Regulation Under Stock Market Information Disclosure

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Objective

Main objective: analyze the effects of the stock market on the relationship between a regulator and the regulated firm.

- Does the listing of a regulated company change the relationship between the regulator and the company?

- We build a model to understand if the presence of the market affects firms behavior towards the regulator, and vice versa.
Motivation

- Many examples of regulated companies that are publicly listed around the world.
  - Brazilian electricity distribution sector: incentive regulation since mid 90’s.
  - Largest Brazilian distribution companies are publicly traded.
    - Obligation to disclose information on a regular basis.
    - Subject to investor’s scrutiny.
Market investors will react to regulator’s announcements, but regulator also learns from the market.

Methodology changes implemented by the Brazilian regulator for the 3rd round of tariff revision raised concerns on stability of rules.

Conjecture: methodology changes can be at least partially attributed to companies’ positive market performance.
Related Literature

- **Empirical literature:** Dnes and Seaton, 1999.
  - Evidence that market information affects regulator’s decision.

  - Public listing reduces the commitment problem by reducing monitoring by the Regulator.
Our Contribution

- We endogenize the disclosure of information by the Firm.
  - The firm can actively choose the information it will disclose to the market and to the regulator.

- Public listing can be beneficial for regulation as it induces more disclosure of information by the Firm.
We approach Regulation as a Principal-Agent problem.

- Focus on the role of informational asymmetries.
- Agent (Firm): informed party, private information on its type/actions
- Principal (Regulator): uninformed party, cannot access Firm’s private information

Regulator wishes to provide some service to consumers.

There is one Firm able to provide such service, but the Regulator does not know how efficient the Firm is.

- Principal subject to adverse selection.
General Framework

- Adverse Selection in a dynamic environment
  - Regulator and Firm interact repeatedly.
  - Regulator cannot commit not to expropriate the firm once efficiency is revealed.
    - Ratchet effect: Firm jeopardizes future gains by disclosing too much information today.
  - Due to ratchet effect, there may be lower disclosure of information (pooling equilibrium).
Regulation Model


- Regulator wants to provide a public service with value $S > 0$ to consumers.

- Firm can provide such service.
  - Regulator does not know Firm’s type.
Regulation Model

- **Firm (Agent):**
  - Cost function: \( C = \theta - e \).
  - Firm can be either efficient (\( \theta_L \)) or inefficient (\( \theta_H \)) and has private information about its type.

- **Regulator (Principal):**
  - Observes prices and cost, but cannot identify cost's decomposition.
  - Maximizes (expected) welfare.
Regulation Model

- Regulation model results.

- Static case:
  - Equilibrium is separating: Firms disclose information.
  - Tradeoff:
    - Inefficient firm: low effort, no rent.
    - Efficient firm: maximum effort, informational rent.

- Dynamic case
  - Tradeoff is aggravated: less disclosure of information (pooling equilibrium).
We introduce a third agent to the dynamic regulation set up: the Market.

- Companies want to pretend that they are inefficient to the Regulator.
- Companies want to show to the market that they are efficiently managed.

Our model builds on the premise that Firms want to send different signals to the regulator and to its market investors.
Market Model

- Two kinds of stockholders in the firm (Miller and Rock, 85):
  - Insiders: long-term investors, have private information about the firm and want to maximize Firm’s long term profit.
  - Outsiders: short-term investors in the Market, have same information as Regulator and want to maximize market value.

- The presence of the market generates a potential conflict of interest:
  - Best decision for increasing long term profit may not be the one that maximizes (short term) market value.
Results - Commitment case

- One-period game: contract remains unchanged after the manager’s choice.
- Results
  - Equilibrium is separating.
  - As we increase market presence, regulator is able to induce more effort.
    - When there are only market investor, both firms exert optimal effort.
  - The higher the market presence, the less the manager cares about the real profit.
Commitment case - numerical results (x-axis: $k$; y-axis: $t_L, t_H, e_L, e_H$) for $\psi(e) = \frac{1}{2} e^2$. Value of parameters:

\[ S = 100, \theta_L = 1.5, \theta_H = 2, \nu = 0.5, \lambda = 0.1 \]
Two-period game; parties are not committed.

- In the dynamic Regulation model, Firm withholds information, fearing expropriation.
- However, Firm wants to show to the market that it is efficient.
Results - Non Commitment case

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Value of parameters: $S = 100$, $\theta_L = 1.5$, $\theta_H = 2$, $v_1 = 0.5$, $\lambda = 0.1$, $\delta = 0.5$
## Results - Non Commitment case

### Comparative statics for difference of types - 1

<table>
<thead>
<tr>
<th>$\Delta \theta = 0.01$</th>
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<th>$k = 0.2$</th>
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<td>$t_H$</td>
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Value of parameters: $S = 100$, $\theta_L = 1$, $\theta_H = 1.01$, $\nu_1 = 0.5$, $\lambda = 0.1$, $\delta = 0.5$
Conclusion

- The market presence induces separation of types for some cases and Regulator is also able to induce more effort.
  - Presence of the market leads to more powerful incentive schemes.

- Also, the presence of the market reduces the informational rent left to the firms, increasing overall social welfare.

- Regulation can benefit from the presence of the market.
  - The market affects the firm’s strategy by making it reveal more information about its cost than it normally would without the market.
THANK YOU!
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