Causal Inference in Empirical Research on Non-Market Strategies

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- **The data sources and methods we will see here are not an exhaustive list or they are ranked in any order. They are only my personal list of some interesting datasets and methods in non-market research.**

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- How many of you have had training in causal methods (econometrics)?

The Non-Market Phenomena

- Research questions about antecedents, strategies, and consequences for firms in the domain of public and private politics
- **Public politics**
  - Corporate Political Action (CPA): lobbying, campaign financing, advocacy, outside jobs

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- **Private politics**
  - Social movements, activism, boycotts, conflicts, philanthropy, stakeholder management, CSR

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  - Does a long-term orientation create value for shareholders?
  - Do companies with higher CSR are more likely to obtain government procurement contracts?
  - Does state ownership affect the internationalization of domestic firms?

Non-Market Research: Some sources of data

- `Center for Responsive Politics`
  - Money in politics
  - Data on elections, politicians (personal finance), fundraising committees, campaign financing and expenditure, lobbying and lobbyists, and revolving door
  - Pros:
  - Cons:

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    - Detailed information connecting firms to legislation and politicians
    - Bulk data can be downloaded
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  - Cons:
    - Some data quality issues, such as bills that are identified as being lobbied, and inability to distinguish issue-specific lobbyists' activities, or specific legislators that were targeted, or the message transmitted
    - Amendments to lobbying reports create duplicates
    - Nonstandard entries identifying the corporation and their subsidiaries (difficult to merge with financial data)

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- `LobbyView`
  - MIT's Political Science Professor In Song Kim
  - Firm-level Lobbying & Congressional Bills Database in the US
  - Data on corporation, issues, associated bills and sponsors, recipient lobbyists, and text search
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    - It overcomes main issues in the OpenSecrets base using natural language processing and matching algorithms (matching bills lobbied, issue-specific activity)
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  - Cons:
    - Bulk data is not yet available to download
    - The search website is still in the beta version

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- `Database on Ideology, Money in Politics, and Elections (DIME)`
  - Stanford's Political Science Professor Adam Bonica
  - General resource for the study of campaign finance and ideology in American politics
  - It uses the CFscore scaling method (Ideal point, spacial metrics)
  - Over 130 million political contributions to local, state, and federal elections (1979 to 2014)). It shows data for over 70k candidates and 14M donor individuals and 1.7M organizations.
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    - Identification of important political actors (Fortune 500 execs)
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  - Cons:
    - Matching between individual donors and business executives (as low as 40%)
    - Some FEC records have misspellings and poor information on employer/occupation

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  - Cons:
    - It is not free
    - Bulk data not available for download (some access restricts 100 docs per download)
    - Search parameters are input manually
    - As in most media coverage bases (Earl et al. 2004)
      - Selection bias (i.e.,ideological biases, over-reporting of negative events)
      - Description bias (the veracity of the coverage, opinion and not facts)

Non-Market Research: Some sources of data

- `BoardEx: Relationship Capital Management`
  - 900,000+ (directors, senior management, disclosed earners) of over 20K companies (listed and private)
  - Educational background, prior employment, and connections of directors and executives
  - Proportion of politically connected directors, using CEO-level controls such as age, gender, and experience
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    - It is not free
    - It is not clear how they solve name ambiguity

Non-Market Research: Some sources of data

- `Global Database on Events, Language (Location) and Tone (GDELT)`
  - "GDELT Project monitors the world's broadcast, print, and web news from nearly every corner of every country in over 100 languages and identifies the people, locations, organizations, themes, sources, emotions, counts, quotes, images and events driving our global society every second of every day, creating a free open platform for computing on the entire world."
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  - Pros:
    - It maps a wide variety of events (interaction between two actors), such as conflicts, violent attacks, sentiments.
    - "Essentially it takes a sentence like "The United States criticized Russia yesterday for deploying its troops in Crimea, in which a recent clash with its soldiers left 10 civilians injured" and transforms this blurb of unstructured text into three structured database entries, recording US CRITICIZES RUSSIA, RUSSIA TROOP-DEPLOY UKRAINE (CRIMEA), and RUSSIA MATERIAL-CONFLICT CIVILIANS (CRIMEA). Nearly 60 attributes are captured for each event, including the approximate location of the action and those involved."
    - It is free, and cloud-based
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    - It is free, and cloud-based
  - Cons:
    - Event coverage by foreign and domestic sources (reduced bias vs lost in translation)
    - Stories can be poor for some less developed areas. It is only as perfect as the source
    - The original data is not released for verification

Non-Market Research: Some sources of data

- `MSCI KLD STATS Environmental, Social, and Governance (ESG) Performance Indicators`
  - Over 6,4k compaies, daily monitoring of over 2k media publications
  - Exposure to ESG risks
  - 96 unique corporate governance metrics (board, pay, ownership, control, accounting practices)
  - Pros:
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  - Cons:
    - It is not free
    - The use of the base to construct a single measure might be arbitrary

Non-Market Research: Some sources of data

- Other sources of data:
  - Surveys (like World Bank): complement disclosed information, but it has sample bias (DeFigueiredo and Ritcher, 2014).
  - Dynamics of Collective Action: Reports of social movements in the US
  - Uppsala Conflict Data Program: information on state- and non-state based violence
  - Foundation Directory Online (FDO): information on corporate giving of US firms through their company-sponsored foundations and corporate giving programs.
  - Other media coverage: Pro quest Newspaper, Thomsom Reuters, S&P Global Market Intelligence
  - LobbyPlag: data of 3,100 amendments by Members of the European Parliament
  - Wikileaks

Causal Effects

Leveling the Playing Field

- If X produces an effect on Y, then X causes Y.
- X need to be present, regardless of the presence of other causes, for Y to produce Y? **X is a necessary condition**
- X alone produces Y, but Y can be produced without the presence of X **X is a sufficient condition**
- X need to be present to produce Y and no other factors are required to produce Y **X is a necessary and sufficient condition**

- How do you conceptualize your theoretical mechanism?
- In, $X->Y$, the $->$ is very important!

Identifying Causal Effects: the experimental ideal

Leveling the Playing Field

- Example: Does lobbying increase firm financial performance?

Lobbying?	ROA	p-value
Yes	15%	
No	10%	0.001

- What does this table say?
- Does it answer the research question?

Identifying Causal Effects: the experimental ideal

- The most important notion is the concept of **Potential Outcomes**:

$$Y_i = \begin{cases} Y_{1i} & \text{if} \quad D_i = 1 \\ Y_{0i} & \text{if} \quad D_i = 0 \end{cases}$$

$Y_i = Y_{0i} + (Y_{1i} - Y_{0i})D_i$

Causal Effect $= Y_{1i} - Y_{0i}$

$D_i = \{0, 1\}$, Treatment status of firm i, Lobbying $= \{$no, yes$\}$

Y_{1i} = ROA of firm i given that it has lobbied

Y_{0i} = ROA of firm i had it not lobbied, irrespective of whether it actually has

- The performance of lobbying firms had they not lobbied $(Y_{1i}|Di = 0)$ and the performance of firms that did not lobby had they lobbied $(Y_{0i}|Di = 1)$ are alternative (potential) paths not taken! It is impossible to go back in time and observe their potential effects!

Identifying Causal Effects: the experimental ideal

- The **Selection Bias** problem:

$$E[Y_i|D_i = 1] - E[Y_i|D_i = 0] = \texttt{(Observed differences in performance)}$$

$$E[Y_{1i}|D_i = 1] - E[Y_{0i}|D_i = 1] + \texttt{(Avg. treat. eff. of the treated - ATT)}$$

$$E[Y_{0i}|D_i = 1] - E[Y_{0i}|D_i = 0] \texttt{ (Selection Bias)}$$

  - The **selection bias** term measures the performance difference without lobbying, between those firms that **chose** to lobby and those who did not. These are correlated with the treatment status.
  - Managers decide to invest in lobbying to the extent to which they believe their firms have the right capabilities to increase firm performance using this tool. Given they have a fair notion of their firms' capabilities, capable firms are more likely to lobby and show a positive performance than firms lacking these capabilities. This add a positive selection bias.
  - This self-selection into the "treatment" or "control" group plagues the observed effects with selection bias.

