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Coordination and the provision of incentives to a common regulated firm ☆

Johann Caro Burnett [a], Vinicius Carrasco [b,*]

[a] Department of Economics, Yale University, 28 Hillhouse Avenue, New Haven, CT 06511, United States
[b] Department of Economics, PUC-Rio, Rua Marques de Sao Vicente, 225, Gavea, Rio de Janeiro, Brazil

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ABSTRACT

This paper considers the problem faced by two regulators in providing incentives to a common (privately informed) regulated firm under various degrees of coordination. In the model, the firm exerts effort toward cost reduction and self-dealing, and incentives can be input-based (monitoring) and output-based (demanded cost targets). Full coordination between the regulators leads to the second best allocation. A setting in which the regulators do not fully coordinate leads to (i) higher overall monitoring (more aggressive input-based incentives) and (ii) higher demanded cost targets (i.e., more lenience in terms of output-based incentives). As a consequence of (i), in all possible equilibria, the effort toward cost reduction will be smaller when the agent reports to two regulators who do not coordinate. (i) and (ii) imply that the impact on the effort toward self-dealing activities is ambiguous. In our leading example, self-dealing will be larger if the regulators coordinate on monitoring levels but smaller if they choose monitoring levels independently.

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1. Introduction

In many industries, firms are subject to the oversight of more than one regulatory authority. More generally, economic agents are often subject to the oversight of multiple principals: taxpayers have to report to multiple tax authorities, policy-makers are overseen by legislators and the chief-executive, and a manager in a company have to report to a Board of Directors, to other stakeholders (e.g., debt-holders) and, in some cases, to a regulatory agency. When an agent reports to multiple principals, the degree of coordination among them is likely to play a key role.[1] This paper studies the provision of incentives to a firm that is regulated by two regulators under varying assumptions regarding the coordination capabilities of the regulatory authorities.

In the model, a regulated firm, through its manager, can implement an indivisible socially beneficial project at a cost that depends on (i) the amount of effort the manager exerts toward cost reduction ("productive effort"), (ii) the amount of effort exerted toward activities that increase the cost at which the project can be implemented by an amount that can be privately appropriated by the firm (effort toward "self-dealing activities"), [2] and (iii) a cost parameter that is privately observed by the firm.

Productive effort is unobservable by the regulators. While the same is in principle true for the effort toward self-dealing activities, upon monitoring the firm, the regulators may find hard evidence of it with some probability. In those states, the amount self-dealt can be fully recouped. In the model, if both regulators monitor the firm, the chances of hard evidence being found are larger. Put differently, in terms of monitoring, a two-regulator arrangement has a technological advantage over a single-regulator one.[3] However, the exercise of such advantage calls for some coordination among the monitors.

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* Corresponding author.
E-mail addresses: johann.caroburnett@yale.edu (J.C. Burnett), vnc@econ.puc-rio.br (V. Carrasco).

[1] The recent financial crisis has sparked discussions about the need for better regulation of the financial sector. In the bulk of such discussions, the question of whether or not regulators should coordinate among themselves has been prominent.

[2] When we lay down the model in Section 2, we provide a couple of examples of such type of effort and argue that regulators should be concerned about self-dealing.

[3] This makes the comparison between a single principal arrangement with a two-principal arrangement meaningful. Indeed, without any type of technological advantage, a single-principal arrangement always (weakly) dominates a two-principal arrangement, as any outcome obtained by the latter could be reproduced by the former, whereas, due to strategic effects, the converse is not true.

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The total cost at which the project is implemented is verifiable, so the regulators can demand from the firm the attainment of certain cost targets when implementing the project. Hence, incentives can be "input" based (monitoring) or "output" based (Lazear, 1995). Our main contribution is to analyze how the use of input based and output based incentives changes when one moves from a single-regulator arrangement to a two-regulator arrangement under various assumptions regarding the degree of coordination among the regulators.

For the benchmark case in which the regulators observe the cost parameter, we show that they can contract with the firm in a way that first best levels of both types of efforts prevail. Such allocation can be attained irrespective of whether the regulators coordinate or not. In fact, such allocation is attained even if the firm reports to a single regulator. This is so because, when the cost parameter is known, all that is needed to implement the first best levels of efforts is the use of well designed output based incentives: the firm must be made the residual claimant of any reduction in the cost at which the project is implemented. In particular, being a residual claimant of any reduction in costs, the firm will have no incentives to pursue self-dealing.

When the firm has private information regarding costs, matters are more complicated. Indeed, the interaction of information asymmetry with the non-observability of productive effort and the possibility of the pursuit of self-dealing by the firm makes the problem of designing an optimal contract non-trivial for the regulators. In a single regulator arrangement, as the technological gains stemming from monitoring by the two regulators are not fully exercised, the regulator will mainly rely on the output based incentives. Moreover, the eliciting of information requires the provision (through higher payments) of some rents to the firm. To reduce such rents, the regulator distorts upward the cost at which the project is implemented. This induces the firm to exert an inefficient amount of efforts toward cost reduction and positive effort toward self-dealing activities.

