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Regulatory Distortions in a Competitive Financial Services Industry

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Abstract

This paper focusses on the interaction between regulation and competition in a simple industrial organization model. We analyze how regulation affects the profitability of financial institutions. We find that information asymmetries impose a heavy regulatory burden on the higher-quality banks, highlighting the importance of fine-tuning regulation. Our other main results point at the importance of a level playing field.

Key words: banking, competition, regulation

1. Introduction

The financial services industry is arguably unique in that the concern about the safety and soundness of the financial system has led to intrusive regulatory interference. Recently, however, this regulatory interference has been called into question. New product innovations and the blurring distinctions between banking and nonbanking financial institutions have transformed the financial services sector into one of the most dynamic and challenging industries. The increasingly competitive and dynamic environment of banking puts severe strains on the viability and effectiveness of regulation. The purpose of this paper is to address and identify the competitive distortions that regulation introduces into the financial services industry.

This general issue has been at the center of much of the recent research on regulation of financial institutions (see the literature review of Bhattacharya, Boot, and Thakor, 1998). The notions of ''regulatory arbitrage'' and ''level playing field'' play important roles here.[1] With the current highly competitive and dynamic environment, existing regulations may be too statically oriented or narrowly defined, inviting regulatory arbitrage and potentially causing competitive distortions that prevent a level playing field.

This paper pays particular attention to the issue of a level playing field. To this end, we focus on the interaction of regulation and competition in the context of a simple industrial organization model. Our approach is to incorporate the standard agency story of suboptimal monitoring under asymmetric information into an industrial organization framework. The agency story motivates the desirability of regulation; the industrial organization framework allows us to highlight the competitive distortions of intrusive regulation. In our model, banks fund loans using both (insured) deposits and equity capital. Banks provide varying qualities of monitoring services that affect potential credit losses. Our goal is to analyze the effectiveness of regulation, and in particular capital requirements, in light of changes in the competitive environment.[2]

Two primary results emerge from our analysis. First, when regulation, by adjusting the capital requirements, changes the cost of funding loans, higher-quality banks (as measured by their monitoring abilities) suffer a greater loss in profits than lower-quality banks. This points at the importance of fine-tuning regulation. Second, a change in funding costs caused by regulation induces a greater loss in profits when regulated banks face competition from nonregulated firms than when they face only equally regulated competitors or no competitors at all. That is, intrusive regulation is most costly in the absence of a level playing field. When a level playing field is present, the costs of regulation actually may diminish when competition intensifies; that is, a monopoly bank may suffer more from regulation. However, in the current environment of banking, the increase in competition goes hand in hand with greater diversity in financial service providers that undoubtedly undermines the notion of a level playing field.

Our analysis underscores the importance of analyzing and evaluating regulation in an industrial organization context. The optimal regulatory design should follow from a careful formal analysis of the costs and benefits of various types of regulation. The effect of regulation on the competitive position of banks—as highlighted in our industrial organization framework—is in our view one of the most important considerations.

The remainder of our paper is organized as follows. We begin in section 2 with a characterization of the various approaches to regulation. Section 3 contains the industrial organization model and analyzes the interaction between competition and regulation. Section 4 concludes.

2. Approaches to regulation

A key issue in the design of regulation is whether it *stipulates* behavior or seeks to *induce* the desired behavior. To this end, we can distinguish between *direct* and *indirect* regulation. Direct forms of regulation explicitly restrict the activities banks can undertake. This form of regulation seeks to reduce discretion on the part of banks (and regulators) by explicitly prescribing and dictating the activities banks can engage in. The Glass-Steagall Act in the United Sstates (separating commercial from investment banking) and the enforced separation between banking and insurance, as observed in many countries around the world, are examples of this approach. While this has the benefit of clearly restricting possible outcomes, such a regulatory structure runs the risk of being outdated by new developments. The questionable sustainability of the separation between commercial and investment banking in the United States is one example. Recent deregulation addresses this concern. The alternative approach, indirect regulation, does not prescribe behavior (i.e., permissible activities) but rather establishes incremental price and nonprice incentives that are designed to elicit socially desired choices by financial institutions. Ultimately, indirect regulation aims at making undesirable activities more expensive. Risk-based capital adequacy rules are one example. Rather than prohibiting risky activities, they seek to mitigate against risk-taking incentives by making risky lending more expensive to fund than safe lending. The problem here is fine-tuning the price incentives. As a further illustration, the indirect approach would sensitize deposit insurance premia to risk in order to encourage low-risk strategies, whereas the direct approach would prohibit high-risk strategies funded with insured deposits. In both cases, compliance would need to be monitored.[3]