Identifying Causal Effects: the experimental ideal

- **Random assignment** solves the selection bias problem because the treatment status D_i is independent of the potential outcomes. The average performance of firms that do not lobby is not different had these firms lobbied or not. There is no selection bias.
- Treatment and control groups have **counterfactual** properties:

$E[Y_i|D_i = 1] - E[Y_i|D_i = 0] =$ `(Observed differences in performance)`

$E[Y_{1i}|D_i = 1] - E[Y_{0i}|D_i = 0] =$

$E[Y_{1i}|D_i = 1] - E[Y0_i|D_i = 1] =$

$E[Y_{1i} - Y_{0i}|D_i = 1]$

$E[Y_{1i} - Y_{0i}]$ `(Avg. treatment effects)`

Identifying Causal Effects: the experimental ideal

- The randomized controlled trials (RCT) are not common practice in non-market research. Rather, researchers need to find and exploit good opportunities to get "as good as random assignments" to treatment and control groups using **observational data** in quasi- or natural experiments.
- Field experiments are an alternative whose adoption has been increasing in strategy research
- Other solutions involving or combining better regression model specifications are also acceptable, e.g., modeling the self-selection process, or using appropriate covariates to increase precision.
- However, the bottom line is to mitigate the selection bias.

Implications for Regression

- The general liner functional model: $Y_i = \alpha + \rho D_i + X_i\gamma + \eta_i$
- Does the coefficient ρ can be identified as a causal effect?
- Omitted variable bias (OVB): When there is selection bias, the error η_i correlates with the treatment status D_i indicating that a possible variable, such as firm capabilities, is associated with the treatment status. Therefore, ρ is not the causal effect.

Implications for Regression

- The Conditional Independence Assumption (CIA): When all possible variables **X** that might correlate with the treatment status and firm performance are observed, then ρ is a causal effect conditional on the values of X_i. In a more general sense, ρ is the average difference between observed outcomes for the treatment and control groups for individuals that has the same values on **X**. For example, firms with similar levels of observed capabilities.
- But, there are two problems:
  - Several important variables are hard to measure
  - Good controls should be exogenous variables (not affected by the treatment)! Bad control can be equally harmful!
- **More creative empirical strategies, less statistics!**

Fixed Effects Regression

- In panel data,

  $y_{it} = \alpha + \beta x_{it} + u_{it}$

- To model individual heterogeneity (individual error component):

  $y_{it} = \alpha + \beta x_{it} + \phi_i + \epsilon_{it}$

- If ϕ_i is correlated with the regressors: within model (include dummies with OLS) (FE)
- if ϕ_i is not correlated with the regressors: but it induces correlation between errors. It needs a GLS estimator that takes into account the variance of the two error components u_{it} and ϵ_{it}. There are a number of procedures to estimate it.

Fixed Effects Regression

- Assumptions:
  - Individual heterogeneity is relevant, but fixed over time, and that the coefficient is applied across all individuals (unless specified that each group has a slope)
  - Haussman tests whether fixed effects is different than the random effects model, but the decision should be a theoretic one.
  - GLS estimation is an appropriate solution when serial correlation and heterocedasticity is a problem, otherwise OLS with dummies is efficient.
  - **Does a FE regression coefficient identify the causal effect?**
    - Weak form of endogeneity: Omitted variable that are fixed, no simultaneity bias.

Differences-in-Differences

- DID is a special case of FE (aggregated data in fixed-effects groups (treatment and control))
- $y_{ist} = \alpha + \gamma_s + \gamma_t + \delta_{st} + \beta x_{it} + \theta_i + \theta_t + \epsilon_{ist}$
- δ is the treatment effect
- Basic assumptions:
  - Exogenous shock, identifiable change in the trend for the treatment group
  - Parallel pre-trends of treatment and control groups (counterfactual properties)
  - No migration of individuals from on group to another over time
  - No effect for other periods of time other than when the shock is applied

Differences-in-Differences

- Rodrigo Bandeira de Mello, Arnaldo Mauerberg Jr., and Julien Jourdan. 2018. Now serving Freedom Fries: The Effect of Stigma on the Political Behavior of Multinationals. Nominated for Best Conference Paper SMS 2018.
- Hypotheses: Event stigma (assigned to their home country) increases the lobbying expenditures of foreign multinationals (moderated by critical issues) and decreases donations to Republican candidates

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- Mechanism: Event stigma is one mechanism through which liability of foreignness affect the political behavior of multinationals. It complicates access to politicians who are afraid of being stigmatized by contagion. The short term strategy is to change perception of current politicians (lobbying), and long-term strategy is the change the audience by electing politicians less prone to perceive stigma (donations).

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- Context: Foreign multinationals in the US. LDA Lobbying data and corporate donations data from Open Secrets, other data from S&P Capital IQ. Final lobbying reports and donations from 306 different multinationals, from 1998 to 2007.

Differences-in-Differences

- Potential identification issues?

Differences-in-Differences

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  - Good (bad) guys are always good (bad) guys (recent history). Lots of confounding factors: religion, foreign trade, terrorism, geopolitics. How do disentangle the actual source/effect of liability of foreignness?
  - Country-level fixed effects does not change the "origin" of the multinational
  - How do a bad (good) guy becomes a good (bad) guy?

Differences-in-Differences

- DID Setup:
  - Exogenous event: Iraq Invasion in 2003. France led an opposition at the UN Security Council, along with Germany and Russia. Huge resistance in the Capitol Hill against these countries: French fries became Freedom Fires and French Toast became Freedom Toast

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  - Treatment: Multinationals from France, Germany, Russia, Chile, Pakistan, Syria, and Guinea (opposing invasion)
  - Control: Multinationals from UK, China, Spain, Mexico, and Bulgaria (in favor of the invasion)

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  - How do you assess this setup?

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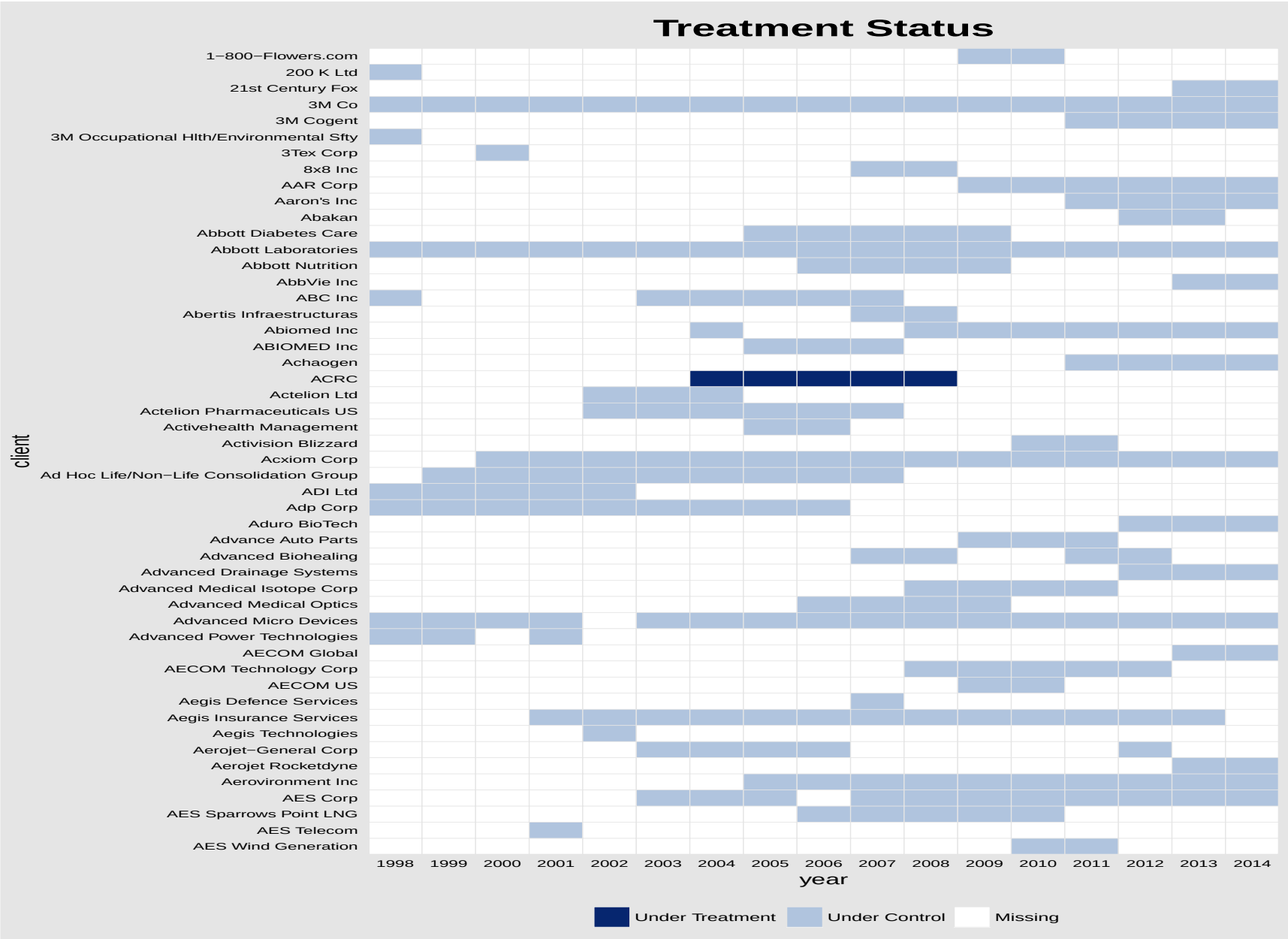
  - Exogenous event: Iraq Invasion in 2003. France led an opposition at the UN Security Council, along with Germany and Russia. Huge resistance in the Capitol Hill against these countries: French fries became Freedom Fires and French Toast became Freedom Toast
  - Treatment: Multinationals from France, Germany, Russia, Chile, Pakistan, Syria, and Guinea (opposing invasion)
  - Control: Multinationals from UK, China, Spain, Mexico, and Bulgaria (in favor of the invasion)
  - How do you assess this setup?
    - Can the "exogenous shock" contaminate the control? Can the effect be driven by a reduction in lobbying expenditures of firms in the control group?
    - The US was at war. Does it make more difficult for any foreign multinational, in general, when contrasted to local firms? Does this matter, or what it matters is the hypothesized contrast?
    - Do these foreign MNE need to lobby for more complicated issues after the invasion?
    - Could this event be anticipated because of the 9/11 terror attacks?

