How Allowing a Little Bit of Dissent Helps Control Social Media

Impact of Market Structure on Censorship Compliance

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An Example: Tianjin Explosion

- On 12 August 2015, a series of **massive explosions** occurred in the city of **Tianjin** in Northeast China.

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The Public | Chinese Government | Social Media Platforms

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2. The Chinese government sent (vague) censorship guidelines (Miller, 2018).
3. Private platforms decide *whether* to comply immediately.

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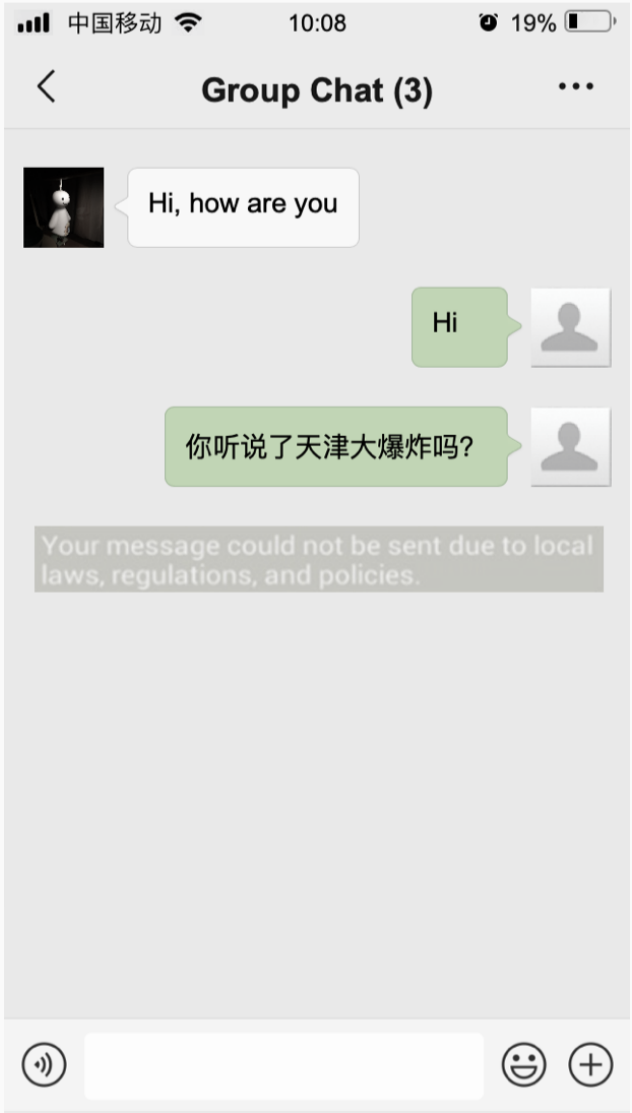

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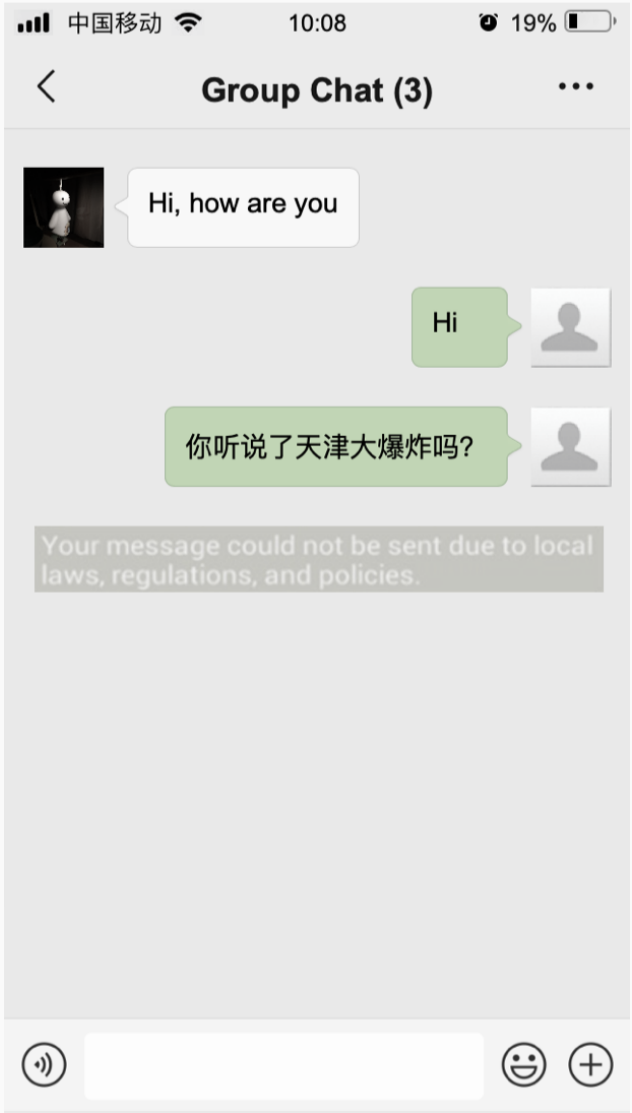

