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Resumen

Los bancos centrales, ¿deberían conducir la supervisión bancaria micro-prudencial además de la supervisión macro-prudencial? En este artículo se utiliza un modelo formal para analizar esta pregunta y, por tanto, informar el debate y las propuestas de reforma actuales. El principal resultado es que, mientras existen buenas razones para que los bancos centrales conduzcan la supervisión macro-prudencial, es socialmente óptimo que otro supervisor conduzca la supervisión micro-prudencial cuando la captura de los supervisores por la industria es una preocupación.
Central banks, regulatory capture and banking supervision reform

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\subsection*{Abstract}

Should central banks be in charge of micro-prudential as well as of macro-prudential supervision? This paper uses a formal model to analyze that question, and thereby informs the current reform efforts on the fields of banking supervision. Our main finding is that, while there are good reasons for central banks to conduct macro-prudential supervision, it is socially optimal that another supervisor conducts micro-prudential supervision when supervisors’ capture by bankers is a concern.

\textit{JEL classification numbers:} D42, G24.

\textit{Key words:} Central banks, banking supervision reform, prudential supervision, regulatory capture, institutional organization.

\section{Introduction}

A series of reform proposals that have been envisaged since the subprime crisis started aim to concentrate regulatory and supervisory powers in the hands of central banks. For example, the United States’ Federal Reserve System is accumulating huge control over the economy and banks. The Restoring American
Financial Stability Act of 2010 gives the Federal Reserve primary responsibilities for supervising all firms that could pose a threat to financial stability (i.e., “macro-prudential supervision”) in addition to its responsibilities for monitoring the operations of holding companies—including traditional banks—and for protecting consumers. The Bank of England has received new responsibilities for guarding the overall system’s stability. Yet, the Conservative Party, now in office, has adopted as policy the investiture of full responsibilities to the Bank of England for the prudential oversight of all individual financial institutions (i.e., “micro-prudential supervision”, see The Conservative Party, 2009).

It is not hard to see why central banks are being given more responsibilities on macro-prudential supervision. Central banks are the natural source of liquidity when markets dry up. Financial instability affects the macroeconomic environment—with substantial consequences for price stability and the monetary policy transmission process—to the point that even central bankers now recognize that they have ignored macro financial stability at their peril. Moreover, the conduction of their monetary policy functions provides central banks with an ideal position to monitor macroeconomic developments as to better anticipate threats to the stability of the whole financial system. Indeed, Goodhart and Schoenmaker (1995) present a detailed analysis of the reasons for and against giving supervisory responsibilities to central banks, and find that the main argument in favor is to preserve financial stability.¹

Should also central bankers be in charge of micro-prudential supervision? Goodhart and Schoenmaker (1995) argue that the main opposition to give supervisory responsibilities to central banks is that these responsibilities could conflict with monetary policy and reduce its efficiency.² Moreover, the increasing com-

¹See also Di Giorgio and Di Noia (1999) and Masciandaro (1995, 2004).
²However, Peek et al. (1999) show that to have access to supervisory information may improve the efficiency of monetary policy because it helps central banks to better forecast economic
plexity of financial institutions and markets may imply that specialized agencies outside central banks are better positioned to monitor idiosyncratic developments.

In this paper, we use a formal model to analyze the previous question from a different perspective. We argue that most of the current reform efforts on the fields of banking supervision ignore the possibility that concentrating supervisory powers in the hands of central bankers could make them more prone to be captured by bankers. According to Barth et al. (2004), Djankov et al. (2002) and Quintyn and Taylor (2002), powerful supervisors may use their powers to benefit favored constituents and to extract bribes instead of improving the well-being of the society. Certain features of banking supervision —e.g., the very specialized skills and the vast amount of data that are necessary to conduct banking supervision, and the maintenance of confidentiality— facilitate the capture of supervisors by bankers. Indeed, capture was a concern during the Savings & Loans debacle (see Kane, 1990b, 2001); and, certain past regulatory debates in the United States were dominated by capture concerns (see, for instance, Abrams and Settle, 1993). Our analysis focuses on the incentives that self-interested bank supervisors may have to use supervisory information in their own benefit. We examine the implications of these incentives and the possibility of capture for the design of banking supervision institutions.\(^3\) We show that concentrating supervisory authority in the hands of a single supervisor (e.g., a central bank) may have a potential drawback: it may make more likely the capture of the supervisor by banks. Considering the allocation of bank supervisory powers as a contracting variable, we find that it is socially optimal that the micro- and the macro-prudential dimensions of banking supervision be conducted by different bank supervisors. Hence, policy makers in many countries would like to reconsider the current trend toward the concentr-\(^3\)

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\(^3\)Hardy (2006) argues that the possibility of regulatory capture needs to be taken into account in designing governance arrangements for bank supervisors.
tion of supervisory powers in the hands of central banks.

In our model, a banker has private information about her bank’s riskiness. A benevolent social planner does not observe that information but may use one or two supervisors to attempt to bridge its informational gap. One can think of the social planner as a legislature designing banking regulation and supervisory arrangements or, alternatively, as a benevolent financial stability committee, and of the supervisors as two governmental agencies (e.g., the Bank of England and the Financial Services Authority). These supervisors are endowed with imperfect informational technologies that allows them to get verifiable information on the riskiness of the bank with some positive probabilities.\footnote{Verifiability has a weak meaning as we do not require that the information can be verified by a jury but only that the social planner can be convinced about it.}

If supervisors were benevolent, then the allocation of supervisory power is of no consequences. Bank supervisors always reveal truthfully their supervisory information about the riskiness of the bank to the social planner. In turn, the latter can implement a socially optimal regulatory contract with the bank.

However, bank supervisors may pursue self interests rather than social welfare (as documented by Kane, 1990a). Gabillon and Martimort (2004) argue that the possibility of collusion between central banks and the banking systems was the reason why some countries (e.g., the United Kingdom) have removed supervision from their central banks’ responsibilities. As a matter of fact, supervision creates particular links between supervisors and the banking sector which make more likely that supervisors deviate from socially optimal objectives. We model the pursuit of self interest by allowing the supervisors to hide supervisory information to the social planner. Supervisory information gathered through audits and in situ inspections is not easily manipulated but it can be easily concealed. Supervisors may have many reasons not to inform the social planner about the riskiness of
the bank. We use the following modeling short-cut: a supervisor may be willing to hide supervisory information in exchange for some monetary bribes from the bank. Making this assumption is an helpful modeling short-cut since these bribes may take the form of various in-kind or implicit favors, revolving doors of jobs in supervisors and the banking system, and post-career concerns.\(^5\)

If supervisors are self-interested agents, then the allocation of supervisory powers may be an useful mechanism to improve social welfare. Assume first that there is only one supervisor gathering information from the bank. This information enables the supervisor to request bribes from the bank, which may reduce social welfare. Assume now that supervisory information can be split into two pieces of information. For example, the total riskiness of the bank is the sum of an idiosyncratic component (i.e., micro risk) and of a systemic exposure (i.e., macro risk). Assume further that there are two risk-specific technologies to assess these two components of risk and that there are two supervisors endowed with one technology each. For example, a central bank may only observe the systemic exposure of the bank, while another bank supervisor may only observe the idiosyncratic risk component of the bank. Under the assumption that bank supervisors request bribes that can always be provided by the bank,\(^6\) we show that the separation of supervisory powers improves social welfare with respect to the situation in which there is only one bank supervisor assessing both dimensions of risk.