R Package: panelView



Differences-in-Differences

Table 3. Lobbying Spending in Critical Issues (H3)

	1998-2007	*1999-2006*	*2000-2005*	*2001-2004*	*2002-2003*
Diff-in-diff x Critical issue	-3,307.576	235.127	23,596.680	39,126.240***	27,197.140**
	(24,776.550)	(16,625.690)	(18,890.730)	(10,459.460)	(12,328.470)
Observations	3,036	2,421	1,823	1,224	627
AdjustedR2	0.040	0.046	0.046	0.042	0.020
F Statistic	2.696*** (df=74;2961)	2.736** *(df=67;2353)	2.427*** (df=62;1760)	1.975*** (df=55;1168)	1.261 (df=49;577)

Note: *p<0.1; **p<0.05; ***p<0.01

Table 4. Campaign Donation (H4)

	1998-2008	*2000-2006*	*2002-2004*
Diff-in-diff x Republican	-1,613.306***	-2,162.166***	-3,260.233***
	(91.498)	(232.573)	(574.904)
Observations	3,432	2,719	1,293
Adjusted R2	0.114	0.125	0.165
F Statistic	13.284*** (df=36;3395)	13.537*** (df=31;2687)	11.642*** (df=24;1268)

Note: *p<0.1; **p<0.05; ***p<0.01

Differences-in-Differences

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- Hypotheses: The size of an immigrant community will have a positive effect on the profitability of firms from the same home country located in the host location (with moderating effects of CEO nationality).

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- Context: "Foreign firms that operated in Russia between 2006 and 2011. Data from Ruslana database, part of Amadeus and Orbis, owned by Bureau van Dijk (BvD). Our dataset consists of 23,489 firms with at least 50 percent foreign ownership and at least one year of financial data, and for which we were able to identify whether the CEO was an immigrant or a native Russian for all years with financial data". "The uniqueness of Russian names helps determine whether top managers of foreign firms are Russian or foreign" (some countries were excluded).

Differences-in-Differences

- Potential identification issues?

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  - May affluent areas attract both immigrants and firms?
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  - High performing firms could attract co-nationals immigration
  - More "nationalistic" companies (cultural value) with national CEO do better in immigrant community
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- The initial model is a fixed-effect regression (firm, industry, country of origin, host region). What issues are solved/not solved with FE?
  - Solved: Culture, country of origin
  - Not solved: Simultaneity bias (immigrants follow firms), affluent areas attract firms and immigrants

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Baseline	Controlling for the stock of immigrants from other countries	Country and region dummies	Time-variant controls	Firm fixed effects	Firm fixed effects and time-variant controls
Dependent variable	OROA	OROA	OROA	OROA	OROA	OROA
Model	OLS	OLS	OLS	OLS	OLS	OLS
Ln(immigrants)	**0.005*** **	**0.005*** **	**0.004** **	**0.005*** **	**0.015** **	**0.013** **
	(0.001)	**(0.001)**	**(0.002)**	**(0.001)**	**(0.006)**	**(0.006)**
Ln(asset)	0.016***	0.016***	0.017***	0.017***	0.029***	0.031***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.005)
Ln(debt)	-0.005***	-0.005***	-0.006***	-0.006***	-0.007***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Ln(age)	0.027***	0.027***	0.029***	0.028***		
	(0.003)	(0.003)	(0.002)	(0.003)		
Ln(country GDP per capita)	-0.004*	-0.003	0.021	-0.004*	0.021	0.020
	(0.002)	(0.002)	(0.014)	(0.003)	(0.014)	(0.016)
Ln(region GDP per capita)	-0.017***	-0.009**	0.015	-0.013	0.001	-0.009
	(0.004)	(0.004)	(0.023)	(0.011)	(0.020)	(0.026)
Ln(other immigrants)		-0.011***				
		(0.003)				
Home-country and host-region time-variant control variables[b]				Yes		Yes
Constant	-0.021	0.021	-0.579	-0.256*	-0.613***	-1.202***
	(0.063)	(0.064)	(421.491)	(0.133)	(0.236)	(0.365)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes		
Country dummies			Yes			
Region dummies			Yes			
R^2/within R^2	0.040	0.041	0.053	0.042	0.015	0.016
N	57,651	57,651	57,651	55,465	57,651	55,465

Differences-in-Differences

- For robustness: DID
  - Exogenous event: The shock is based on two major construction projects (Asia-Pacific Economic Cooperation and 2014 Winter Olympic Games) that attracted a significant amount of foreign labor from certain countries (worker quotas were lifted in late 2000s and early 2010s) to specific areas. The year of the "shock" was arbitrarily defined as 2008.
  - Treatment: firms in the affected region whose ownership are from countries providing workers for these projects (Uzbekistan, Tajikistan, Turkey, China, North Korea, Armenia, Kyrgyzstan, Ukraine, Belarus, and Serbia)
  - Control: firms from all other countries in the affected region

Differences-in-Differences

- How do you assess the DID setup?

Differences-in-Differences

- How do you assess the DID setup?
  - Does the type of workers that were attracted matter?
  - Is there enough time to build social embeddedness? "Many of these workers came with their family members, who found jobs in other industries; some workers who started in the construction industry gradually transitioned to other industries."
  - Could this event be expected by firms? Robustness tests for firms founded before 2006 when there would be no information about venues. Founded or established in the area? What about the parallel trends assumption?
  - The "shock" year is not precise. Placebo for other year?
  - The construction firms were directly affected by the shock and immigrants came to work for the projects. Robustness tests excluded these firms. Can I say that the projects affect both the immigration and the performance of co-national firms in other sectors?

Table 4. Exogenous Increase in the Number of Immigrants in Regions with Major Construction Projects During 2008–2011[a]

	(1)	(2)	(3)	(4)	(5)
Variables	All firms	Entrepreneurs with immigrant CEOs	All other firms	Excluding manufacturing firms	Firms founded before 2006
Dependent variable	OROA	OROA	OROA	OROA	OROA
Model	OLS DD	OLS DD	OLS DD	OLS DD	OLS DD
Affected country*post	**0.040****	**0.245*****	**0.065***	**0.045***	**0.065*****
	(0.018)	**(0.065)**	**(0.036)**	**(0.024)**	**(0.022)**
Ln(assets)	0.060***	0.035	0.069***	0.056***	0.075***
	(0.014)	(0.028)	(0.014)	(0.014)	(0.015)
Ln(debt)	-0.022***	-0.019	-0.025***	-0.021***	-0.027***
	(0.007)	(0.020)	(0.006)	(0.007)	(0.007)
Constant	-0.565***	-0.260	-0.738***	-0.538***	-0.762***
	(0.160)	(0.153)	(0.237)	(0.149)	(0.234)
Year dummies	Yes	Yes	Yes	Yes	Yes
Firm f.e.	Yes	Yes	Yes	Yes	Yes
Within R^2	0.043	0.103	0.052	0.039	0.056
N	1,899	411	1,488	1,541	1,601

Differences-in-Differences

- Other interesting examples of "exogenous shocks" used in non-market research:

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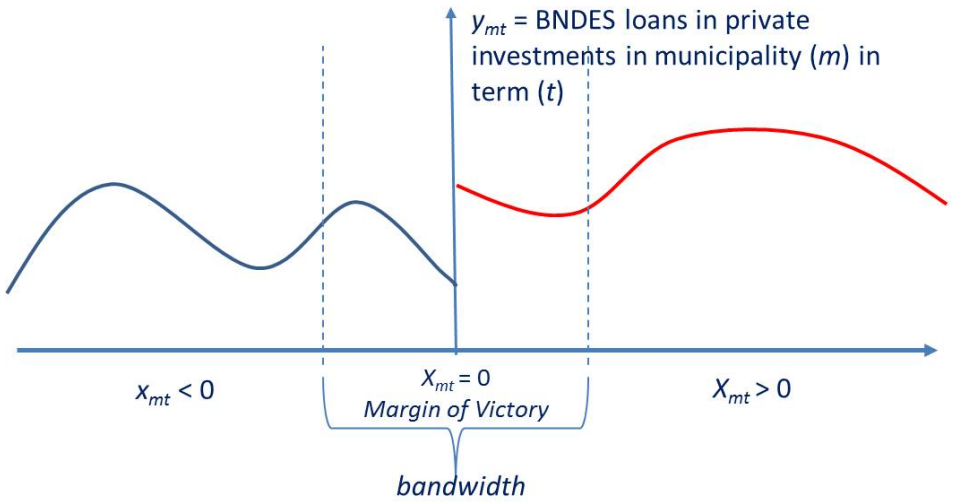
  - The use of Twitter on political donations (corporate, only indirectly) (Petrova, Sen, and Yildirim, 2017)
  - Oil shocks to test the effects of uncertainty on CSR (Zhao, 2018)

Regression Discontinuity Design



$$TE = \lim_{x_{mt} \to 0+} E[y_{mt} \mid x_{mt}] - \lim_{x_{mt} \to 0-} E[y_{mt} \mid x_{mt}]$$

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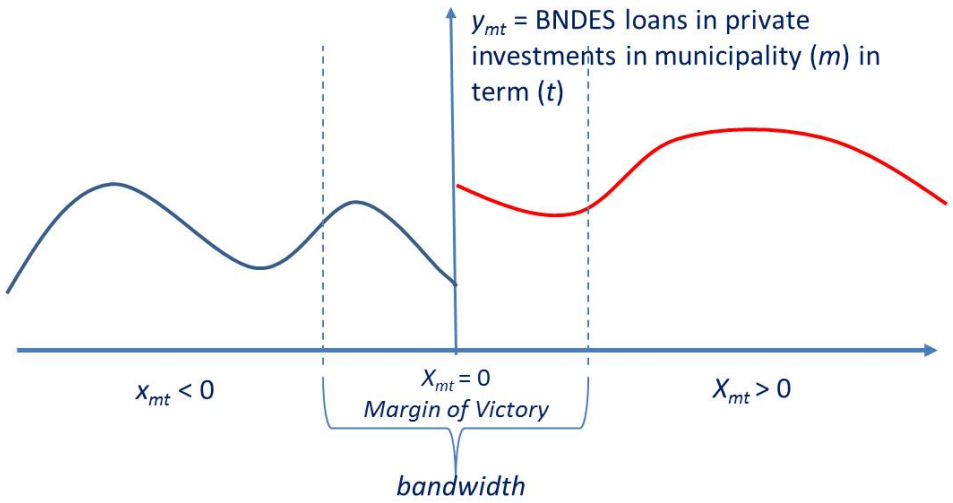

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- Exogenous running variable defines the treatment/control on each side of an "exogenous" cutoff
- The function must be discontinuous at the cutoff
- There must be no sorting of units around the cutoff
- Treatment and control must not differ in pre-treatment background features
- There must be no effect in other values other than the cutoff
- The effect is identified locally at the cutoff (bandwidths)

Regression Discontinuity Design

- Rodrigo Bandeira de Mello. 2017. Leveraging the Winner: Corporate political action under resource-dependence heterogeneity
- Hypotheses: Firms allocating economic assets (strategic projects) to exploit the political alignment between local and central governments will have superior CPA performance (subsidized loans). This "political" decisions is a substitute for political capabilities.

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- Mechanism: In a multiparty presidential system, the president needs to build a stable coalition in congress. Firms exploits this institutional feature to bargain for better subsidies when their projects serve as pork to please national politicians' core constituents.
- Context: Brazilian President uses the National Development Bank to grant subsidies. Brazil had 28 Political parties in Congress. Sample: 688 loan contracts for 477 firms and 274 recipient municipalities, from 2005-2012 (two terms)

Regression Discontinuity Design

- Potential identification issues?

Regression Discontinuity Design

- Potential identification issues?
  - Firms can influence the alignment (working to elect a given mayor)
  - Firms are more willing to invest in localities with better economic goods (infrastructure, labor)
  - Firms may invest in less development localities to profit from government incentives

Regression Discontinuity Design

- Causal identification
  - Close mayoral elections as the running variable
  - The treatment (control) group is the sample of loan contracts invested by firms in a given municipality where, in the previous election, the party of the winner candidate is coalition-aligned (opposition) and the party of the runner-up candidate is non-aligned (coalition-aligned)
  - Projects are not randomly assigned, but it is part of the treatment: firms endogenously select project-locality that will maximize the coalition-building efforts by the government and will benefit more from subsidized finance. Given the covariate balance, I am assuming that there is no reason for a project to receive more subsidies other than its political attractiveness (being riskier, for instance)

Empirical Strategy

- Model specification:
  - Functional form: local linear (triangular weights).
  - Four bandwidths: 6%, 7%, 10%
  - Covariates: election-effect controls, firm industry, and firm political capabilities

$$\min \sum_{c=1}^{N} 1\{-h \geq x_m \leq h\} K_{\lambda(x_m)}(y_{cim} - \alpha - \tau D_m - \beta x_m - \boldsymbol{A} - D_m \boldsymbol{A} - \gamma D_m x_m)$$

