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ENHANCING BANK TRANSPARENCY: A RE-ASSESSMENT***

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ABSTRACT: Transparency regulation aims at reducing financial fragility by strengthening market discipline. There are however two elementary properties of banking that may render such regulation inefficient at best and detrimental at worst. First, an extensive financial safety net may eliminate the disciplinary effect of transparency regulation. Second, achieving transparency is costly for banks, as it dilutes their charter values, and hence also reduces their private costs of risk-taking. We consider both the direct costs of complying with disclosure requirements and the indirect transparency costs stemming from imperfect property rights governing information and particularly infer the conditions under which transparency regulation cannot reduce financial fragility.

KEYWORDS: banking, disclosure, deposit insurance, market discipline, transparency

JEL: G21, G28

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TIIVISTELMÄ: Pankkitoiminnan tiedonantovelvollisuussääntelyllä pyritään lisäämään markkinakuria ja siten vahvistamaan pankkijärjestelmän vakautta. Pankkijärjestelmällä on kuitenkin kaksi ominaisuutta, jotka saattavat heikentää tällaisen sääntelyn tehokkuutta. Ensinnäkin kattava pankkijärjestelmän turvaverkko saattaa vähentää tiedonantovelvollisuuden markkinakuria vahvistavaa vaikutusta. Toiseksi tiedonantovelvollisuuksien lisääminen aiheuttaa pankeille kustannuksia, mikä osaltaan vähentää pankkien kannattavuutta ja voi siten myös vähentää riskinottoon liittyviä yksityisiä kustannuksia. Tarkastelemme tässä selvityksessä sekä suoria tiedonantovelvollisuuden noudattamisesta syntyviä kustannuksia että epäsuoria kustannuksia, jotka syntyvät informaatioon liittyvien omistusoikeuksien määrittelemisen epätäydellisyydestä. Johdamme myös ehdot, joiden vallitessa tiedonantovelvollisuuden laajentaminen vahvistaa (ja ei vahvista) pankkijärjestelmän vakautta.

ASIASANAT: tiedonantovelvollisuus, markkinakuri, pankkitoiminnan avoimuus, talletusvakuutus, pankkijärjestelmän turvaverkko

1 INTRODUCTION

The aim of a safety net for the banking sector is to reduce financial fragility. However, safety nets in general, and depositor insurance schemes (DISs) in particular, provide incentives for excessive risk taking by banks. This concern about moral hazard has led to a novel idea regarding regulation. It has been argued that enhancing the transparency of the financial condition of banks would expunge the problem by strengthening market discipline. The argument is that claimants are the more responsive to changes in banks' risk profiles, the more comprehensive the available information on the financial condition. Stringent transparency requirements should thus deter banks from excessive risk taking. As discussion of the transparency argument has been rather informal, the main purpose of this study is to examine the validity of this argument in a stylized framework.

There is abundant evidence that weak transparency makes the asset risks of banks opaque.[1] To enhance the transparency of banking sectors, various international institutions, such as the Basel Committee on Banking Supervision, G7 Finance Ministers, International Monetary Fund and the World Bank, have campaigned for improved accounting and disclosure practices (see, e.g., Basel Committee (1998, 1999)). Numerous scholars, such as Berlin, Saunders and Udell (1991), Mayes (1997, 1998), Bhattacharya, Boot and Thakor (1998), Rosengren (1998), and Jordan, Peek and Rosengren (1999, 2000) also advocate a transparent banking system. These calls for increased transparency seem to be well founded given the experience of recent banking crises around the world.

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1 As Kaminsky and Reinhart (1999, p. 476) put it, 'Indicators of business failures and nonperforming loans are also usually available only at low frequencies, if at all; the latter are also made less informative by banks' desire to hide their problems for as long as possible.' It is not easy to interpret banks' accounting data (Beatty, Chamberlain and Magliolo (1995) and Genay (1998)) nor disclosures of banks' credit losses (Ahmed, Takeda and Thomas (1999) and US General Accounting Office (1994)).