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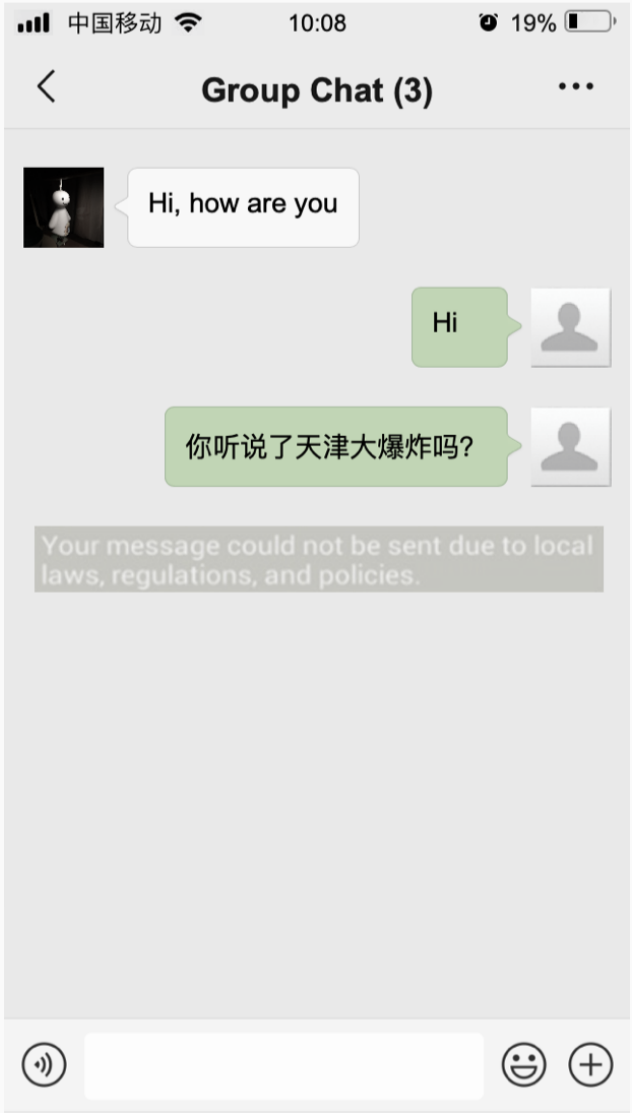

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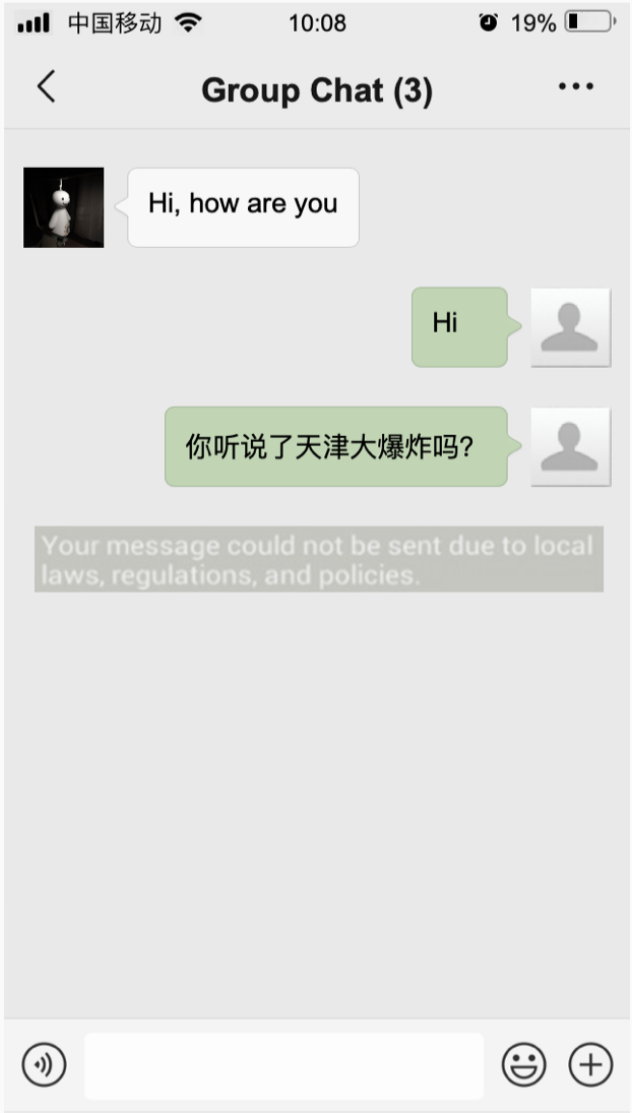

