39x SD.
- **Secondary market:** results are mixed and inconclusive, yet provide suggestive evidence toward:
- ⬇️ spreads at trade and ⬆️ trading volumes for bonds issued by CRF recipients.

Robustness Checks: Baseline Model

- **Bandwidth 90K**: stronger ⬇️ in bond spreads (12-23 bps, 0.22-0.43x SD) and larger increase in debt issuance ($2.0-$8.7 per capita).
- **Bandwidth 221K**: results within the magnitude and precision of the baseline model.
- **Only county central governments**: stronger ⬇️ in primary spreads: 23-25 bps. Precise estimates for secondary spreads: ⬇️ 23-58 bps. Mixed evidence on amount issued/traded.
- **Exclude Indirect CRF Payments**: no effect on primary market spreads. Model with smaller bandwidth shows increase in secondary market spreads between 13-18 bps.
- **Takeaway**: indirect payments amplified effects on the primary market. Investor's perception of direct aid point towards a signal of larger economic dislocations.

Heterogeneity by Credit Rating and Time to Maturity

RDD (Interactions with Credit Rating or Maturity Categories)

$$y_{igst} = \alpha + \sum_h \boldsymbol{\theta_h} \times I(h = k) + \sum_p \beta_p Pop_{gs}^p + \gamma X_{igst} + \alpha_s + \beta_t + e_{igst}$$

Summary of Results

- While not precisely estimated, results confirm descriptive evidence and suggest a substitution of longer-term instruments towards shorter-term ones.
- Large and significant ⬇️ in primary bond spreads for bonds A-rated and above. In the margin, lower rated instruments observed larger spread reductions.
- Results for the secondary market show suggestive evidence of fly-to-safety behavior: ⬇️ trading shorter-term bonds and ⬆️ trading of longer-term bonds.

Policy Implications

- Broadly, the findings indicate that recipient governments observed mild reductions in their borrowing costs and increased their debt issuance on the primary market, with no significant spillovers to the secondary market.
- This indicates that federal aid produced crowd-in effects for local governments that enabled the provision of local services.
- Credit-enhancement role of federal aid to municipalities during periods of economic and fiscal distress.

Ch3: Preferences for Local Public Goods and the Gig Economy

Research Question

Research Question: How do preferences for government-provided goods shape the participation in the gig economy?

Introduction

- In many states, school districts require voter approval to issue debt for capital (infrastructure) spending.
- Public education quality plays an important role in voter preferences for housing (both ownership and renting).
- Evidence suggests bond approval leads to increases in housing prices (Cellini et.al, 2010).
- **This paper:** school districts and Airbnb market in Texas from 2014 to 2019.

How do school bond referendums influence the Housing market ?

School District Spending:

$$\textit{Bond Approval} \rightarrow \textit{Debt Issuance} \rightarrow \uparrow \textit{Capital Outlays} \rightarrow \uparrow \textit{Home Prices}.$$

Cellini et al. (2010): *House prices increase by about 6% following a bond approval. This price effect develops gradually over 2-3 years and persists in the long run.*

Property Taxes: To cover debt obligations, the school district could increase property tax liabilities. In the short-run (i.e., before benefit capitalization of spending on home prices) this could increase the property tax rate faced by households.

$$\textit{Bond Approval} \rightarrow \textit{Debt Issuance} \rightarrow \uparrow \textit{Property Taxes} \rightarrow \uparrow \textit{HomePrices}.$$

How do school bond referendums influence the Airbnb market ?

- **Housing Market:** Long Term Leases (Residential) + Short Term Rent (Airbnb).
- **Residential:** increase in demand for housing (i.e., school investments attract attention to the school district).
- **Airbnb:** assuming demand for Airbnb services does not depends on education quality, then no short-term effect on demand.
- **Housing supply** is fixed in the short-term. Changes in the supply of Airbnb units = shifts from the long-term residential market (and vice versa).

Theoretical Predictions

Increase in Home Prices:

If there is pass-through of prices to Airbnb rents, then the incentives to enter the market increase.

$$\downarrow Pr(Exit): \uparrow Pr(Entry)$$

With mild-null pass through, the opportunity cost of listing an Airbnb increases. In the margin, some units exit the market.

$$\uparrow Pr(Exit): \downarrow Pr(Entry)$$

Timing: it can take 1-2 years after the bond approval to manifest effects on home prices (Cellini et al., 2010).

Asymmetric Effects: Effects on the probability of exit could be more pronounced if there are differences in the costs for entry/exit.

Data

- Bond Referendums: Texas State Comptroller. Bond elections occur twice a year.
- Sociodemographic variables: American Community Survey 5-year estimates. School district by year.
- School District Finances: Common Core Data. School district by year.
- Airbnb: AirDNA. Airbnb unit by month.

Empirical Challenges

- Reduced form of interest: $AirbnbSupply_i = f(BondApproval_i)$. Bond Approval is likely endogenous.
- Bond referendums → staggered adoption of multiple and continuous treatments.
- Never-adopters comparison not ideal: school districts without elections could observe difference mechanisms.

This paper:

- **Stacked Dynamic RDD** (Cellini et al 2010, ITT estimator): Dynamic comparison of school districts with narrow approval/rejections.
- **Stacked Differences in Discontinuities** (Grembi et al 2016): addresses OVB driven by differences across arms of the study confounded at the cutoff (e.g., previous elections).

Empirical Analysis

First Stage: Effect of Bond Referendums in School District Outcomes

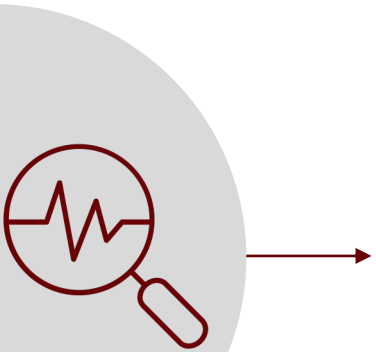
- **Coverage:** school districts annual data 2010-2019.
- **Dependent Variables:** school district spending, revenues and housing market outcomes.

Main Results: Effect of Bond Referendums in the Airbnb Market

- **Sample selection:** Airbnb units monthly data 2014-2019. Only full rentals subject to property taxes (i.e., exclude units renting a room and/or campers, tents, etc).
- **Dependent variables:** Pr(Exit) and Pr(Entry) to the Airbnb market.

First Stage: Stacked Dataset

First Stage: Effect of Bond Referendums in School District Outcomes



Stacked Panel: For each year (sub-experiment):

1. Identify the school districts that held an election
2. Keep only districts with election results within the selected bandwidth.
3. Get observations for 6 years before and after the election.

Final Dataset: school district *s* - by year *t* - by sub experiment *g*.

Control Group: Districts that observed a narrow rejection.
Treatment Group: Districts that observed a narrow approval.

Research Design

- y_{stg} is the outcome of school district s by sub-experiment g during period t.
- X_{stg} is a vector of controls.
- d_{sg} is a dummy=1 for school districts with a referendum approval.
- v_{sg} is the centered running variable (i.e., distance to approval cutoff, 50%).

For Airbnb level analysis.

- y_{istg} is the outcome of Airbnb unit i school district s by sub-experiment g during period t.

Research Design: Stacked Dynamic RDD and Diff-in-Disc

Stacked RDD: Cellini et al (2010)

$$y_{stg} = \boldsymbol{\theta}(d_{sg} \times T_t) + \delta(v_{sg} \times T_t) + \eta X_{stg} + a_{sg} + b_t + e_{stg}$$ → (1) Main Model

$$y_{stg} = \boldsymbol{\theta_t} d_{sg} + \delta_t v_{sg} + \eta X_{stg} + a_{sg} + b_t + e_{stg}$$ → (2) Dynamic (Event Study) Model

Stacked Differences in Discontinuities: Grembi et al (2016)

$$y_{stg} = \boldsymbol{\theta}(d_{sg} \times T_t) + \delta(v_{sg} \times T_t) + \gamma(d_{sg} \times v_{sg} \times T_t) + \eta X_{stg} + a_{sg} + b_t + e_{stg}$$ →(3) Main Model

$$y_{stg} = \boldsymbol{\theta_t} d_{sg} + \delta_t v_{sg} + \gamma_t(d_{sg} \times v_{sg}) + \eta X_{stg} + a_{sg} + b_t + e_{stg}$$ → (4) Dynamic (Event Study) Model

Identification Assumptions

- **No Manipulation at the Cutoff:** McCrary test on referenda data.
  - ✓ *No evidence of non-random sorting at the cutoff.*

- **Treatment vs Control Covariate Balance Before the Election by Sub-Experiment:** T-test on the main predictors of Airbnb supply for treatment (narrow approvals) and control groups (narrow rejections) before the election.
  - ✓ *Overall, no detectable differences on the main determinants of Airbnb supply across districts on both arms of the study.*

- **Pre-Trends Wald Test:** Joint nullity test for all treatment effect coefficients θ_t on the pre-treatment period.
  - ✓ *Overall, no evidence of anticipation effects.*

First Stage: Effect of Bond Referendums in School District Outcomes

Table 1: Effect of Bond Referendums on School District Expenditures (Bandwidth 5.0%)

	LT Debt	Tot Exp	Cap Out	Curr Exp
Dynamic RDD	528.0267**	671.3869**	326.9377*	218.0685**
	(228.549)	(297.478)	(185.221)	(103.68)
	[0.1444]	[0.7602]	[0.4278]	[0.1438]
Diff in Disc	584.6412**	797.0932**	329.133**	210.1022**
	(245.214)	(311.504)	(162.205)	(103.835)
	[0.2531]	[0.8211]	[0.2709]	[0.061]
Mean DV	604.8338	2911.8492	403.497	1951.6
SD DV	2777.9492	4513.2469	1325.5615	1401.0568

Table 3: Effect of Bond Referendums on Housing Market Outcomes (Bandwidth 5.0%)

	SD Prop Tax Revenue	Prop Tax Liab	Median Eff Prop Tax Rate	Housing Units
Dynamic RDD	243.8045	15.5454	-0.0127	-0.0058
	(189.702)	(30.092)	(0.05)	(0.006)
	[0.7601]	[0.0377]	[0.2705]	[0.5714]
Diff in Disc	383.7478	9.5863	-0.0062	-0.0056
	(291.933)	(27.962)	(0.054)	(0.006)
	[0.8474]	[0.0558]	[0.0068]	[0.2725]
Mean DV	1584.596	692.3485	1.3797	0.2753
SD DV	4362.0415	511.2711	0.3835	0.0492

Takeaways

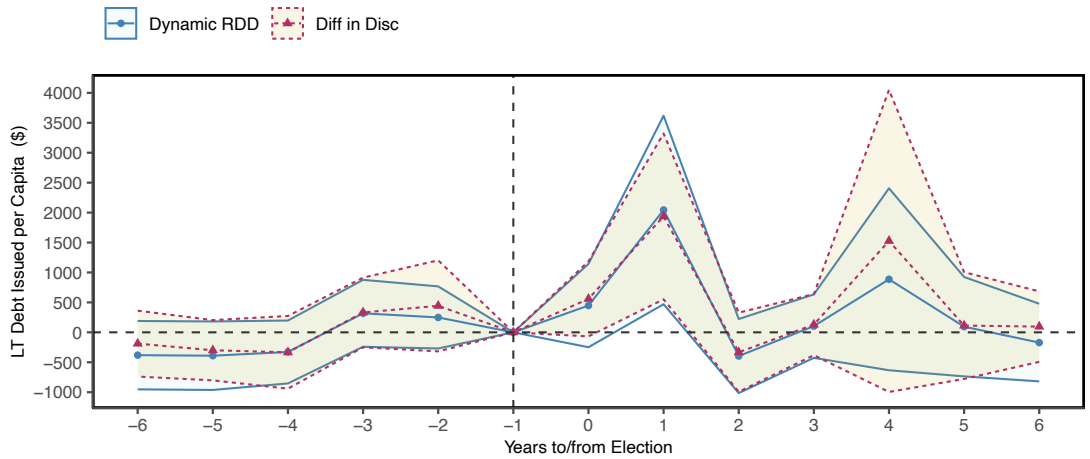
- **Long Term (LT) Debt:** ⬆️ $528-584 per capita (pc).
- **Total Expenditures:** ⬆️ $671-797 pc.
- Detectable effects on capital outlays (⬆️ $326-329 pc) and current expenditures (⬆️ $210-218 pc).
- No detectable effects on school district property tax revenues, school district resident's property tax liability, median effective property tax rates, and number of housing units.

Note: Each panel show the results of the model on different dependent variables. Point estimates for coefficient θ from Equations 1 and 3. Standard errors clustered at the school district level reported in parenthesis. P-value of a Wald test on the joint nullity of coefficients θt for the years before the election from Equations 2 and 4 reported in brackets.

First Stage: Effect of Bond Referendums in School District Outcomes

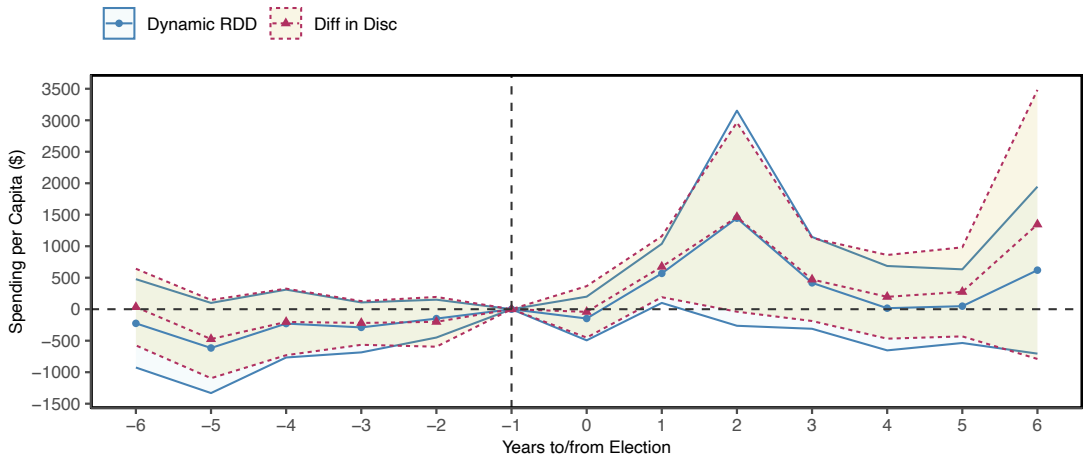
SD LT Debt Issued (5% Bw)

*Dynamic RDD:528.0267**[0.1444]| Diff in Disc:584.6412**[0.2531]*



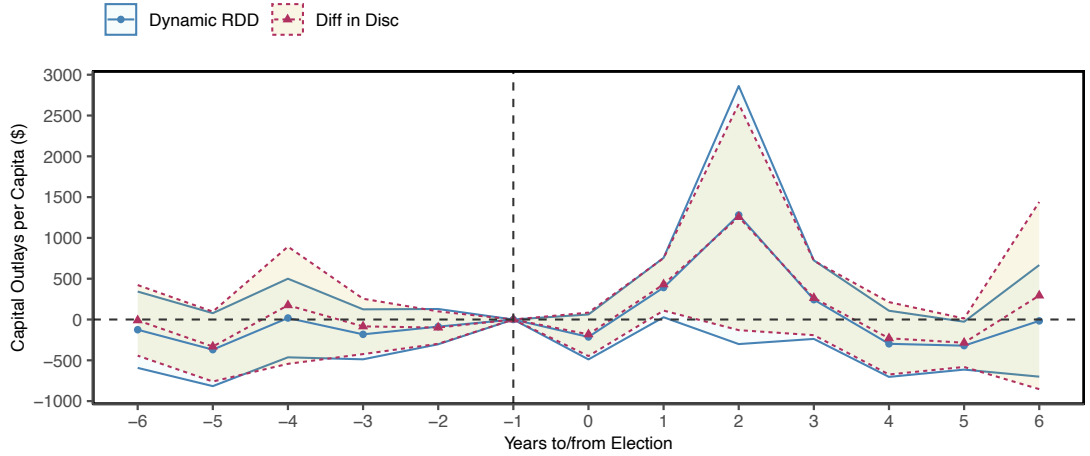
SD Total Expenditures (5% Bw)

*Dynamic RDD:671.3869**[0.7602]| Diff in Disc:797.0932**[0.8211]*



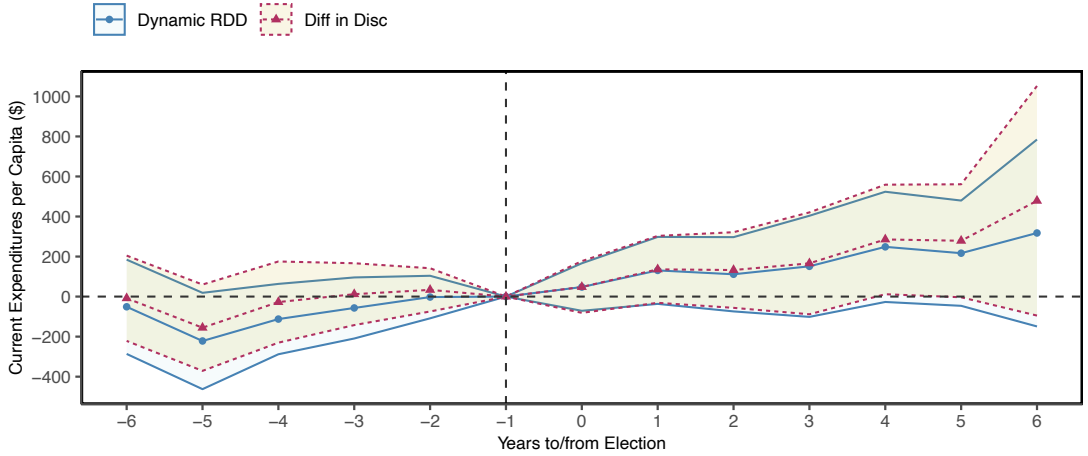
SD Capital Outlays (5% Bw)

Dynamic RDD:326.9377[0.4278]| Diff in Disc:329.133**[0.2709]*



SD Current Expenditures (5% Bw)

*Dynamic RDD:218.0685**[0.1438]| Diff in Disc:210.1022**[0.061]*

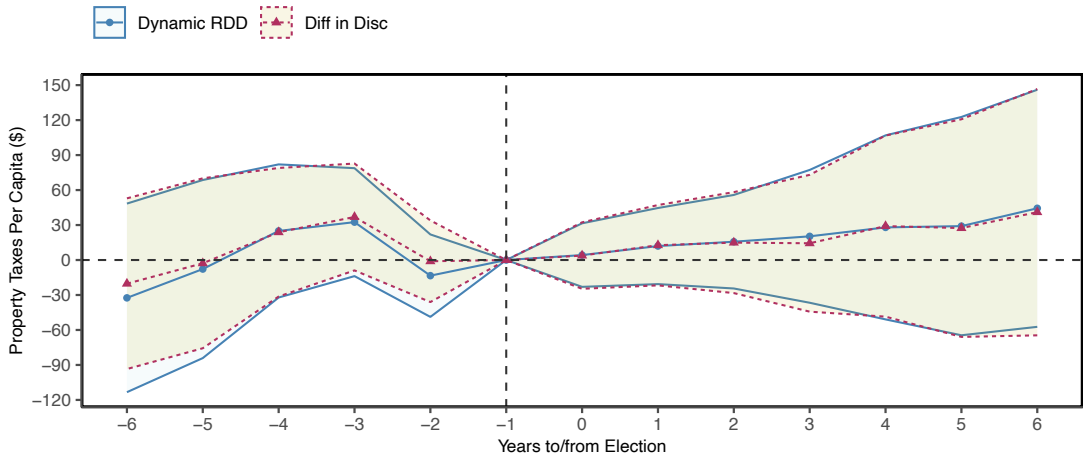


Note: This graph shows the estimates for coefficients θt from the stacked RDD and stacked diff in disc. Each panel shows the results for a specific dependent variable. The shaded areas show confidence intervals at the 95% level, assuming clustered standard errors at the school district level. The estimates reported at the top of the graphs correspond to the point estimates of θ from Equations 1 and 3. P-value of a Wald test on the joint nullity of coefficients θt for the years before the election of Equations 2 and 4 reported in brackets..