A bank can be transparent to market participants both before and after investments are made in the bank. If it *ex post* transpires that the value of a bank's assets is low, its creditors, and particularly its uninsured depositors, may withdraw their funds. The threat of a bank run can then discipline bankers in their risk-taking (see, e.g., Calomiris and Kahn (1991) and Chen (1999)). *Ex ante* transparency implies that *potential* depositors and other creditors can appreciate a bank's financial condition prior to placing funds in it. This strengthens market discipline, because the better investors are able to evaluate banks' risk positions, the more risk-sensitive the supply of funds to the banks should be.[2]

Our main argument is that there are two elementary reasons why transparency regulation may be inefficient or even detrimental. First, an extensive DIS or, more generally, an extensive financial safety net may prevent transparency regulation from reducing financial fragility. If deposits are fully insured, there is no market discipline, regardless of how transparent the banking system is. Second, achieving transparency is costly for banks. These costs can be divided to two broad categories.

- *Direct compliance costs* may arise because effective transparency necessitates providing market participants with accurate and credible information on banks. To achieve transparency, banks should regularly produce comprehensive information on their financial performance and solvency, risk-management policy, risk exposures in various dimensions, general business strategy, accounting policy, and corporate governance. There is abundant evidence that such information disclosure is costly (e.g., Mayes (1997), Basel Committee (1998), Davis et al. (1999), and Admati and Pfleiderer (2000)). At the very least, it requires a well-functioning information and

[2] The contention that lower quality banks attract fewer uninsured deposits than higher quality banks has sound empirical support (e.g., Billet, Garfinkel and O'Neal (1998), Park and Peristiani (1998), and Martinez Peria and Schmukler (2001)).

book-keeping system, labor inputs from the accounting, risk management and IT departments, use of external auditors, and binds the scarce resources of banks.

- *Indirect compliance costs* may arise from the information intensity of lending decisions and from the weak protection of *informational* property. As known at least since Arrow (1962), it is hard to appropriate the rents on investments in information production, because property rights governing information are weak. Transparency regulation almost by definition aggravates these appropriability problems.[3]

We feel that these effects of the financial safety net and the costs of transparency, even though seemly almost self-evident, have been overlooked in the campaign for high-quality public disclosure in banking. When complying with transparency regulation is costly, a tradeoff emerges. On the one hand, a transparency requirement enhances market discipline and reduces the moral hazard temptation. On the other hand, transparency requirements constitute a burden to banks, which increases their private incentive to take risks. For example, it is well understood that expected future profits, i.e., a bank's charter value, can discipline banks by increasing the private cost of risk-taking (e.g., Herring and Vankudre (1987), and Bhattacharya et al. (1998), and Hellmann, Murdock and Stiglitz (2000)). We show how the costs of transparency may undermine the charter value and thereby worsen the moral hazard problem. Moreover, the efficiency of monitoring investment may be reduced even in the short-term. We can thus report that if the coverage of the DIS is broad, it dilutes the beneficial effect of transparency regulation on market discipline to the extent that the regulation eventually destabilizes the banking system.

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[3] Rosengren (1998) argues that transparency is to some extent inconsistent with the very nature of bank lending, because loan transactions are based on confidential relationships and because banks have private information on customers' investment projects (see also Jordan et al. (2000)). More generally, it has been suggested that valuable information may spill over to a firm's rivals when it releases information for its investors (Bhattacharya and Chiesa (1995) and Yosha (1995)).

Our study builds on the ideas in the important contribution by Matutes and Vives (2000), who analyze the impact of market power on banks' risk-taking incentives. They find that the introduction of flat premium deposit insurance eliminates the beneficial effects of the competition and that unobservable portfolio risk, along with limited liability, leads to maximal risk-taking incentives. They also document an interesting equivalence result: full transparency and a risk-based DIS lead to an equal risk-taking incentive (see also Cordella and Levy Yeyati (2002)). Another related paper is Cordella and Levy Yeyati (1998), who point out that if the shocks are economy-wide and banks cannot control their asset portfolio risks, then full transparency of banks' risk positions may increase financial fragility. Our paper also has a link to the recent contributions by Admati and Pfleiderer (2000) and Boot and Thakor (2001) considering the desirability of disclosure regulation and voluntary information disclosure.

The rest of the paper proceeds as follows. In section 2, we set out a model of horizontal differentiation where banks compete for depositors on the basis of asset quality. To keep our analysis as simple and comparable with the previous literature as possible, we adopt the standard model of spatial competition developed by Salop (1979). This model - and its cousin, the Hotelling line - has been used extensively in the banking literature, for instance, in Williamson (1987), and Matutes and Vives (1996). In section 3 we evaluate the various costs of transparency regulation and prove our main proposition that transparency regulation may increase financial fragility. Concluding remarks are given in section 4.