Figure: Brazilian cities with BNDES loans to private firms

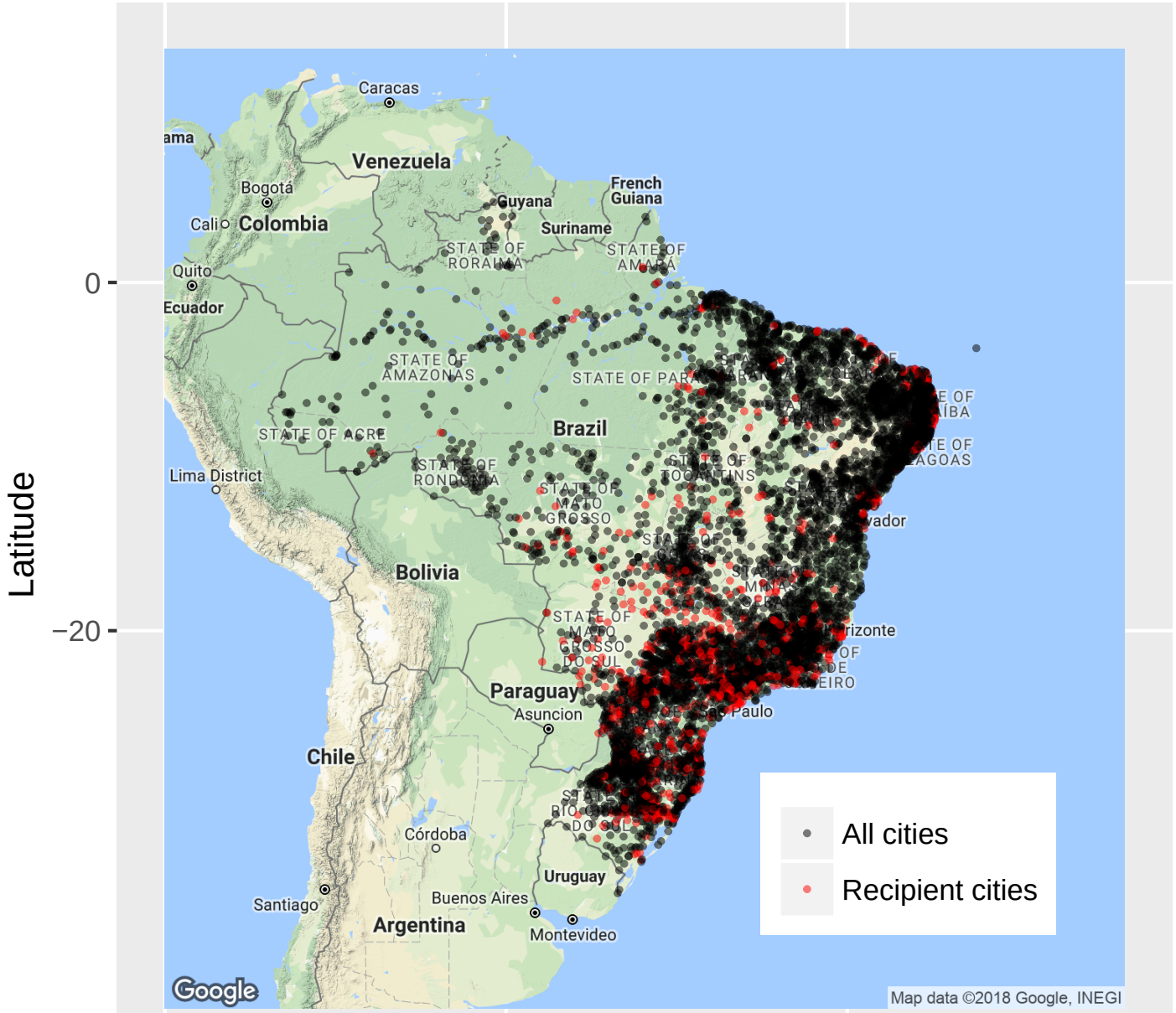


Figure: Geographic distribution of treatment and control units

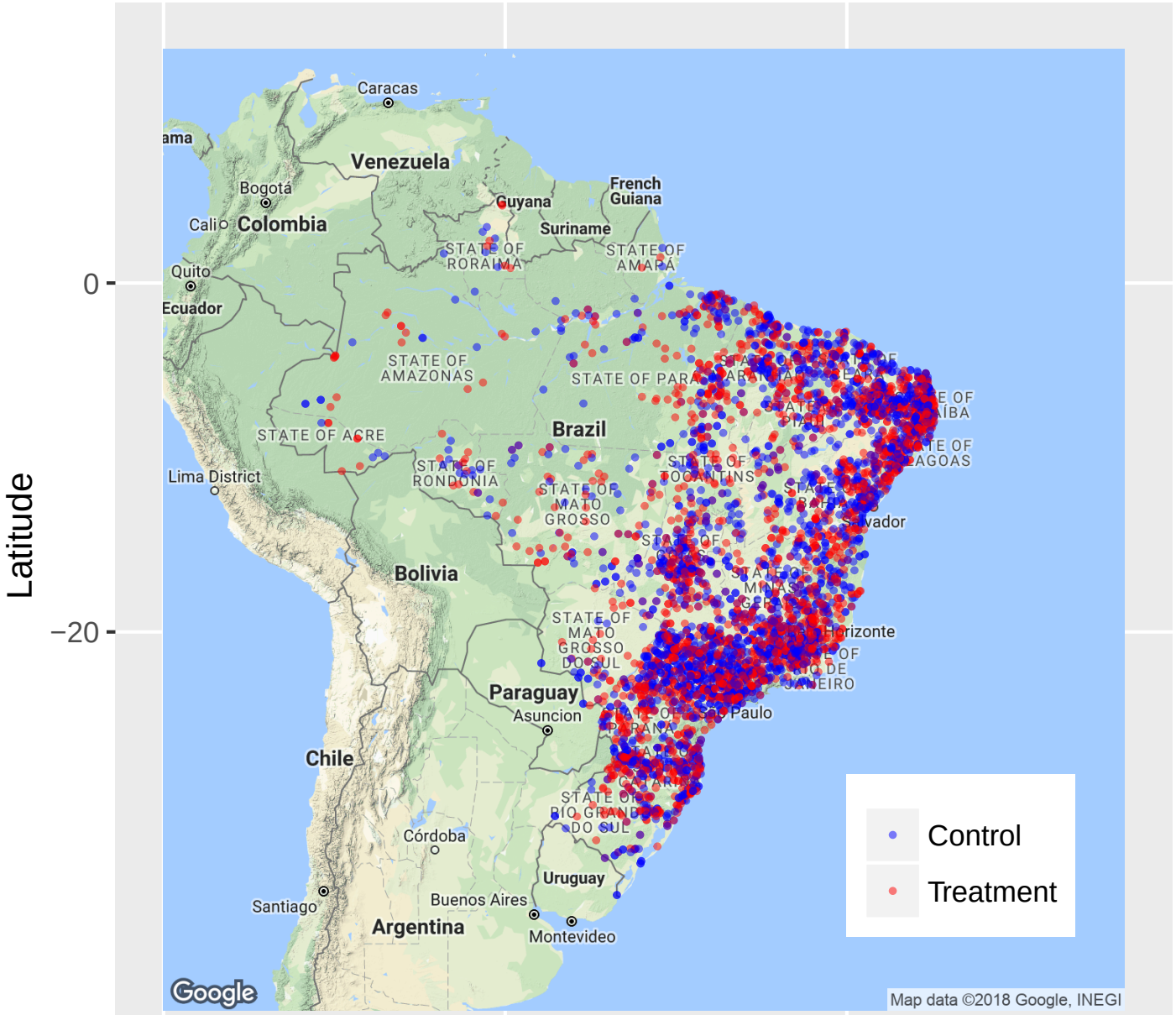


Table: Effects of previous loans on subsequent margin of victory

Dependent Variables	**Mean**	**Mean**	**h=6%**	**h=7%**	**h=10%**
	Full Sample	Pre Treatment	Coef (se)	Coef (se)	Coef (se)
Total Loans	3.83	5.30	-1.17	-1.30	-0.72
			(2.45)	(2.21)	(1.87)
Total Loans (1st half)	1.18	0.90	0.67	0.67	0.80
			(0.91)	(0.84)	(0.68)
Total Loans (2nd half)	2.05	3.40	-1.48	-1.73	-1.57
			(2.11)	(1.91)	(1.58)
N	3,821		1,223	1,410	1,881

Note: Sample of municipalities in the treatment and control group. The dependent variables are the total amount of BNDES loans to projects invested in the municipality in the respective years within the previous four-year term of the mayor.