Splitting supervisory powers into two different supervisors reduces their discretion by limiting the information at their disposal. Under separation, each supervisor does not observe the information gathered nor the bribe requested by

\(^5\)This form of modelization is common to the regulatory literature (see, for example, Laffont and Tirole, 1993). Moreover, bank supervisors may have other reasons for concealing information as, for example, to protect their reputation like in Boot and Thakor (1993).

\(^6\)This is a natural assumption when a bank supervisor is afraid of being sued for requesting bribes that cannot be accepted by the bank.
the other supervisor. Each supervisor may then request bribes based only on the piece of information it has gathered. Hence, each supervisor is constrained to request bribes that are accepted by the bank whatever its riskiness and whatever the bribe requested by the other supervisor. As a result, the sum of the bribes requested by both supervisors is at most as large as the bribe requested by a supervisor endowed with both supervisory technologies. Splitting supervisory powers may make it cheaper for the social planner to get information and so to provide incentives to bank supervisors; thus, it may improve social welfare.

In our model, policy implications are straightforward. Splitting supervisory powers among different bank supervisors is a superior arrangement in terms of social welfare than concentrating supervisory powers in a single supervisor. Since central banks seem to be natural candidates to perform macro-prudential supervision, then micro-prudential supervision should be allocated to a different from the central bank supervisor. From an ex ante perspective, the design of two separated supervisory entities with precise objectives and specific supervisory technologies leads to more rules and less discretion in banking supervision. The move from discretion to rules is indeed a constitutional response to capture. Each supervisor then receives a single mission, i.e. to monitor a single dimension of risk, and follows stringent rules.

This paper builds on the previous literature on self-interested bank regulation. Boot and Thakor (1993) model the pursuit of self interest by introducing uncertainty about the supervisor’s ability to gather supervisory information from the bank. Differently, we model the pursuit of self interest by allowing bank supervisors to hide supervisory information in exchange for monetary bribes from the bank. Moreover, we consider a richer environment where more than one supervisor can be appointed.

This paper contributes to the recent literature on the institutional allocation
of bank regulatory powers. Kahn and Santos (2005, 2006), Ponce (2010) and Repullo (2000) study the optimal allocation of lender of last resort responsibilities, deposit insurance and supervision among several bank regulators. Their guiding question is who should perform each of these activities. In this paper, we focus on banking supervision and analyze whether or not more than one supervisor should be responsible for conducting such an activity. So, we contribute with new results about the allocation of supervisory responsibilities.

This paper borrows extensively from the insights of the regulatory literature on collusion (see, for example, Laffont and Tirole, 1993). The closest paper is by Laffont and Martimort (1999), who formally study the effects of asymmetric information on the efficiency of side-contracting between utility market regulators and the regulated industry. Differently, we focus on banking supervision, the incentives of bank supervisors to use their power in order to improve social welfare, and its implications for the optimal allocation of the micro- and macro-prudential dimensions of banking supervision.

The rest of the paper is organized as follows. In Section 2 we present the model. In Section 3 we compare the implications of having one or two bank supervisors in terms of social welfare. In Section 4, we discuss some extensions to the model. Finally, in Section 5 we offer some concluding remarks.

2. The model

We consider the following three-tier hierarchy: social planner—bank supervisors—bank, in a model inspired of Laffont and Martimort (1999).

2.1. Agents, preferences and information

A banker has private information about her bank’s riskiness, \( r \). The riskiness of the bank can be decomposed into two components. A first component of risk is idiosyncratic to the bank; it is a risk affecting the bank individually. Since it
is bank-specific and not related to the rest of the banking system, we call this component a “micro” risk. A second component of risk is systemic. It measures the exposure of the bank to developments in the rest of the system and to external shocks. We call this component a “macro” risk. We assume that these two components of risk are additive. Hence, \( r \) has the following structure:

\[
r = \underline{r} + r_m + r_M,
\]

where \( \underline{r} \) is the minimal level of risk. \( r_m \) and \( r_M \) are two binary random variables with support in \( \{0, \Delta r\} \) representing the micro and the macro components of risk respectively. The structure of \( r \) is common knowledge. The random variables \( r_m \) and \( r_M \) are independently drawn from the same probability distribution function with \( P(0) = \alpha \) and \( P(\Delta r) = 1 - \alpha \).\(^7\) We denote \( \hat{r} \equiv r + \Delta r \) and \( \overline{r} \equiv r + 2\Delta r \). Hence, the bank can have three levels of risk \( \underline{r}, \hat{r}, \) and \( \overline{r} \), associated with probabilities \( P(\underline{r}) = \alpha^2, P(\hat{r}) = 2\alpha(1 - \alpha), \) and \( P(\overline{r}) = (1 - \alpha)^2 \), respectively.

For simplicity, we normalize to zero the amount of deposits in the bank. Hence, the size of the bank’s balance sheet is equal to the level of capital, \( k \), put at risk by the banker. If the (net) profit of the bank is denoted by \( \pi \), then the utility function of the banker is given by

\[
B = \pi - rk.
\]

The reservation utility of the banker is such that \( B \geq 0 \).

A benevolent social planner in the form of a banking commission or a financial stability committee is responsible for the design of banking regulation and supervisory arrangements, and for the implementation of bank regulations. The social planner does not observe the riskiness of the bank. It can use, however, one or two supervisors in order to attempt to bridge its lack of information on \( r \). Let \( w_i \),

\(^7\) The assumption of independence is introduced for the sake of simplicity. In section 4, we analyze the case of positive correlation.
for $i \in \{1, 2\}$, to be the wage of each supervisor. If the social planner uses only one supervisor, then that supervisor’s utility level is

$$S = w,$$

with the individual rationality constraint $w \geq 0$. If the social planner uses two supervisors, then we have similarly

$$S_i = w_i \geq 0 \quad \text{for} \quad i \in \{1, 2\}.$$

Figure 1 summarizes the structure of the three-tier hierarchy in our model.