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  - **attract** users who **switch** between platforms to evade censorship

Research Agenda

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- Roadmap

  Empirical facts event study
  Structural Model a static game of oligopolistic competition
  Estimation policy-relevant counterfactual predictions

Contribution

- **Media Bias and Censorship**
  e.g. King et al. (2013); Qin, Stromberg and Wu (2017, 2018); Chen and Yang (2019); Zhuang (2022)
  - Contribution: introduces a new framework where censorship could **remain effective** by leveraging market structure **despite** misaligned incentives and increasing competition.
- **Discrete choice models of firms' strategic decisions**
  e.g. Sweeting (2006, 2009); De paula and Tang (2012); Aradillas-Lopez and Gandhi (2013); Wan and Xu (2014)
  - Contribution: **micro-founds** the "reduced-form" **strategic interaction term** in the profit function that maps from a set of structural parameters with important economic implications.

Data and Empirical Facts

Panel Data on Censorship

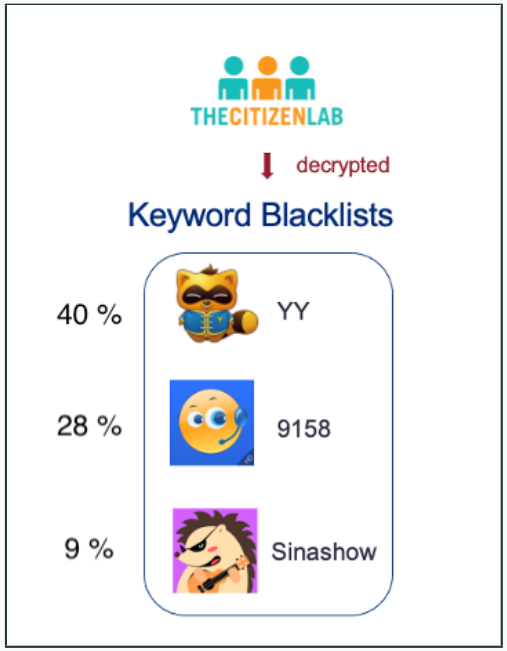

Figure 1: Data Structure

Timestamps and **content** of entire updates during 2015-2017

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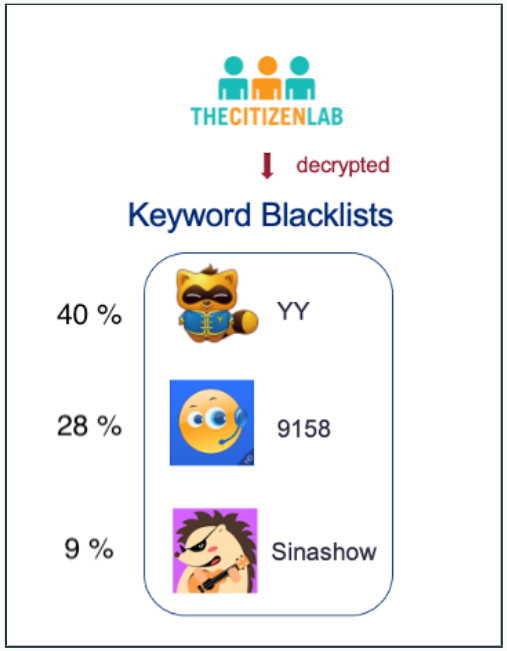