Figure: Smoothness tests for several pre-treatment covariates

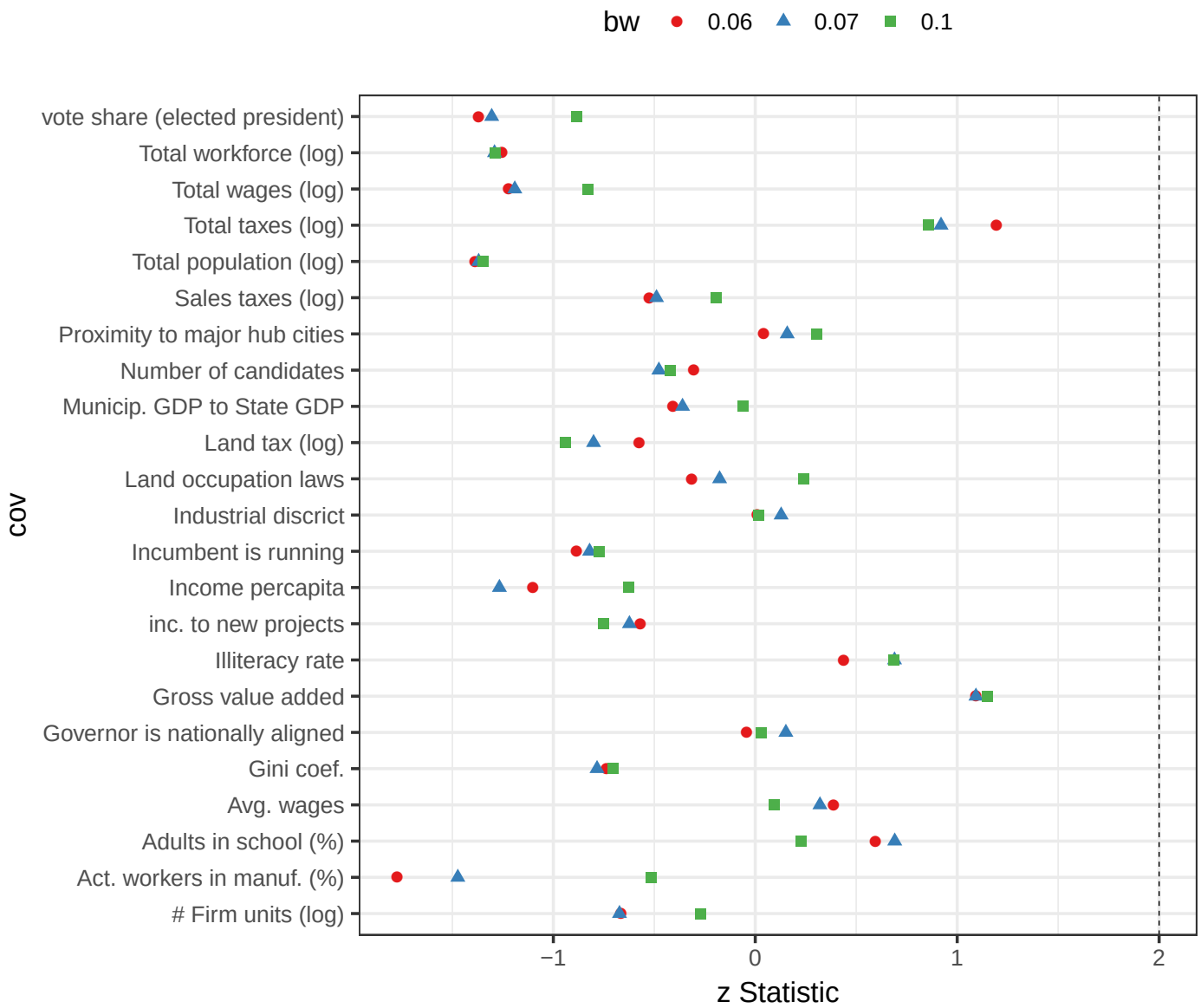


Figure: McCrary test for sorting around the cutoff

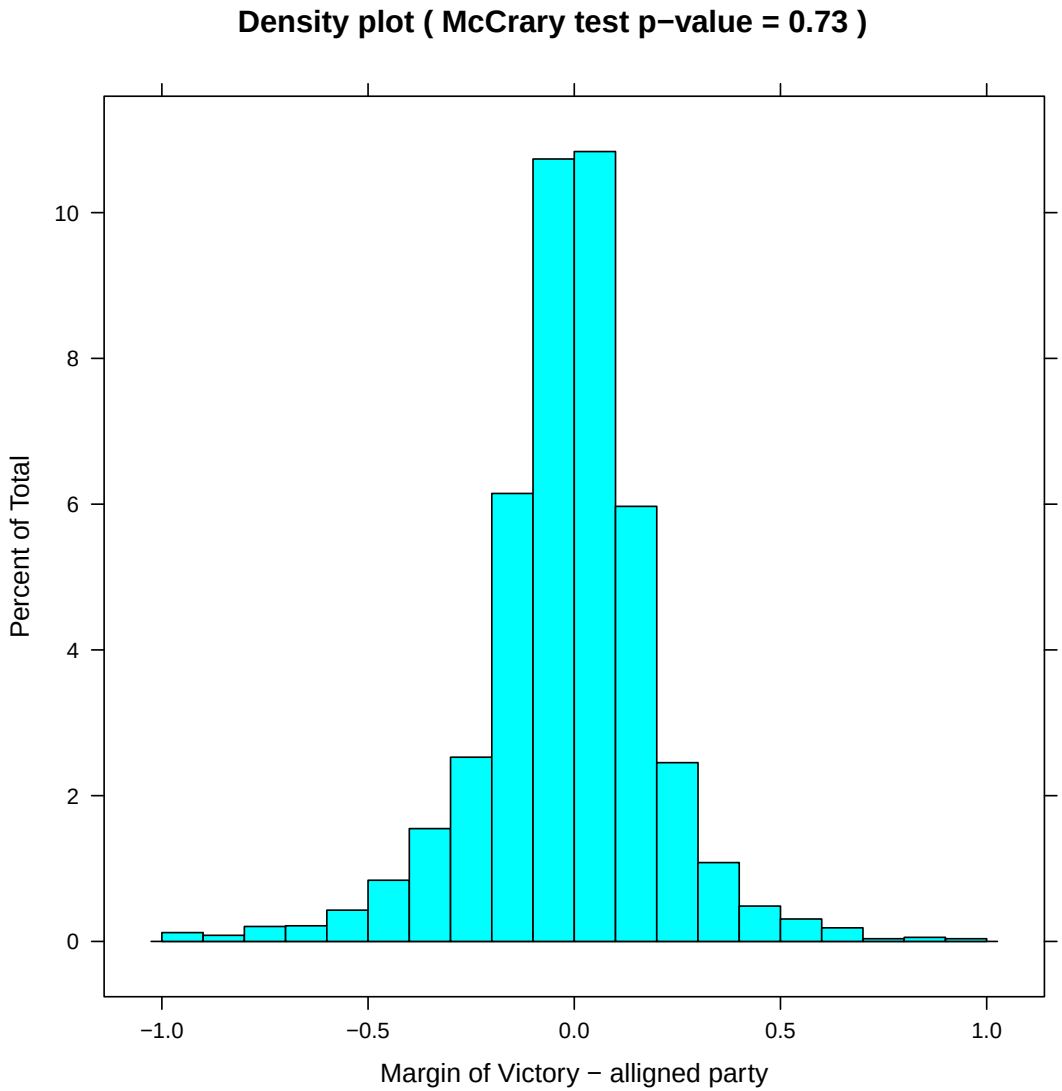
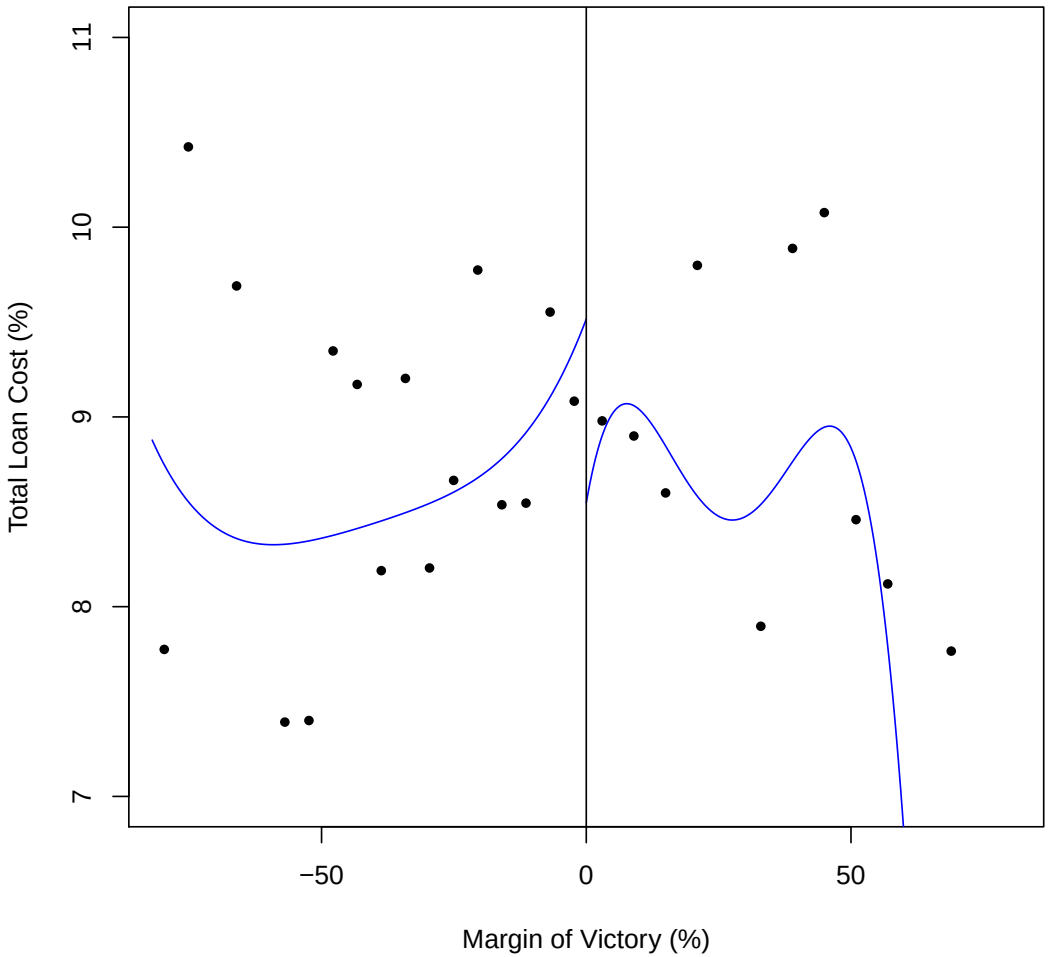


Figure: Regression discontinuity at the cutoff



Findings

Dependent Variables	Mean Full Sample	Mean Pre Treatment	h=6% Coef (se)	h=7% Coef (se)	h=10% Coef (se)
Panel I: Full Sample					
Total loan rate	0.09	0.08	-0.01	-0.01	-0.02
			(0.01)	(0.02)	(0.01)
Interest rate	0.03	0.02	0.01	0.01	0.00
			(0.01)	(0.01)	(0.01)
Financial cost	0.06	0.06	-0.02	-0.01	-0.02
			(0.01)	(0.01)	(0.01)
N	834		186	212	345

Findings

Panel III(a): High Political Capabilities					
Total loan rate	0.09	0.11	-0.01	-0.03	-0.04
			(0.01)	(0.02)	(0.02)
Interest rate	0.04	0.02	0.01	0.01	0.00
			(0.03)	(0.02)	(0.02)
Financial cost	0.06	0.08	-0.02	-0.04	-0.04
			(0.03)	(0.04)	(0.02)
N	330		71	77	125
Panel III(b): Low Political Capabilities					
Total loan rate	0.08	0.14	-0.09	-0.09	-0.01
			(0.01)	(0.01)	(0.02)
Interest rate	0.03	0.04	-0.02	-0.02	-0.02
			(0.00)	(0.00)	(0.01)
Financial cost	0.06	0.09	-0.07	-0.07	0.01
			(0.01)	(0.01)	(0.02)
N	504		115	135	220
Difference a-b (Total loan rate)			0.08	0.06	-0.02
			(0.02)	(0.03)	(0.03)