![Figure 1: Structure of the three-tier hierarchy](image)

2.2. Regulation, supervision and their costs

The benevolent social planner regulates banks using a set of regulatory instruments. First, the social planner regulates the size of the bank’s balance sheet, $k$, using capital regulations, merges and acquisition regulations, and downsizing policies among other tools. For example, the Restoring American Financial Stability Act of 2010 introduces tough new capital and leverage requirements with the aim of making it undesirable for banks to get too big. Second, the social planner may
use instruments like fees, taxes, provisioning for expected and unexpected loses, and monetary penalties that directly or indirectly affect the profit of the bank, $\pi$.

Bank regulation, as well as bank supervision, entails some costs due to, for example, the bureaucratic structures that are needed to enact regulations and to collect public funds in order to pay wages, $w$, to bank supervisors. For simplicity, we assume that these costs are equal to $\lambda(\pi + w)$ with $\lambda > 0$. The term $\lambda \pi$ measures the bureaucratic costs of enacting regulations affecting the profit of banks, while the term $\lambda w$ measures the costs of collecting public funds to pay bank supervisors.

2.3. Supervisory technologies

There are two supervisory technologies denoted by $T_j$ for $j \in \{m, M\}$. A bank supervisor using technology $T_j$ obtains hard information on the random variable $r_j$ with probability $\epsilon \in (0, 1)$ when the realization of the variable is 0; nothing is learned otherwise. The information gathered by supervisors is hard in the sense that it can be justified by evidences. Let $\sigma_j$ denote the signal provided by technology $T_j$. Hence, we have that the signal $\sigma_j$ is informative with probability $\alpha \epsilon$ and that it is not informative with probability $1 - \alpha \epsilon$.

We denote by $s \in \{0, 1, 2\}$ the number of informative signals. Hence, we have that $P(s = 0) = (1 - \alpha \epsilon)^2$, $P(s = 1) = 2\alpha \epsilon (1 - \alpha \epsilon)$, and $P(s = 2) = (\alpha \epsilon)^2$.

Let $P_s(r)$ be the probability that the riskiness of the bank is $r \in \{\underline{r}, \hat{r}, \overline{r}\}$ conditional on the number of the signals that are informative, $s$. Hence, if none of the technologies provides an informative signal, i.e. $\sigma_m = \sigma_M = \emptyset$, we have

$$P_0(\underline{r}) = \frac{\alpha^2 (1 - \epsilon)^2}{(1 - \alpha \epsilon)^2}, \quad P_0(\hat{r}) = \frac{2\alpha (1 - \alpha)(1 - \epsilon)}{(1 - \alpha \epsilon)^2}, \quad \text{and} \quad P_0(\overline{r}) = \frac{(1 - \alpha)^2}{(1 - \alpha \epsilon)^2}.$$ 

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8See Perotti and Suarez (2009) and Shin (2010) for proposals of bank regulation that use taxes and charges as prudential tools.
If only one of the supervisory technologies provides an informative signal, i.e. \( \sigma_m = \emptyset \) and \( \sigma_M = 0 \), or \( \sigma_m = 0 \) and \( \sigma_M = \emptyset \), then the riskiness of the bank cannot be equal to \( \tau \). In this case we have

\[
P_1(r) = \frac{\alpha(1 - \epsilon)}{1 - \alpha\epsilon}, \quad \text{and} \quad P_1(\hat{r}) = \frac{1 - \alpha}{1 - \alpha\epsilon}.
\]

If both signals are informative, i.e. \( \sigma_m = 0 \) and \( \sigma_M = 0 \), it is necessarily the case that \( r = \hat{r} \).

2.4. Social welfare

The benevolent social planner maximizes the following welfare function

\[
W = \Psi(k) + B + S - (1 + \lambda)(\pi + w),
\]

where \( \Psi(k) \), with \( \Psi' > 0 \) and \( \Psi'' < 0 \), is the utility that the customers of the bank derive from using its services. The surplus of customers, \( \Psi(k) \), is assumed to be increasing in the size of the bank (which is measured by its capital, \( k \)) but with decreasing returns to scale. Indeed, larger banks generally offer more complete sets of products, which may better satisfy the preferences of customers. However, the marginal utility derived by customers from the introduction of a new product tends to zero when the current offer of products by the bank is large enough. Moreover, better capitalized banks offer better protection to their depositors. Whereas, the marginal utility of extra protection tends to zero when the bank is well capitalized. Recall that \( B \) and \( S \) are the utilities of the banker and of bank supervisors respectively. Finally, the term \( (1 + \lambda)(\pi + w) \) represents the total costs of regulating and supervising banks. The welfare function can be restated as follows

\[
W = \Psi(k) - (1 + \lambda)rk - \lambda B - \lambda S.
\]

2.5. The structure of regulatory and supervisory contracts

The social planner uses all the information at its disposal in order to provide incentives to the banker and to bank supervisors. Hence, the social planner first
asks supervisors to reveal their signals and, if they are not fully informative, the social planner asks the bank directly. Denoting by $\tilde{\sigma}_j$ with $j \in \{m, M\}$ the report by supervisors and by $\tilde{r}$ the report by the bank, capital (size) regulations are given by $k(\tilde{\sigma}_m, \tilde{\sigma}_M, \tilde{r})$; other bank regulations affecting the profit of the bank are denoted by $\pi(\tilde{\sigma}_m, \tilde{\sigma}_M, \tilde{r})$; together, they determine the benefits of the bank, i.e. $B(\tilde{\sigma}_m, \tilde{\sigma}_M, \tilde{r})$. The wages of supervisors are given by $w(\tilde{\sigma}_m, \tilde{\sigma}_M)$.

2.6. Timing

The timing of the model is as follows:

(i) The social planner defines the supervisory structure, i.e. either to use one or two bank supervisors.

(ii) The bank learns $r_m$ and $r_M$. Simultaneously, the supervisor(s) learn(s) its (their) signals $\sigma_m$ and $\sigma_M$.

(iii) The social planner announces its regulatory policy and the supervisor(s) wage(s). The bank and supervisor(s) decide whether or not to accept to participate. If any one refuses, the game ends.

(iv) Non-benevolent supervisor(s) that observe(s) informative signal(s) request(s) bribes from the bank in exchange for hiding supervisory information to the social planner.

(v) The supervisor(s) report(s) its (their) signal(s) and, if uninformative, the bank reports its signal to the social planner. The regulatory policy is executed and supervisory wages are paid.

2.7. Benchmark: benevolent supervision

For further references, we solve for the benchmark case in which bank supervisors are benevolent. Benevolent supervisors truthfully report their supervisory
information to the social planner for a zero reward. Hence, to have one or two supervisors is indifferent from the perspective of the social planner.\footnote{As we discuss in Section 4, this conclusion would differ when, for instance, to appoint a second supervisor entails the duplication of some costs.}

Let denote by $k_s$, $\hat{k}_s$ and $k_s$ the capital (size) regulations imposed to a bank of risk equal to $r$, $\hat{r}$ and $\tau$ respectively, and by $B_s$, $\hat{B}_s$ and $\overline{B}_s$ the respective utility levels of the banker when $s \in \{0, 1, 2\}$ informative signals are observed.

