

Market Power, Port Activity, and Environmental Health

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Question

- How does market power of port-related businesses influence:
 1. the level of regulation, and
 2. environmental health
- Giuliano and O'Brien (2007): Terminal operators and steamship companies were able to develop PierPASS because of their market power
- PierPASS created in response to political pressure

Model Background

- Port regulation policies can be thought of as a result of negotiations between government and business
- Stricter regulation raises operating costs
- More regulation has a positive impact on environmental health
- Firms have a common interest (low level of regulation) and a competing interest (market share)

The Players: Firm and Government

- Firm in oligopolistic industry
- Produces port services (a homogeneous good)
- Maximize profits: $\pi = Pq - cU - B$
- Measure of market power: price-cost margin

$$pcm = \varepsilon.(q / Q)$$

- Government maximizes utility: $G = UH = U \frac{c^\alpha}{\alpha}$

Bargaining

- Nash bargaining solution obtained by solving:

$$\max_{c,U} \left(G - \overline{G} \right)^\delta \left(\pi - \overline{\pi} \right)^{(1-\delta)}$$

- Binmore, et al (1986)
- We can rewrite the above as:

$$\max_{c,U} \left(U \frac{c^\alpha}{\alpha} (1 - D) \right)^\delta \left(Pq - cU \right)^{(1-\delta)}$$

Bargaining Solution

- Tangency between firm iso-profit curves and government indifference curves gives a *contract curve*

- Solution lies on this contract curve

$$c = Pq_U + \frac{\delta}{U} [P(q - Uq_U)]$$

- Regulation leads to higher operating costs—profit-maximizing level plus bonus

Interpretation of Solution

- Bonus regulation is a portion of the price-cost margin set by firm facing some exogenous level of regulation
- Combining solution with the expression for the price-cost margin gives:

$$c = Pq_U + \delta \cdot pcm \cdot \left[\frac{Pq}{U} \right]$$

- Use this to determine what influences regulation

Results

- Higher levels of regulation when:
 1. Market power generates economic rents that are used to bargain for more favorable regulation
 2. Public opinion is favorable toward having more regulation since this enhances the bargaining power of the government

Conclusions

- More market power increases the firm's ability to commit to stricter levels of regulation
- Higher levels of regulation are more likely if public opinion is behind such a policy orientation
- More market power implies better environmental quality $H = c^\alpha / \alpha$

Future Research

- Empirical estimation of model
- Explicitly model cooperative behavior between different types of firms to determine the level of regulation
- Move to a dynamic framework: consider implications of evolving market conditions and market power