2 THE BASIC MODEL

Consider a universally risk-neutral economy with a horizontally differentiated banking industry where there are n banks, indexed by $i = 1, \ldots, n$. The banks locate themselves symmetrically on a unit circle.[4] There is a continuum of potential depositors uniformly distributed along the circle. All depositors incur a 'transportation cost' (i.e., transaction or participation cost) when traveling to a bank, and the cost per unit of 'distance' is τ. We normalize the size of deposits to unity and denote bank i's repayment obligation by r_i.

The financial safety net in our model consists of a deposit insurance scheme (DIS) such that the depositors receive a fraction σ of the promised repayment if a bank defaults. We consider risk-based pricing of deposit insurance and assume that the insurance premium can be conditioned on the actual bank risk. The insurance premium per deposit unit is denoted by ρ_i and the DIS is fairly priced. The reason for choosing risk-based funding is that the alternative, flat-premium pricing would, as in Matutes and Vives (2000), merely exacerbate the banks' moral hazard problems regardless of whether their asset portfolio risks are observable or not (see Hyytinen and Takalo (2000)). Furthermore, the empirical relevance of the risk-based DIS is increasing (Garcia (1999)).

The banks invest the funds collected in risky projects (loans). The probability that a unit of deposit funds invested in bank i's portfolio will yield a positive return is denoted by p_i. The gross return on the investment portfolio for a unit of funds invested is y, resulting in a profit margin per deposit unit of $y - r_i$. The probability of a zero return is $1 - p_i$. If a bank's projects fail, the bank itself also fails. We assume that the only cost of a bank failure is that its depositors suffer the loss of their funds to the extent that they are not insured.

Clearly, the probability of bank failures is affected by banks' lending and monitoring decision. The success probability reflects the bank's screening and monitoring decisions and ultimately its ability to gather information for building a high-

4 Following the usual practice we take the number of banks, n, as given, and focus entirely on symmetric equilibria.

quality loan portfolio. In the spirit of modern banking theory, increasing p_i is costly because of information gathering costs such as ex ante, interim and ex post monitoring costs. Some of the information gathering cost varies with the size of the asset portfolio, but some at least is periodic. The costs that are independent of the portfolio cannot fully be conveyed to deposit interest rates and therefore reduce bank profits. These costs might reflect maintenance of risk management infrastructure, including information systems, basic databases and credit scoring models, as well as the periodic wages of monitoring personnel and the cost of sustaining a branch network to gather local information.

We build a general model where the cost of monitoring consists of information gathering costs $c(p_i)$ that vary with the size of the portfolio, and the periodic costs of maintaining a monitoring infrastructure $C(p_i)$ that are independent of the size of the portfolio. Both cost functions are strictly increasing and convex in the success probability of a bank, i.e., $\partial c/\partial p_i > 0$, $\partial^2 c/\partial p_i^2 > 0$, $\partial C/\partial p_i > 0$ and $\partial^2 C/\partial p_i^2 > 0$. Throughout the paper we assume that these monitoring cost functions are sufficiently convex to satisfy the second-order conditions and keep the model well-behaved. To ensure an interior solution, the usual boundary conditions are also assumed: $\partial c(0)/\partial p_i = \partial C(0)/\partial p_i = 0$, and $\partial c(1)/\partial p_i = \partial C(1)/\partial p_i = \infty$.

A bank competes for depositors via its interest rate and monitoring decisions, i.e., its success probability. In practice, it is easy to verify the bank's interest rate offer from catalogs and advertisements, but the same does not necessarily apply to the monitoring decision. We thus assume the bank can commit itself to its interest rate announcements but encounters moral hazard temptations regarding the monitoring decision. As a result, the level of p is only imperfectly known to depositors. In line with Boot and Schmeits (2000), we assume that with probability α the depositors are able to detect the actual monitoring choice of banks. Even when the actual choice is observed, it cannot be verified in court and no contract can be enforced contingent on it. With the complementary probability, p_i remains undetected. In such a case, the depositors rationally evaluate bank *i*'s asset risk positions according to the expectation E(p_i) = p_i^e. In equilibrium, these beliefs are fulfilled, as the depositors infer that the banks' failure probabilities are those that prevail in the Nash equilibrium.