Existing bank regulatory practices incorporate both direct and indirect elements. For instance, the separation of investment and commercial banking in the United States and Japan, restrictions on branching and insurance, and bank holding company limitations all illustrate direct restrictions. On the other hand, risk-based capital requirements and liquidity reserve requirements illustrate indirect controls.[4] The former approach ''brute forces'' the desired behavior, while the latter would induce banks to reach the desired outcome. The latter inducements are feasible only when the regulator is sufficiently informed to price correctly. However, it could be costly if informational deficiencies loom large enough. This is particularly true in an environment where competitive distortions could be substantial. Moreover, banks might seek to exploit the discretion that indirect regulation grants them. Indirect regulation may also grant regulators discretion and they may need to be supervised themselves, if only to contain corruption. Indirect regulation therefore requires a well-defined regulatory and legal structure.

We may conclude that both direct and indirect forms of regulation are costly, particularly in a more competitive environment, where issues of a level playing field and regulatory arbitrage become of primary concern. Direct regulation seems least compatible with a rapidly changing, competitive environment. The recent wave of both scale and scope expansion in banking underscores the lesser emphasis put on this type of regulation. Indirect regulation has gained importance; witness, for example, the increased emphasis put on further refining the risk-based capital requirements and other control instruments. But, in a competitive environment, these instruments must be delicately and constantly fine-tuned such that they do not cause competitive distortions. Hence, the applicability of the indirect, control-oriented approach to regulation also is strained. In the next section, we analyze this in the context of an industrial organization model.

3. Regulatory distortions in a model of industrial organization

We develop a simple industrial organization model of banking that is concerned with the impact of capital requirement regulation on banks under various competitive environments. The main objective is to highlight the distortionary effects of intrusive regulation in a more competitive environment. In future work, we will consider the optimal design of regulation in this industrial organization framework.[5] For now, we focus on the distortionary effects of regulation and highlight the suitability of industrial organization models for analyzing regulatory design issues in banking. We consider a simple static environment, with two dates, $t \in \{0, 1\}$, covering one period. All agents are risk neutral and the riskless rate is normalized to 0.

3.1. Players and supply of loans

There are two types of players in the model: banks and regulators. Banks loan funds to firms and regulators dictate capital requirements. Loans are funded through (fully insured) deposits and equity capital.[6] We assume that, for each \$1 raised, $\delta \in (0, 1)$ are funded by deposits and $[1 - \delta]$ funded by equity capital. Banks affect the firm's loan repayment probability by providing monitoring efforts; and along this dimension, bank quality (τ) plays an important role. We model two types of banks, good (G) and bad (B).[7] The bank privately knows its own type, and monitoring levels chosen in equilibrium are not observable. Cross-sectionally, a randomly drawn bank is of type G with probability (w.p.) $\phi \in (0, 1)$ and of type B w.p. $1 - \phi$.

On extending a loan, the bank must choose its per-loan monitoring level, $m \in (0, 1)$. It will choose the monitoring level to minimize the total cost of the loan, which includes both potential credit losses from defaults and direct monitoring costs. Expected credit losses are a function of monitoring and given by the function $L(m)$, which is decreasing and concave in m. We assume that credit losses are defined as $L(m) = 1 - m$. The direct costs of monitoring are given by the increasing and convex function $V(m) = \alpha_\tau m^2$, where α_τ is inversely related to bank quality. Higher α_τ, with $\tau \in \{G, B\}$, denotes a lower-quality bank, and therefore we assume that $\alpha_G < \alpha_B$.