When no informative signal is observed, i.e. $s = 0$, the welfare function is

$$W_0 = P_0(\tau)[\Psi(k_0) - (1 + \lambda)r - \lambda B_0] + P_0(\hat{r})[\Psi(\hat{k}_0) - (1 + \lambda)\hat{r} - \lambda \hat{B}_0] + P_0(\tau)[\Psi(\overline{k}_0) - (1 + \lambda)\tau - \lambda \overline{B}_0].$$

When only one informative signal is observed, i.e. $s = 1$, the welfare function is

$$W_1 = P_1(\tau)[\Psi(k_1) - (1 + \lambda)r - \lambda B_1] + P_1(\hat{r})[\Psi(\hat{k}_1) - (1 + \lambda)\hat{r} - \lambda \hat{B}_1].$$

When both signals are informative, i.e. $s = 2$, the welfare function is

$$W_2 = \Psi(k_2) - (1 + \lambda)r - \lambda B_2.$$ 

From an ex ante perspective, the expected social welfare under benevolent supervision, denoted by $W^B$, is

$$W^B = (1 - \alpha \epsilon)^2 W_0 + 2 \alpha \epsilon (1 - \alpha \epsilon) W_1 + (\alpha \epsilon)^2 W_2. \quad (1)$$

In the case with benevolent supervision, the social planner maximizes the expected value of social welfare, which is given in Equation (1), under the constraints that guarantee the banker’s participation and compatibility of incentives. These constraints depends on the number of signals that are informative.

If both signals are informative, i.e. $s = 2$, the social planner has perfect information so that it knows that the riskiness of the bank is $r = \tau$. In this case, maximizing $W^B$ yields the same results that maximizing $W_2$: all the banker’s
informational rent should be extracted, \( B^B_2 = 0 \), and the capital (size) regulations, \( k^B_2 \), should be such that \( \Psi'(k^B_2) = (1+\lambda)r \). In this case, the riskiness of the bank is observed by supervisors and thus by the social planner. Hence, the bank directly falls into a particular regulatory scheme. Indeed, as the information gathered by supervisors is hard in the sense that it can be justified by evidences, the social planner knows that the riskiness of the bank is \( r \) and applies the complete information regulation that leads to a profit \( B^B_2 \) for the bank with the associated capital \( k^B_2 \).

However, as soon as at least one of the signals is not informative, i.e. when \( s = 0 \) or \( s = 1 \), the riskiness of the bank is the banker’s private information and the social planner is not able to assign the bank to a particular regulatory scheme. In this case, the bank chooses the regulatory scheme that fits better its needs. Hence, the social planner, in designing banking regulation, has to ensure that the banker chooses the regulatory scheme that is socially optimal for its level of risk. This introduces some self-selection or incentive compatibility constraints to the problem of the social planner. These constraints ensure that the bank finds it optimal to truthfully report its riskiness rather than mimicking other category of risk and being imposed the associated regulations. Under asymmetric information, i.e. \( s = 0 \) and \( s = 1 \), the single-crossing property\(^{10} \) ensures that it is enough to consider only upward incentive constraints. Hence, the relevant incentive compatibility constraints are

\[
B_0 \geq \hat{B}_0 + \Delta r \hat{k}_0, \quad (IC_1)
\]

\[
\hat{B}_0 \geq \hat{B}_0 + \Delta r \hat{k}_0, \quad \text{and} \quad (IC_2)
\]

\(^{10}\) The single-crossing property, or Spence-Mirrlees property, refers to a situation in which the isoutility curves of different types cross only once. See Laffont and Martimort (2002, Chapter 2), and the references therein for detailed analyzes of the single-crossing property.
Constraints $(IC_1)$ and $(IC_3)$ ensures that a bank of riskiness $r$ is not willing to mimic a bank of riskiness $\hat{r}$ when both signals are not informative and when only one signal is informative respectively. Constraint $(IC_2)$ says that a bank of riskiness $\hat{r}$ is not willing to mimic a bank of riskiness $\bar{r}$ when no signal is informative.

The single-crossing property also ensures that it is enough to consider the most risky bank’s participation constraints. These constraints are

$$B_0 \geq \hat{B}_1 + \Delta r \hat{k}_1.$$  

$(IC_3)$

Maximizing the expected value of social welfare, $W^B$, under the previous constraints we find that $k_{B0} = k_{B1} = k_{B2}$, and that $\hat{k}_{B0}, \hat{k}_{B1}$ are such that

$$\Psi'(\hat{k}_{B0}) = (1 + \lambda)\hat{r} + \lambda \frac{P_0(r)}{P_0(\hat{r})} \Delta r,$$

$$\Psi'(\hat{k}_{B1}) = (1 + \lambda)\hat{r} + \lambda \frac{P_1(r)}{P_1(\hat{r})} \Delta r,$$

and

$$\Psi'(\hat{k}_{B1}) = (1 + \lambda)\hat{r} + \lambda \frac{P_1(r)}{P_1(\hat{r})} \Delta r.$$

The previous results imply the following Proposition.

**Proposition 1.** Optimal regulation under benevolent supervision entails more severe regulations for the most risky banks such that 

$$B_1 \geq \hat{B}_1 + \Delta r \hat{k}_1.$$
(i) the most risky banks face more stringent capital (size) regulations than the less risky banks: \( k^B_0 > \hat{k}^B_0 > \bar{k}^B_0 \) and \( k^B_1 > \hat{k}^B_1 \); and

(ii) the less risky banks make more profits: \( B^B_0 > \hat{B}^B_0 > \bar{B}^B_0 \) and \( B^B_1 > \hat{B}^B_1 \).

Under the optimal regulatory scheme, the less risky banks face the less severe capital or size regulations. Moreover, the size that is allowed by regulation for the less risky banks does not depend on the information gathered by supervisors, i.e. \( k^B_0 = k^B_1 = k^B_2 \).\(^{11}\) However, the profit of the less risky banks depends on the supervisors’ signals. In particular, the less risky banks gain more under asymmetric information, i.e. when \( s = 0 \) and \( s = 1 \), than under perfect information, i.e. when \( s = 2 \): \( B^B_0 > \hat{B}^B_0 > \bar{B}^B_0 \) and \( \hat{B}^B_0 > \bar{B}^B_1 \). Intuitively, when benevolent supervisors observe the riskiness of a bank, the social planner can leave less profit to that bank and still implement the level of capital that is socially optimal. Otherwise stated, as soon as at least one supervisory signal is not informative, the social planner has to leave some informational rent to the banker in order the latter chooses the regulatory scheme that is socially optimal for its bank level of risk.