First Stage: Effect of Bond Referendums in School District Outcomes

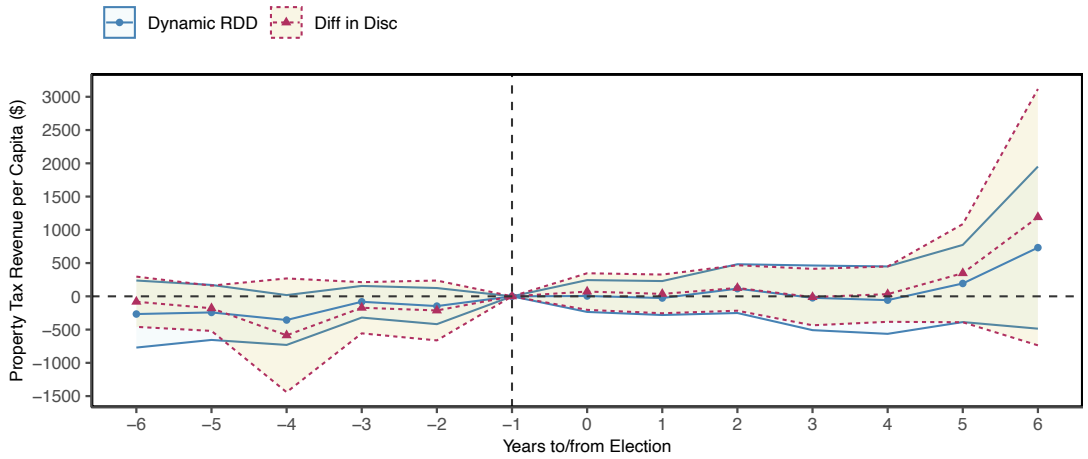
SD Property Tax Rev (5% Bw)

Dynamic RDD:15.5454 [0.0377]| Diff in Disc:9.5863 [0.0558]



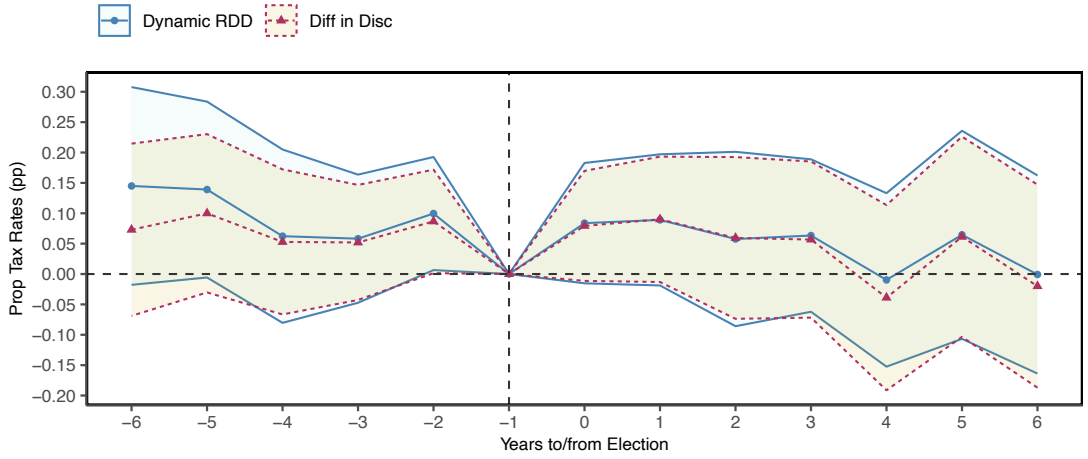
Property Tax Liabilities (5% Bw)

Dynamic RDD:243.8045 [0.7601]| Diff in Disc:383.7478 [0.8474]



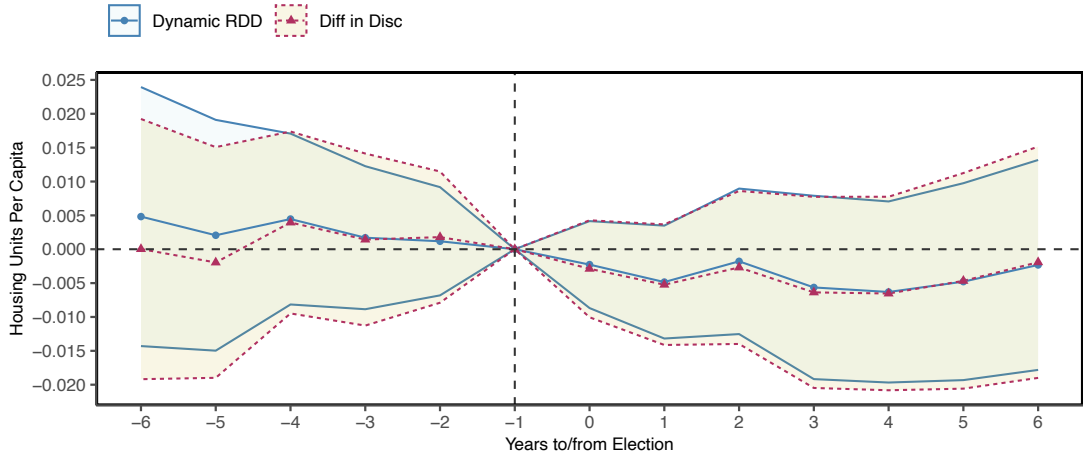
Median Effective Property Tax Rate (5% Bw)

Dynamic RDD:−0.0127 [0.2705]| Diff in Disc:−0.0062 [0.0068]



Housing Units (5% Bw)

Dynamic RDD:−0.0058 [0.5714]| Diff in Disc:−0.0056 [0.2725]



Note: This graph shows the estimates for coefficients θt from the stacked RDD and stacked diff in disc. Each panel shows the results for a specific dependent variable. The shaded areas show confidence intervals at the 95% level, assuming clustered standard errors at the school district level. The estimates reported at the top of the graphs correspond to the point estimates of θ from Equations 1 and 3. P-value of a Wald test on the joint nullity of coefficients θt for the years before the election of Equations 2 and 4 reported in brackets..

First Stage Takeaways

- **Positive effects:** debt issuance, school spending, capital outlays. Effects manifest 1-2 years after the election.

- **Mechanisms:** effects on the housing market seem to operate via the effect of spending on home prices. No documented effect via SD property tax revenues nor property tax liabilities or effective rates.

- **Robustness and Validity:** results robust to quadratic and cubic polynomial specifications on the running variable. Effects lose precision with a lower bandwidth. Sample size trade off.

Main Results Stacked Dataset

Stacked Panel: For each semester/focal-election (sub-experiment):

1. Identify the school districts that held an election. Identify all the Airbnb units present in each district.
2. Keep only districts with election results within the selected bandwidth.
3. Obtain the listing status of each Airbnb unit 18 months before and 24 months the election. Analysis window is 6 months before the election and 24 months after.

Sample Restriction for the Analysis

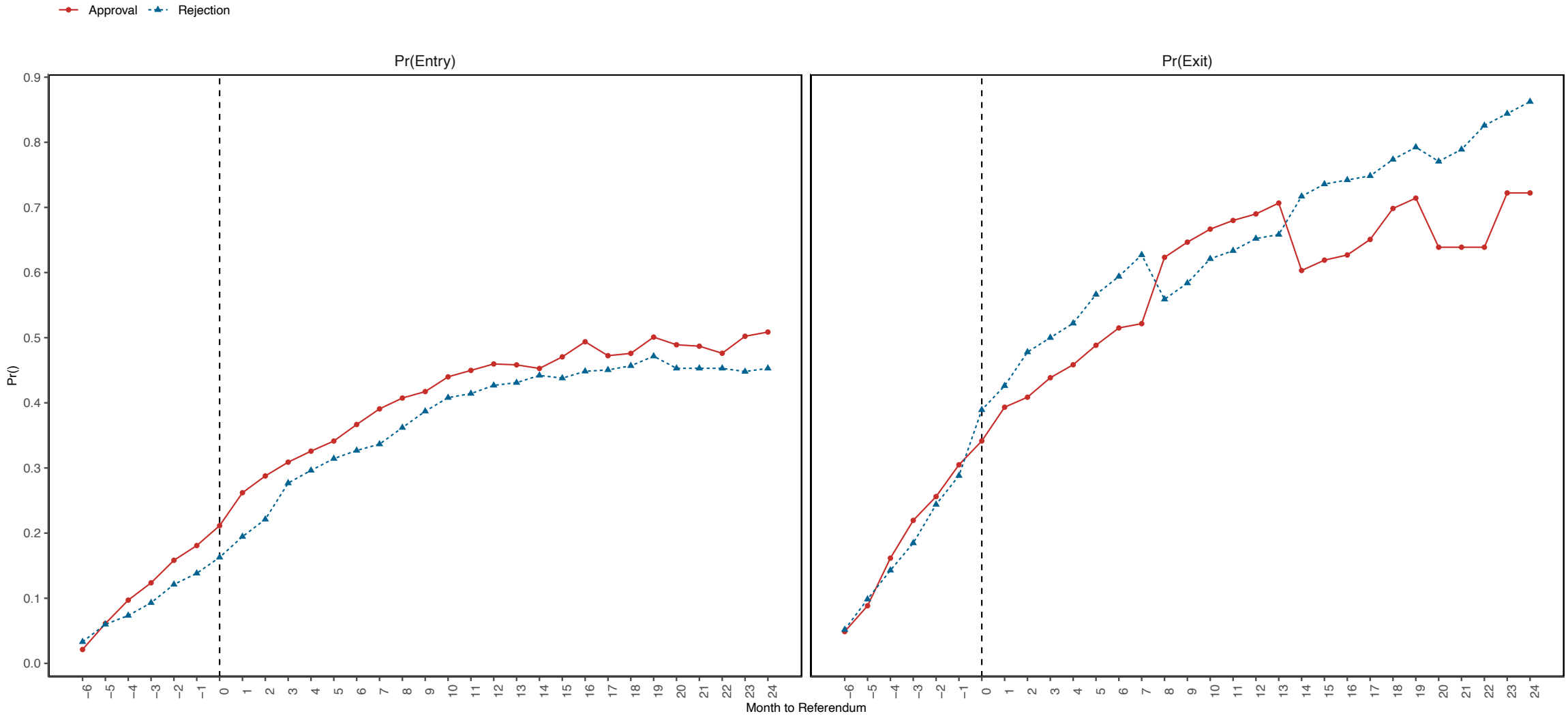
Dep Var	Description	Sample Restriction
Pr(Exit)	Dummy var = 1 if unit is **not listed**	Units that were continuously **listed** on the platform for the 12 months preceding the analysis window.
Pr(Entry)	Dummy var = 1 if unit is **listed**	Units that were continuously **not listed** on the platform for the 12 months preceding the analysis window.

Final Dataset: Airbnb unit *i* in school district *s* - by month *t* - by sub experiment *g*.

Dependent Variables

Dependent Variables: Pr(Exit) and Pr(Entry)

Baseline Sample – 5% Bandwidth



Main Results: Effect of Bond Referendums in the Airbnb Market

Table 7: Effect of Bond Approvals on the Airbnb Market

	Pr(Exit) Bw:5.0%	Pr(Exit) Bw:2.5%	Pr(Entry) Bw:5.0%	Pr(Entry) Bw:2.5%
Panel A: Linear Polynomial				
Dynamic RDD	-0.1076***	-0.1441**	0.0554*	-0.0175
	(0.042)	(0.056)	(0.031)	(0.043)
	[0.0716]	[0.3872]	[0.0405]	[0.3479]
Diff in Disc	-0.1076***	-0.1039*	0.0658**	-0.0178
	(0.042)	(0.057)	(0.031)	(0.044)
	[0.0045]	[0.7112]	[0.0298]	[0.6838]
Panel B: Quadratic Polynomial				
Dynamic RDD	-0.1065**	-0.101*	0.0281	-0.02
	(0.042)	(0.057)	(0.032)	(0.044)
	[0.0733]	[0.4937]	[0.0688]	[0.3521]
Diff in Disc	-0.1176***	-0.1196**	0.0098	-0.0134
	(0.043)	(0.058)	(0.035)	(0.046)
	[0.0838]	[0.4229]	[0.1003]	[0.0191]
Obs Left Cutoff	7885	4488	18588	13118
Obs Right Cutoff	6989	4966	19731	7433
Mean DV	0.6021	0.6339	0.3599	0.3909
SD DV	0.4895	0.4818	0.48	0.488

Note: This table shows the coefficient estimates from the main model (θ). Standard errors clustered at the school district level reported in parenthesis. P-value of the pre-trends Wald test is reported between brackets.

Takeaways:

⬇️ Pr(Exit):10.7% - 14.4%

⬆️ Pr(Entry): 5.5% - 6.5%

- Effects on Pr(Exit) persist across bandwidths and models.
- Results for Pr(Entry) are less robust.
- **Implication:** increase in the incentives to participate in the Airbnb market.

Effect on Airbnb Supply | Pr(Exit) : Dynamic Effects

Table 9: Effect of Bond Approvals on the Airbnb Market
Dynamic Effects (Linear Polynomial)

	Pr(Exit) Bw:5.0%	Pr(Exit) Bw:2.5%	Pr(Entry) Bw:5.0%	Pr(Entry) Bw:2.5%
Panel A: Dynamic RDD				
Years to Election = 0	-0.131***	-0.1443**	0.0965***	0.0012
	(0.045)	(0.064)	(0.031)	(0.049)
Years to Election = 1	-0.1394***	-0.133	0.0565	-0.056
	(0.053)	(0.083)	(0.046)	(0.073)
Years to Election = 2	0.0942	-0.4747**	0.1116	0.0197
	(0.12)	(0.228)	(0.071)	(0.17)
Panel B: Diff in Disc				
Years to Election = 0	-0.1304***	-0.1088	0.1062***	0.0102
	(0.045)	(0.067)	(0.033)	(0.051)
Years to Election = 1	-0.1385***	-0.0992	0.0542	-0.0365
	(0.052)	(0.079)	(0.046)	(0.078)
Years to Election = 2	-0.0342	-0.6396***	0.0915	0.3538*
	(0.149)	(0.124)	(0.072)	(0.208)
Obs Left Cutoff	11156	6248	26654	18568
Obs Right Cutoff	9139	6355	28966	10144
Mean DV	0.638	0.674	0.3809	0.3964
SD DV	0.4806	0.4688	0.4856	0.4892

Note: This table shows the coefficient estimates from the main model (θ). Standard errors clustered at the school district level reported in parenthesis.

Dynamic Effects

- Estimation: interact the treatment variable with years to election dummies.
- Decrease in the probability of exit manifest in the 24 months following the bond approval.
- Increase in the probability of entry takes place in the 12 months following the bond approval. No significant effects afterwards.

Effect on Airbnb Supply | Market Outcomes

Table 10: Effect of Bond Referendums on Aggregated Airbnb Outcomes (Bandwidth 5.0%)

	New Airbnb Units	Units Listed 1 Month	Units Listed 12 Months	Airbnb Revenues
Dynamic RDD	0.0804	0.1275**	0.0716**	-0.8958
	(0.057)	(0.053)	(0.033)	(1.11)
	[0.1087]	[0.0899]	[0.2297]	[0.248]
Diff in Disc	0.1173*	0.1261**	0.0705**	-0.4632
	(0.066)	(0.05)	(0.031)	(1.115)
	[0.0518]	[0.0839]	[0.205]	[0.1661]
Mean DV	0.211	0.2216	0.0829	4.5464
SD DV	0.685	0.5199	0.223	5.1031

Note: This table shows the coefficient estimates from the main model (θ). Standard errors clustered at the school district level reported in parenthesis. P-value of the pre-trends Wald test is reported between brackets. All the dependent variables (with the exception of Airbnb revenues) are expressed as percentage of the number of housing units in the school district. Airbnb revenues are expressed in log dollars.