We can then express the expected cost of issuing a \$1 loan as

$$C(m) = [1 - \delta]L(m) + V(m)$$

$$C(m) = [1 - \delta][1 - m] + \alpha_\tau m^2 \tag{1}$$

The cost function in (1) captures the idea that credit losses are only partially borne by the bank via equity capital, with the deposit insurer bearing the residual loss. Note also that, at higher levels of capital, the bank internalizes more of the credit losses.[8] The bank chooses m to minimize (1). This results in an optimal monitoring level of

$$m_\tau^* = \frac{[1 - \delta]}{2\alpha_\tau} \tag{2}$$

Naturally, the regulator can affect monitoring levels through capital requirements (i.e., $[1 - \delta]$) since the monitoring choice in equilibrium m_τ^* is increasing in $[1 - \delta]$. Moreover, eq. (2) highlights that, for a given capital level, $m_G^* > m_B^*$. This implies that the per-unit expected cost of extending a \$1 loan is greater for the B-type bank than G-type bank. We let $C(m_G^*) \equiv C_G$ and $C(m_B^*) \equiv C_B$.

3.2. Market for loans

The aggregate demand for loans over the period is given by $\Omega^L > 0$. Each bank then competes as a Cournot duopolist and chooses a quantity of loans (L) to produce, given by Q^L_τ, where $\tau \in \{G, B\}$. The per-unit price of L, given by P^L, is determined by the inverse demand function:

$$P^L(\Omega^L, Q^L) = \Omega^L - Q^L \tag{3}$$

where $Q^L = Q^L_G + Q^L_B$ is the total quantity of L produced.

Demand for L is such that there is room for both types of banks to compete. That is, the demand structure allows for positive profits to both competitors. We therefore specify demand such that both players will enter the market for L; that is,

$$\Omega^L > 2C_B - C_G \tag{4}$$

3.3. Equilibrium analysis

We first derive general expressions for the output quantities of the two firms and their expected profits. Let $E\left(\prod^L_G\right)$ and $E\left(\prod^L_B\right)$ represent the expected profits of the G and B banks, respectively. The banks will choose and commit to produce Q^L_τ units of output L to maximize their expected profits. That is, for any per-unit production cost of C_τ, the bank of type τ competing with a bank of type $\chi \neq \tau$ solves

$$\max_{Q^L_\tau} E\left(\prod\nolimits^L_\tau\right) = P^L Q^L_\tau - C_\tau Q^L_\tau$$

which we restate using (3) as

$$\max_{Q^L_\tau} E\left(\prod\nolimits^L_\tau\right) = \left[\Omega^L - Q^L_\tau - Q^L_\chi\right] Q^L_\tau - C_\tau Q^L_\tau \tag{5}$$

Both type G and B banks will, given their own respective per-unit production cost, solve the maximization problem in (5). Therefore, the equilibrium outputs and expected profits are:

$$Q^L_G = \frac{1}{3}[\Omega^L - 2C_G + C_B] \tag{6}$$

$$Q^L_B = \frac{1}{3}[\Omega^L - 2C_B + C_G] \tag{7}$$

$$E\left(\prod\nolimits^L_G\right) = \frac{1}{9}[\Omega^L - 2C_G + C_B]^2 \tag{8}$$

$$E\left(\prod\nolimits^L_B\right) = \frac{1}{9}[\Omega^L - 2C_B + C_G]^2 \tag{9}$$

An immediate implication of eqs. (6) through (9) is that, since $C_G < C_B$, we have $Q^L_G > Q^L_B$

and $E\left(\prod_G^L\right) > E\left(\prod_B^L\right)$. That is the firm that has the cost advantage (G) gets a larger share of the market and enjoys a higher expected profit.