The observability of the monitoring level depends on the information disclosure policy of the banks. Such information disclosure is however costly. These costs are spelled out in the next section. Without loss of generality we normalize the banks' voluntary information disclosure to zero so that we can identify α as *a transparency requirement* imposed by the regulatory authority. [5]

The timing of events is that depositors are endowed with a common assessment of the success probability of each bank p_i^e. The banks then simultaneously choose their deposit interest rates and monitoring effort, knowing that the deposit interest rates become observable with probability one and that the actual monitoring choice will be observed with probability α. The more transparent the banking sector is, the higher is the probability that the market observes the actual choice. The market then either detects the choice or it does not. Finally, the depositors choose their banks.

Let us now focus on the behavior of a depositor located at distance $x \in [0, 1/n]$ from bank *i*. With probability α the market observes the actual monitoring choice and the depositor receives an expected return of $R_i(p_i) = [p_i+(1-p_i)\sigma]r_i$ on depositing in bank *i*. With probability 1-α the actual choice remains unobservable, but the depositor rationally anticipates the bank's privately optimal choice and receives an expected return of $R_i(p_i^e) = [p_i^e+(1-p_i^e)\sigma]r_i$. The bank is able to attract the depositor only if the

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5 It is actually easy to show that in our model the banks provide no information voluntarily, precisely because of the cost of information disclosure. Indeed, the banks would disclose information if it were remunerative, and their transparency would not be an issue.

expected return covers the cost and if its repayment contract is more lucrative than those offered by rival banks. With probability α bank i encounters the standard incentive compatibility constraint $R_i(p_i)$-1-$\tau x \geq R(\bar{p})$-1-$\tau(1/n\text{-}x)$ where $R(\bar{p}) = [\bar{p} + (1-\bar{p})\sigma]\bar{r}$ with $\bar{p} = p_j$ and $\bar{r} = r_j$ for $j \neq i$. With probability 1-α the constraint reads as $R_i(p_i^e)$-1-τx $\geq R(\bar{p}^e)$-1-$\tau(1/n\text{-}x)$. Provided that τ (the transportation cost) is small enough, the market will be covered in equilibrium. Under this assumption of full-scale competition, the total supply of funds for bank i is

$$D_i = \frac{1}{n} + \frac{1}{\tau}\{(1-\sigma)[\alpha(p_i r_i - \bar{p}\bar{r}) + (1-\alpha)(p_i^e r_i - \bar{p}^e \bar{r})] + \sigma(r_i - \bar{r})\}. \qquad (1)$$

Because the insurance is fairly priced, the insurance premium per deposit unit ρ_i equals (1-p_i)σr_i, and the profits of the bank in a given period can be written as

$$\pi_i = A_i D_i - C(p_i). \qquad (2)$$

where $A_i \equiv p_i(y - r_i) - \rho_i - c(p_i)$ captures the profit per deposit unit.

Bank i maximizes its expected discounted profits, $V_i = \sum_{t=1}^{T} \delta^t \pi_i$, where δ is the common discount factor. To keep the per-period profits constant, we assume that a new bank replaces a failed bank and that a given depositor exists only for one period. We will look at the limit as $T \rightarrow \infty$ and concentrate on the subgame perfect equilibrium where the stage game Nash equilibrium is repeated. In other words, bank i chooses p_i and r_i so as to maximize its charter value, which is given by

$$V_i = \frac{\delta \pi_i}{1 - \delta p_i}. \qquad (3)$$

The first-order condition for p_i can be written as $\partial\pi_i/\partial p_i+V_i = 0$, which clearly demonstrates how the threat of bankruptcy renders the bank prudential. Because of the limited liability, the bankruptcy cost is essentially the opportunity cost of lost future profits and, accordingly, the higher the charter value, the higher the bank's private cost of asset portfolio risk. All regulatory interventions that reduce future profits also reduce the incentive to avoid bankruptcy.