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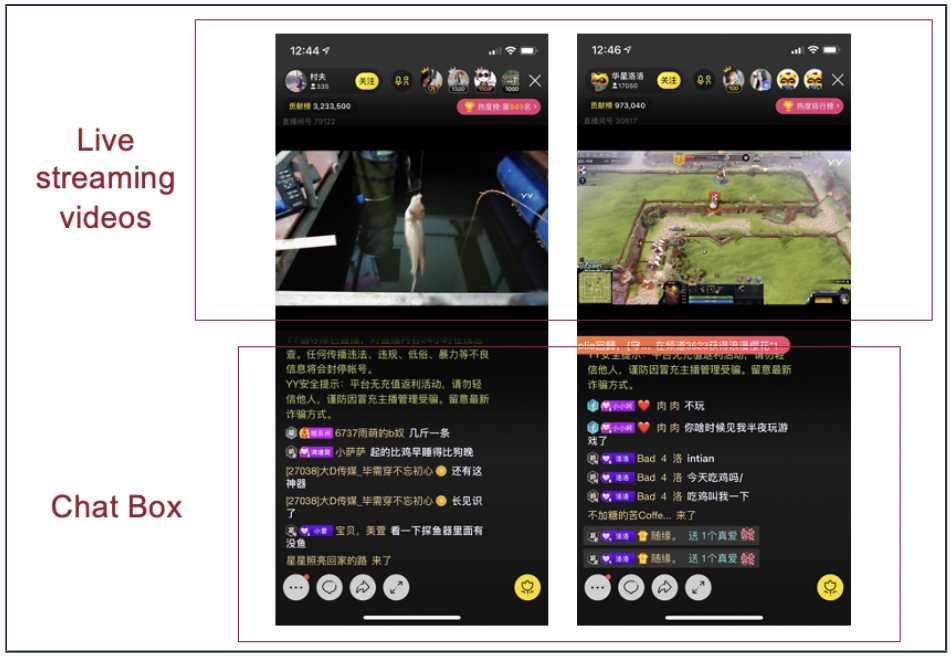


Figure 2: Screenshot of User Interface.

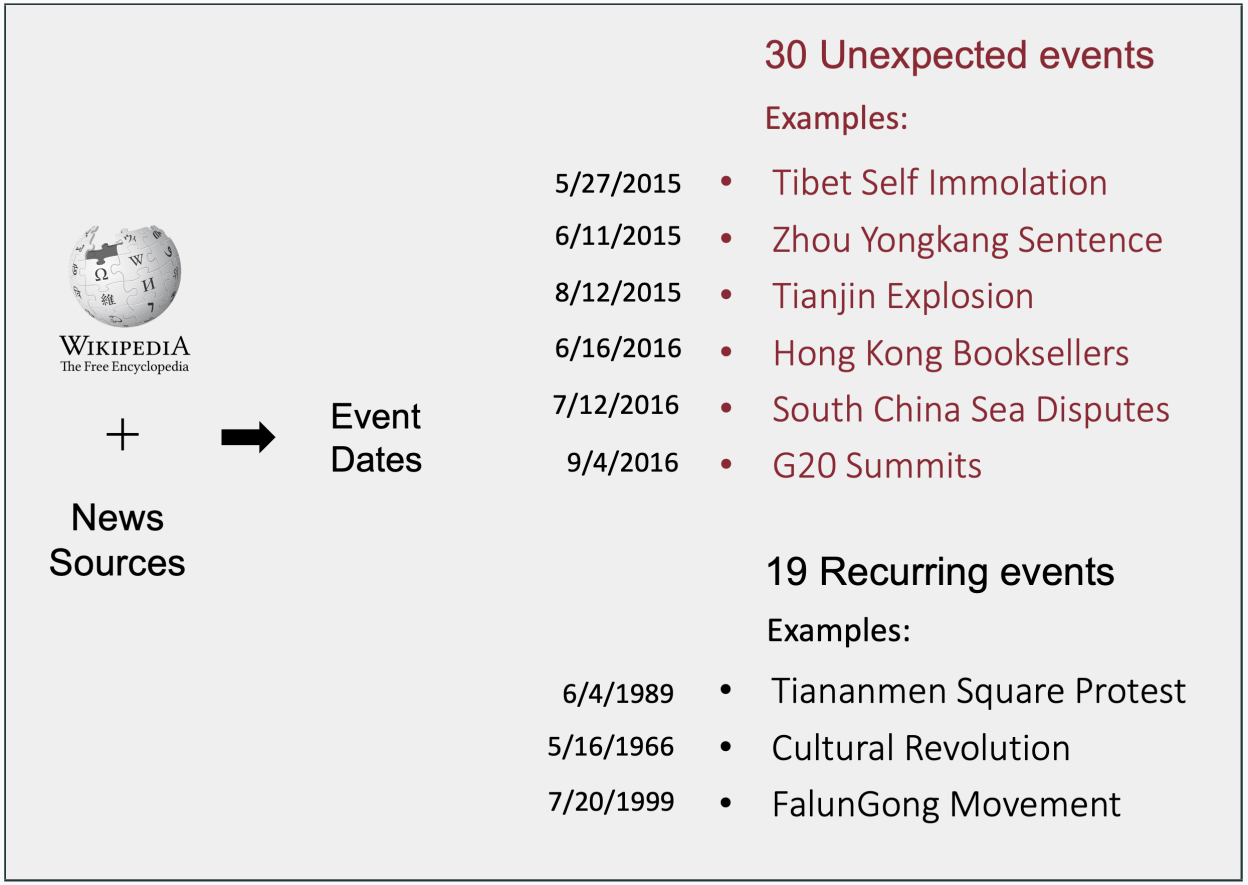
Users watch live-streaming videos and exchange messages in the chatroom;

Platforms profit from the virtual goods sales.