Intermediate and high-risk banks face more stringent regulations than low-risk banks. Under asymmetric information, i.e. when \( s = 0 \) and \( s = 1 \), and due to incentive reasons, the social planner restricts further the size of the most risky banks and their profits accordingly. By so doing, the social planner has to leave less informational rents to banks in order they self-select the regulatory scheme that is designed for their category of risk. As a result, optimal regulation entails an inverse relationship between riskiness and size of banks.

Since \( \hat{k}^B_0 > \hat{k}^B_1 > \bar{k}^B_0 \), the maximization of the expected value of social welfare also implies the following relationships among the utility of the bank.

\(^{11}\)This is an expression of the classical “no distortion at the top” result of the theory of incentives. See, for example, Laffont and Martimort (2002).
Corollary 1. Under benevolent supervision, the profits of the banks are such that

\[ \hat{B}_0^B < B_0^B - B_1^B, \quad \text{and} \]
\[ \hat{B}_0^B < B_1^B. \]

These conditions will be useful for the analysis in the next section.

3. How many supervisors should be used?

In this section, we compute optimal regulations for the case in which bank supervisors are non-benevolent. We compute the distortions in terms of social welfare for the case in which only one supervisor is used and for the case in which two supervisors are used. Finally, we compare the results in order to answer how many bank supervisors should be used.

3.1. One non-benevolent supervisor

In this section, we consider the case in which the social planner uses one bank supervisor in order to attempt to bridge its informational gap on the riskiness of the bank. The single bank supervisor is endowed with both supervisory technologies \( T_j, j \in \{m, M\} \). The bank supervisor is non-benevolent and has some discretion in performing its tasks. In particular, it may hide supervisory information to the social planner in exchange for some monetary bribes from the bank. Hence, the social planner has to reward the supervisor in order the latter truthfully reveals its information about the riskiness of the bank.

If the supervisor obtains hard information about the riskiness of the bank, it could be that the banker is better off when such information is not revealed to the social planner. In such a case, there is scope for a collusive agreement between the banker and the supervisor. We assume that all the bargaining power belongs
to the bank supervisor. Hence, the supervisor requests a monetary bribe from the bank that is consistent with the information at its disposal and with the extra benefit accruing to the banker when the information is not revealed to the social planner. This kind of bribe request is “safe” in the sense that it is always accepted by the banker. However, due to the illegal nature of bribes and the difficulties that arise when organizing such a collusive agreement, side-contracts between the banker and the supervisor are subject to transaction costs. These transaction costs imply that each unit of bribes paid by the banker increases the utility of the supervisor by only $\tau$, with $\tau \in (0, 1)$.

In this setting, the social planner has to offer a reward to the bank supervisor at least equal to the stake of bribes. There is not loss of generality in restricting the analysis to collusion-proof schemes, namely schemes that do not induce the bank and the supervisor to collude and motivate the latter to report truthfully to the social planner. The wage of the supervisor, $w_s$, is thus contingent on the number of informative signals, $s \in \{0, 1, 2\}$, reported to the social planner. In particular, these wages must satisfy the following collusion-proof constraints

\[
w_2 - w_1 \geq \tau B_1, \quad (CP_1)
\]

\[
w_2 - w_0 \geq \tau B_0, \quad (CP_2)
\]

\[
w_1 - w_0 \geq \tau \min\{B_0 - B_1, \hat{B}_0\}. \quad (CP_3)
\]

\[\text{\footnotesize 12 Alternative assumptions are possible. The important point is that the social planner can anticipate the outcome of the bargaining game.}\]

\[\text{\footnotesize 13 We assume that $\tau$ is exogenous and common knowledge. See Kofman and Lawarre (1993) for supervision models where the social planner does not know $\tau$. In Laffont and Martimort (1997, 2000) transaction costs are endogenously generated by asymmetric information among agents who want to enter collusive agreements.}\]

\[\text{\footnotesize 14 The collusion-proofness principle holds in our context. See Laffont and Tirole (1993) for a formal exposition of this principle.}\]
Constraint \((CP_1)\) says that a fully informed supervisor prefers to report both signals rather than hiding one of them and getting a bribe from the banker. Constraint \((CP_2)\) says that the supervisor prefers to report both signals rather than hiding both of them and getting the corresponding bribe from the banker. If the supervisor observes only one signal, it does not know whether or not the unobserved piece of information yields some rent to the banker. If it does, the maximum safe bribe that can be requested to the banker is equal to \(B_0 - B_1\), while it is equal to \(\hat{B}_0\) otherwise. Hence, constraint \((CP_3)\) says that the supervisor prefers to report the only signal it has gathered rather than hiding it and getting the bribe that can be provided by the banker whatever its riskiness.

The social planner does not need to compensate the supervisor for a pair of uninformative signals, i.e. \(\sigma_m = \emptyset\) and \(\sigma_M = \emptyset\), hence \(w_0^O = 0\). The expected social cost of hiring only one bank supervisor, denoted by \(C^O\), is thus

\[
C^O = \lambda[(\alpha \epsilon)^2 w_2 + 2\alpha \epsilon(1 - \alpha \epsilon)w_1].
\]

Therefore, expected social welfare with only one non-benevolent supervisor, denoted by \(W^O\), is

\[
W^O = (1 - \alpha \epsilon)^2 W_0 + 2\alpha \epsilon(1 - \alpha \epsilon)W_1 + (\alpha \epsilon)^2 W_2 - \lambda[(\alpha \epsilon)^2 w_2 + 2\alpha(1 - \alpha \epsilon)w_1].
\]

The social planner maximizes this objective function under collusion-proof constraints \((CP_1)\) to \((CP_3)\), incentive compatibility constraints \((IC_1)\) to \((IC_3)\), the banker’s participation constraints \((PC_1)\) and \((PC_2)\), and the supervisor’s participation constraints \(w_1 \geq 0\) and \(w_2 \geq 0\).