Airbnb Market Outcomes

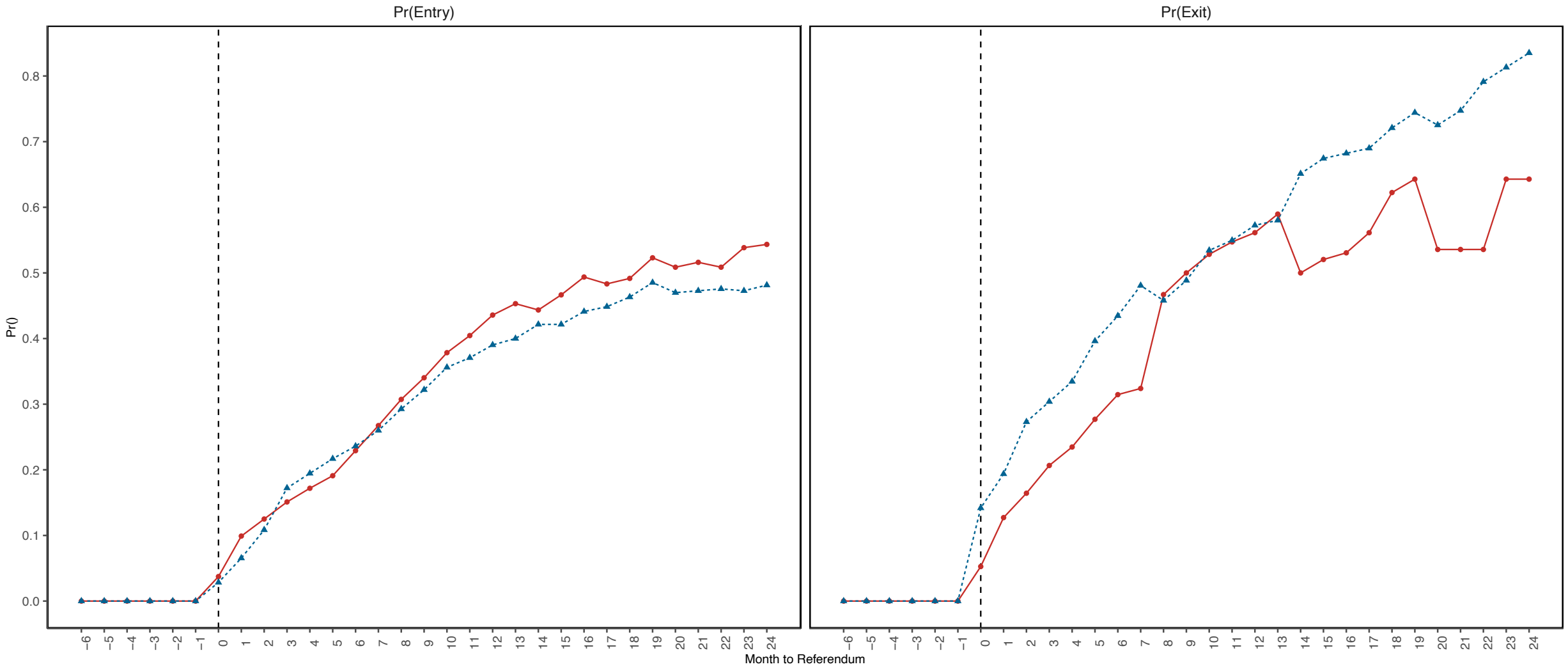
- Return to school district level data.
- Detectable increase in the number of Airbnb units listed in the market.
- ⬆️ 0.11% in New Airbnb Units, 0.12% in units listed 1 month, 0.07% in units listed 12 months. All as % of Housing units.
- No significant effect on Airbnb revenues.

Robustness Checks: Enforce Common Pre-Trends

Dependent Variables: Pr(Exit) and Pr(Entry)

Enforce Common Pre–Trends – 5.0% Bandwidth

Restrict the sample to include only units that were listed/not listed before the referendum.



Main Results: Effect of Bond Referendums in the Airbnb Market

Table 8: Effect of Bond Approvals on the Airbnb Market
Enfore Common Pre-Trends

	Pr(Exit) Bw:5.0%	Pr(Exit) Bw:2.5%	Pr(Entry) Bw:5.0%	Pr(Entry) Bw:2.5%
Panel A: Linear Polynomial				
Dynamic RDD	-0.1283**	-0.1831**	0.0404	-0.066
	(0.052)	(0.075)	(0.033)	(0.048)
Diff in Disc	-0.1381***	-0.1172	0.0429	-0.0569
	(0.052)	(0.079)	(0.034)	(0.05)
Panel B: Quadratic Polynomial				
Dynamic RDD	-0.1228**	-0.1179	0.0153	-0.061
	(0.052)	(0.08)	(0.034)	(0.049)
Diff in Disc	-0.1407**	-0.1335*	-0.0227	-0.0586
	(0.056)	(0.081)	(0.036)	(0.053)
Obs Left Cutoff	5887	3410	16039	11190
Obs Right Cutoff	4951	3600	16455	5919
Mean DV	0.478	0.5279	0.3051	0.3449
SD DV	0.4996	0.4993	0.4605	0.4754

Note: This table shows the coefficient estimates from the main model (θ). Standard errors clustered at the school district level reported in parenthesis.

Dep Var	Baseline	Enforce Common Pre-Trends
Pr(Exit)	⬇️ 10.7% -14.4%	⬇️ 12.8% -18.8%
Pr(Entry)	⬆️ 5.5% -6.5%	no detectable effects.

Summary of Results

- ⬇️ Pr(Exit) and ⬆️ Pr(Entry). Increase in the supply of Airbnb. Consistent with model where an increase in home prices creates incentives to participate in the gig economy.
- Asymmetric effects. Stronger effects on the Pr(Exit) vis-à-vis Pr(Entry). Potentially explained by differences in listing/de-listing costs. More persistent effects in the Pr(Exit), relative to Pr(Entry).
- Null effects on Airbnb revenues or reservation days. Evidence that effects are driven by supply side adjustments.
- Stronger effects for smaller bandwidths. Extrapolation bias leads to underestimation of the true effect of bond approvals on the Airbnb market.

Policy Implications

- Gig hosting is one of the ways in which people pay for the school district improvements. Investor hosts pay property taxes, but do not send kids to school.
- School spending aims to improve the quality of education. However, as incentives to enter Airbnb market increase, the availability of housing for potential long-term residents decreases. Prevalent crowding-out effects are amplified. Unintended consequence of public goods spending?
- School district debt management and political economy of bond referendum spillovers to household economic decisions.

Dissertation Takeaways

- Interactions between the federal government and state/local governments plays a crucial role in subnational debt management decisions.
- First chapter illustrates how government cash flow management is determined by liquidity constraints and tells a cautionary tale on fiscal spillovers from the federal budget to state finances.
- Second chapter builds upon this conclusion and shows how federal aid could serve as a credit enhancement when turmoil prevails in financial market. Deficit spending does not crowds-out local borrowing.
- Tapping into the bond market allows local governments to develop and improve infrastructure for local goods provision. However, it could lead to unintended consequences on the provision of such goods and markets related to them.

Thanks for your attention!

Scan to learn more about my research.

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INDIANA UNIVERSITY BLOOMINGTON

O’Neill School of Public and Environmental Affairs

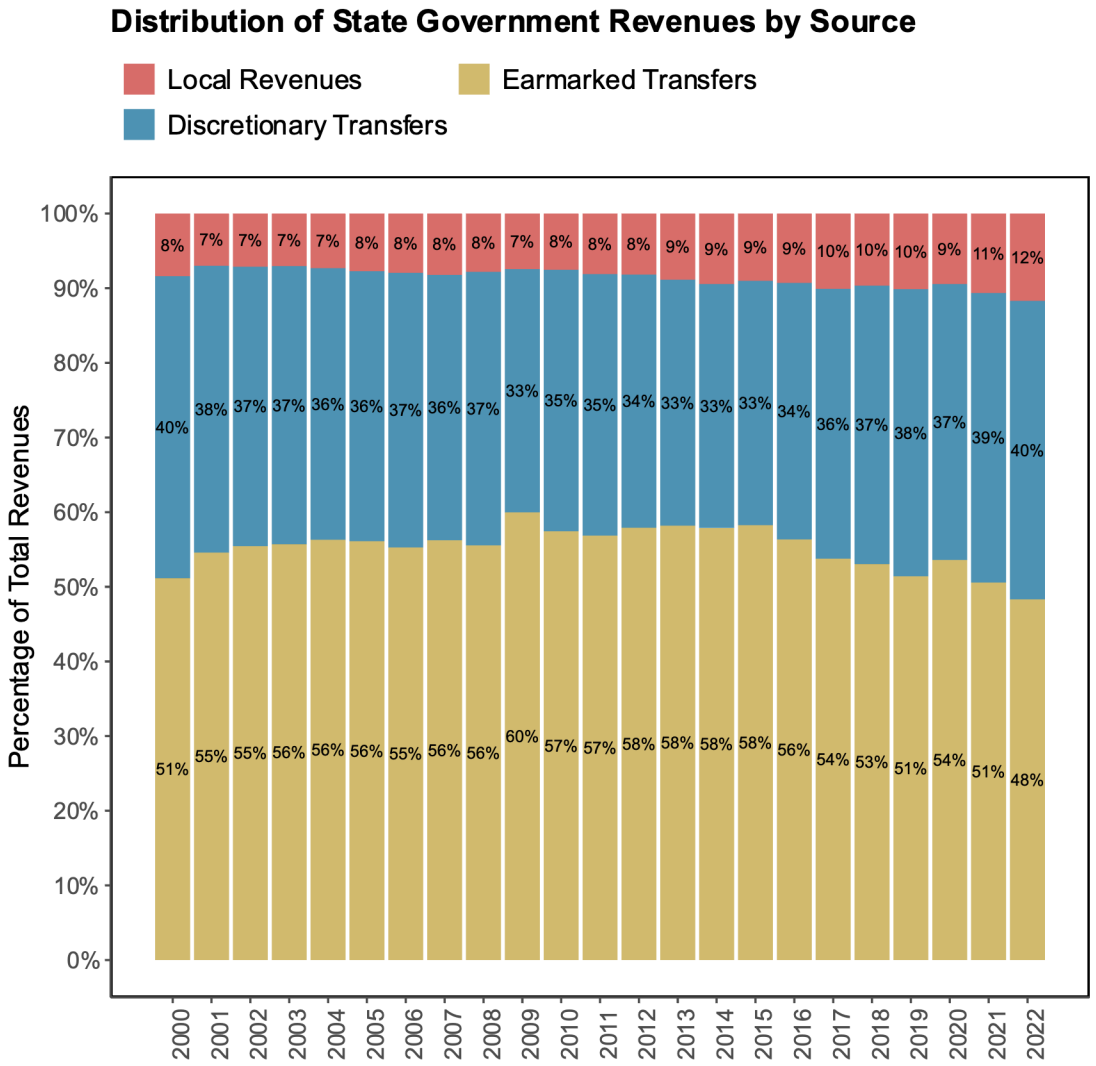
Essays on Fiscal Federalism and Debt Management

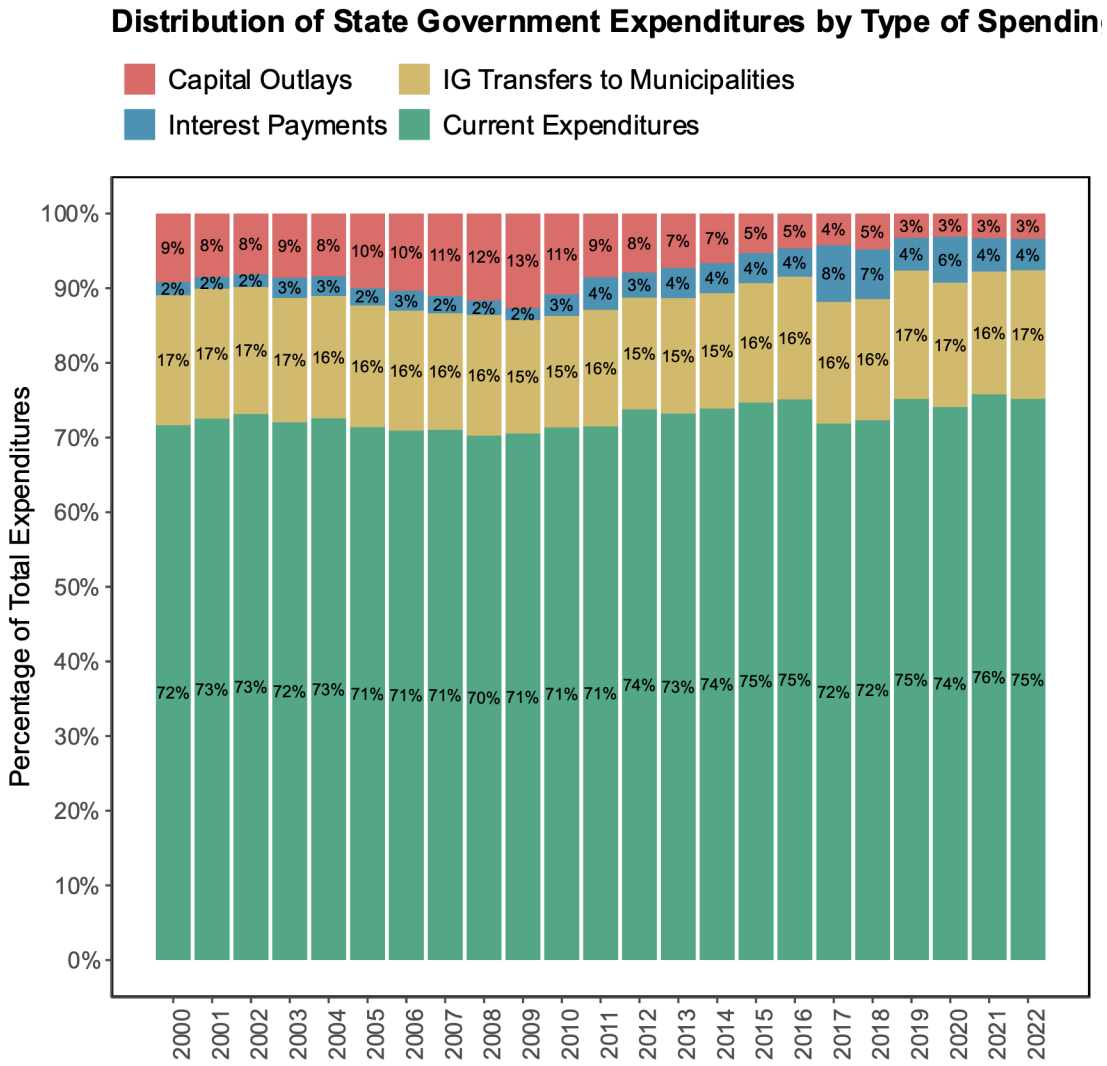
Luis Navarro

Dissertation Defense
April 24, 2025

Ch1: Cash Reserves and Short-Term Debt under Liquidity Constraints

Revenue and Expenditure Structure of State Governments



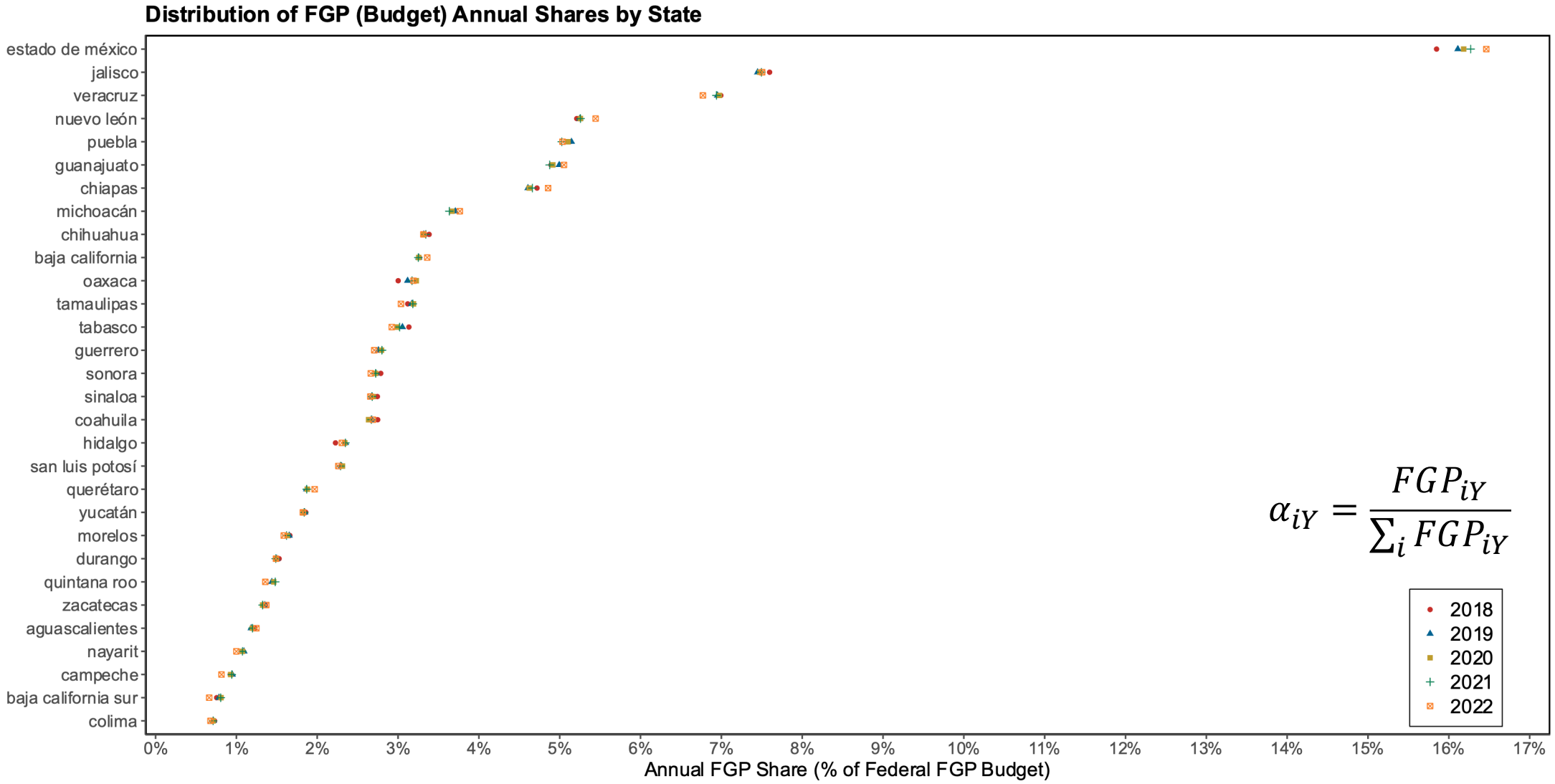


Notes: The panel on the left shows the distribution of revenues by source. Earmarked transfers (Aportaciones) include funds to finance education payroll (FONE) and infrastructure development (FAM, FAETA), health care (FASSA), social development and welfare programs (FAIS), security and policing (FASP). Discretionary transfers (Participaciones) include FGP transfers. **Source: INEGI.**