By using symmetry and rational prior beliefs, $p_i = p_i^e = \overline{p} = \overline{p}^e \equiv p$ and $r_i = \overline{r} \equiv r$, the first-order conditions $\partial V/\partial p=0$ and $\partial V/\partial r=0$ can be simplified to

$$\frac{\alpha(1-\sigma)rA}{\tau}+\frac{\partial A}{n\partial p}-\frac{\partial C}{\partial p}+V=0 \tag{4a}$$

and

$$A-\frac{\tau}{n}=0, \tag{4b}$$

where $A=p(y-r)-\rho-c(p)$ is the equilibrium profit per deposit unit and $V=\delta[A/n-C(p)]/(1-\delta p)$ is the equilibrium charter value. Equations (4a) and (4b) implicitly determine the equilibrium success probability and the deposit interest rate as a function of the model parameters.

The main concern in this paper is to isolate the effect of the transparency requirement, α, on the success probability, p.[6] The common view is that increasing the level of transparency discourages risk taking. In short, it is generally thought that $dp/d\alpha > 0$. The first term in (4a), $\alpha(1-\sigma)rA/\tau$, reveals the static disciplinary mechanism

[6] For brevity, we abstract from analyzing the effects of parameters δ, τ, and n in detail. Such an analysis can be found in an earlier version of this paper (Hyytinen and Takalo (2000)). It suffices here to note that the other parameters are essentially related to the charter value; if there are no frictions, the number of banks grows large, or the discount factor approaches zero, no charter value emerges. Similarly, we abstract from analyzing the sign of $dr/d\alpha$. These exercises are available from the authors on request.

underlying this common view. Because the equilibrium level of r only indirectly depends on α through p, this term determines the sign of $dp/d\alpha$ (see the end of appendix 1 for the details), and it is obvious that it is non-negative. However, this argument has two glaring defects. The contracting force of the financial safety net can be observed in (4a). If $\sigma = 1$, the transparency requirement is irrelevant, because then $dp/d\alpha=0$. Another and perhaps the more important flaw in the argument is that it ignores the direct and indirect compliance cost of transparency. Proper evaluation of the transparency argument necessitates incorporation of this cost into the model.

3 THE EFFECT OF TRANSPARENCY REGULATION ON FINANCIAL FRAGILITY

In this section we introduce the direct and indirect compliance costs of transparency in order to investigate their potential to undermine the static disciplinary effect or the dynamic effect stemming from the charter values of banks. We illustrate two sources of such compliance costs. In the first scenario, the direct compliance cost of information disclosure is considered. In the second scenario, compliance costs are indirect, because they are caused by leakage of information gathered by a bank to its rivals. Although these two scenarios are presented separately in order to specify the basic mechanisms that we wish to emphasize, they can be combined straightforwardly.

3.1 The Effect of Direct Transparency Costs

In this scenario we focus on the direct transparency costs that banks incur in complying with transparency requirements. The cost of the disclosure is assumed to increase with its accuracy and scope (see, e.g., Admati and Pfleiderer (2000)). We assume that these costs directly enter the bank’s cost function.

Assumption 1. The cost function of bank *i* that is increasing in the size of its asset portfolio is given by $c(p_i, \alpha)$, and the periodic cost function that is independent of the size of the portfolio is given by $C(p_i, \alpha)$. Both functions are increasing and convex in α.

Although this straightforward formulation of the transparency costs yields obvious effects, it also yields practical policy lessons. The sign of the cross-partial derivatives $\partial^2 c / \partial p \partial \alpha$ and $\partial^2 C / \partial p \partial \alpha$, determine whether there are economies or diseconomies of scope in producing information for monitoring and disclosure purposes. Economies of scope might materialize, especially in small banks, where elementary monitoring information such as distribution of loans across different borrower types and concentration of loan risks is likely to be required for disclosure purposes. In contrast, in large banks with sophisticated monitoring systems, additional disclosure requirements may overload the system, compromise efficient processing of monitoring information, or tie up limited monitoring resources, thus leading to diseconomies of scope. In general, information required for the mandatory disclosure is not necessarily equally useful in a bank’s monitoring operations. The communication and validation of the bank's risk management ability to outsiders is a prime example. If the bank’s information production is at the optimal level, transparency regulation is simply likely to distort it.