Since the incentive compatibility constraints and the participation constraints of the banker are binding at the optimum, we have \(B_0^O = 0\), \(B_1^O = \Delta r \tilde{k}_0^O\), \(B_0^O = \Delta r(\tilde{k}_0^O + \tilde{\tilde{k}}_0^O)\), \(B_1^O = 0\), and \(B_1^O = \Delta r \tilde{k}_1^O\). When conditions (2) and (3) holds,\(^{15}\)

\(^{15}\)As usually done in the literature, e.g. Laffont and Martimort (2002), we assume that these conditions hold and check that it is indeed the case ex post.
equation \((CP_3)\) can be rewritten as \(w_1 \geq \tau \hat{B}_0\). Both \((CP_2)\) and \((CP_3)\) are binding at the optimum, then condition \((3)\) ensures that \((CP_1)\) is slack. Using the binding collusion-proof constraints, expected social welfare can be rewritten as

\[
W^O = (1 - \alpha \epsilon)^2 W_0 + 2 \alpha \epsilon (1 - \alpha \epsilon) W_1 + (\alpha \epsilon)^2 W_2 - \lambda \tau [((\alpha \epsilon)^2 B_0 + 2 \alpha \epsilon (1 - \alpha \epsilon) \hat{B}_0].
\]

Optimizing, we find that \(k_0^O = k_1^O = k_2^O\), and that \(\hat{k}_0^O, \hat{k}_1^O, \) and \(\hat{k}_1^O\) are such that

\[
\Psi'(\hat{k}_0^O) = (1 + \lambda) \hat{r} + \lambda \left( \frac{P_0(r)}{P_0(\hat{r})} + \frac{\sigma(\alpha \epsilon)^2}{(1 - \alpha \epsilon)^2 P_0(\hat{r})} \right) \Delta r,
\]

\[
\Psi'(k_0^O) = (1 + \lambda) r + \lambda \left( \frac{P_0(r)}{P_0(\hat{r})} + \frac{\tau \alpha \epsilon (2 - \alpha \epsilon)}{(1 - \alpha \epsilon)^2 P_0(\hat{r})} \right) \Delta r,
\]

and

\[
\Psi'(\hat{k}_1^O) = (1 + \lambda) \hat{r} + \lambda \frac{P_1(\hat{r})}{P_1(\hat{r})} \Delta r.
\]

The possibility that the bank supervisor colludes with the banker and hides supervisory information to the social planner distort the optimal regulatory policy under asymmetric information. The following Proposition summarizes these distortions.

**Proposition 2.** Optimal regulation with one non-benevolent bank supervisor entails more capital restrictions for the most risky banks and lower profits for the less risky banks with respect to the case of benevolent supervision. More precisely, \(k_0^O < k_0^B, \hat{k}_0^O < \hat{k}_0^B, \hat{B}_0^O < \hat{B}_0^B, \) and \(P_0^O < P_0^B\).

The threat of collusion between the supervisor and the bank leads to additional distortions on the optimal capital regulation for intermediate and high risk banks when no informative signal is reported, i.e. when \(s = 0\). Indeed, no informative signals are more likely to be observed by the social planner when collusion between the bank and the supervisor is an issue. Hence, the social planner has to reward the supervisor for truthfully reporting in order to revert its incentive to engage in collusive agreements with the banker. Since such a reward depends on the capacity of the banker to provide bribes to the bank supervisor, the social planner reduces
the social cost of being informed by decreasing the stake for collusion. This is achieved by reducing the profit of the bank in states where collusion is an issue and by introducing additional capital regulations such that the size of the most risky banks is lower than in the case in which supervisors are benevolent: $\mathcal{F}_0^O < \mathcal{F}_0^B$ and $\tilde{\mathcal{R}}_0^O < \tilde{\mathcal{R}}_0^B$.

It is worth to note that the regulatory distortions that are necessary to provide incentives to the bank supervisor depends on the transaction costs of side-contracting between the banker and the supervisor. In particular, when these costs are extremely large, i.e. $\tau \to 0$, optimal regulation with a single non-benevolent supervisor tends to the optimal regulation under benevolent supervision.

3.2. Two non-benevolent supervisors

In this section, we consider the case in which the social planner uses two bank supervisors in order to attempt to bridge its informational gap on the riskiness of the bank. Each supervisor is endowed with only one supervisory technology $T_j$ with $j \in \{m, M\}$. For example, the central bank monitors the exposure of the bank to macroeconomic risks and another bank supervisor monitors the risks that are idiosyncratic to the bank. Hence, each supervisor observes only the signal coming from its supervisory technology and remains ignorant about the other supervisor’s signal. In order to simplify the analysis, we assume that supervisors do not exchange information about their signals.\footnote{In the absence of monetary bribes, central banks and bank supervisors do not have an incentive to voluntarily share supervisory information with each other (see, for example, Kahn and Santos, 2005, 2006; Ponce, 2010). If monetary bribes were allowed, then it may be the case that one supervisor “sells” its information to the other. However, the social planner is likely to be able to better control and therefore prevent monetary bribes between supervisors than bribes between supervisors and banks. Moreover, in Section 4 we show that the results are robust to assuming that one supervisor observes the report of the other supervisor before making its own report to the social planner.}

In this setting, we look for a Bayesian-Nash equilibrium in which the social planner prevents collusive agreements between supervisors and the bank, and
therefore supervisors truthfully report their information. If a bank supervisor observes an informative signal, then three cases are possible. First, if the second supervisor also observes an informative signal, then the bank’s riskiness is $r$. Providing that in a Bayesian-Nash equilibrium the first supervisor expects that the second supervisor is not deviating, and thus reporting its signal to the social planner, the first supervisor can request a bribe equal to $B_1$ from the bank. Second, the riskiness of the bank may be $\hat{r}$ even though the second supervisor does not observe an informative signal. In this case, the first supervisor can request a bribe equal to $B_0 - B_1$ from the bank. Third, if the second supervisor does not observe an informative signal, then the riskiness of the bank may be $\hat{r}$. If this is the case, the first bank supervisor can request a bribe equal to $\hat{B}_0$ from the bank. Each bank supervisor follows a safe behavior by requesting bribes that are accepted by the bank whatever its riskiness and whatever the information reported by the other supervisor. Hence, the following collusion-proof constraint guarantees that a bank supervisor truthfully reveals its supervisory information to the social planner

$$w_1 - w_0 \geq \tau \min\{\hat{B}_0, B_0 - B_1, B_1\}. \quad (CP_4)$$

The social planner does not need to compensate a supervisor that provides a non-informative signal, hence $w_0^T = 0$. If conditions (2) and (3) hold, then each bank supervisor having an informative signal receives an incentive to report its signal to the social planner when $w_1 \geq \tau \hat{B}_0$. Hence, $w_1^T = \tau \hat{B}_0$ at the equilibrium and the expected social cost of hiring two bank supervisors, denoted by $C^T$, is

$$C^T = 2\alpha\epsilon\lambda\tau\hat{B}_0.$$ 

Therefore, expected social welfare with two non-benevolent supervisors, denoted by $W^T$, is

$$W^T = (1 - \alpha\epsilon)^2W_0 + 2\alpha\epsilon(1 - \alpha\epsilon)W_1 + (\alpha\epsilon)^2W_2 - 2\alpha\epsilon\lambda\tau\hat{B}_0.$$
Optimizing $W^T$ under the incentive compatibility constraints ($IC_1$) to ($IC_3$), and the banker’s participation constraints ($PC_1$) and ($PC_2$), we find that $\hat{k}_0^T = k_1^T = k_2^T$, and that $\hat{k}_0^T, \hat{k}_0^T, \hat{k}_1^T$ are such that

$$\Psi'(\hat{k}_0^T) = (1 + \lambda)\hat{\tau} + \lambda \frac{P_0(\tau)}{P_0(\hat{\tau})} \Delta r,$$

$$\Psi'(\hat{k}_0^T) = (1 + \lambda)\tau + \lambda \frac{P_0(\tau) + P_0(\hat{\tau})}{P_0(\tau)} + \frac{2\tau \alpha \epsilon}{(1 - \alpha \epsilon)^2 P_0(\tau)} \Delta r, \quad \text{and}$$

$$\Psi'(\hat{k}_1^T) = (1 + \lambda)\hat{\tau} + \lambda \frac{P_1(\tau)}{P_1(\hat{\tau})} \Delta r.$$

