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The regulation of markets with interdependent demands

Raffaele Fiocco [a,*], Carlo Scarpa [b]

[a] Department of Economics, University of Mannheim, L7, 3-5, D-68131 Mannheim, Germany
[b] Department of Economics, University of Brescia, Italy

A B S T R A C T

We examine the regulatory design of a market for products with interdependent demands, where regulated firms provide (imperfect) substitutes and can engage in lobbying activities. Under centralized regulation, a single regulator is established, whose mandate is to maximize aggregate welfare. Under decentralized regulation, each firm is assigned to a regulator charged with maximizing the welfare generated by that firm. With asymmetric cost information, centralized regulation results in a negative externality between firms when engaging in lobbying. Decentralized regulation removes this externality and reduces lobbying. Since this benefit comes at the cost of miscoordination between regulators, a trade-off results which favors decentralized regulation when goods are substitutes enough.

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1. Introduction

Should a country establish a single energy regulator, or rather different agencies for gas and electricity? Is it better to have a single transportation authority, or rather a regulator for railways separated from those regulating motorways or airports?

Our paper provides an attempt to explore this issue, focusing on how to devise the regulation of a market for differentiated products. In this setting, we examine the possibility that regulation is susceptible to lobbying by the industry. Regulated firms typically exert pressure activities on regulators in several manners, for instance by organizing events or presenting position papers which try to support the idea that the country's long term interests by and large coincide with their own interests.

In particular, we study the regulatory design of a market for products with interdependent demands, where two regulated firms provide (imperfect) substitutes and can engage in lobbying activities. Two regulatory structures are investigated. Under centralized regulation, a single regulator controls both firms and is charged with maximizing aggregate social welfare. Under decentralized regulation, two agencies regulate one firm each and are assigned the mandate to maximize the welfare generated by that firm.

In the absence of regulatory informational constraints, regulated firms cannot obtain rents in equilibrium and therefore they do not have any incentive to lobby the relevant regulator. Centralized regulation clearly dominates decentralized regulation, which entails a miscoordination cost since the regulator for one firm neglects the welfare generated by the other firm.

This natural result may be reversed when the regulator is not omniscient. In practice, firms usually have a privileged knowledge of their costs. It is well established in

* Corresponding author. Tel.: +49 6211811873.
 E-mail addresses: raffaele.fiocco@uni-mannheim.de (R. Fiocco),
cscarpa@eco.unibs.it (C. Scarpa).

the incentive regulation literature (e.g., Baron and Myerson, 1982; Laffont and Tirole, 1986) that regulated firms can command some rents from their private information. In our setting, this implies that each firm exhibits an incentive to lobby the relevant regulator in order to increase its rents. Specifically, it undertakes lobbying expenditures aimed at persuading the regulator to increase the weight attached to the firm's profits in the regulatory objective function. Clearly, this yields a distortion of regulation towards the firm's interests. We show that, in a centralized regulatory setting, each firm imposes a negative externality upon the other when engaging in lobbying activities. As goods are substitutes, a higher quantity (and a higher profit) from lobbying activities of one firm reduces the social value of the good produced by the other firm. Since a single regulator internalizes this effect, a lower quantity (and a lower profit) results for the latter firm. Consequently, a negative externality between firms arises when engaging in lobbying activities. This entails an over-investment in lobbying, since each firm lobbies the single regulator excessively. The lobbying problem is more severe when the demand interdependencies are stronger, namely, with a higher degree of substitutability between goods.

A decentralized regulatory structure alleviates lobbying activities, because the regulator for one firm does not internalize the welfare generated by the other firm, and this removes the negative lobbying externalities between firms. As a result, the lobbying problem is mitigated at the cost of a coordination failure. Since centralized regulation aggravates the lobbying problem in the presence of higher substitutability, decentralized regulation entails a trade-off that is welfare-improving when goods are substitutes enough.

Our paper attempts to offer a contribution to the analysis of the allocation of regulatory responsibilities, providing policy implications which lend themselves for an empirical validation of our results. As Table 1 illustrates, in practice a number of countries, such as Chile, France, Italy and the UK, have established a single energy authority. Far less common is a separation of the regulation of electricity and gas between two different agencies. Argentina, Bolivia, Brazil and Pakistan constitute examples of some interest. Since in these countries the problems of corruption and regulatory capture seem to be relevant, our results provide support for this regulatory design. In the public transportation sector, we observe a more heterogeneous pattern. For instance, in Canada, Denmark, Finland and Sweden there is a single regulator, while France, Norway, Spain and the UK split the regulation of railways, motorways and airports between different agencies.

It is worth noting that France and the UK have a single agency for energy but different agencies for public transportation. A possible explanation in line with our results is that the heterogeneity between transportation services is perceived to be lower than that between energy services.

Some countries have adopted a more centralized regulatory structure, with a single agency jointly regulating electricity, gas, railways and telecommunications, such as the Bundesnetzagentur (Federal Network Agency) in Germany and some State Public Utility Commissions in the US. In these cases, additional motivations outside the scope

Table 1
Regulatory regimes in different countries.

	Energy (electricity, gas)	Public transportation (railways, motorways, airports)
Centralized regulation	Chile, France, Italy, UK	Canada, Denmark, Finland, Sweden
Decentralized regulation	Argentina, Bolivia, Brazil, Pakistan	France, Norway, Spain, UK

of our analysis might be relevant, such as economies of scale in the regulation of network industries.

2. Related literature

The regulatory design of a market for differentiated goods is an issue which, despite its theoretical and empirical relevance, has been only touched by the literature on optimal regulation, which is extensively surveyed by Armstrong and Sappington (2007).

The economic literature has explored the relationship between one regulated firm and an administrative structure which may consist of one or more agencies. One of the first papers on this topic is Baron (1985), which examines the regulation of a non-localized externality by two different agencies. Another model closely related to ours is Martimort (1996), which builds on Baron (1985) by adding the possibility that the firm, regulated by two agencies, may lobby to capture their benevolence. The main result is that the duplication of non-benevolent regulators may improve social welfare.

Along these lines, Laffont and Martimort (1999) consider the problem of monitoring a regulated firm which has private information about some pieces of its activity. They find that splitting regulatory rights on some aspects of the firm's performance between different agencies may act as a device against the threat of regulatory capture, since it reduces regulatory discretion in engaging in socially wasteful activities.[1]

The literature on strategic delegation is also relevant for our purposes. The seminal papers of Fershtman (1985) and Fershtman and Judd (1987) show that a firm's profit maximizing owner may find it optimal to provide managers with incentives that differ from his own preferences. Along these lines, in our paper decentralized regulation is assigned an objective which diverges from aggregate social welfare. However, differently from the aforementioned contributions, in our setting strategic delegation aims at removing negative externalities from lobbying.

Our work is finally related to the well-known capture theory of economic regulation, whose seminal contribution traces back to Stigler (1971). Following his paradigm, we assume that the industry is able to mobilize regulatory powers to obtain favors since it has greater incentives than

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[1] The terms "centralization" and "decentralization" have been sometimes used with substantially different meanings from the one we adopt. For instance, a relevant stream of literature analyzes the optimal "vertical" structure of economic organizations. Laffont and Martimort (1998) show that under certain conditions a decentralized hierarchical structure can alleviate the problem of collusion if there are limits on communication between the principal and the agents.