A two-regulator arrangement has the benefit of allowing more effective monitoring of the firm. However, the extent to which this benefit results in better outcomes depends on the degree of coordination among the regulators. It is undeniable that, *fixing* the level of all other instruments available to provide incentives to the firm, the more monitoring performed by the regulators, the better. However, one cannot assume that all other incentive schemes are held the same when the regulators do not fully coordinate. In fact, it may be the case that, in *response* to more monitoring, the regulators decide to alter the intensity of other incentive instruments. Hence, the benefits of more monitoring have to be balanced against the possible strategic effects brought up by a two-regulator arrangement. Indeed, we establish that a key trade-off in our analysis is related to the benefits brought up by the possibility of more monitoring in a two-regulator arrangement *vis à vis* the costs of miscoordination by the principals.

We consider three different cases varying according to the degree of coordination among the regulators: (i) full coordination, (ii) independent choice of payments to the firm and full coordination on the monitoring levels, and (iii) independent choice of payments *and* monitoring levels. In the first case the regulators jointly decide the levels of all relevant variables — demanded cost targets, monitoring levels and payments. In the second case, the regulators coordinate on the choices of cost targets and monitoring levels, but make payments to the firm in a non-coordinated fashion. In the third case, the regulators choose payments and monitoring levels independently.[4]

When there is full coordination among the regulators, the second best allocation is attained. In comparison to a single regulator arrangement, in which excessive reliance on output-based incentives prevail, with full coordination, the regulators increase the amount of monitoring and demand less aggressive cost targets from the firm. Put differently, the exploitation of the monitoring technology by the two (fully coordinated) regulators allow them to substitute output based incentives – saving, as consequence, on informational rents – for input based incentives. Therefore, a balanced choice of the incentive instruments ensues in such a case.

Compared to the full coordination benchmark, a setting in which the regulators do not fully coordinate always leads to *higher* demanded cost targets and *higher* monitoring. In other words, when they do not coordinate, the regulators will always be *less* aggressive regarding output based incentives and *more* aggressive regarding input based incentives.

The reason is simple. Higher monitoring induces less effort toward self-dealing activities by the firm. Since in our model efforts are substitutes for the firm, this reduces its marginal cost to deliver projects more efficiently (i.e., at lower costs). When regulators do not coordinate, the reduction in the firm's marginal cost to deliver more efficient projects is perceived by each of them as an *additional* benefit of monitoring, so more monitoring takes place. This is the source of higher monitoring. Since (lower) cost targets and monitoring are *substitute* incentive instruments to preclude self-dealing, the regulators become more lenient with respect to the cost at which the project is implemented. Finally, if the project is implemented at a higher cost, the perception of an additional benefit of monitoring is just reinforced.

The effect of the lack of coordination among the regulators on productive effort is unambiguous: in *all* possible equilibria, productive effort will decrease. The combination of more monitoring and higher cost targets has ambiguous consequences for self-dealing. On the one hand, for a fixed level of cost targets, the more monitored the manager is, the less self-dealing he will pursue. On the other hand, for a fixed level of monitoring, the higher the cost targets, the higher the incentives for the manager to exert effort towards self-dealing rather than toward cost reduction.

In our leading example, we show that, for the case in which regulators *coordinate* on monitoring (but not on payments), the amount self-dealt *increases* in comparison to a single-regulator arrangement despite the fact that more monitoring prevails in a two-regulator arrangement. However, when the regulators choose monitoring efforts independently, the amount self-dealt decreases. This is so because, somewhat surprisingly, compared to a setting in which they coordinate on monitoring (but set payments independently), the lack of coordination on monitoring leads to *higher* overall monitoring by the principals, with no effect on cost targets. The reason is that, without an explicit coordination on monitoring, the perception that monitoring has the additional benefit of reducing the agent's marginal cost to deliver more efficient project is *exacerbated*. This effect more than compensates the standard effect of free-riding in teams, which is a force toward less monitoring. These findings suggest that, whenever it is technologically advantageous to have more than one regulator monitoring, the best arrangement is one in which the regulated firm reports to all regulators, who then fully coordinate.

When full coordination among the regulators is not feasible, our leading example suggests that allowing them to choose monitoring levels independently may be beneficial. Indeed, a trade-off between a single regulator arrangement and a two-regulator arrangement in terms of their implications on the firm's choice of how to allocate its efforts arises. On the one hand, in a single regulator arrangement, the firm is forced to deliver lower cost targets but is monitored less. Lower cost targets naturally trigger more effort toward cost reduction. Less monitoring, however, by increasing the firm's marginal benefit to self-deal, leads to more self-dealing. In a two regulator setting in which

[4] When the regulators themselves are in charge of watching the firm, full coordination in monitoring would correspond to explicit communication between the regulators, perfect information sharing and transmission, avoidance of redundant efforts, and exploration of comparative advantages when executing the different activities that compose the monitoring process. A setting in which the regulators rely on a common third party, such as an auditor, to watch the firm would also fit our interpretation of full coordination.

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