The Regulation of Interdependent Markets

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Outline

- Aim of the paper

- Basic structure of the model

- Optimal regulation and welfare comparisons

- Concluding remarks

Aim of the paper

- We consider interdependent markets
  - Choice between centralization (a unique regulator), and decentralization (two different agencies)
  - Two monopolists engage in regulatory capture activities

- Products are substitutes
  - Railroad and motorways; natural gas and electricity; mail and internet services

- Regulation of multiproduct industries
  - Attention from industry structure to regulatory structure.
    - Focus on the number of regulators

Related literature

- Optimal regulation with hidden characteristic
  - Baron & Myerson (1982)

- Capture
  - Stigler (1971)
  - Laffont and Tirole (1991, Lobbying is costly)

- Multi-principal
  - Baron (1985) non localized externalities
  - Martimort (1996)
  - Laffont and Martimort (1999)
    - splitting regulatory duties (on a single market) may act as a device against regulatory capture

Main results

- Under full information, centralizing regulation is always optimal, but relevant distributional issues emerge

- Under asymmetric cost information, lobbying pays off

- A unique regulator is more distorted to the industry's interests.
  - Competition between firms in the "political" arena

- When goods are good substitutes this effect is stronger
  - Decentralizing regulation can increase social welfare.

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The main ingredients

- Two markets, each run as a monopoly

- The Congress/Parliament has a benevolent objective function

- It delegates regulation either to a unique regulator or two different regulators

- The regulator(s) may have different objective(s) and have different regulatory tools

- Firms lobby the regulator(s)

The regulatory process

- A benevolent principal (Congress) delegates regulation
  - It cares about net consumer welfare minus the subsidization of firms financed by taxpayers

- The regulator decides the policy
  - Its objective function is not observable
  - The regulator may give profits a positive weight (capture)

- Firms have superior cost information
  - They lobby to increase the weight each regulator attaches to profits

Some key points

- The regulator is not a completely self-interested subject
  - the agency can be only in part captured by industry.

- The regulator maximizes the Congress' objective plus a share of profits of the firm(s) it regulates,
  - affected by the lobbying effort of firms
  - this effort in turn depends on the firms' expected profits

Timing

1. Given its objective function, the Congress decides the regulatory structure

2. The firms lobby towards the regulator(s)
   – This decides the weight of profits in each regulator's objective function

3. Each regulator announces its policy menu (price-subsidy) conditional on the firm's type

4. Each firm announces its type and the actual price-subsidy pair is chosen

The formal model

- Two interdependent markets (1 & 2)
  - each monopolised, cost $c_i \in [c_L, c_H]$

- Total gross consumer surplus

$$U(q_1, q_2) = \alpha_1 q_1 + \alpha_2 q_2 - \frac{1}{2}\left(\beta_1 q_1^2 + 2\gamma q_1 q_2 + \beta_2 q_2^2\right)$$

- Linear demand functions

$$p_i(q_i, q_j) = \alpha_i - \beta_i q_i - \gamma q_j$$

Objective functions

- The Congress' objective is net consumer surplus CS minus the amount of subsidies ($S_1 + S_2$) to the firms
  - Little would change if we assumed that profits enter the Congress' objective function, with a given weight
  - Same introducing a cost of public funds (stronger result)

- Each regulator takes the Congress' objective function but distorts it towards profits π_i because of firms' lobbying activity
  - The additional weight on profits is φ_I

Two regulatory structures

- Centralization: only one regulator
  - $V^C = CS - S_1 - S_2 + \varphi^C_1 \, \pi_1 + \varphi^C_2 \, \pi_2$

- Decentralization: one regulator per market
  - $V_i^D = CS - S_i - S_j + \varphi^D_i \, \pi_i$
  - Regulator i only decides variables for firm i

- Each regulator has expectations about the firm's costs
  - Density function $f(c_i)$

Lobbying activity

- Each firm maximizes its profit wrt its (costly) lobbying effort

$$\max_{\varphi_i^k \in [0,1]} \left[\pi_i^k \left(\varphi_i^k, \varphi_j^k \right) - \nu \left(\varphi_i^k \right) \right]$$

  - $\nu(.)$ convex

- Each profit depends on the other firm's output

  - …and on its ability to manipulate its regulator

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Full information results

- In all cases, zero equilibrium profits
  - No incentive to lobby

- Different prices
  - $p^C = c$
  - $p^D = c - z(\alpha - c)$ where $z = \gamma/\beta < 1$

- Centralization is socially preferable
  - Obvious
    - no reason not to use all available tools in the best way

Distributional issues

- Decentralization
  - favours consumers (price below cost)
  - at the expense of tax payers

- Notice that even in Baron-Myerson the same issue appears
  - Consumers' and firms' interests are aligned
  - Tax payers bear the cost

Asymmetric information results

- Now firms obtain a rent
  - lobbying pays off
    - Under both regimes, $\varphi_i > 0$

- Centralization provides bigger incentives to lobby
  - $\varphi^C_i > \varphi^D_i$
- $\Rightarrow$ A trade-off emerges