6 Content Themes

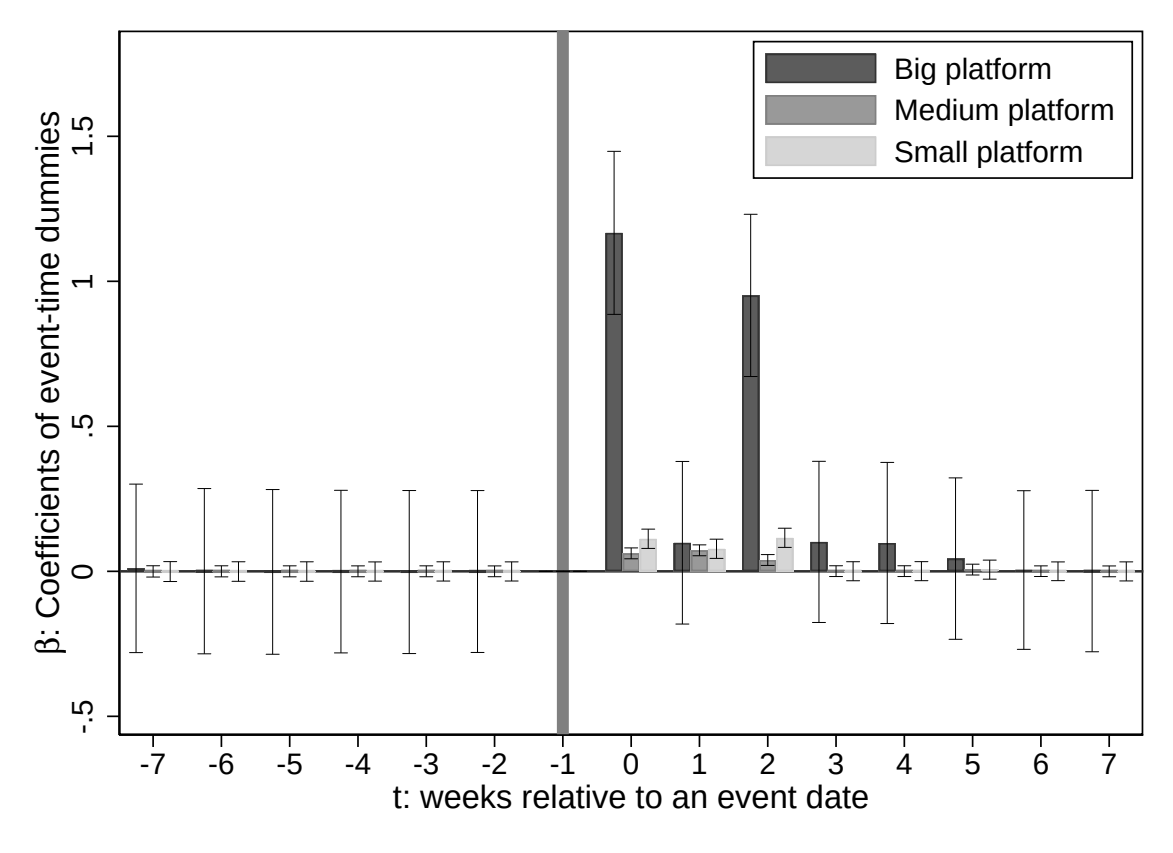
Theme	Example categories	Example of translated keywords
Event	**Social events**	"**Tianjin Nuclear Explosion**"
(**29%**)	**Political events**	"**1989Tankman**"
Social	Gambling, illicit goods and services	"Crystal meth formula"
(47%)	Prurient interests	"Adult video"
Political	Communist Party of China	"Inner-party division"
(14%)	Ethnic groups	"East Turkistan Muslim"
Technology	URLs	"app.box.com", "freelibs.org"
(5%)	Applications and services	"VPN800", "Encryption Router"
People	Government officials	"Xi Jinping", "Ruthless Xi"
(3%)	Dissidents	"Liu Xiaobo"
Misc (2%)	Keywords with unclear contexts	"Heavenly Mercy"

Identification Strategy: Event Study



- **Unexpected events** serve as external shocks.