FGP Error: Conceptual Framework

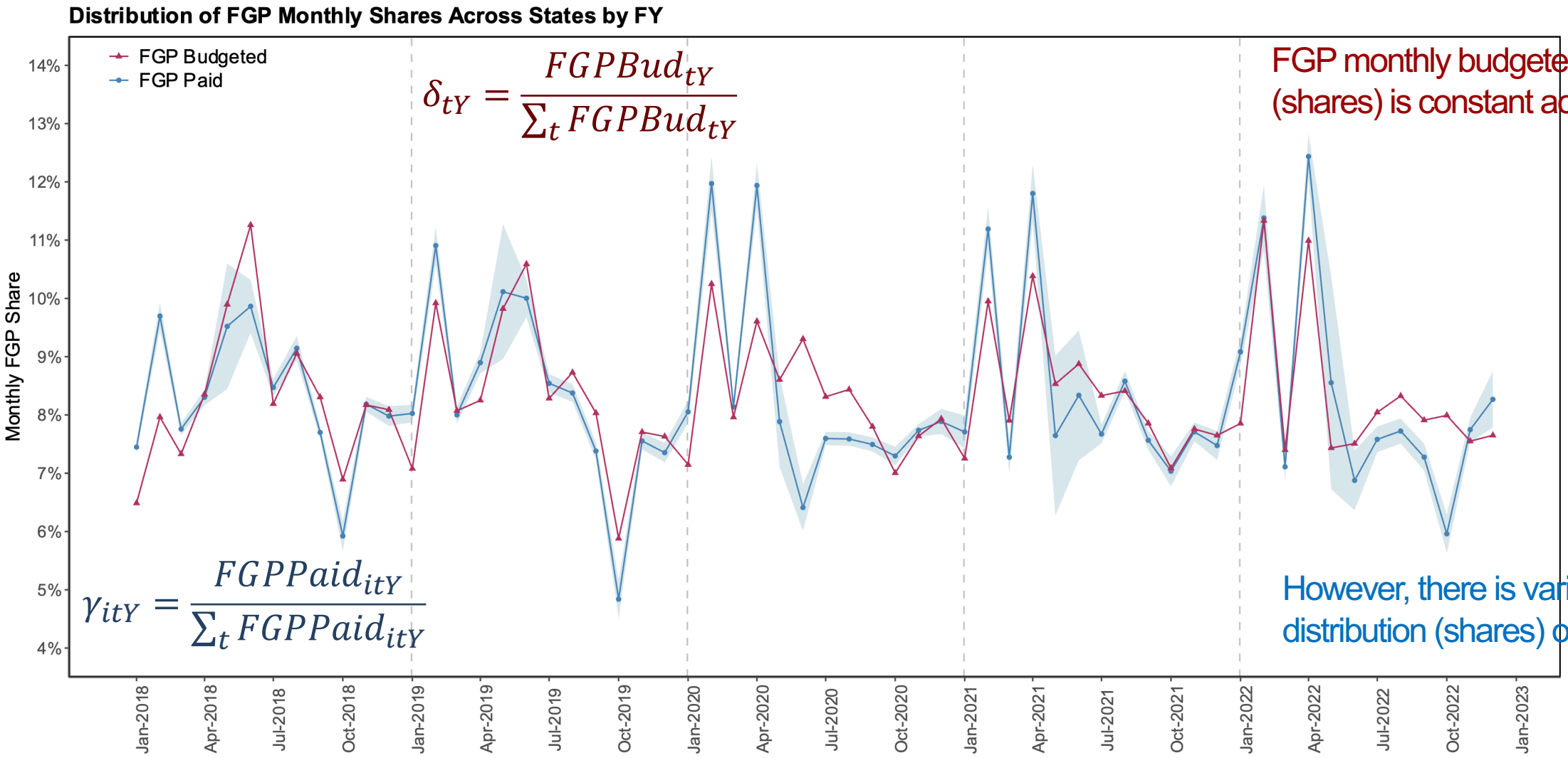
- Let g_{it} be actual FGP transfers and b_{it} be budgeted ones. Then, $FGPError_{it} = g_{it} - b_{it}$
- Let b_i be annual allocation of the FGP to state i, and B be the annual national budget for the FGP.
- Denote α_i as the proportion of national budget B received by state i. Hence, $b_i = \alpha_i B$.
- Denote δ_t as the proportion of annual allocation b_i scheduled for month t. Hence, $b_{it} = \alpha_i \delta_t B$.
- For budgeting purposes, the federal government assumes the same δ_t for all states i
- However, actual FGP transfers g_{it} show variation by state and month. Hence, $g_{it} = \alpha_i \gamma_{it} G$.
- Arguably, $\gamma_{it} = \delta_t + \upsilon_{it}$ where υ_{it} is an unobserved factor.
- Then we can write: $FGPError_{it} = \alpha_i[\delta_t(G - B) + \upsilon_{it} G]$

Annual FGP Shares had been stable over time. Mainly determined by population.



Notes: The panel on the left shows the annual shares of the FGP by state.

Monthly FGP Shares across FYs



$$\delta_{tY} = \frac{FGPBud_{tY}}{\sum_t FGPBud_{tY}}$$

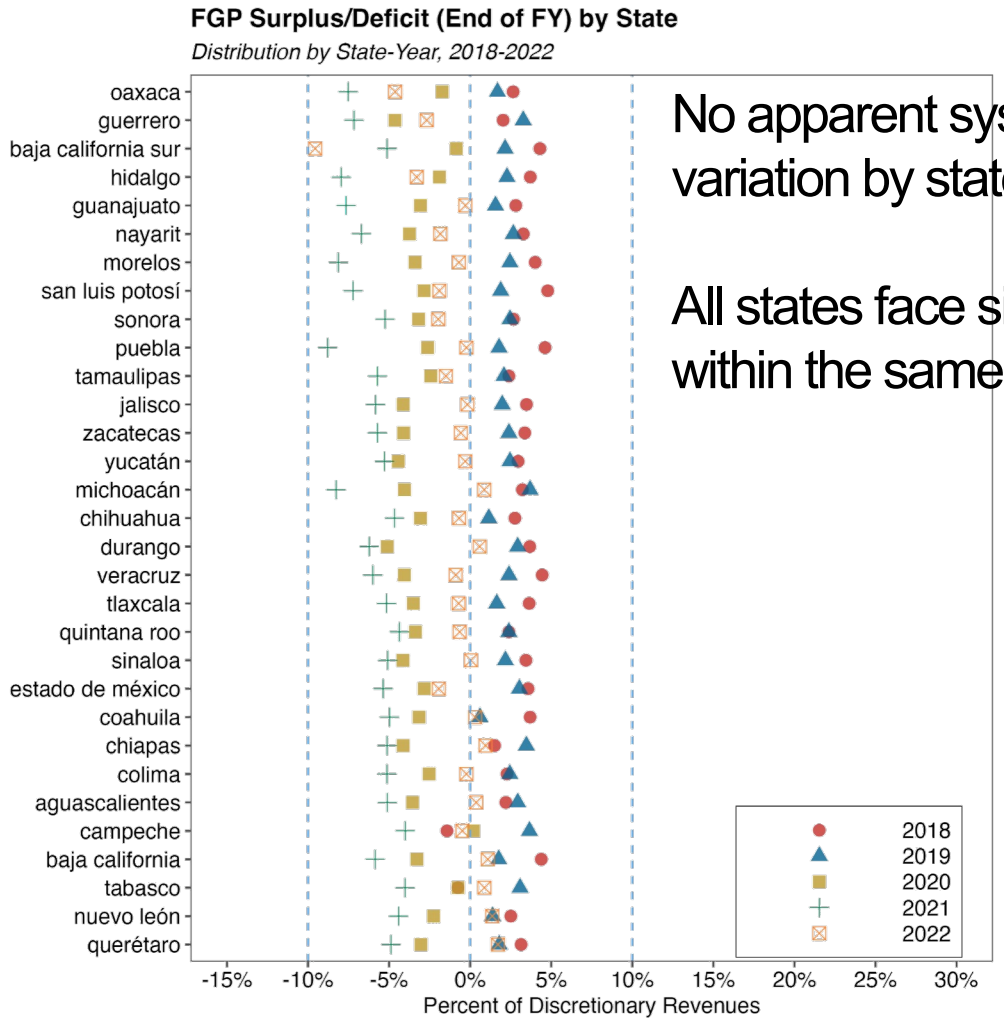
$$\gamma_{itY} = \frac{FGPPaid_{itY}}{\sum_t FGPPaid_{itY}}$$

FGP monthly budgeted distribution (shares) is constant across states.

However, there is variation in the distribution (shares) of actual transfers.

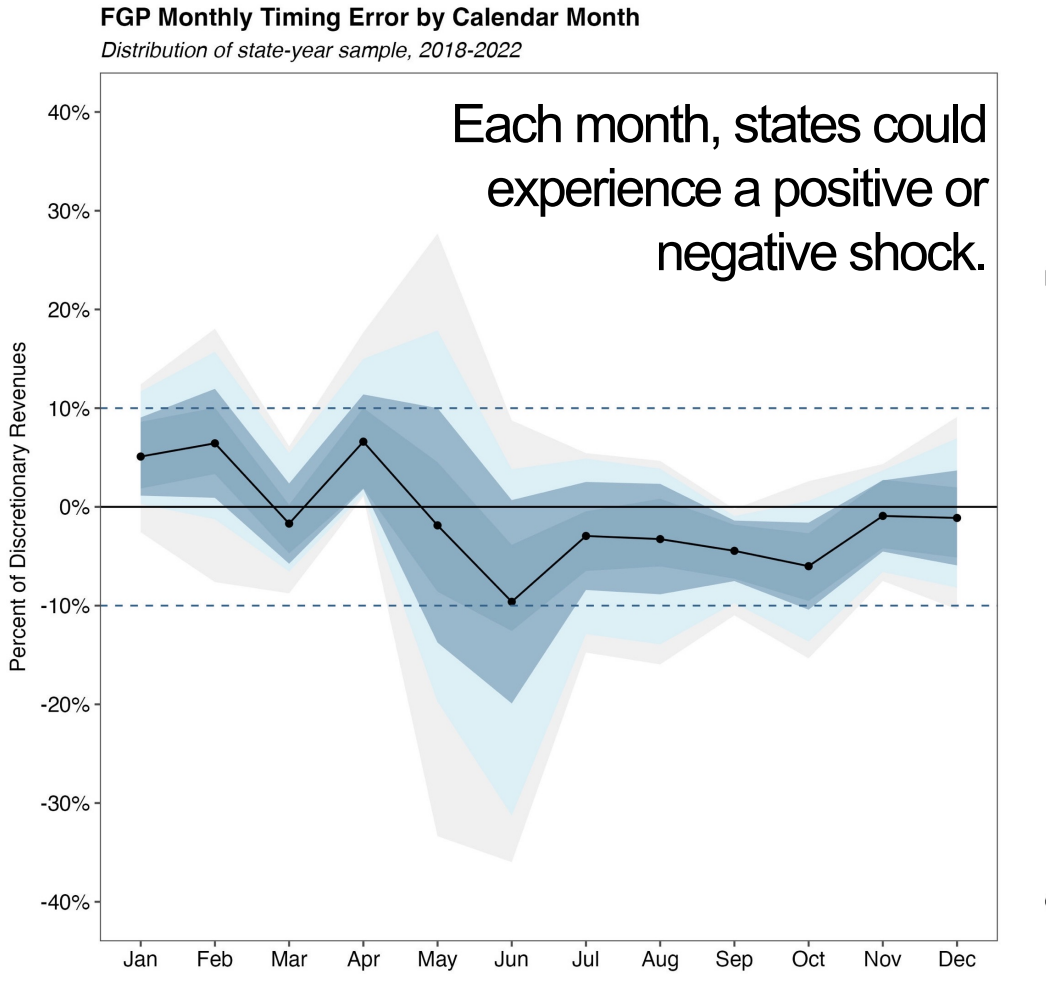
Notes: This panel compares the monthly shares of the FGP, within the FY. From the right panel it stands out that there is no variation on the monthly budgeted shares across states. However, the actual shares (implied by the actual transfers) differ from the budgeted ones, showing variation across states. Shaded area shows the interval within 1 SD from the mean.

FGP Error Distribution Over Time



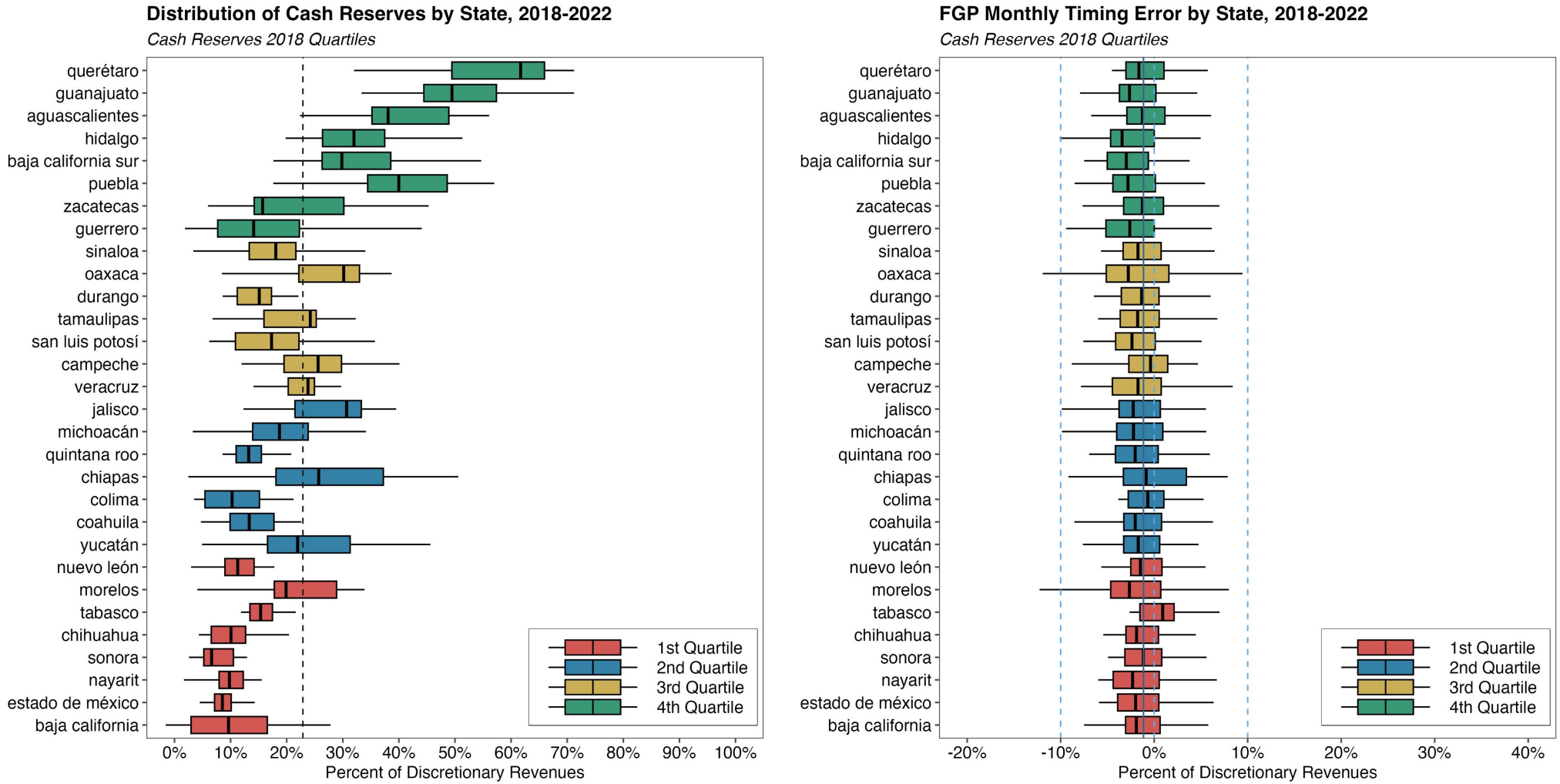
No apparent systematic variation by states.

All states face similar shocks within the same fiscal year.



Notes: The panel on the left shows the distribution of the FGP timing error across time. The solid line represents the mean across states by month-year. The dark-shaded area shows the percentiles between 25%-75%, as well as the area within one standard deviation form the mean, while the light-shaded areas percentiles 1% to 99% (excluding outliers) and 5%-95%. The panel on the right shows the end-of-year cumulative difference between the FGP paid and FGP budgeted across years, expressed as percentage of discretionary revenues. The solid vertical line shows the sample mean. For illustrative purposes, dashed blue lines show the interval between +/- 10% of discretionary revenues.

FGP errors do not seem to vary with the level of cash reserves.