Equilibrium prices

- With centralized regulation

$$\overline{p}_i^C \left(\varphi_i^C \right) = c + \left(1 - \varphi_i^C \right) H$$

- With decentralized regulation

$$\overline{p}_i^D \left(\varphi_i^D, \varphi_j^D \right) = c - z \left(\alpha - c \right) + H \left[\left(1 - \varphi_i^D \right) + z \left(1 - \varphi_j^D \right) \right]$$

- The difference may be either positive or negative

$$\overline{p}^D - \overline{p}^C \equiv \Delta \overline{p} = -z \psi - \Delta \overline{\varphi} \left(z \right) H$$

- Where

$$\psi \equiv \alpha - c - \left(1 - \overline{\varphi}^D \right) H > 0$$

The trade off

$$\overline{p}^{D} - \overline{p}^{C} \equiv \Delta\overline{p} = -z\psi - \Delta\overline{\varphi}\left(z\right)H$$

- Both elements depend on *z*
  - $-\psi z < 0$ is the direct market interdependence effect (I^{AI})
    - Prices under D tend to be lower
    - More so, the larger *z* is

  - $-\Delta\varphi(z)H > 0$ is the lobbying effect (L^{AI})
    - Tends to make prices under D higher
   - It increases with *z* ($\Delta\varphi(z)$ decreases in *z*)

Distributional issues, again

- Whichever regime produces lower prices, it produces the following effects
  - Favours consumers
  - Penalizes taxpayers
  - Yields higher profits
  - Decreases aggregate welfare

- Is centralization always desirable?

Sometimes, centralization always prevails
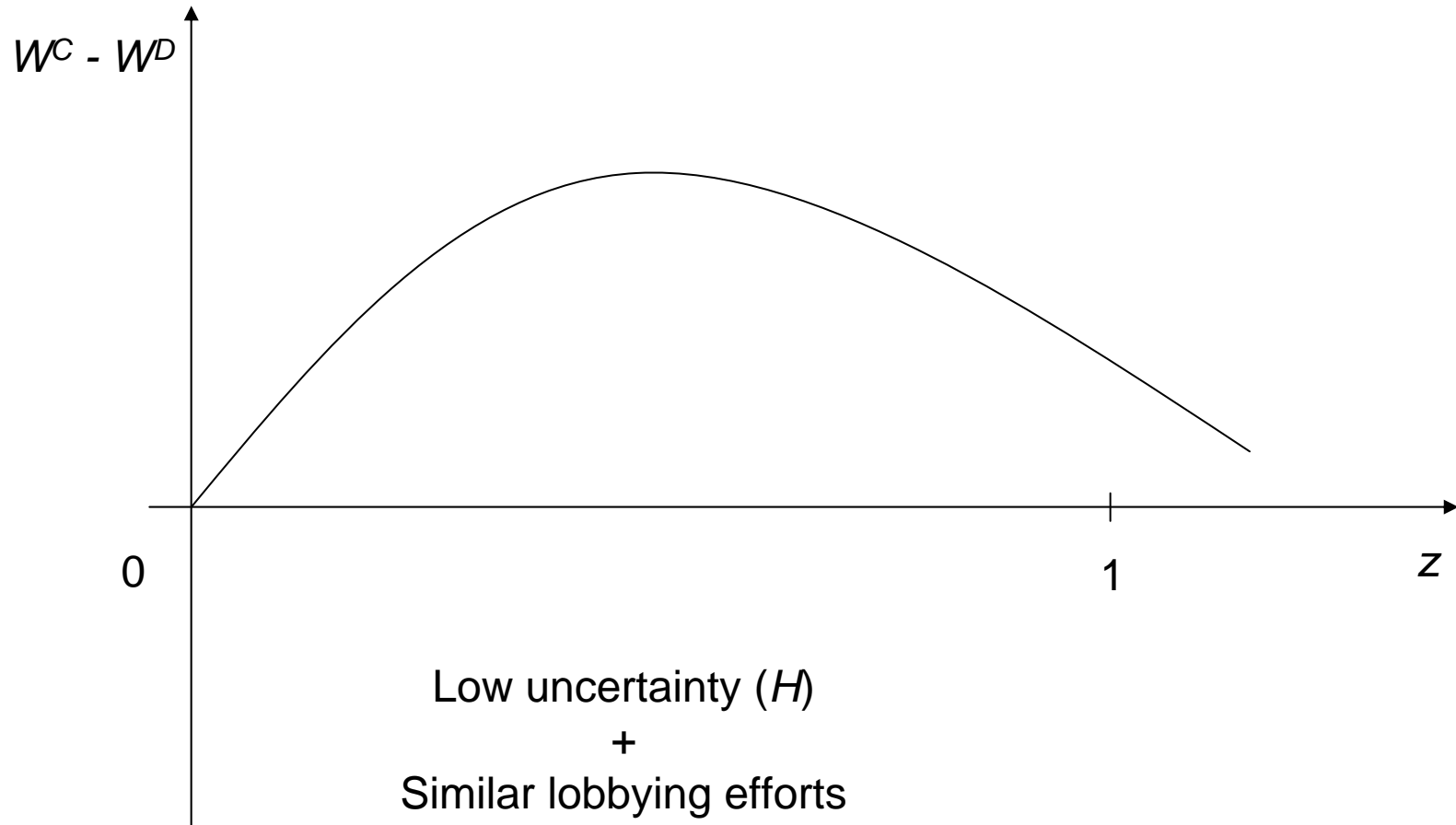
…or decentralization may be preferable