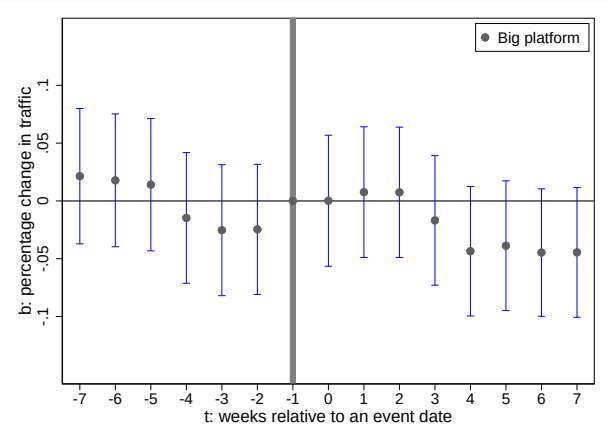
Censorship decisions are size-dependent



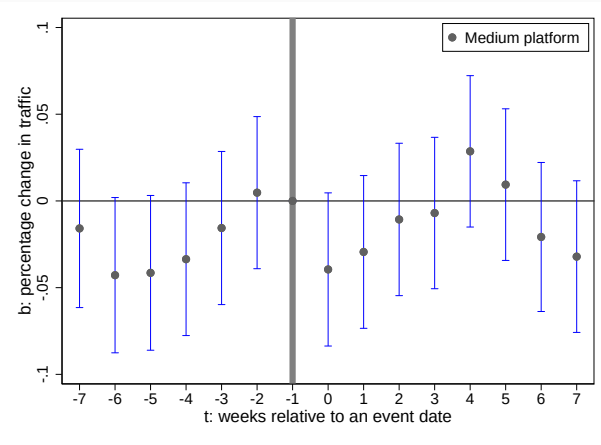
- Relative to the small platforms, big platforms censored
  - **more** keywords on average
  - **more** events immediately (i.e. complied faster on average)

Platform traffic declined after censorship

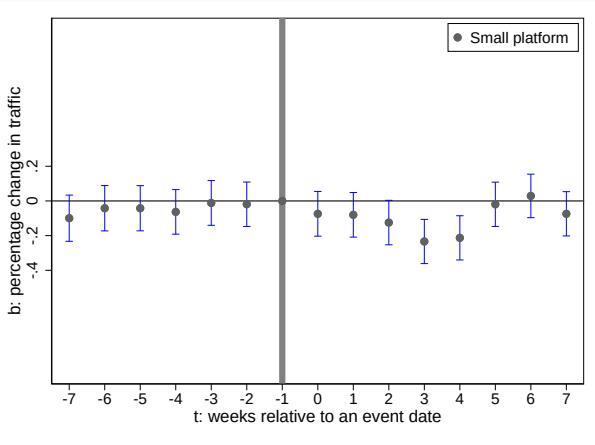
Dependent Variable: log(1/Alexa rank)



(a) Big Platform



(b) Medium Platform



(c) Small Platform

Summary Statistics | Switching Users

Structural Model

Model Set-up

- $N(\geq 2)$ Platforms
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- When an event occurs,
  - platform i receives a private signal ε_i from the government
    - allowed to be correlated across platforms
  - platforms simultaneously choose to censor ($a_i = 1$) or not to censor ($a_i = 0$) to maximize their own profit:

$$\pi_i = \begin{cases} \underbrace{D_i(a_i = 1, a_{-i}, x)}_{\text{remaining mass of users}} & a_i = 1 \\ \underbrace{D_i(a_i = 0, a_{-i}, x)}_{\text{remaining mass of users}} - \underbrace{(c_0 + c_1 x_i + \varepsilon_i)}_{\text{total cost of not censoring}} & a_i = 0 \end{cases}$$

User Switching Behavior

Observing platform i's censorship decision a_i, a type-θ user

- chooses to switch ($s = 1$) or not to switch ($s = 0$) to maximize his/her utility:

$$\max_{s \in \{0,1\}} u_i(s;\theta) = v_0 \underbrace{-(1-s)a_i \times \theta}_{\text{disutility from censorship}} - \underbrace{s \times \gamma}_{\text{expected switching cost}}$$

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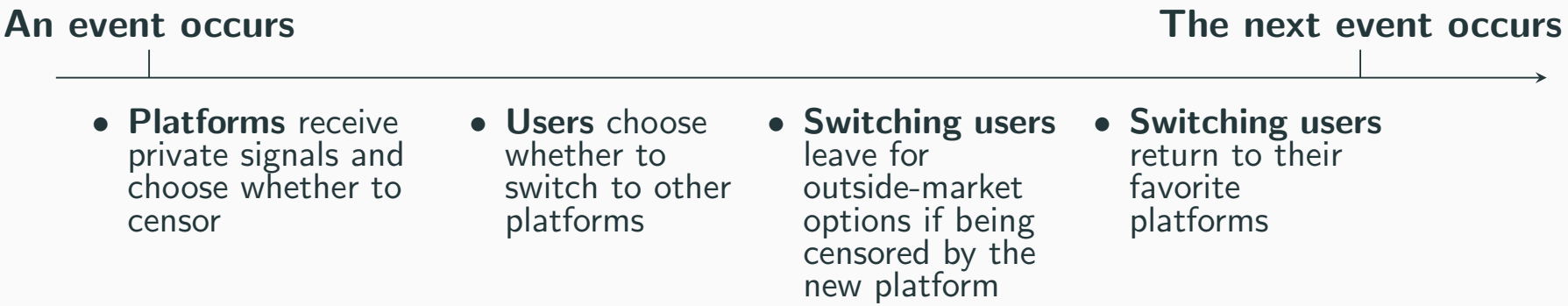
- will switch out if and only if