Notes: Both panels shows the distribution of cash reserves (left) and FGP errors (right) by state across quarter-years. Each boxplot depicts the distribution by state, excluding outlier observations. States are partitioned into groups depending on quartiles of the distribution of cash reserves in FY 2018. Variables expressed as percent of discretionary revenues. For illustrative purposes, dashed blue lines on the left panel show the interval between +/- 10% of discretionary revenues.

Main Variables

Descriptive Stats	Mean	Std.Dev.
DepVar: Short-Term Debt (% DR)	0.0519	0.0635
EndVar: Cash Reserves (% DR)	0.2289	0.1548
InstVar: FGP Error (% DR)	-0.0043	0.0235
FGP Annual Difference (%DR, Lag = 1yr)	-0.0130	0.0655
Primary Balance (% Rev, Lag = 1yr)	-0.0623	0.1261
Current Expenditures (% Exp, Lag = 1 yr)	0.7375	0.0600
Discretionary Revenues (% Rev, Lag = 1yr)	0.4766	0.0781
Long Term Debt (% Debt, Lag = 1yr)	0.6726	0.5133
Credit Rating	3.1273	1.0700
FGP as Collateral (%)	0.5332	0.2163
Unemployment Rate	0.0346	0.0129
Taxpayers (% Population)	0.5574	0.1015
Age < 18 (% Population)	0.0584	0.0040
Age 19-35 (% Population)	0.0438	0.0022
Age 36-65 (% Population)	0.0847	0.0047

Controls

liquidity needs

fiscal structure

debt burden

economic activity

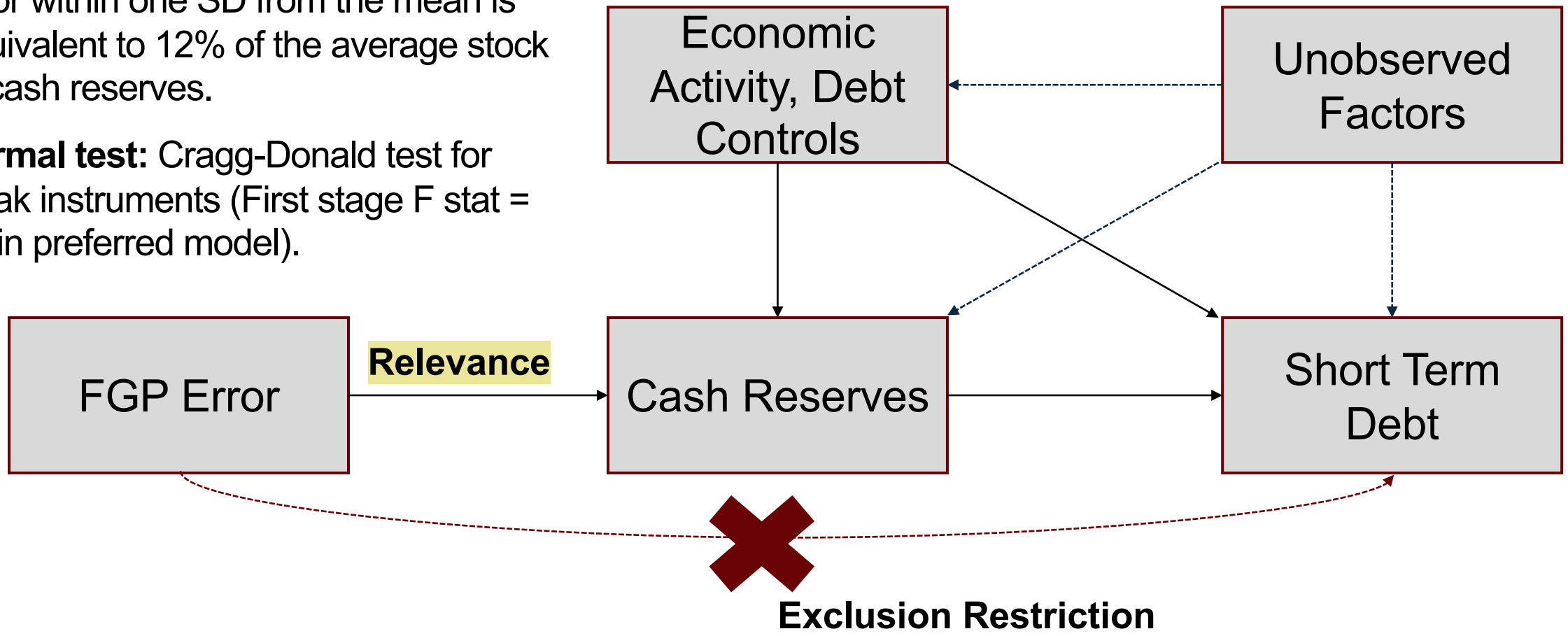
Notes: This panel shows the descriptive statistics of the main variables used for the analysis. N= 597 for all variables. The first two columns show the sample mean and standard deviation. Considering the distribution of ratings I grouped them in 3 categories AAA,AA = 1, A = 2, and BBB,BB,NR = 3. Short-Term borrowing, cash reserves, FGP budget error, and fiscal balance measures are expressed as a percentage of the average discretionary revenues (DR) observed between 2009 and 2016. That is, outside the analysis period to avoid endogeneity concerns. All these fiscal variables correspond to one-year lagged measures.

Identification Assumptions

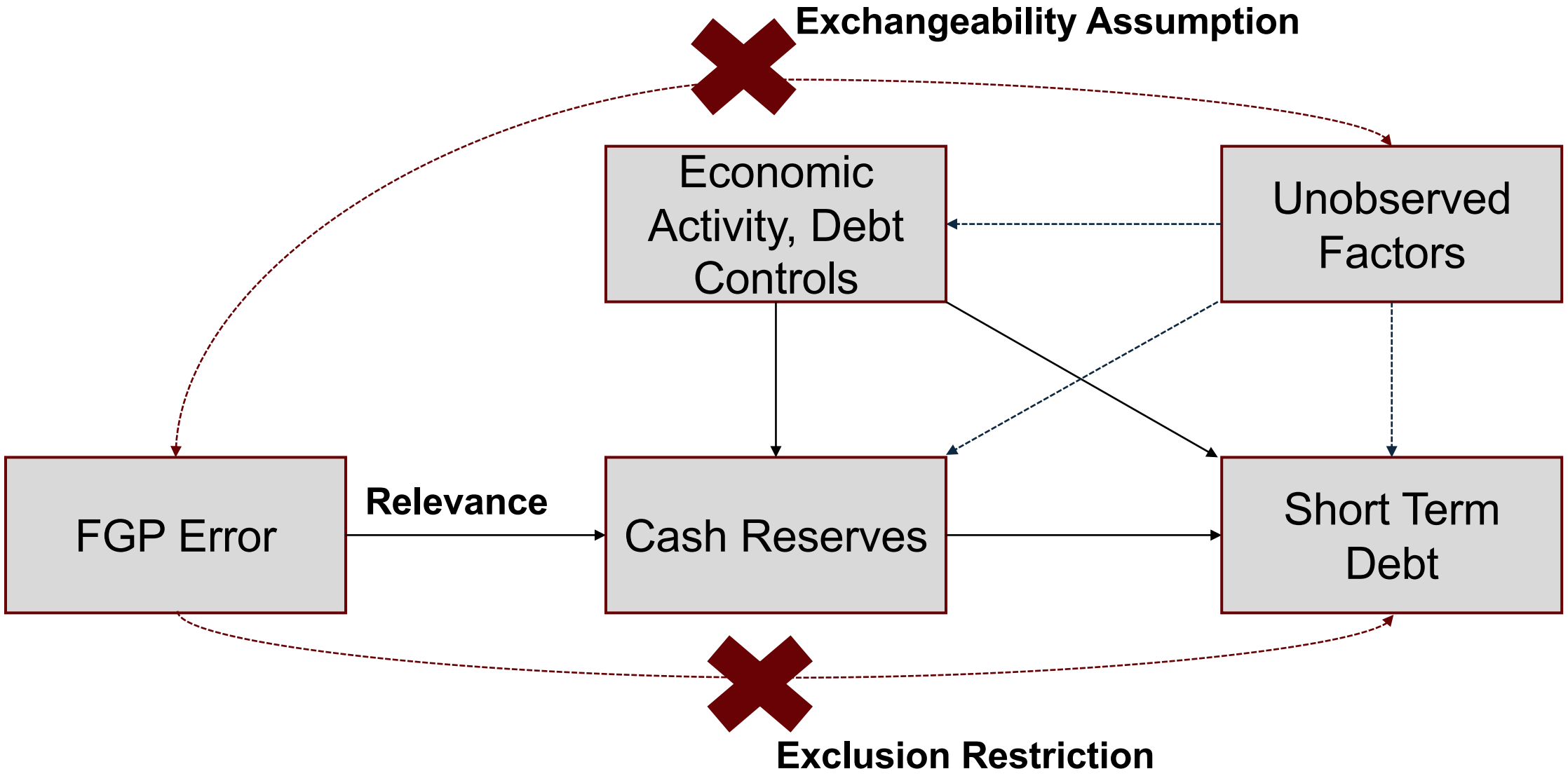
Relevance Assumption

Descriptive Stats: observing a FGP error within one SD from the mean is equivalent to 12% of the average stock of cash reserves.

Formal test: Cragg-Donald test for weak instruments (First stage F stat = 24 in preferred model).



Identification Assumptions



Exchangeability Assumption: State Economic Activity and FGP Errors

Table: Instrument Validity: State Economic Activity Predicting FGP Errors
(Dep Var: FGP Errors)

Independent Variable	(1)	(2)	(3)	(4)
Unemployment Rate	0.068	0.059	0.087	0.019
	(0.045)	(0.046)	(0.060)	(0.072)
Active Taxpayers (% Population)	0.001	0.004	-0.044	0.000
	(0.005)	(0.006)	(0.069)	(0.072)
Industrial Activity Index	0.001	0.004	-0.044	0.000
	(0.005)	(0.006)	(0.009)	(0.072)
Quarterly Economic Activity Index	0.020*	0.018*	0.009	0.009
	(0.010)	(0.010)	(0.018)	(0.013)
Informal Labor (% Population)	-0.036	0.002	0.013	0.010
	(0.029)	(0.033)	(0.047)	(0.036)
Num.Obs.	597	597	597	597
Controls	No	Yes	No	Yes
State FE	No	No	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

Notes: These panels show the results from estimating Equation 9 across different subsets of the data set. In this case, with observations from each quarter of the calendar year. All coefficients correspond to the 2SLS specification with controls, state and quarter-by-year fixed effects. All the dependent, independent, and instrumental variables are expressed as a percentage of each state's average discretionary revenues (DR) from 2009-2016. Time FE = Quarter-Year FE. Standard errors clustered by state. Significance level: *p < 0.10 , ** p < 0.05 , *** p < 0.01

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Table 2: Effects of Cash Reserves on Short-Term Debt

	(1)	(2)	(3)	(4)
Panel A: OLS Estimates				
Cash Reserves (% DR) $\hat{\delta}$	-0.152***	-0.043	0.067*	0.093**
	(0.030)	(0.031)	(0.036)	(0.036)
Panel B: 2SLS IV Estimates				
Cash Reserves (% DR) $\hat{\delta}$	0.194	0.325	0.211*	0.246**
	(0.149)	(0.200)	(0.107)	(0.107)
First Stage: FGP Error $\hat{\beta}$	1.565**	1.131**	1.661***	1.467***
	(0.573)	(0.454)	(0.415)	(0.365)
Cragg-Donald F-Statistic	7.4171	6.9449	30.0677	24.2066
Short-Term Debt (Mean)	0.0519	0.0519	0.0519	0.0519
Short-Term Debt (SD)	0.0635	0.0635	0.0635	0.0635
Cash Reserves (SD)	0.1548	0.1548	0.1548	0.1548
Num.Obs.	597	597	597	597
Controls	No	Yes	No	Yes
State FE	No	No	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

Notes: Panel A shows the results of estimating Equation 1.7 with an OLS estimator across several specifications. Panel B displays the results from estimating Equation 1.9 with a 2SLS estimator using FGP errors as instrument for cash reserves. All the dependent, independent, and instrumental variables are expressed as a percentage of each state's average discretionary revenues (DR) from 2009-2016. Time FE = Quarter-Year FE. Standard errors clustered by state. Significance level: *$p < 0.10$, **$p < 0.05$, *** $p < 0.01$

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Mechanisms: Levels of Cash Reserves

Table 3: Effect of Cash Reserves on Short-Term Debt: Heterogeneity by Distribution of Cash Reserves

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
Cash Reserves (% DR) $\hat{\delta}$	0.012	0.511*	0.701	-0.287
	(0.320)	(0.262)	(0.426)	(0.338)
First Stage: FGP Error $\hat{\beta}$	1.706***	1.677***	0.483	0.445
	(0.469)	(0.362)	(0.438)	(0.374)
Cragg-Donald F-Statistic	7.8162	4.6089	1.3406	0.8011
Short-Term Debt (Mean)	0.0699	0.0671	0.0457	0.0263
Short-Term Debt (SD)	0.0596	0.0693	0.0647	0.0506
Cash Reserves (SD)	0.0823	0.1045	0.0836	0.1849
Num.Obs.	158	140	139	160

Notes: These panels show the results from estimating Equation 9 across different subsets of the data set. In this case, with the states at each quartile of the cash reserves distribution observed in 2018. All coefficients correspond to the 2SLS specification with controls, state and quarter-by-year fixed effects. All the dependent, independent, and instrumental variables are expressed as a percentage of each state's average discretionary revenues (DR) from 2009-2016. Time FE = Quarter-Year FE. Standard errors clustered by state. Significance level: *$p < 0.10$, **$p < 0.05$, *** $p < 0.01$

- **Descriptive Stats:** States with less cash rely more on debt.
- **First Stage:** FGP Timing errors have more predictive power for states with less cash.
- **IV 2nd Quartile:** ⬆️ 5.3% DR.
- **Eff Size:** 0.77 SD_{debt}

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Mechanisms: Credit Quality

Table 5: Effect of Cash Reserves on Short-Term Debt: Heterogeneity by Credit Rating

	AAA	AA	A	BBB,BB
Cash Reserves (% DR) $\hat{\delta}$	-0.041	0.134	0.293*	1.123**
	(0.086)	(0.084)	(0.159)	(0.368)
First Stage: FGP Error $\hat{\beta}$	1.527	1.335**	1.925**	1.551***
	(2.402)	(0.378)	(0.741)	(0.428)
Cragg-Donald F-Statistic	0.9127	4.3514	24.4371	5.5323
Short-Term Debt (Mean)	0.0029	0.0121	0.0522	0.0898
Short-Term Debt (SD)	0.0146	0.0261	0.0622	0.0627
Cash Reserves (SD)	0.24	0.1632	0.1148	0.0744
Num.Obs.	46	74	302	146

- **Descriptive Stats:** Lower rated states rely more on debt.
- **First Stage:** FGP errors have more predictive power for lower rated states.
- **A:** ⬆️ 3.3% DR. **Eff Size:** 0.54 SD_{debt}
- **BBB,BB:** ⬆️ 8.3% DR. **Eff Size:** 1.33 SD_{debt}

Notes: These panels show the results from estimating Equation 9 across different subsets of the data set. In this case, according to the credit rating of each state at any given period of the sample. All coefficients correspond to the 2SLS specification with controls, state and quarter-by-year fixed effects. All the dependent, independent, and instrumental variables are expressed as a percentage of each state's average discretionary revenues (DR) from 2009-2016. Time FE = Quarter-Year FE. Standard errors clustered by state. Significance level: *$p < 0.10$, **$p < 0.05$, *** $p < 0.01$

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Mechanisms: Temporal Heterogeneity and Anticipation Effects

Table 4: Effect of Cash Reserves on Short-Term Debt: Heterogeneity by Quarter

	Q1	Q2	Q3	Q4
Cash Reserves (% DR) $\hat{\delta}$	0.120	0.064	0.489	0.519*
	(0.182)	(0.103)	(0.471)	(0.305)
First Stage: FGP Error $\hat{\beta}$	1.377*	1.296***	1.827	2.737**
	(0.693)	(0.464)	(1.156)	(1.014)
Cragg-Donald F-Statistic	3.5495	11.3331	1.8524	6.33
Short-Term Debt (Mean)	0.0569	0.0422	0.0343	0.0746
Short-Term Debt (SD)	0.0605	0.0552	0.049	0.0787
Cash Reserves (SD)	0.141	0.1625	0.1674	0.1292
Num.Obs.	150	150	149	148

Notes: These panels show the results from estimating Equation 9 across different subsets of the data set. In this case, with the observations from each quarter of the calendar year. All coefficients correspond to the 2SLS specification with controls, state and quarter-by-year fixed effects. All the dependent, independent, and instrumental variables are expressed as a percentage of each state's average discretionary revenues (DR) from 2009-2016. Time FE = Quarter-Year FE. Standard errors clustered by state. Significance level: *$p < 0.10$, **$p < 0.05$, *** $p < 0.01$

- **Descriptive Stats:** Debt stocks are higher closer to the end/beginning of the FY.
- **First Stage:** FGP errors have more predictive power in Q2 and Q4
- **Q4:** ⬆️ 6.7% DR. **Eff Size:** 0.85 SD_{debt}
- **Implication:** States smooth cash-flows via short-term debt and preserve cash-reserves.

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Ch2: Cash Reserves and Short-Term Debt under Liquidity Constraints

Coming to the pandemic, treated governments observed lower bond spreads, and less debt issued and traded…

Table: Balance Table: Municipal Debt Outcomes (Primary and Secondary Markets)

	Pre-Intervention Period (Jan19 – Mar20)			Post-Intervention Period (Apr20-Dec21)		
Variable	Control	Treatment	Mean Diff	Control	Treatment	Mean Diff
Panel A: Dependent Variables						
Spread at Issue	0.0820	-0.0497	-0.1317***	0.3817	0.3726	-0.0091
	(0.5572)	(0.4727)	(0.0213)	(0.5241)	(0.5351)	(0.0188)
Amount Issued Per Capita	7.1220	4.6512	-2.4708***	7.4964	5.8880	-1.6085***
	(14.3861)	(9.5284)	(0.4979)	(13.0134)	(12.7902)	(0.4571)
Spread at Trade	0.2950	0.2103	-0.0847***	0.6402	0.4226	-0.2176***
	(0.8971)	(0.8782)	(0.0044)	(1.0243)	(0.8071)	(0.0040)
Amount Traded Per Capita	0.2892	0.2303	-0.0588***	0.2662	0.2394	-0.0268***
	(0.8308)	(0.7299)	(0.0038)	(0.8008)	(0.7753)	(0.0035)

Note: This table shows the balance table across the treatment and control groups, for both the pre-intervention and post-intervention period. Columns Control and Treatment show the mean of each variable, with the standard deviation reported in parenthesis. The column Mean Diff shows the result of a t-test with the standard error reported in parenthesis.