Figure: Treatment effects: sensitivity to bandwidth

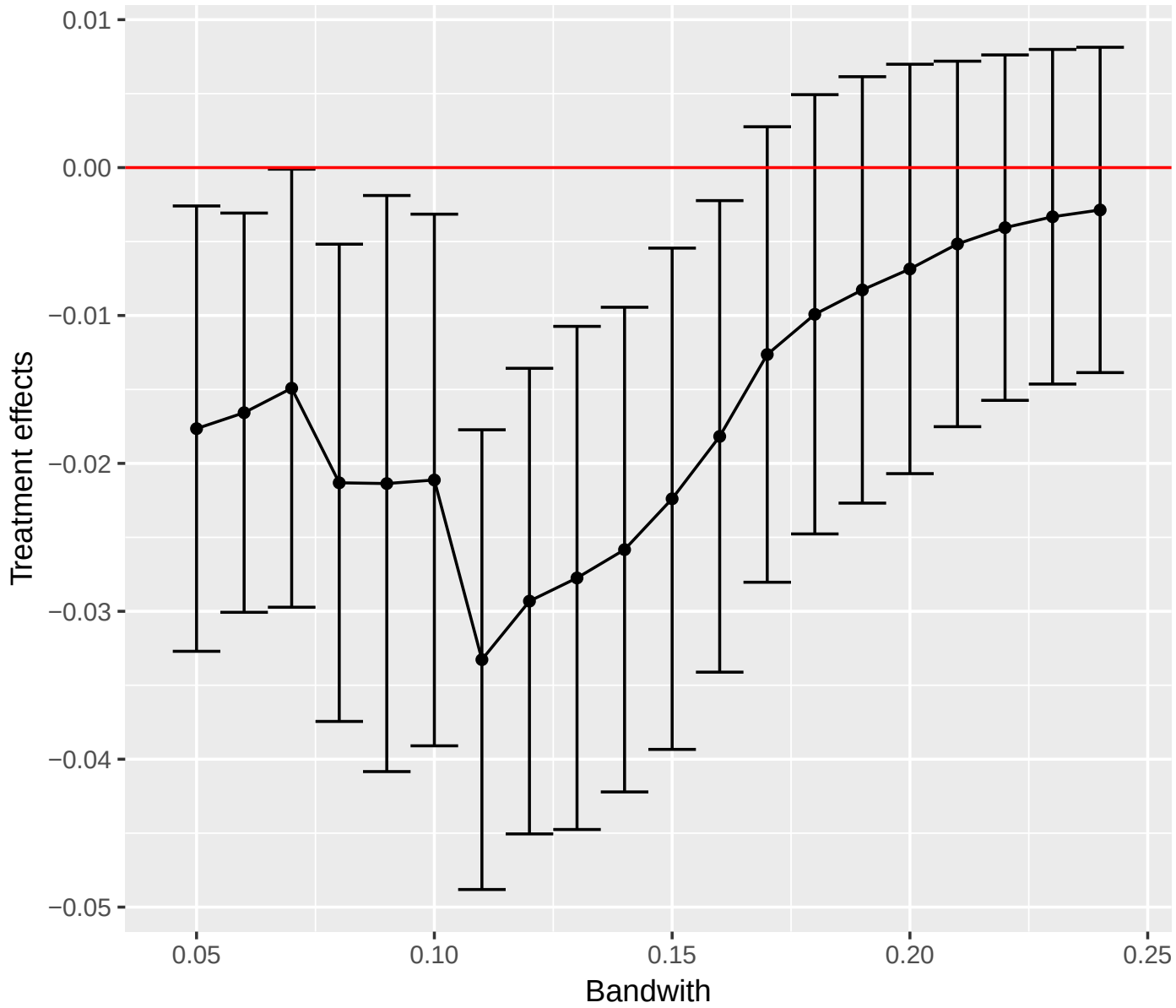


Table: Treatment effects at cutoff of 3%

Dependent Variables	**Mean**	**Mean**	**h=6%**	**h=7%**	**h=10%**
	Full Sample	Pre Treatment	Coef (se)	Coef (se)	Coef (se)
Total loan rate	0.09	0.09	-0.02	-0.00	-0.00
			(0.03)	(0.02)	(0.01)
Interest rate	0.03	0.04	-0.01	0.00	-0.00
			(0.02)	(0.01)	(0.01)
Financial cost	0.06	0.05	-0.01	-0.00	-0.00
			(0.02)	(0.01)	(0.01)
N	834		183	209	282

Table: Election placebo effects

Dependent Variables	**Mean**	**Mean**	**h=6%**	**h=7%**	**h=10%**
	Full Sample	Pre Treatment	Coef (se)	Coef (se)	Coef (se)
Total loan rate	0.09	0.08	0.01	0.01	0.01
			(0.01)	(0.01)	(0.01)
Interest rate	0.03	0.03	0.00	0.00	0.00
			(0.01)	(0.00)	(0.00)
Financial cost	0.06	0.05	0.01	0.01	0.00
			(0.01)	(0.01)	(0.01)
N	938		230	242	360

Regression Discontinuity

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- Potential identification problems?

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- Hypotheses: An exogenous increase in executives' long-term incentives increases firm value, operational performance, innovation and engagement in stakeholder relations.
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- Context: Shareholder proposals (sponsor, meeting date, voting and outcome) about increasing executives long-term incentives. Collected from RiskMetrics and SharkRepellent databases of US public held companies. KLD Stats to measure stakeholder relationships.
- Potential identification problems?
  - OVB: Firms with good reputation will adopt long-term orientation
  - Reverse Causation: The need to increase stakeholder relations as an risk-insurance strategy will require long-term orientation

Regression Discontinuity

- RDD Set-up: quasi-randomized assignment of passing a long-term compensation proposal to companies. "The regression discontinuity design (RDD) is helpful in approximating this ideal setting, since it relies on proposals that pass or fail by a narrow margin of votes. Arguably, whether a proposal passes with 50.1 percent of the votes, or fails with 49.9 percent is as good as random. Hence, such close call proposals provide a source of random variation in the adoption of long-term compensation proposals"

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- Assessment of the running variable:
  - The Dynamics in the board room
  - Can the CEO influence voting as the chairman of the board?
  - Can the proposal go to vote only when there is a fairly certainty that will pass?
  - Are activists investors the proponents of proposals and how does it matter?
  - Same meeting multiple issues are voted
  - Do previous compensations affect the actual vote?

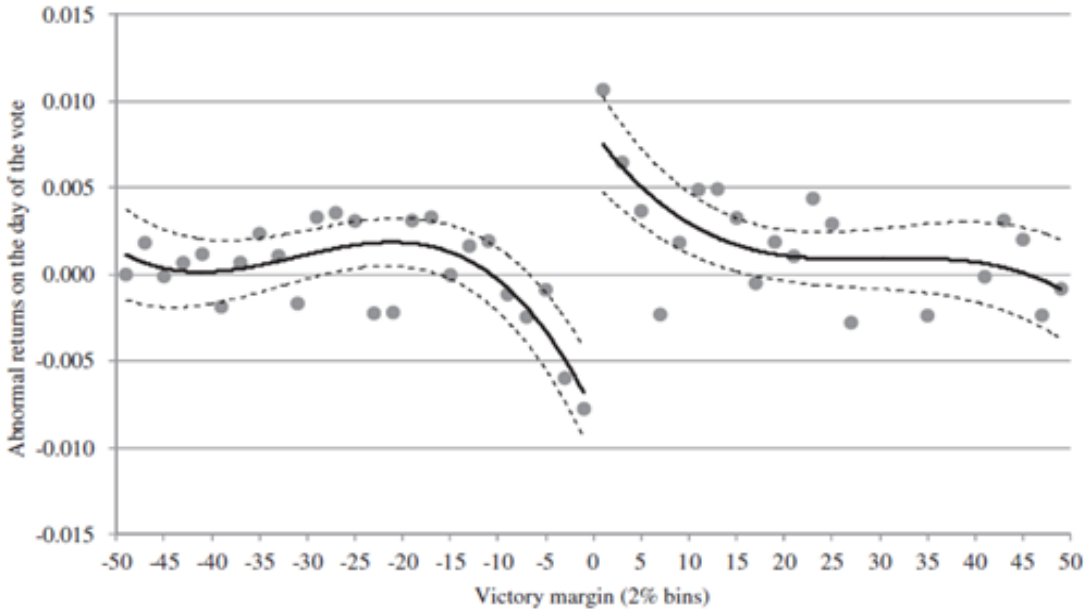

Figure 2. Abnormal returns on the day of the vote.
Notes. The vertical axis indicates abnormal returns on the day of the vote. The horizontal axis indicates the victory margin (i.e., the vote share minus the majority threshold). Each dot represents the average abnormal return in 2% bins of vote share. The solid line plots predicted values of abnormal returns from third-order polynomials in vote share estimated separately on either side of the majority threshold. The dashed lines represent one-standard deviation bounds.