The following proposition summarizes the distortions introduced to the optimal regulatory policy when two non-benevolent bank supervisors are used.

**Proposition 3.** Optimal regulation with two non-benevolent bank supervisors entails more capital restrictions for the most risky banks and lower profits for the less risky banks with respect to the case of benevolent supervision. However, for banks of riskiness $\hat{\tau}$ (respectively $\tau$), optimal regulation is less (respectively more) distorted when two non-benevolent bank supervisors are used instead of using only one non-benevolent bank supervisor. More precisely, $\hat{k}_0^T = \hat{k}_0^B > \hat{k}_0^O$, $\hat{k}_1^T = \hat{k}_1^B$, and $\hat{k}_0^T < \hat{k}_0^O < \hat{k}_0^B$.

Proposition 3 shows that the use of two bank supervisors implies more severe regulation, i.e. more capital restrictions and less profits, for the most risky banks than the use of only one bank supervisor. Intuitively, if two supervisors are used, then a collusive agreement between one of the supervisors and the bank can only involve the non report of one signal. Consequently, the capacity of each supervisor to request bribes from the bank is reduced. As a consequence, the social planner reduces the stake for collusion, and thus the social cost of being informed, by introducing additional capital regulations only to the most risky banks. However, bank supervisors are now two instead of only one. Hence, the distortion introduced to the optimal regulation for the most risky banks with
respect to the case under benevolent supervision is larger when two supervisors are used than when one supervisor is used: $\bar{k}_0^T < \bar{k}_0^O < \bar{k}_0^B$. Differently from the case in which only one bank supervisor is used, the social planner does not distort the optimal regulation for other categories of risk. Indeed, it is enough to apply more stringent regulations to the most risky banks in order to ensure that bank supervisors truthfully report their information at the lowest social cost.

3.3. Comparison

The two supervisory arrangements lead to different distortions to the optimal regulatory policy. In particular, the single-supervisor arrangement implies more capital restrictions for banks of riskiness $r$ and $\hat{r}$ with respect to the case of benevolent supervision. Meanwhile, the two-supervisors arrangement implies no distortion for banks of riskiness $\hat{r}$ and further distortions for the most risky banks (i.e., for banks of riskiness $r$). The ranking of supervisory arrangements in terms of social welfare is then ambiguous since the distortions generated go in opposite directions. However, we are able to prove the following result.

**Proposition 4.** From an ex ante point of view, the gain in expected social welfare from using two non-benevolent bank supervisors instead of only one non-benevolent bank supervisor is at least equal to zero.

The intuition for Proposition 4 is the following. By using two bank supervisors, the social planner gets ride of a constraint to its optimization problem while the other constraints remain unchanged. Indeed, by using two supervisors the social planner gets ride of the collusion-proof constraint ($CP_2$), which is binding when only one supervisor is used. Meanwhile, simple algebra shows that collusion-proof constraint ($CP_3$), which is binding when only one supervisor is used, is equal to collusion-proof constraint ($CP_4$), which is binding when two supervisors are used. The cost of banking supervision in the case with one non-benevolent supervisor

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is then equal to \( C^T = 2\alpha\epsilon\lambda\tau \Delta r\tilde{k}_0^T \), whereas it is equal to \( C^O = \alpha\epsilon\lambda\tau \Delta r[\alpha\epsilon(\tilde{k}_0^O + \hat{k}_0^O) + 2(1 - \alpha\epsilon)\tilde{k}_0^O] \) under separation of supervisors. Simple algebra shows that \( C^O - C^T = \alpha\epsilon\lambda\tau \Delta r[2(\tilde{k}_0^O - \tilde{k}_0^T) + \alpha\epsilon(\hat{k}_0^O - \hat{k}_0^O)] > 0 \). Hence, the social planner may achieve a higher value of its objective function, i.e. social welfare may be higher, by using two bank supervisors instead of only one.

Splitting supervisory powers into two different bank supervisors reduces the social cost of obtaining two informative signals about the riskiness of the bank. Otherwise stated, it is cheaper for the social planner being informed by two bank supervisors endowed with a risk-specific supervisory technology each, than by only one bank supervisor endowed with both supervisory technologies. Under the two-supervisors arrangement, each bank supervisor is partially informed about the riskiness of the bank. This fact reduces the stake to engage in collusive agreements with the banker. Whereas a single supervisor may be perfectly informed about the riskiness of the bank and may use such a piece of information to request bribes from the banker that could never be requested under separation of supervisors. Hence, the response to the threat of capture is the design of two separated supervisory entities with precise objectives and specific supervisory technologies. The separation of supervisory tasks introduces more rules to banking supervision and improves social welfare by reducing the discretion of bank supervisors. Each supervisor receives a single mission, i.e. to monitor a single dimension of risk, and follows stringent rules.

4. Extensions and discussion

In this section we analyze several extensions to the model and discuss their implications.

4.1. Correlation between risks

In the basic model we assume that the idiosyncratic component of the bank’s riskiness, i.e. the micro risk \( r_m \), is independent from the macro risk, i.e. \( r_M \).
However, a positive correlation between these two component of risk is likely to exist in an environment where banks are “too big to fail” and domino effects are possible. A simple way to introduce a positive correlation between micro and macro risks is to assume that the probabilities associated to extreme levels of bank’s riskiness are higher than in the case of independence between these two components of risk. In particular, we can modify the basic model such that

$$P(r) = \alpha^2 + \rho, \quad P(\hat{r}) = 2[\alpha(1 - \alpha) - \rho], \quad \text{and} \quad P(\tau) = (1 - \alpha)^2 + \rho,$$

where $\rho > 0$ measures the correlation between risks.

Introducing a positive correlation between the two components of risk into our model makes the algebra more complicated but does not change the qualitative results. Indeed, all the expressions for probabilities will contain terms accounting for the correlation, $\rho$.