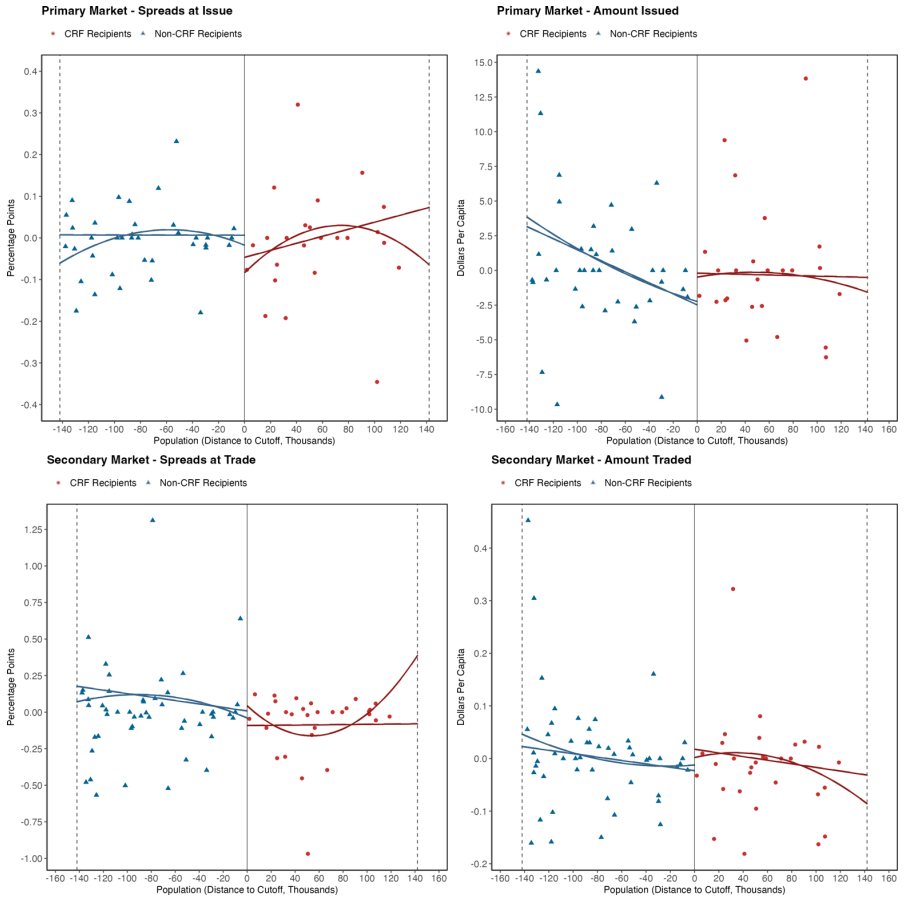
Post-Intervention Period:

- Larger increase in bond spreads and amount of debt issued/traded for treated units.
- Unconditional differences on primary bond spreads not significant.

Table B1: Descriptive Statistics

Variable	Mean	SD	Min	P25	P50	P75	Max	N
Panel A: Primary Market								
Spread at Issue	0.2269	0.5558	-0.93	-0.18	0.14	0.58	2.27	5525
Amount Issued Per Capita	6.4048	12.7385	0.0722	1.3529	3.2381	6.7978	195.2708	5525
Coupon	3.602	1.3746	0	2.471	4	5	5	5525
Credit Rating	2.8822	1.958	1	1	3	4	10	5525
Years to Maturity	9.3189	6.5066	0	4	8	14	39	5525
Offering Type	0.5006	0.5	0	0	1	1	1	5525
GO Bond	0.5694	0.4952	0	0	1	1	1	5525
Central Government	0.6626	0.4729	0	0	1	1	1	5525
Unemployment Rate	4.9132	2.5674	1.8	3.1	4.4	5.8	17.4	5525
Panel B: Secondary Market								
Spread at Trade	0.4172	0.9293	-2.708	-0.21	0.236	0.808	4.414	373144
Amount Traded Per Capita	0.2585	0.7894	0.008	0.0271	0.0564	0.138	10.1146	373144

Note: This table shows the descriptive statistics of the samples used for the primary and secondary market analysis. Spreads, coupon rate, and the unemployment rate are expressed in percentage points and amounts (issued an traded) in dollars per capita. Offering Type, GO Bond and Central Government are dummy variables that equal to one if the bond sale was competitive, the bond is a general obligation bond, and was issued by the central county government, respectively.



Note: These figures display the scatter binned plots of the dependent variables around the cutoff for treatment assignment, as well as the results from the non-parametric estimation of the statistical model at Equation 1. The gray dashed lines show the optimal bandwidth used for the estimation of the Local Average Treatment Effect. Both linear and quadratic estimations are reported. The top-left scatter-plot (spreads at issue) restricts the vertical axis to exclude an outlier observation that obscures the visualization results.

Table B3: LATE Estimates of the CRF on the Municipal Bond Market (Bandwidth = 90K)

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Model	Spread Issue	Amount Issued	Spread Trade	Amount Traded
Panel A: Non-Parametric				
Linear	-0.122***	2.0563*	-0.1936***	-0.0073
	(0.0348)	(0.8468)	(0.013)	(0.0132)
Quadratic	-1.4567***	-23.5114	1.8227***	-0.5106***
	(0.4362)	(16.662)	(0.1221)	(0.1073)
Panel B: Parametric				
Linear	-0.1858	8.763*	0.1468	0.0783
	(0.1026)	(3.8046)	(0.2258)	(0.0547)
Quadratic	-0.2326*	7.1787**	0.1369	0.0799
	(0.1019)	(2.6133)	(0.2274)	(0.0563)
Mean Dep Var	0.4367	6.6966	0.5943	0.252
SD Dep Var	0.5402	12.4442	0.9836	0.7779
Obs (Left Cutoff)	1117	1117	76170	76170
Obs (Right Cutoff)	1012	1012	57652	57652

Note: This table shows the coefficient estimates of the Local Average Treatment Effect for the dependent variables of interest, on the sample of bonds of all issuers with a population within 90 thousand people from the cutoff. Each column shows the estimations from the non-parametric and parametric estimations, for both linear and quadratic polynomial specifications on the data during the post-intervention period. For the non-parametric estimation, bias corrected estimates with robust standard errors are reported. Parametric estimation reports standard errors clustered at the county level. All econometric specifications include control variables, state and month-by-year fixed effects. Spreads at issue and trade are expressed in percentage points and amount issued and traded are expressed in dollars per capita. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table B4: LATE Estimates of the CRF on the Municipal Bond Market (Bandwidth = 221K)

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Model	Spread Issue	Amount Issued	Spread Trade	Amount Traded
Panel A: Non-Parametric				
Linear	-0.0727*	0.9516	0.0778***	0.0093
	(0.029)	(0.7716)	(0.0105)	(0.0108)
Quadratic	-0.4514*	-7.5199	-3.1384***	-0.2907***
	(0.1849)	(7.0466)	(0.0712)	(0.0696)
Panel B: Parametric				
Linear	-0.0913	5.0732*	-0.4154	0.0744
	(0.0553)	(2.0702)	(0.3178)	(0.043)
Quadratic	-0.0907	4.8842*	-0.4084	0.0742
	(0.0579)	(2.0338)	(0.3122)	(0.043)
Mean Dep Var	0.3958	6.5797	0.5445	0.2582
SD Dep Var	0.533	12.4497	0.9353	0.7978
Obs (Left Cutoff)	3130	3130	123691	123691
Obs (Right Cutoff)	1736	1736	88717	88717

Note: This table shows the coefficient estimates of the Local Average Treatment Effect for the dependent variables of interest, on the sample of bonds of all issuers with a population within 221 thousand people from the cutoff. Each column shows the estimations from the non-parametric and parametric estimations, for both linear and quadratic polynomial specifications on the data during the post-intervention period. For the non-parametric estimation, bias corrected estimates with robust standard errors are reported. Parametric estimation reports standard errors clustered at the county level. All econometric specifications include control variables, state and month-by-year fixed effects. Spreads at issue and trade are expressed in percentage points and amount issued and traded are expressed in dollars per capita. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table B5: LATE Estimates of the CRF on the Municipal Bond Market - Only Central County Governments

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Model	Spread Issue	Amount Issued	Spread Trade	Amount Traded
Panel A: Non-Parametric				
Linear	-0.0305	-1.0945	-0.231***	-0.0467**
	(0.0378)	(1.0154)	(0.0127)	(0.0182)
Quadratic	-0.3976	-4.316	-2.0399***	-0.4323***
	(0.2672)	(8.7396)	(0.089)	(0.1059)
Panel B: Parametric Estimation				
Linear	-0.2346**	3.2395	-0.584*	0.0938
	(0.1112)	(4.6124)	(0.3135)	(0.0663)
Quadratic	-0.2584**	2.4895	-0.5356**	0.0875
	(0.0966)	(4.6091)	(0.2674)	(0.0693)
Mean Dep Var	0.3368	7.2556	0.4833	0.267
SD Dep Var	0.4975	12.5913	0.8759	0.8204
Obs (Left Cutoff)	1058	1058	76896	76896
Obs (Right Cutoff)	876	876	49474	49474

Note: This table shows the coefficient estimates of the Local Average Treatment Effect for the dependent variables of interest on the sample of bonds considering only central county government issuers. Each column shows the estimations from the non-parametric and parametric estimations, for both linear and quadratic polynomial specifications on the data during the post-intervention period. For the non-parametric estimation, bias corrected estimates with robust standard errors are reported. Parametric estimation reports standard errors clustered at the county level. All econometric specifications include control variables, state and month-by-year fixed effects. Spreads at issue and trade are expressed in percentage points and amount issued and traded are expressed in dollars per capita. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table B8: LATE Estimates of the CRF on the Municipal Bond Market - Excluding Indirect CRF Recipients (Bandwidth = 90K)

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Model	Spread Issue	Amount Issued	Spread Trade	Amount Traded
Panel A: Non-Parametric Estimation				
Linear	-0.0029	-0.3027	0.1318***	-0.0608***
	(0.0416)	(1.1194)	(0.0142)	(0.0209)
Quadratic	-1.3837	-2.8847	3.3754***	-3.1102***
	(1.382)	(65.157)	(0.4399)	(0.7688)
Panel B: Parametric Estimation				
Linear	-0.0113	9.368	0.1834**	0.1667*
	(0.1876)	(5.6185)	(0.0835)	(0.0897)
Quadratic	-0.027	8.7181**	0.1831**	0.1768*
	(0.1467)	(3.6627)	(0.0801)	(0.0894)
Mean Dep Var	0.4163	7.9846	0.4444	0.2757
SD Dep Var	0.5318	12.6195	0.852	0.8452
Obs (Left Cutoff)	589	589	32432	32432
Obs (Right Cutoff)	672	672	40016	40016

Note: This table shows the coefficient estimates of the Local Average Treatment Effect for the dependent variables of interest on the sample of bonds of all issuers with a population within 90 thousand people from the cutoff, but excluding indirect CRF recipients from both the treatment and control arms of the study. Each column shows the estimations from the non-parametric and parametric estimations, for both linear and quadratic polynomial specifications on the data during the post-intervention period. For the non-parametric estimation, bias corrected estimates with robust standard errors are reported. Parametric estimation reports standard errors clustered at the county level. All econometric specifications include control variables, state and month-by-year fixed effects. Spreads at issue and trade are expressed in percentage points and amount issued and traded are expressed in dollars per-capita. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table B6: Robustness Checks: Placebo Estimates on the LATE

Model	Spread Issue	Amount Issued	Spread Trade	Amount Traded
Panel A: Non-Parametric				
Linear	-0.029	1.4842	0.1315***	0.0265**
	(0.0324)	(0.9819)	(0.0129)	(0.0116)
Quadratic	-0.2298	10.7008	-0.5157***	-0.293***
	(0.1992)	(7.6214)	(0.0791)	(0.0805)
Panel B: Parametric Estimation				
Linear	-0.0949	4.9162**	0.0145	0.055
	(0.0859)	(2.4537)	(0.0922)	(0.0565)
Quadratic	-0.0935	5.0143*	0.0205	0.049
	(0.0836)	(2.5278)	(0.0894)	(0.0546)
Mean Dep Var	0.0219	5.9954	0.2582	0.2636
SD Dep Var	0.5244	12.4678	0.8899	0.789
Obs (Left Cutoff)	1272	1272	93529	93529
Obs (Right Cutoff)	998	998	63630	63630

Note: This table shows the coefficient estimates of the Local Average Treatment Effect for the dependent variables of interest. Each column shows the estimations from the non-parametric and parametric estimations, for both linear and quadratic polynomial specifications on the data during the post-intervention period. For the non-parametric estimation, bias corrected estimates with robust standard errors are reported. Parametric estimation reports standard errors clustered at the county level. All econometric specifications include control variables, state and month-by-year fixed effects. Spreads at issue and trade are expressed in percentage points and amount issued and traded are expressed in dollars per capita. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 3: Treatment Effect Heterogeneity by Credit Rating and Years to Maturity

Variable	Spread (1)	Spread (2)	Amount (1)	Amount (2)
Panel A: PM-Years to Maturity				
3-5	-0.0112	-0.0086	0.9771	1.0442
	(0.032)	(0.0327)	(2.2011)	(2.1798)
5-10	0.0298	0.032	0.7753	0.8329
	(0.0605)	(0.0606)	(2.1669)	(2.1519)
11-15	-0.0201	-0.0183	0.1319	0.1804
	(0.0859)	(0.0863)	(2.2331)	(2.2234)
16-20	-0.0841	-0.0822	-0.0978	-0.0501
	(0.0936)	(0.0933)	(2.5196)	(2.5081)
+20	-0.193	-0.1825	-8.7971	-8.5248
	(0.1304)	(0.1305)	(13.6596)	(13.5597)
Panel B: PM-Credit Rating				
AAA	-0.9599***	-0.9813***	10.7081**	10.8928**
	(0.1918)	(0.2049)	(4.7261)	(4.657)
AA	-1.0689***	-1.114***	10.2448**	10.6344**
	(0.1919)	(0.2124)	(3.8895)	(4.2342)
A	-0.968***	-1.0174***	8.0134	8.4395
	(0.2657)	(0.2759)	(5.8052)	(5.7057)
Panel C: SM-Years to Maturity				
3-5	0.0116	0.0037	0.0005	-0.0001
	(0.0297)	(0.0297)	(0.0143)	(0.0146)
5-10	-0.0999	-0.1073*	-0.0265	-0.027
	(0.062)	(0.0633)	(0.0199)	(0.0197)
11-15	-0.0013	-0.008	-0.032	-0.0325
	(0.0579)	(0.0589)	(0.0388)	(0.0386)
16-20	-0.239	-0.2543	0.062	0.0609
	(0.2148)	(0.2197)	(0.0449)	(0.0443)
+20	-0.2843	-0.3057	0.1435**	0.142**
	(0.2582)	(0.2642)	(0.0704)	(0.0709)
Panel D: SM-Credit Rating				
AAA	-0.5049	-0.4544	-0.0309	-0.0314
	(0.3888)	(0.4042)	(0.1304)	(0.1328)
AA	-0.5574	-0.5568	0.0253	0.0253
	(0.4044)	(0.4066)	(0.1214)	(0.1214)
A	-0.6092	-0.6151	0.1825*	0.1825*
	(0.4403)	(0.4421)	(0.0922)	(0.0921)
Specification	Linear	Quadratic	Linear	Quadratic
Mean Dep Var	0.3772	0.3772	6.7051	6.7051
Std Dev Dep Var	0.5295	0.5295	12.9271	12.9271

Note: This table shows the estimates of coefficients θ_s from Equation 2.2 under the parametric estimation. Each panel shows the results from independent models on the dependent variables of interest. PM: Primary Market. SM: Secondary Market. Clustered standard errors at the county level are reported in parenthesis. Spreads at issue and trade are expressed in percentage points and amount issued and traded are expressed in dollars per capita. All econometric specifications include control variables, state and month-by-year fixed effects. Spreads at issue and trade are expressed in percentage points and amount issued and traded are expressed in dollars per-capita. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Ch3: Preferences for Local Public Goods and the Gig Economy