$W^C - W^D$

High uncertainty (H)
+
High substitutability

0   z^* 1 z
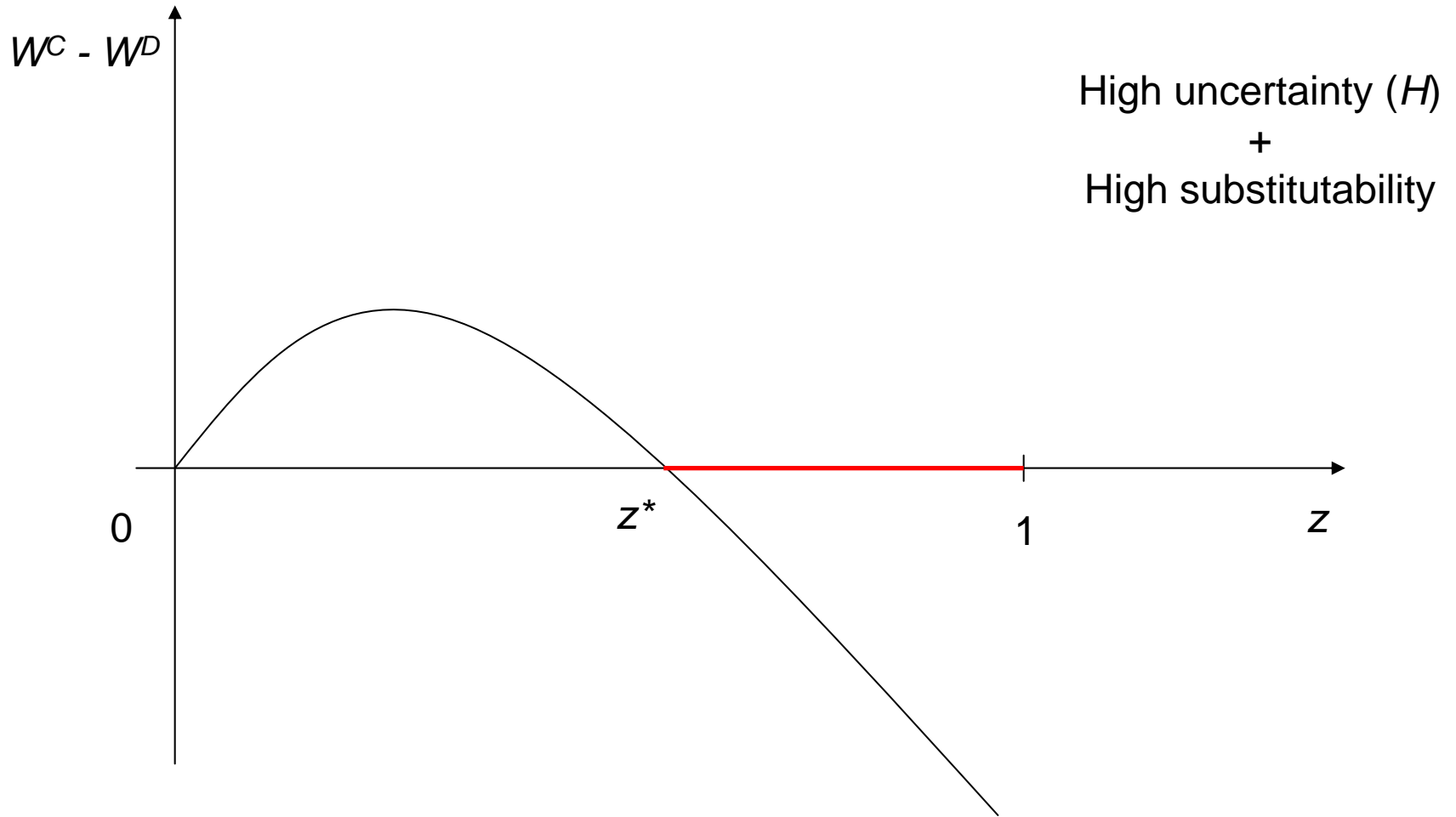
Conclusions

- Centralization is obviously better unless lobbying is so strong (because of strict substitutability) that you need diluting the incentive
  - Could this explain the resistance against the very creation of a transport regulator in Italy?

- When substitutability is strong, full liberalization may be an option

- Other factors to consider
  - Economies of scope in a regulatory authority
  - Lesser accountability with multitasking authority