Moreover, the positive correlation between the two components of risk would be used by the social planner to better provide incentives to bank supervisors, reinforcing the result that separating supervisory powers into two supervisors implies welfare gains with respect to concentrating these powers in the hands of only one supervisor. Since risks are positively correlated, then signals are positively correlated.\(^{17}\) Hence, the social planner would use the report of one supervisor to “monitor” the other supervisor. Otherwise stated, under correlation of signals, the remuneration scheme to one bank supervisor may depend not only on the report by the incumbent supervisor but also on the report by the other supervisor. This introduces yardstick competition between bank supervisors. It is well-known in the industrial organization literature that this kind of competition helps the social planner to reduce the social cost of providing incentives to bank supervisors (see, for instance, Shleifer, 1985).

\(^{17}\)If risks are positively correlated, then the probabilities of getting two informative signals or no informative signal increase by $\rho \epsilon^2$ each, and the probability of getting only one informative signal decreases by $2\rho \epsilon^2$ with respect to the case in which risks are independent.
A potential limit to the use of yardstick competition is the presence of limited liability. For incentive reasons, the social planner may want to heavily punish a bank supervisor when it is caught misreporting. However, this is not possible when supervisors are protected by limited liability. Another potential limit to the use of yardstick competition is the possibility that supervisors engage in collusive agreements between themselves and decide together on their reports to the social planner.

4.2. A different structure of hierarchy

In the basic model, we assume that the social planner designs supervisory arrangements and bank regulation, and that it also implements these regulations. The social planner was thought as a benevolent regulator in the form of a banking commission or a financial stability committee that uses bank supervisors to be informed about the riskiness of the bank. In this section, we show that the results of the model are robust to consider a different structure of the hierarchy where supervisors are responsible for implementing bank regulations.

Figure 2: A different structure of the hierarchy

Figure 2 represents this structure of the hierarchy. The differences with respect to the basic model showed in Figure 1 are represented by bold fonts in Figure 2.
The social planner can be thought as a legislature or constitution that designs supervisory arrangements and bank regulation in order to maximize expected social welfare. Bank supervisors gather signals about the riskiness of the bank, i.e. bank supervision, and implement regulations.

In the basic model, the social planner has to provide an incentive to bank supervisors in order they truthfully reveal their signals. It does so through a supervisory contract rewarding supervisors for informative signals and through bank regulation that reduces the stake for collusion between supervisors and the banker. In the structure of the hierarchy considered in this section, the incentive has to be provided in order to bank supervisors implement the regulation that has been designed for the signals they have gathered. The social planner observes which regulation has been implemented. Hence, it provides incentives to bank supervisors through a supervisory-regulatory contract which is contingent on the regulation that has been implemented. Since there is a one to one relationship between the number of informative signals and optimal regulation, these two incentive problems are identical; i.e., collusion-proof constraints \((CP_1)\) to \((CP_4)\) are the same for both problems. Hence, the supervisory contracts (i.e. signal contingent rewards) that motivate bank supervisors to truthfully reveal their signals is analogous to the supervisory-regulatory contracts (i.e., implemented regulation reward) that motivate bank supervisors to implement the optimal bank regulation. Consequently, the result that separating supervisory powers implies welfare gains with respect to concentrating these powers holds when bank supervisors are responsible for implementing bank regulations.

4.3. Different accuracy of supervisory technologies

The use of the two supervisory technologies by only one bank supervisor may imply some informational advantages. For example, by using one of the technologies, a bank supervisor may get skills, training and information that can improve
its accuracy in the use of the other technology. Formally, we can extend the basic model by assuming that a single bank supervisor using the two supervisory technologies gets an informative signal with probability $\epsilon^O$, whereas two bank supervisors get an informative signal with probability $\epsilon^T$, where $\epsilon^O > \epsilon^T$.

The different accuracy of supervisory technologies introduces some interesting effects. On the one hand, if bank supervisors truthfully reveal their signals to the social planner, then the latter will get more accurate information by using a single bank supervisor than by splitting supervisory powers into two supervisors. In turn, having access to more accurate information allows the social planner to leave less informational rents to the banker and then to improve social welfare. On the other hand, the access to more accurate information for a single supervisor increases the stake for collusion with the banker. Hence, the social planner has to introduce larger distortions on the optimal regulation scheme than in the basic model and to leave more revenue to the bank supervisor in order to motivate it to truthfully reveal its signals, which reduces social welfare. Consequently, the result that separating supervisory powers implies welfare gains with respect to concentrating these powers holds as long as the latter effect is larger than the former one.

4.4. Cost of duplicating supervisory structures

In the basic model, we assume that the only cost associated to bank supervision is the revenue necessary to motivate bank supervisors. However, bank supervision may entails some fixed costs (e.g., buildings and bureaucracy) that need to be duplicated when supervisory powers are split. Formally, this can be modeled as a minimal fixed budget that has to be paid to each supervisor such that $w_i \geq w$. If two supervisors are used, the social planner faces twice this constraint. Hence, the result that separating supervisory powers implies welfare gains with respect to concentrating these powers holds as long as the cost of settling a bank supervisor,
i.e. \( w \), is not too large.

It is indeed possible that in countries with relatively small banking systems the costs of duplicating supervisory structures exceed the benefits of separating supervision. In this case, policy makers should empower the central bank with the authority to conduct micro- as well as macro-prudential supervision. Moreover, policy makers using the insights of this paper, would like to allocate supervisory technologies to two different divisions into the central bank. For example, the division in charge of financial regulation would be responsible for micro-prudential supervision, while the division in charge of price stability would be responsible for macro-prudential supervision.

5. Concluding remarks

In this paper, we use a formal model to analyze whether or not the same bank supervisor should conduct both micro- and macro-prudential supervision when supervisors’ capture is a concern. We find robust results that supervisory tasks should be split into more than one bank supervisor. The concentration of supervisory powers in the hands of a single supervisor makes the capture of the supervisor by the banking system more likely. Hence, it makes more costly for a benevolent social planner to provide incentives. The separation of supervisory responsibilities appears as an optimal organizational response to the threat of capture. Separation leads to more rules and reduces supervisors’ discretion to pursue their private agendas by limiting the information at their disposal.

A series of reform efforts that have been envisaged in the aftermath of the subprime crisis aim to concentrate supervisory powers (both micro- and macro-prudential supervision) in the hands of central banks. We think that there are good reasons for central banks to be in charge of macro-prudential supervision; and, most of the current reform proposals agree that central banks should be explicitly in charge of it (see, for example, Brunnermeier et al., 2009; Acharya
and Richardson, 2009). Hence, our results suggest that policy makers in many countries would like to reconsider the current trend toward the concentration of supervisory powers into central banks because the monopoly in information acquisition may be a curse when capture is a concern.

References