Manipulation at the Cutoff

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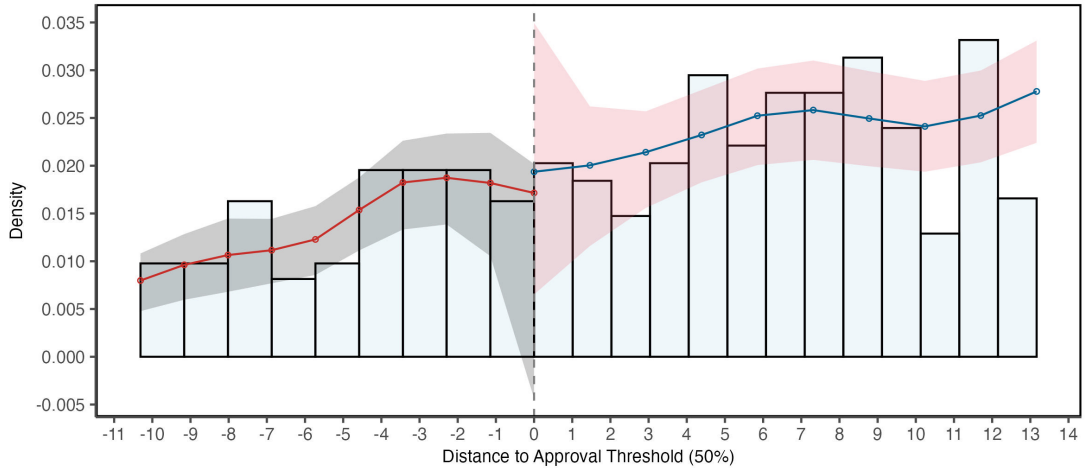
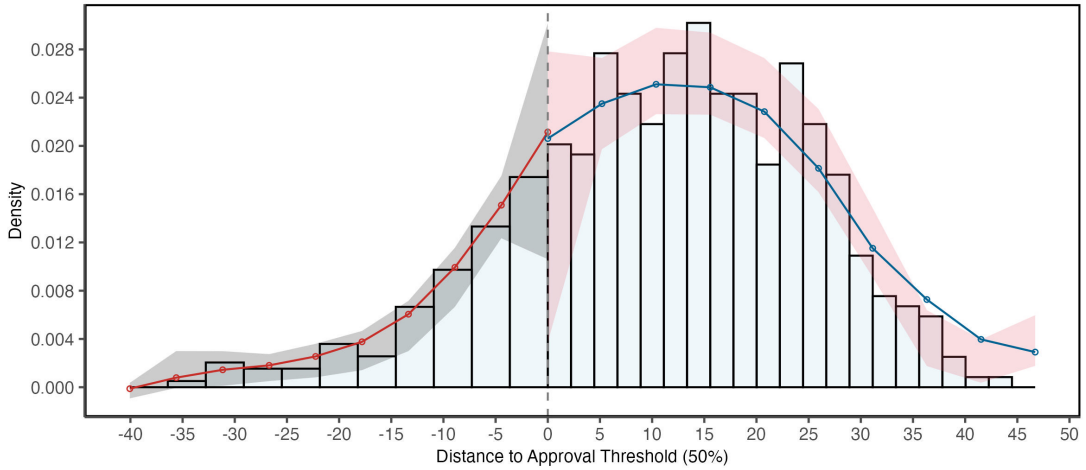
Manipulation at the Cutoff Test | Linear Polynomial

McCrary Test p-value: 0.1872



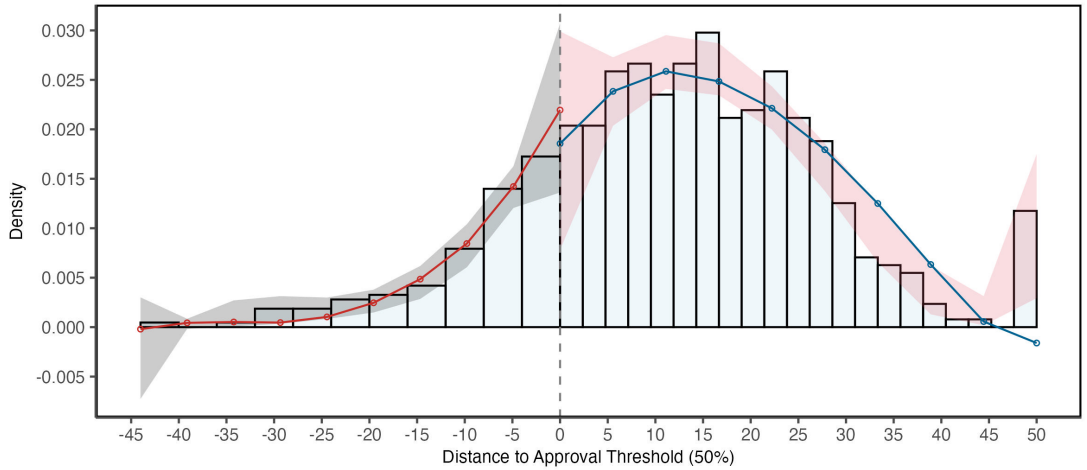
Manipulation at the Cutoff Test | Quadratic Polynomial

McCrary Test p-value: 0.5638



Manipulation at the Cutoff Test | Cubic Polynomial

McCrary Test p-value: 0.6462



No Evidence of Sorting at the Cutoff

McCrary Test: Null hypothesis: density of voting results is continuous at the cutoff for approval (50% vote).

- Linear: 0.1872
- Quadratic: 0.5638
- Cubic: 0.6462

Null hypothesis not rejected.

Treatment vs Control Covariate Balance Before the Election

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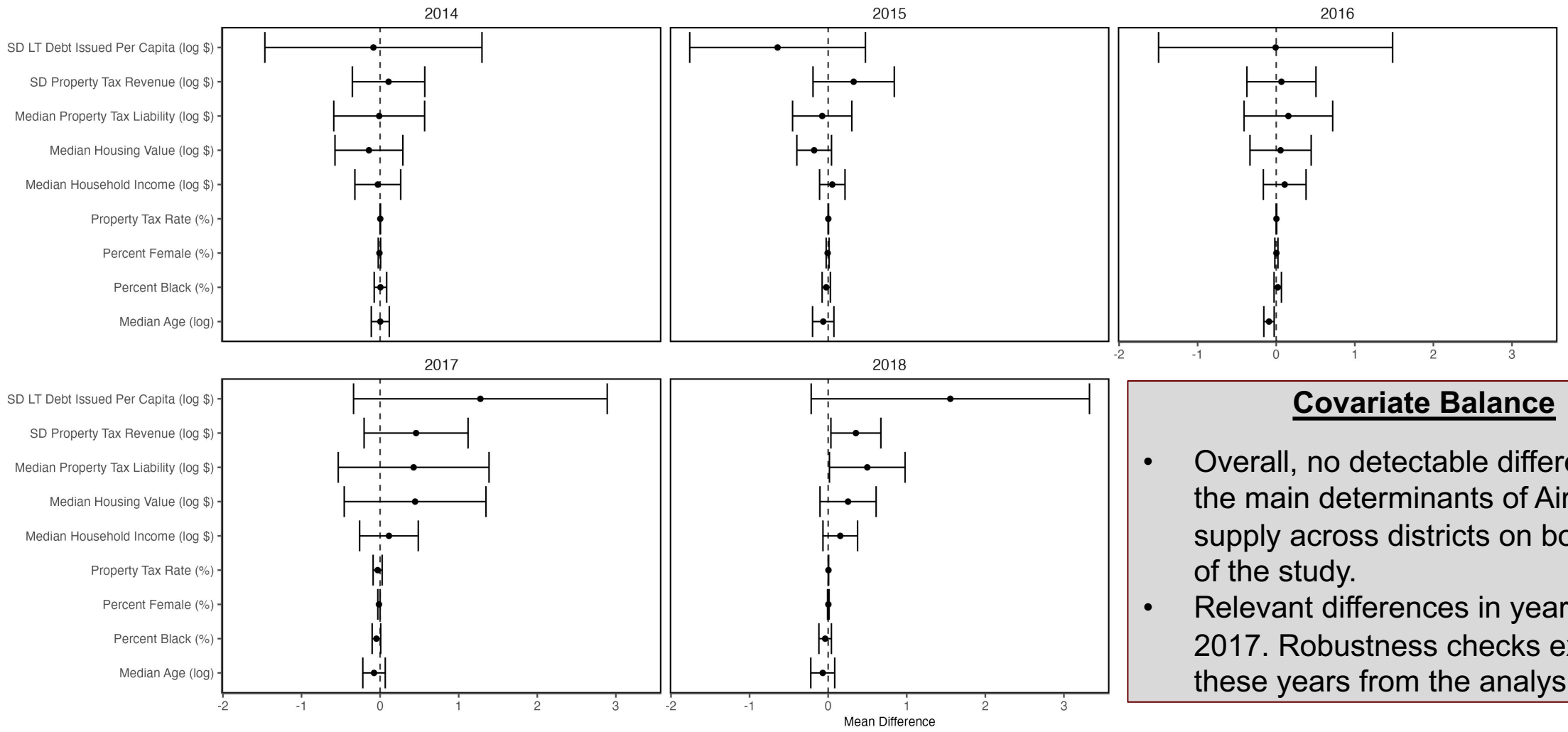
Balance Table: Determinants of Airbnb Supply (Bandwidth = 5%)

Mean Difference between Treatment and Control School Districts before the Election



Covariate Balance

- Overall, no detectable differences on the main determinants of Airbnb supply across districts on both arms of the study.
- Relevant differences in years 2015, 2017. Robustness checks exclude these years from the analysis.

Note: This graph shows the mean difference for a set of explanatory variables between the treatment and control group in the years before the election, for each sub-experiment.

First Stage Results

Table 1: Effect of Bond Referendums on School District Expenditures (Bandwidth 5.0%)

	LT Debt	Tot Exp	Cap Out	Curr Exp
Dynamic RDD	528.0267**	671.3869**	326.9377*	218.0685**
	(228.549)	(297.478)	(185.221)	(103.68)
	[0.1444]	[0.7602]	[0.4278]	[0.1438]
Diff in Disc	584.6412**	797.0932**	329.133**	210.1022**
	(245.214)	(311.504)	(162.205)	(103.835)
	[0.2531]	[0.8211]	[0.2709]	[0.061]
Mean DV	604.8338	2911.8492	403.497	1951.6
SD DV	2777.9492	4513.2469	1325.5615	1401.0568

Table 2: Effect of Bond Referendums on School District Expenditures (Bandwidth 2.5%)

	LT Debt	Tot Exp	Cap Out	Curr Exp
Dynamic RDD	401.6118**	479.8049	294.5042	128.2706
	(201.633)	(300.453)	(208.837)	(112.128)
	[0.7057]	[0.1141]	[0.3023]	[0.0974]
Diff in Disc	394.7794**	428.3382	313.2683	123.8204
	(194.35)	(258.103)	(192.089)	(108.131)
	[0.3528]	[0.0626]	[0.2719]	[0.1366]
Mean DV	408.4397	2262.5616	311.1514	1809.5774
SD DV	908.487	834.1857	453.8058	563.8843

Table 3: Effect of Bond Referendums on Housing Market Outcomes (Bandwidth 5.0%)

	Prop Tax Revenue	Prop Tax Liab	Prop Tax Rate	Housing Units
Dynamic RDD	243.8045	15.5454	-0.0127	-0.0058
	(189.702)	(30.092)	(0.05)	(0.006)
	[0.7601]	[0.0377]	[0.2705]	[0.5714]
Diff in Disc	383.7478	9.5863	-0.0062	-0.0056
	(291.933)	(27.962)	(0.054)	(0.006)
	[0.8474]	[0.0558]	[0.0068]	[0.2725]
Mean DV	1584.596	692.3485	1.3797	0.2753
SD DV	4362.0415	511.2711	0.3835	0.0492

Table 4: Effect of Bond Referendums on Housing Market Outcomes (Bandwidth 2.5%)

	Prop Tax Revenue	Prop Tax Liab	Prop Tax Rate	Housing Units
Dynamic RDD	156.6866	3.9134	-0.0048	-0.008
	(174.637)	(38.26)	(0.078)	(0.008)
	[0.822]	[0.1579]	[0.4727]	[0.7725]
Diff in Disc	47.5964	-4.4559	-0.0037	-0.0093
	(155.337)	(34.893)	(0.085)	(0.009)
	[0.2233]	[0.0089]	[0.1]	[0.7882]
Mean DV	1015.2478	646.3323	1.3727	0.2692
SD DV	520.6357	430.9053	0.3755	0.0401

Main Results: Effect of Bond Referendums in the Airbnb Market

Table 5: Effect of Bond Approvals on Pr(Exit) the Airbnb Market

	Bandwidth 10.0%	Bandwidth 7.5%	Bandwidth 5.0%	Bandwidth 2.5%
Panel A: Linear Polynomial				
Dynamic RDD	-0.0594**	-0.0829**	-0.1076***	-0.1441**
	(0.029)	(0.036)	(0.042)	(0.056)
	[0.0044]	[0.1746]	[0.0716]	[0.3872]
Diff in Disc	-0.0602**	-0.0857**	-0.1076***	-0.1039*
	(0.029)	(0.035)	(0.042)	(0.057)
	[0.0028]	[0.1893]	[0.0045]	[0.7112]
Panel B: Quadratic Polynomial				
Dynamic RDD	-0.0709**	-0.0844**	-0.1065**	-0.101*
	(0.032)	(0.038)	(0.042)	(0.057)
	[0.0628]	[0.1922]	[0.0733]	[0.4937]
Diff in Disc	-0.0977***	-0.1049***	-0.1176***	-0.1196**
	(0.037)	(0.036)	(0.043)	(0.058)
	[0.1905]	[0.039]	[0.0838]	[0.4229]
Obs Left Cutoff	8665	8463	7885	4488
Obs Right Cutoff	17791	10953	6989	4966
Mean DV	0.6018	0.6103	0.6021	0.6339
SD DV	0.4896	0.4877	0.4895	0.4818

Note: This table shows the coefficient estimates from the main model (θ). Standard errors clustered at the school district level reported in parenthesis. P-value of the pre-trends Wald test is reported between brackets.

Main Results: Effect of Bond Referendums in the Airbnb Market

Table 6: Effect of Bond Approvals on Pr(Entry) the Airbnb Market

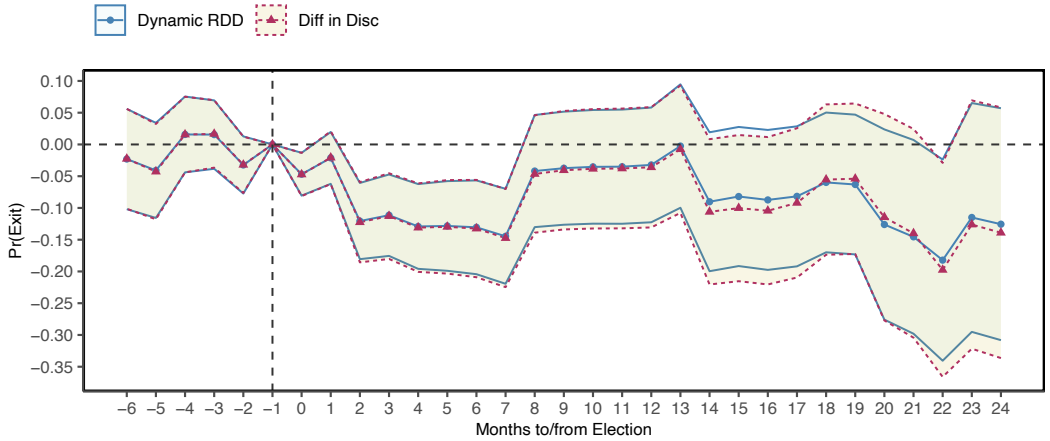
	Bandwidth 10.0%	Bandwidth 7.5%	Bandwidth 5.0%	Bandwidth 2.5%
Panel A: Linear Polynomial				
Dynamic RDD	0.0073	-0.0064	0.0554*	-0.0175
	(0.012)	(0.015)	(0.031)	(0.043)
	[0]	[0.0539]	[0.0405]	[0.3479]
Diff in Disc	0.0482***	0.0633***	0.0658**	-0.0178
	(0.014)	(0.024)	(0.031)	(0.044)
	[0]	[0.0502]	[0.0298]	[0.6838]
Panel B: Quadratic Polynomial				
Dynamic RDD	-0.0066	-0.0091	0.0281	-0.02
	(0.013)	(0.015)	(0.032)	(0.044)
	[0.0542]	[0.0602]	[0.0688]	[0.3521]
Diff in Disc	0.0649**	0.0456	0.0098	-0.0134
	(0.026)	(0.03)	(0.035)	(0.046)
	[0.0012]	[0.0791]	[0.1003]	[0.0191]
Obs Left Cutoff	21001	19876	18588	13118
Obs Right Cutoff	189450	26976	19731	7433
Mean DV	0.3679	0.3649	0.3599	0.3909
SD DV	0.4822	0.4814	0.48	0.488

Note: This table shows the coefficient estimates from the main model (θ). Standard errors clustered at the school district level reported in parenthesis. P-value of the pre-trends Wald test is reported between brackets.