Our interest in this setup is to examine the impact of a change in regulated capital levels $[1 - \delta]$ on the banks' costs, and consequently their respective profits. To contrast the impact of regulation on G versus B banks directly, we consider a change in capital requirements that affects the per-unit production costs of both banks identically. This gives us our first result.

Theorem 1. *The absolute loss in expected profits for bank G, due to an increase in the per-unit costs of extending a loan, is greater than the commensurate loss in expected profits for bank B; that is,*

$$\left|\frac{\partial E\left(\prod_G^L\right)}{\partial C_G}\right| > \left|\frac{\partial E\left(\prod_B^L\right)}{\partial C_B}\right|$$

Proof. Taking the partial derivatives of (8) and (9) with respect to their individual per-unit costs yields

$$\frac{\partial E\left(\prod_G^L\right)}{\partial C_G} = -\frac{4}{9}\left[\Omega^L - 2C_G + C_B\right] \tag{10}$$

$$\frac{\partial E\left(\prod_B^L\right)}{\partial C_B} = -\frac{4}{9}\left[\Omega^L - 2C_B + C_G\right] \tag{11}$$

Given that $C_G < C_B$, we have $\partial E\left(\prod_G^L\right)/\partial C_G < \partial E\left(\prod_B^L\right)/\partial C_B$. Since both $\partial E\left(\prod_G^L\right)/\partial C_G$ and $\partial E\left(\prod_B^L\right)/\partial C_B$ are negative,

$$\left|\frac{\partial E\left(\prod_G^L\right)}{\partial C_G}\right| > \left|\frac{\partial E\left(\prod_B^L\right)}{\partial C_B}\right|$$

Theorem 1 says that a good bank's profits are more sensitive to changes in costs. The implication of this result is that, even when regulators can ensure that their actions affect all banks identically in terms of costs, the higher-quality banks will suffer a greater absolute loss in profits.[9] This highlights the distortionary effects of regulation: Asymmetric information regarding bank type makes fine-tuning regulation imperfect, and this particularly hurts higher-quality banks.

3.4. Nonregulated competition

We now explore the effects of regulation-induced cost changes in the face of different competitive environments. The idea we wish to capture is that (intrusive) direct and indirect regulation causes greater distortions in a highly competitive environment than when banks operate in a more protected environment. To facilitate this comparison, we take one representative bank from the regulated banking market. We examine the impact of regulatory cost changes when the bank enjoys a monopoly position and also when it faces an identically regulated competing bank. These results then are contrasted against the impact of similar cost changes when the representative bank faces competition from a firm that is *not* subject to regulation. The latter comparison allows us to say something about the importance of a level playing field.

3.5. *Profits in commercial banking*

Assume that there exists a representative bank, denoted type R, with per-unit costs of extending loans of C_R. If this bank enjoys a monopoly when facing the inverse demand function given by (3), its equilibrium production quantity and profits are

$$Q_R^L(monopolist) = \frac{1}{2}[\Omega^L - C_R] \tag{12}$$

$$E\left(\prod\nolimits_R^L \mid monopolist\right) = \frac{1}{4}[\Omega^L - C_R]^2 \tag{13}$$

If the bank competes as a Cournot duopolist with another (identical) bank facing identical costs and regulations, then we have the following equilibrium quantity and profit outcomes:

$$Q_R^L\ (regulated\ competitor) = \frac{1}{3}[\Omega^L - C_R]$$

$$E\left(\prod\nolimits_R^L \mid regulated\ competitor\right) = \frac{1}{9}[\Omega^L - C_R]^2 \tag{14}$$

Suppose now that we introduce a different type of competitor, a specialist financial (SF) services firm that does *not* fall under the umbrella of regulation. The SF firm also can extend loans at a per-unit expected cost of C_{SF}. For simplicity, we assume that the SF is a weaker competitor in that the bank (R) enjoys a cost advantage ($C_R < C_{SF}$). Again, Ω^L is assumed large enough to accommodate both players in the market; that is, $\Omega^L > 2C_{SF} - C_R$.