Table 3. Abnormal returns around the majority threshold

	All votes (1)	Non close (2)	[−10%, +10%] (3)	[−5%, +5%] (4)	[−2.5%, +2.5%] (5)	Full model (6)
Pass	0.0039	0.0033	0.0068	0.0142	0.0228	0.0114
	(0.0025)	(0.0029)	(0.0041)	(0.0066)	(0.0134)	(0.0039)
Polynomial in vote share	No	No	No	No	No	Yes
R-squared	0.004	0.000	0.019	0.064	0.055	0.013
Observations	808	656	152	65	19	808

- Dynamic RDD: controls for firm and meeting fixed effects that may affect future outcomes after each meeting

Table 4. The impact of long-term incentives on operating performance and corporate strategy

	Operating performance			Long-term strategies	
	ROA (1)	NPM (2)	Sales growth (3)	Innovation (R&D expenditures) (4)	Stakeholders (KLD-index) (5)
Year of vote, t	−0.0029	−0.0015	−0.0154	0.0036	0.292
	(0.0044)	(0.0091)	(0.0192)	(0.0020)	(0.168)
One year later, $t+1$	0.0042	0.0077	0.0149	0.0049	0.585
	(0.0046)	(0.0093)	(0.0198)	(0.0020)	(0.171)
Years $t+2$ to $t+4$	0.0094	0.0191	0.0385	0.0043	0.631
	(0.0047)	(0.0097)	(0.0204)	(0.0022)	(0.174)
Polynomial in vote share	Yes	Yes	Yes	Yes	Yes
R-squared	0.803	0.806	0.289	0.941	0.870
Observations	3,666	3,666	3,743	1,902	3,462

The regressions are estimated using the dynamic RDD specification of Cuñat *et al.* (2012) with firm-meeting fixed effects. Standard errors (reported in parentheses) are clustered at the firm level.

Regression Discontinuity

- Other interesting examples of "running variables" used in non-market research:
  - Any legislation/regulation that introduces a treatment based on an exogenous threshold
  - India's Companies Act of 2013, which requires (on a comply-or-explain basis) that firms satisfying specific size or profit thresholds spend a minimum of 2% of their net profit on CSR (Dharmapala and Khanna, 2018)
  - Other examples?

Instrumental Regression

- Very powerful tool to "create" exogenous variation on observation studies
- IV: exogenous variable (Z) correlated with the main effect (Y) only because is affects the endogenous regressor (S).
- 2SLS: first stage $S = f(Z, X)$, and fitted values for S are plugged in the second stage $Y = f(\hat{S}, X)$.
- The effect is identified for "compliers" (LATE) Angrist et Piscke (2008)

Instrumental Regression

- Caroline Flammer. 2018. Competing for government procurement contracts: The role of corporate social responsibility. Strategic Management Journal. 2018. DOI: 10.1002/smj.2767.
- Hypothesis 1 (H1): Companies with higher CSR are more likely to obtain government procurement contracts.

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- Context: The sample used in this study is obtained by merging the KLD database with Standard & Poors Compustat (1992-2013), 27,062 firm-year obs, in the US.
- Potential identification problems?

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- Potential identification problems?
  - Does government require explicit compliance with stakeholder?
  - High CSR firms are better firms, therefore more efficient and competitive in public bids

Instrumental Regression

- The paper instruments changes in the KLD-index using the enactment of **constituency statute** as a quasi-natural experiment.
- Constituency statute, also called a stakeholder statute, allows corporate directors to consider non-shareholder interests when making business decisions (source).
- A total of 35 states in the U.S. have adopted constituency statutes (see Karpoff & Wittry, 2017); five of them adopted the statutes during the sample period (1992 to 2013).

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  - Ultimately, the adoption (or not) of CSR is voluntary regardless the legislation enactment. Are never-takers relevant that could make the external validity problematic (LATE effect?) (Angrist et Piscke, 2008)

TABLE 2 Corporate social responsibility and the allocation of government contracts

		2SLS	
Dependent variable	Log(1 + Procurement) OLS (1)	KLD-index First-stage (2)	Log(1 + Procurement) IV (3)
KLD-index	0.088		
	(0.024)		
KLD-index (instrumented)			0.075
			(0.035)
Constituency statute		0.245	
		(0.059)	
Size	0.580	0.143	0.582
	(0.089)	(0.038)	(0.089)
Return on assets	0.191	0.041	0.191
	(0.353)	(0.209)	(0.354)
Tobin's Q	0.100	−0.024	0.099
	(0.036)	(0.016)	(0.036)
Leverage	0.736	0.250	0.739
	(0.253)	(0.114)	(0.253)
Cash holdings	−1.239	0.473	−1.233
	(0.287)	(0.114)	(0.287)
Log(1 + Political contributions)	0.037	−0.026	0.037
	(0.015)	(0.015)	(0.015)
Herfindahl	0.032	−0.117	0.031
	(1.462)	(1.283)	(1.456)
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
R-squared	0.81	0.76	0.81
Observations	27,062	27,062	27,062

Instrumental Regression

- R's `ivreg` empirical tests:
  - Correlation between endogenous regressor and the IV is strong
    - **Weak instruments test**: First-stage F test comparing the models with and without IV (H0: instruments are weak)
  - The endogenous regressor is really endogenous (test of exogeneity)
    - **Hausman test**: if the residuals of the first stage are relevant in the second state, then the endogenous regressor is really endogenous. This is everything **not randomized** that is affecting the endogenous regressor and the effect (Ho: IV is exogenous). A bit problematic for panel data.
  - IV are really exogenous, or uncorrelated to the regression error terms (over-identification)
    - **Sargan test** for instrument validity (Chi.Sq., H0: IV are exogenous)

Instrumental Regression

- Fernanda Arreola and Bandeira de Mello. 2018. The Differential Effects of Minority State Ownership Types on the Internationalization of Emerging Market Multinationals from Democratic States. Accept for publication at Management International Review (MIR)
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- IV: (Electoral performance * Industry) to instrument Own. State Inst. Investors

	Assets	Revenue	Jobs
	(1)	(2)	(3)
Own. state inst. investors	1.08**	1.98***	1.89***
	(0.46)	(0.58)	(0.43)
Own. state ag. and SOEs	-2.14**	-3.27***	-3.79***
	(0.94)	(1.18)	(0.97)
Own. state inst. investors (non vot.)	-0.58***	-0.15	0.002
	(0.19)	(0.31)	(0.20)
Own. state ag. and SOEs (non vot.)	1.79	2.79	4.28**
	(1.77)	(2.18)	(1.89)
Foreign capital	0.13	-0.50***	-0.21**
	(0.11)	(0.14)	(0.11)
Operational prof.	0.28	0.49*	0.98***
	(0.24)	(0.30)	(0.26)
Fixed-asset invest (var.)	3.21	-17.26	3.87
	(7.66)	(10.64)	(6.20)
Total assets (log)	4.12***	6.48***	5.85***
	(1.48)	(2.00)	(1.67)
Founding year	-0.10	0.09	0.03
	(0.08)	(0.09)	(0.09)
Group affiliate	-2.75	-9.94	-18.36**
	(5.39)	(7.47)	(7.65)
Firm effects	No	No	No
Year dummies	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes
Inv. Mills ratio	Yes	Yes	Yes
Observations	145	146	146
Residual Std. Error	18.07 (df = 125)	25.48 (df = 126)	21.88 (df = 126)
Wald Stat.	9.84(p<0.00)	5.71(p<0.00)	5.82(p<0.00)
Weak Instrument	15.71(p<0.00)	16.27(p<0.00)	16.27(p<0.00)
Wu-Hausman	7.11(p<0.01)	12.46(p<0.00)	19.08(p<0.00)
Sargan	4.37(p<0.36)	2.68(p<0.61)	2.94(p<0.57)

- Other interesting examples of "instrumental variables" used in non-market research:
  - Weather events to test predisposition of firms to collaborate with social movement organizations (Odziemkowska, 2018) or to give to philanthropy (Hornstein and Zhao, 2017)
  - Institutional pressure (mimetic) to test the effect of corporate philanthropy strategies on performance (Seo, Luo, and Kaul, 2018).
  - Prior protests against the firm to test whether being targeted by activists affect the likelihood of getting a government concession (Gupta and Briscoe, 2018).
  - Examples?