Effect of Bond Referendums in the Airbnb Market: Pr(Exit)

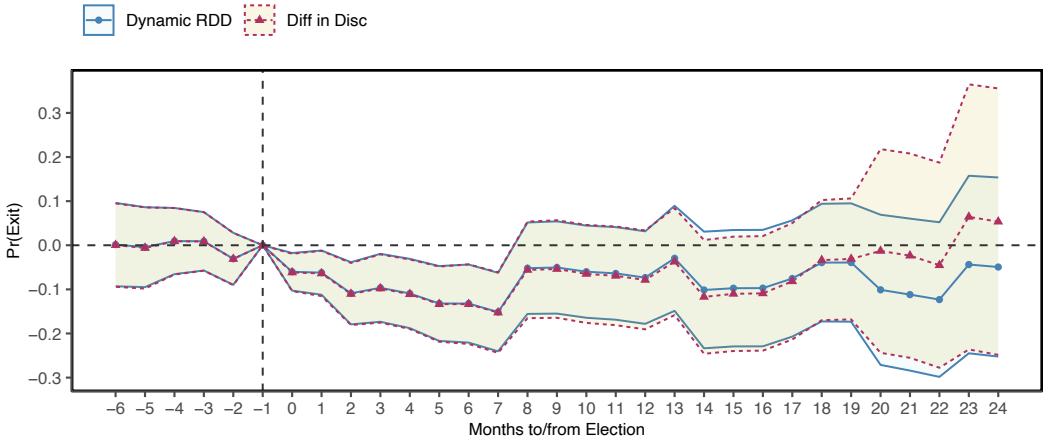
Bandwidth 10.0%

*Dynamic RDD:–0.0594**[0.0044]| Diff in Disc:–0.0602**[0.0028]*



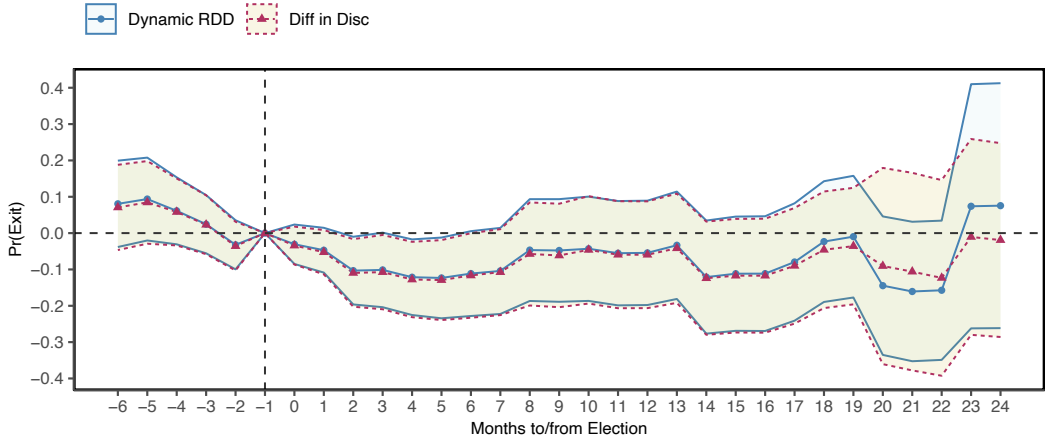
Bandwidth 7.5%

*Dynamic RDD:–0.0829**[0.1746]| Diff in Disc:–0.0857**[0.1893]*



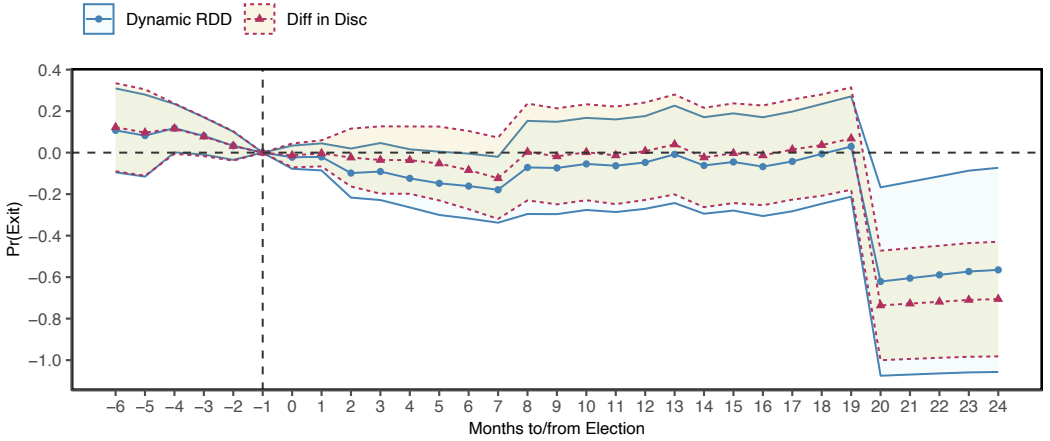
Bandwidth 5.0%

*Dynamic RDD:–0.1076***[0.0716]| Diff in Disc:–0.1076***[0.0045]*



Bandwidth 2.5%

*Dynamic RDD:–0.1441**[0.3872]| Diff in Disc:–0.1039*[0.7112]*

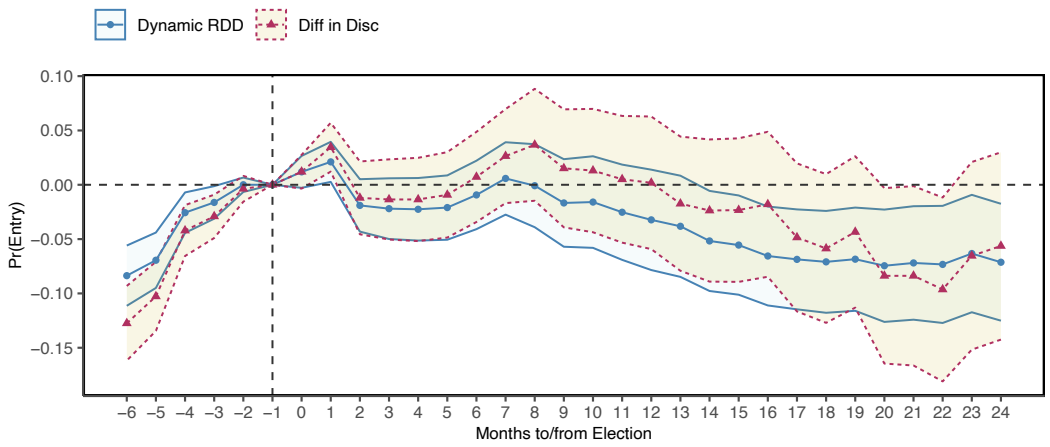


Note: This graph shows the estimates for coefficients θt from the stacked RDD and stacked diff in disc. Each panel shows the results for models considering elections for different bandwidths around the approval cutoff. The shaded areas show confidence intervals at the 95% level, assuming clustered standard errors at the school district level. The estimates reported at the top of the graphs correspond to the point estimates of θ from Equations 1 and 3. P-value of a Wald test on the joint nullity of coefficients θt for the years before the election of Equations 2 and 4 reported in brackets. Econometric models assume a cubic polynomial on the running variable and its interaction terms.

Effect of Bond Referendums in the Airbnb Market: Pr(Entry)

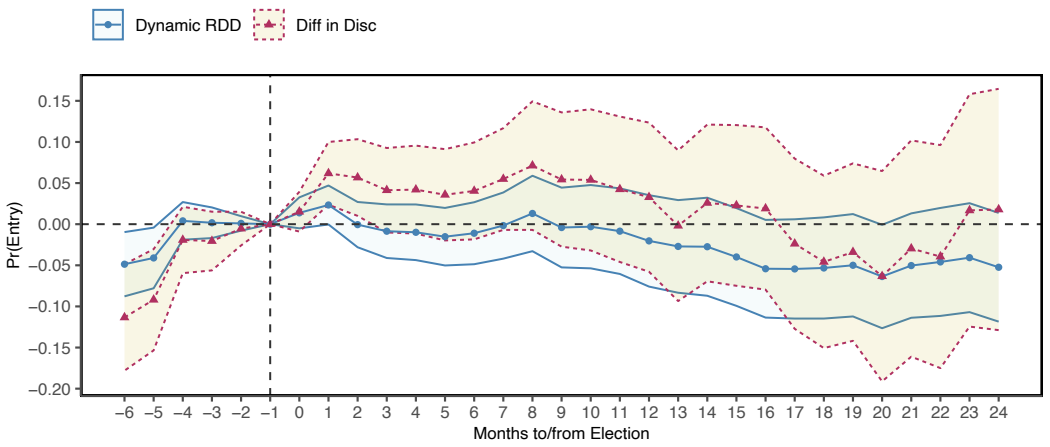
Bandwidth 10.0%

*Dynamic RDD:0.0073 [0]| Diff in Disc:0.0482***[0]*



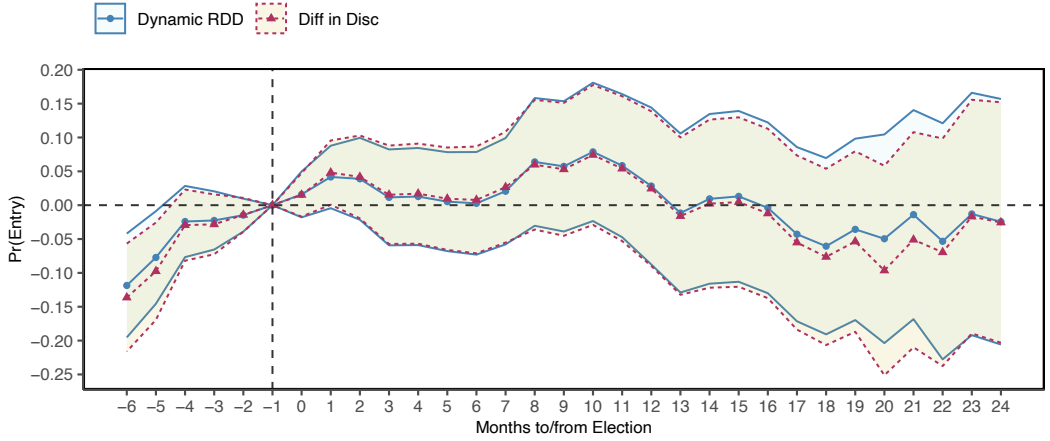
Bandwidth 7.5%

*Dynamic RDD:−0.0064 [0.0539]| Diff in Disc:0.0633***[0.0502]*



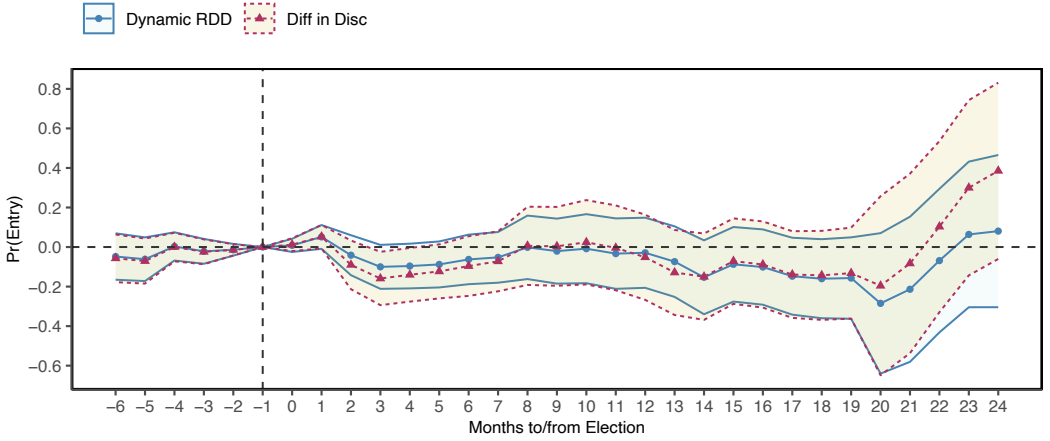
Bandwidth 5.0%

Dynamic RDD:0.0554[0.0405]| Diff in Disc:0.0658**[0.0298]*



Bandwidth 2.5%

Dynamic RDD:−0.0175 [0.3479]| Diff in Disc:−0.0178 [0.6838]



Note: This graph shows the estimates for coefficients θt from the stacked RDD and stacked diff in disc. Each panel shows the results for models considering elections for different bandwidths around the approval cutoff. The shaded areas show confidence intervals at the 95% level, assuming clustered standard errors at the school district level. The estimates reported at the top of the graphs correspond to the point estimates of θ from Equations 1 and 3. P-value of a Wald test on the joint nullity of coefficients θt for the years before the election of Equations 2 and 4 reported in brackets. Econometric models assume a cubic polynomial on the running variable and its interaction terms.

Robustness Check: Enforce Common Pre-Trends

Table 11: Effect of Bond Approvals on Pr(Exit) the Airbnb Market — Enforce Common Pre-Trends

	Bandwidth 10.0%	Bandwidth 7.5%	Bandwidth 5.0%	Bandwidth 2.5%
Panel A: Linear Polynomial				
Dynamic RDD	-0.0975***	-0.1323***	-0.1283**	-0.1831**
	(0.034)	(0.041)	(0.052)	(0.075)
Diff in Disc	-0.1018***	-0.1421***	-0.1381***	-0.1172
	(0.034)	(0.041)	(0.052)	(0.079)
Panel B: Quadratic Polynomial				
Dynamic RDD	-0.1028***	-0.1191***	-0.1228**	-0.1179
	(0.037)	(0.042)	(0.052)	(0.08)
Diff in Disc	-0.1561***	-0.153***	-0.1407**	-0.1335*
	(0.048)	(0.047)	(0.056)	(0.081)
Panel C: Cubic Polynomial				
Dynamic RDD	-0.1262***	-0.1087**	-0.1385**	-0.1356*
	(0.041)	(0.048)	(0.057)	(0.081)
Diff in Disc	-0.1438***	-0.1345**	-0.1276*	-0.133
	(0.051)	(0.063)	(0.076)	(0.081)
Obs Left Cutoff	6404	6210	5887	3410
Obs Right Cutoff	12347	7650	4951	3600
Mean DV	0.4721	0.4791	0.478	0.5279
SD DV	0.4993	0.4996	0.4996	0.4993

Note: This table shows the coefficient estimates from the main model (θ). Standard errors clustered at the school district level reported in parenthesis. In this case, pre-trends Wald tests cannot be computed as point estimates for some coefficients θ_t in the pre-election period are estimated precisely at zero. See Figure 12 for reference.

Table 12: Effect of Bond Approvals on Pr(Entry) the Airbnb Market — Enforce Common Pre-Trends

	Bandwidth 10.0%	Bandwidth 7.5%	Bandwidth 5.0%	Bandwidth 2.5%
Panel A: Linear Polynomial				
Dynamic RDD	-0.0026	-0.0138	0.0404	-0.066
	(0.012)	(0.015)	(0.033)	(0.048)
Diff in Disc	0.0347**	0.0556**	0.0429	-0.0569
	(0.015)	(0.026)	(0.034)	(0.05)
Panel B: Quadratic Polynomial				
Dynamic RDD	-0.0128	-0.0165	0.0153	-0.061
	(0.014)	(0.015)	(0.034)	(0.049)
Diff in Disc	0.0603**	0.0153	-0.0227	-0.0586
	(0.028)	(0.032)	(0.036)	(0.053)
Panel C: Cubic Polynomial				
Dynamic RDD	-0.0247	-0.027*	-0.0106	-0.0697
	(0.015)	(0.016)	(0.042)	(0.051)
Diff in Disc	0.0123	-0.0336	-0.0827*	-0.0667
	(0.033)	(0.04)	(0.048)	(0.053)
Obs Left Cutoff	17971	16908	16039	11190
Obs Right Cutoff	173855	22453	16455	5919
Mean DV	0.3101	0.3049	0.3051	0.3449
SD DV	0.4626	0.4604	0.4605	0.4754

Note: This table shows the coefficient estimates from the main model (θ). Standard errors clustered at the school district level reported in parenthesis. In this case, pre-trends Wald tests cannot be computed as point estimates for some coefficients θ_t in the pre-election period are estimated precisely at zero. See Figure 13 for reference.

Effect on Airbnb Supply | Pr(Entry) : Dynamic Effects

Table 8: Effect of Bond Approvals on Pr(Exit) the Airbnb Market — Dynamic Effect

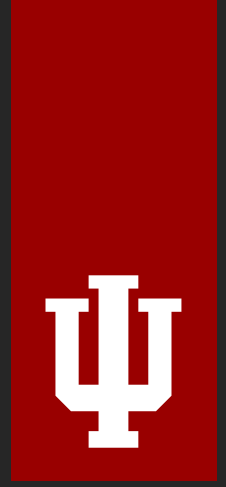
	Bandwidth 10.0%	Bandwidth 7.5%	Bandwidth 5.0%	Bandwidth 2.5%
Panel A: Dynamic RDD				
Years to Election = 0	-0.061*	-0.084**	-0.131***	-0.1443**
	(0.032)	(0.038)	(0.045)	(0.064)
Years to Election = 1	-0.0529	-0.0782	-0.1394***	-0.133
	(0.046)	(0.058)	(0.053)	(0.083)
Years to Election = 2	-0.0767	0.0534	0.0942	-0.4747**
	(0.07)	(0.086)	(0.12)	(0.228)
Panel B: Diff in Disc				
Years to Election = 0	-0.0639**	-0.0867**	-0.1304***	-0.1088
	(0.032)	(0.037)	(0.045)	(0.067)
Years to Election = 1	-0.058	-0.0822*	-0.1385***	-0.0992
	(0.046)	(0.049)	(0.052)	(0.079)
Years to Election = 2	-0.0953	0.2173	-0.0342	-0.6396***
	(0.092)	(0.181)	(0.149)	(0.124)
Obs Left Cutoff	12204	11898	11156	6248
Obs Right Cutoff	25616	15088	9139	6355
Mean DV	0.6308	0.643	0.638	0.674
SD DV	0.4826	0.4792	0.4806	0.4688

Note: This table shows the coefficient estimates of coefficients θ_y from Equations 3.7 and 3.8. Each coefficient shows the effect in the probability of exiting the market, throughout the years following the election. Standard errors clustered at the school district level reported in parenthesis.

Table 9: Effect of Bond Approvals on Pr(Entry) the Airbnb Market — Dynamic Effect

	Bandwidth 10.0%	Bandwidth 7.5%	Bandwidth 5.0%	Bandwidth 2.5%
Panel A: Dynamic RDD				
Years to Election = 0	0.0481***	0.0138	0.0965***	0.0012
	(0.013)	(0.017)	(0.031)	(0.049)
Years to Election = 1	-0.0009	-0.0237	0.0565	-0.056
	(0.017)	(0.022)	(0.046)	(0.073)
Years to Election = 2	-0.0018	-0.0062	0.1116	0.0197
	(0.021)	(0.028)	(0.071)	(0.17)
Panel B: Diff in Disc				
Years to Election = 0	0.0945***	0.0942***	0.1062***	0.0102
	(0.015)	(0.026)	(0.033)	(0.051)
Years to Election = 1	0.037	0.046	0.0542	-0.0365
	(0.024)	(0.037)	(0.046)	(0.078)
Years to Election = 2	0.0068	0.0474	0.0915	0.3538*
	(0.035)	(0.06)	(0.072)	(0.208)
Obs Left Cutoff	29958	28308	26654	18568
Obs Right Cutoff	296050	39508	28966	10144
Mean DV	0.3886	0.3839	0.3809	0.3964
SD DV	0.4874	0.4863	0.4856	0.4892

Note: This table shows the coefficient estimates of coefficients θ_y from Equations 3.7 and 3.8. Each coefficient shows the effect in the probability of exiting the market, throughout the years following the election. Standard errors clustered at the school district level reported in parenthesis.



O’Neill School of Public and Environmental Affairs

Essays on Fiscal Federalism and Debt Management

Luis Navarro

Dissertation Defense
April 24, 2025