In this case, equilibrium production quantities and expected profits for the representative bank (R) and SF competing as Cournot duopolists are given by

$$Q_R^L \ (nonregulated\ competitor) = \frac{1}{3}[\Omega^L - 2C_R + C_{SF}] \tag{15}$$

$$Q_{SF}^L = \frac{1}{3}[\Omega^L - 2C_{SF} + C_R] \tag{16}$$

$$E\left(\prod_R^L \mid nonregulated\ competitor\right) = \frac{1}{9}[\Omega^L - 2C_R + C_{SF}]^2 \tag{17}$$

$$E\left(\prod_{SF}^L\right) = \frac{1}{9}[\Omega^L - 2C_{SF} + C_R]^2 \tag{18}$$

The question we wish to ask is, How does a regulatory-induced change in costs affect the bank? And, what impact does competition have? In particular, what is the impact of having a regulated versus an unregulated competitor? Our next theorem provides some answers.

Theorem 2. *The loss in expected profits for a regulated bank due to an increase in per-unit costs of extending a loan is greatest when facing a non regulated competitor, smaller when acting as a monopolist, and least when facing an identically regulated bank; that is, if* $\Omega^L < 8C_{SF} - 7C_R$*, then*

$$\left|\frac{\partial E(\prod_R^L \mid nonregulated\ competitor)}{\partial C_R}\right| > \left|\frac{\partial E(\prod_R^L \mid monopolist)}{\partial C_R}\right| > \left|\frac{\partial E(\prod_R^L \mid regulated\ competitor)}{\partial C_R}\right|$$

Proof. Taking the partial derivatives of (13), (14), and (17) with respect to their individual per-unit costs yields

$$\frac{\partial E(\prod_R^L \mid monopolist)}{\partial C_R} = -\frac{1}{2}[\Omega^L - C_R]$$

$$\frac{\partial E(\prod_R^L \mid regulated\ competitor)}{\partial C_R} = -\frac{2}{9}[\Omega^L - C_R]$$

$$\frac{\partial E(\prod_R^L \mid nonregulated\ competitor)}{\partial C_R} = -\frac{4}{9}[\Omega^L - 2C_R + C_{SF}]$$

Comparing these three equations offers the following result. Given that $C_{RG} < C_{SF}$, as long as $\Omega^L < 8C_{SF} - 7C_G$, then

$$\frac{\partial E(\prod_R^L \mid nonregulated\ competitor)}{\partial C_R} < \frac{\partial E(\prod_R^L \mid monopolist)}{\partial C_R} < \frac{\partial E(\prod_R^L \mid regulated\ competitor)}{\partial C_R}$$

Since

$$\frac{\partial E(\prod_R^L \mid nonregulated\ competitor)}{\partial C_R}, \quad \frac{\partial E(\prod_R^L \mid monopolist)}{\partial C_R}, \quad \text{and}$$
$$\frac{\partial E(\prod_R^L \mid regulated\ competitor)}{\partial C_R}$$

are negative,

$$\left|\frac{\partial E(\prod_R^L \mid nonregulated\ competitor)}{\partial C_R}\right| > \left|\frac{\partial E(\prod_R^L \mid monopolist)}{\partial C_R}\right|$$
$$> \left|\frac{\partial E(\prod_R^L \mid regulated\ competitor)}{\partial C_R}\right|$$

for $\Omega^L < 8C_{SF} - 7C_G$.

Theorem 2 indicates that losses imposed on a monopoly bank exceed those imposed on a bank that faces an equally regulated competitor. But regulation is most costly in terms of lost profits when regulated banks face competition from unregulated firms; that is, when there is no level playing field, regulation is most distortionary.[10]

3.6. Implications of the model

Our model can be summarized as follows. The nature of competition in the lending market is a vitally important component of the optimal regulatory framework. Consequently, any changes in regulation that manifest themselves in the costs of extending loans may hurt high-quality banks more than low-quality banks (see Theorem 1). Moreover, similar cost changes due to regulation have a bigger impact on bank profit when a level playing field cannot be maintained (see Theorem 2).[11]

