A model for Regulatory Capture

Submission for Toy Model 1
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Motivation

A lot of the discussion among investors has been focused on the growing market share for technological firms in the S&P index. This has been accompanied with a concern about the lack of regulation, especially around AI firms. The model tries to explore the following questions:

- Does market power of firms contribute to regulatory capture?
- Is regulatory capture driven by "bad" firms or rational behaviour?
- Are there practices or constraints that can be put in place to prevent regulatory capture?

Model Agents, Assumptions, and Primitives

- **Two firms**
  - A large firm with initial endowment of W_H at period 0
  - A small firm with initial endowment of W_L at period 0 such that $W_L < W_H$
  - At the end of period 0, both firms can choose to either
    - ◇ not engage in any "illegal" activity, which generates a surplus of 0, or
    - ◇ participate in an "illegal" activity that generates a surplus of S_H for the large firm and S_L for the small firm, respectively, such that.

    $$S_H \geq S_L$$
  - Both firms exhibit a utility function given by

    $$U(W) = \frac{W^{1-\rho}}{1-\rho}$$

    where ρ is the CRRA coefficient and $\rho \neq 1$
- **A regulator**
  - The regulator can monitor and identify a firm engaging in "illegal" activity with probability p
  - If caught, the regulator imposes a fine on the firm, F, at period 1
  - The firms can escape the monitoring by paying a fixed fee, L to the regulator (in the form of lobbying) in period 0, given by,

    $$F \geq L \geq p.F$$
  - The regulator will try to maximize L and F

The Key Friction

Information Asymmetry - The firm is aware of the true value of the surplus generated by its "illegal" activity, but not the regulator. The regulator is willing to accept a rent for the asymmetric information.

Payoff structures at period 1

- If firm chooses not to enagage in "illegal" activity, payoff is W with probability 1
- If the firm chooses to engage in "illegal activity, payoff is
  - $\diamond$ $W + S - F$ with probability p
  - $\diamond$ $W + S$ with probability $1 - p$
- Alternatively, the firm can choose to engage in the illegal activity and pay a lobbying fee to the regulator, payoff is $W + S - L$ with probability 1

Constraints

From the point of view of the firm, it will engage in "illegal" activity when

$$p * U(W + S - F) + (1 - p) * U(W + S) \geq U(W)$$

Additionally, the firm will engage in "illegal" activity and pay a lobbying fee to avoid the fine when

$$U(W + S - L) \geq p * U(W + S - F) + (1 - p) * U(W + S) \geq U(W)$$

Bankruptcy deterrence

However, if the fine is so high that

$$F \geq W + S$$

Then, the firm will always engage in illegal activity without paying a lobbying fee. Therefore, the upper bound on the fine amount, F^U, is given by

$$F^U = W + S$$

Equilibrium Characteristics

- The fine structure will be constrained by the wealth limit of the smaller firm, W_L
- To maximise its wealth, the regulator will set the lobbying fee such that it is just beyond the lobbying appetite for the smaller firms
- Under CRRA, the larger firm will have a higher appetite for risk-taking, and will choose to pay the fixed lobbying fee to operate in a "risk-free" environment
- If the game is repeated across multiple time periods till ∞,
  - $\diamond$ the smaller firm will eventually lose all its wealth
  - $\diamond$ the larger firm will operate in a monopolistic market without any risk

Model Extensions

- The immediate extension of the model could be to introduce a consumer who can choose to
  (a) receive a share of the surplus, S, from the firms, proportional to $\frac{W_L}{W_L+W_H}$
  (b) receive a share of F, but not L from the regulator
- Another extension could be to introduce the fine structure such that $F = \mathcal{F}(W)$. This should reduce the speed of decay for the smaller firm in a multi-period model
- Finally, we can model the probability of a firm being caught, p, as a proportional function of $\mathcal{F}(F)$, i.e., regulators pursuing bigger criminals instead of smaller ones.