$$\theta a_i \geq \gamma$$

Timing of the Game



serial correlation

Model Intuition

- **Solution Concept**: Monotone Pure Strategy Equilibrium (Athey, 2001; Wan and Xu, 2014)

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- 2 channels affecting censorship decisions

$$\varepsilon_i^*(x) = \underbrace{-\left[c_0 + (c_1 - (\gamma)^{-\alpha})x_i\right]}_{\text{legal cost (net of economic gains)}} + \underbrace{\sum_{j \neq i} \frac{x_j}{(N-1)(\gamma)^{\alpha}} \mathbb{P}\left[\varepsilon_j \geq \varepsilon_j^*(x) | \varepsilon_i = \varepsilon_i^*(x)\right]}_{\text{strategic incentive}}$$

Assumption: Bounded Regression Dependence

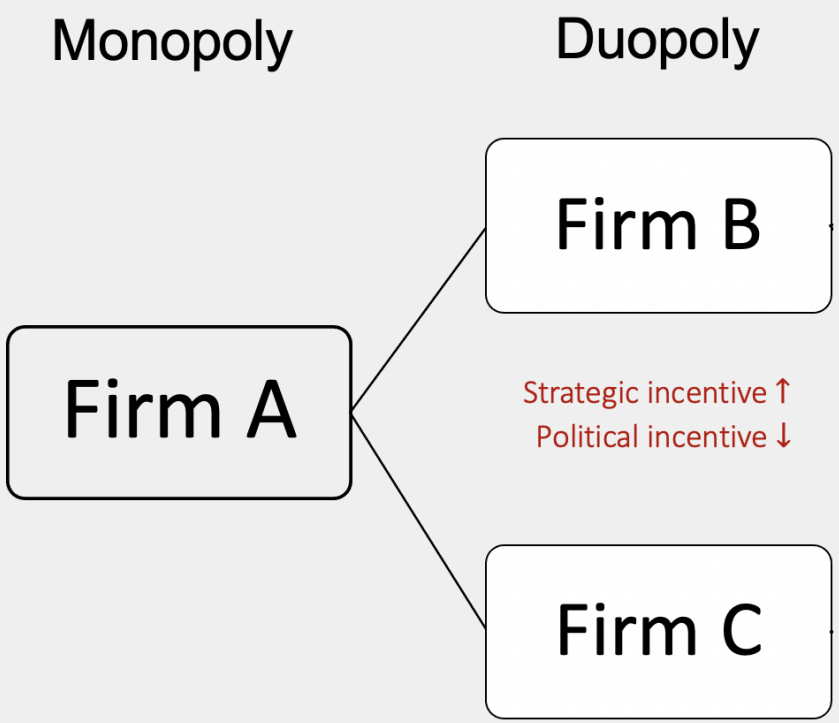
Model Intuition

Monopoly

Firm A

Strategic incentive = 0

Model Intuition



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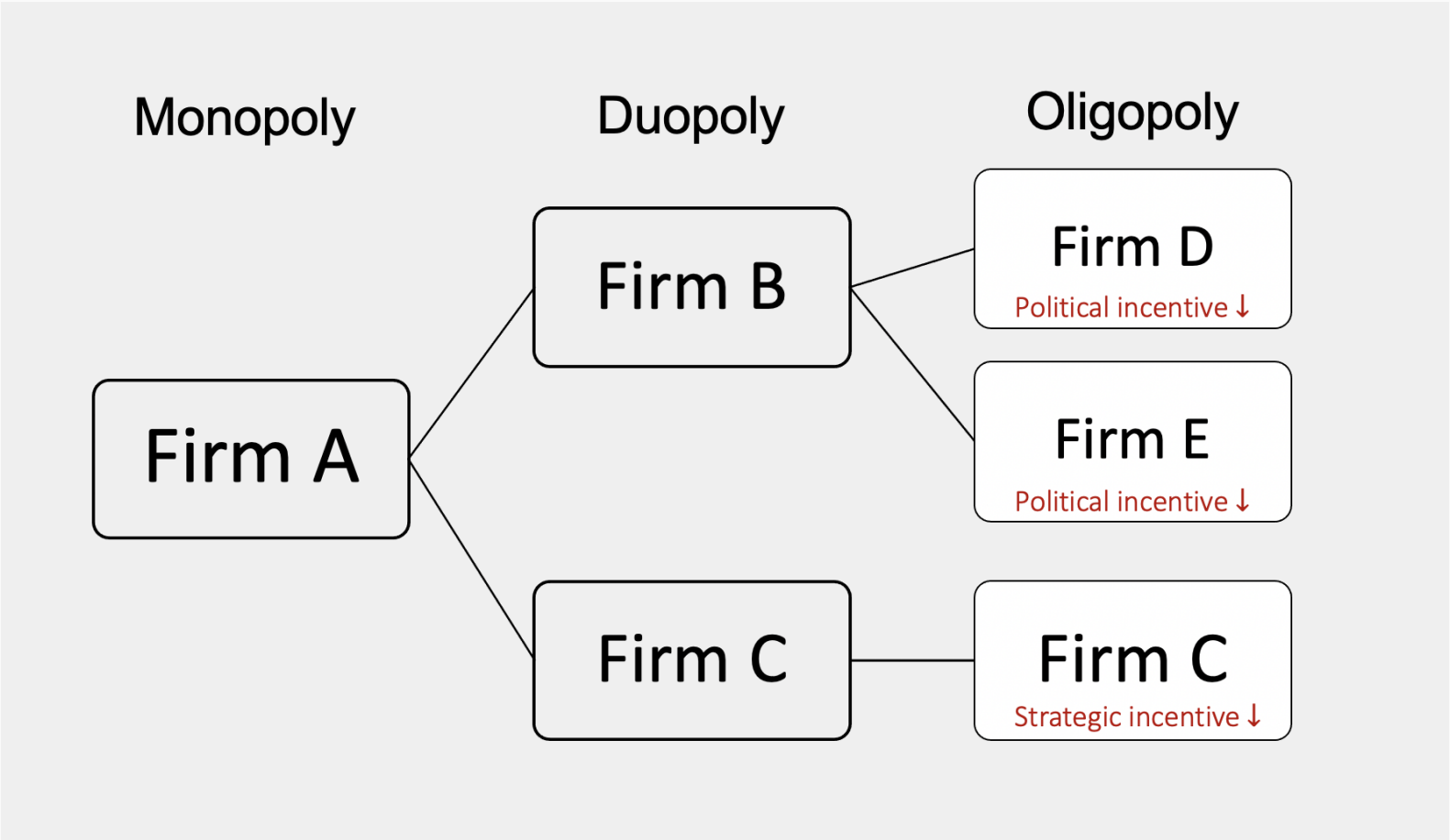

Identification

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  - variation in platforms' own traffic across different events
- Strategic incentive
  - variation in competitors' traffic across different events
    - **exclusion restriction**: changes in the size of a competitor only affects the platform's decision through the strategic incentive
  - correlation between private signals
    - correlation between platforms' actions conditional on traffic
- $(c_0, c_1, (\gamma)^{-\alpha})$ is identified up to scale.

Estimation

- Two-step Modified Maximum Score Estimator (Wan and Xu, 2014)
  - Does not require parametric assumption on private signal distribution ($Median(\varepsilon_i) = 0, \forall i = 1, 2, 3$)
  - Computationally simple
- Maximum Likelihood Estimator
  - Assuming private signals follow joint normal distribution
  - More efficient estimates
  - Allow for counterfactual predictions

Model Fit

Key Findings

Main Findings: Market Structure Affects Compliance

- Large platforms censor more intensely and comply faster on average than small platforms.
- However, market **concentration** could **lower** market-level compliance due to **increasing** strategic incentives

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- However, market **concentration** could **lower** market-level compliance due to **increasing** strategic incentives
  - Merger of the medium and small platforms would lead to a -2.305% $_{[-4.365\%,-1.273\%]}$ **decrease** in the scope of censorship
  - Permanently shutting down the small platform would lead to a -0.727% $_{[-3.465\%,0.681\%]}$ **decrease** in the scope of censorship

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- Broader implications for policy debates
  - Regulators may leverage platform competition to enforce content moderation

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- However,
  - market concentration could lead to **lower** market-level compliance.
- Policy implications
  - **decentralizing** online market power (i.e. tolerating a bit of dissent on small platforms) could **help** an authoritarian government **control** social media
- Broader implications for policy debates on
  - content moderation
  - purge misinformation

Thank You!

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