These results further illustrate the competitive distortions of intrusive direct and indirect forms of regulation. The main issue is that fine-tuned capital requirements that seek to control the behavior of financial institutions will appear in their ''first-order conditions.'' Regulation then needs to be set at precisely the right levels to induce the right decisions. As shown in Theorem 1, with asymmetric information this might be elusive. Moreover, even if regulation is optimally fine-tuned, all institutions need to be subjected to it in an equal manner. A level playing field is crucial. If not, distortions along the lines of Theorem 2 will appear.[12]

4. Conclusion

The regulation of the financial services industry is a primary public policy issue. In this paper, we focus on the competitive distortions of regulation. In particular, problems of fine-tuning regulation and maintaining a level playing field are of primary concern. The increasingly competitive nature of the financial services industry elevates the importance of these distortions and forces regulators to take them into account.

A general comment that could be made is that, ultimately, the public policy makers are interested in the social welfare implications of regulatory design. Our focus on a level playing field and fine-tuning regulations definitely will be relevant for social welfare, but a broader analysis is needed. In fact, the industrial organization model that we have employed could be expanded to formally address the issue of optimal regulatory design. Ideally, we would like ''to solve'' for the optimal regulatory design endogenously. Social welfare issues will be of great importance to this analysis. In future work, we seek to address this question of regulatory design.

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Notes

1. For the origins of these arguments on regulatory arbitrage, see the seminal work of Kane (1981, 1984).
2. A variety of papers have suggested structural shifts in the regulatory framework, aimed mainly at reducing the dependence of the financial services industry on regulation by reducing the special status of banks. See, for a recent discussion, Herring and Santomero (1999). Others have focused on the compliance costs of regulation (see Franks, Schaefer, and Staunton, 1997 and Thakor and Beltz, 1994).
3. In the case of price incentives, monitors must ensure that institutions do not shift their portfolio risk structure after the prices have been set. Ex post penalty (settling up) mechanisms may be necessary.
4. The distinction between direct and indirect (forms of) regulation is not necessarily exhaustive. That is, ''lump sum'' capital requirements and various reporting obligations can be classified separately. These may not affect bank decisions and could be used simply to ''weed out'' lemons.
5. Interested readers are referred to Spulber (1989) for an excellent treatment of regulation theory.
6. We normalize the bank's cost of deposit insurance to 0.
7. Later, we introduce a competitor to the banks that does not fall under the regulatory net.
8. We assume here that deposits are fully insured; therefore they are available at the risk-free rate. Observe that $\{L(m) - [1 - \delta]L(m)\}$ could be interpreted as the deposit insurance subsidy (see Kwast and Passmore, 1997).
9. In a richer agency setting, it can be shown that identical changes in capital requirements that are binding may affect good banks more than bad banks, and thus reinforce the result in Theorem 1.
10. Theorem 2 is derived under the assumption that the market is sufficiently competitive. To see what we mean by this, consider the two conditions on demand that we identify. These are $\Omega^L > 2C_{SF} - C_R$ and $\Omega^L < 8C_{SF} - 7C_R$. The first says that demand must be high enough to ensure that both players (the representative bank and *SF*) can enjoy nonzero profits. The second condition captures the idea that it is a competitive market; that is, demand cannot be so high that additional firms can profitably enter the market. Importantly, a multitude of other specifications would generate the same qualitative results.
11. While we have focused on the effect of regulation on a bank's lending business, the results are more general and could be extended to include other bank activities.

12. Giammarino, Lewis, and Sappington (1993) examine the optimal design of a risk-adjusted deposit insurance scheme when the regulator has less information than the bank about the inherent risk of the bank's assets and is unable to monitor the extent to which bank resources are being directed toward activities of lower asset quality. They find that, relative to the first-best situation, a socially optimal deposit insurance scheme is able to discriminate among banks on the basis of risk but, at the same time, encourages a reduction in the quality of the bank's assets.

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