Except for the introduction of α into the cost-function, analysis of the basic model in section 2 remains unchanged. Keeping in mind that *c* and *C* are functions of α, the first-order conditions for *p* and *r* are seemingly identical to (4a) and (4b) (equations (A1) and (A2) in appendix 1). Nonetheless, the changes in the effect of transparency regulation on the success probability are substantial. Firstly, the first-order condition for the monitoring effort reveals that transparency costs alter both the charter value and the rate at which the profit per deposit unit increases. Secondly, the transparency costs also influence the monitoring decision thorough the repayment obligation. The equilibrium deposit interest rate, $r(\alpha) = (py\text{-}c(p,\alpha)\text{-}\tau/n)/(p+(1\text{-}p)\sigma)$, is a function of the variable cost of disclosure regulation. The burden of these transparency costs is hence transferred to the depositors via the deposit rates, making the depositors worse off in this regard. Combining these effects yields

Proposition 1. (Direct compliance costs): If economies of scope in monitoring and achieving transparency are at most moderate, and if the DIS is sufficiently broad, an increase in the transparency requirement increases the probability of bank failures.

Proof: We sketch the proof here and relegate the details to appendix 1. Keeping in mind that, under assumption 1, c and C are functions of α, we differentiate the equation system (4a)-(4b) to see that the sign of $dp/d\alpha$ is given by the sign of

$$(1-\sigma)\left[\frac{(1-\alpha)}{n}\frac{\partial c}{\partial \alpha}+py-c-\frac{\tau}{n}\right]-\left[p+(1-p)\sigma\right]\left(\frac{\partial^2 c}{n\partial\alpha\partial p}+\frac{\partial^2 C}{\partial\alpha\partial p}+\frac{\delta}{1-\delta p}\frac{\partial C}{\partial\alpha}\right). \quad (5)$$

Letting $\sigma \to 1$, equation (5) simplifies to

$$-\left(\frac{\partial^2 c}{n\partial\alpha\partial p}+\frac{\partial^2 C}{\partial\alpha\partial p}+\frac{\delta}{1-\delta p}\frac{\partial C}{\partial\alpha}\right). \quad (6)$$

Provided that economies of scope in monitoring and achieving transparency are at most moderate, equation (6) and thus the sign of $dp/d\alpha$ is negative. By continuity, the argument also applies at least for some $\sigma < 1$.

QED

From (5) we can observe the tradeoff underlying this finding. The first term in (5) explains why transparency regulation may improve the stability of financial markets.

The term $[(1-\sigma)(1-\alpha)\partial c/\partial\alpha]/n$ shows how the variable transparency cost decreases the repayment obligation and thus increases the profit margin per deposit unit. The term $(1-\sigma)[py-c-\tau/n]$ captures the response in the supply of funds to changes in bank risk. This disciplinary effect of increased transparency is positive, because (4b) shows that $py-c-\tau/n = rp+\rho > 0$. Both the deposit interest rate and disciplinary effects enhance the incentive to monitor and are stronger with less coverage of the DIS.

The second term in (5) depicts the potential cost of transparency regulation. The bank's charter value is reduced when there are some periodic costs of regulation that cannot be transferred to the deposit interest rates. Unless economies of scope in monitoring and achieving transparency are strong, this cost of transparency regulation should be taken into account. If complying with transparency regulation necessitates no periodic costs, we obtain a clear-cut prediction from (6). Regardless of the coverage of a DIS, transparency regulation is certain to stabilize the banking sector provided that $\partial^2 c/\partial p\partial\alpha < 0$.

Our main point is thus embodied in proposition 1: there may be circumstances in which a transparency requirement increases financial fragility. This is likely to occur when the financial safety net is comprehensive and economies of scope in monitoring and achieving transparency are weak.

3.2 The Effect of Indirect Transparency Costs

The indirect cost of transparency arises from the information intensity of monitoring investments in the banking industry and the weak protection of informational property. As argued by Anand and Galetovic (2000), the information in banking could be treated both as a private and public good. For brevity, we only consider monitoring information a private good.[7] Similarly, we suppress the direct transparency costs and return to the simple cost functions of the basic model in what follows.

To highlight our argument, we assume that information is initially perfectly excludable and that transparency regulation renders it partially non-excludable. Whether the information leakage affects the profit margin or the success probability, or both, is an open question. We consider a general case and postulate that the transparency requirement affects both the profit margin and the effective monitoring investment.

Assumption 2. i) Bank *i*'s profit margin is $Y_i = y + \alpha\left(\sum_{j\neq i=1}^{n} p_j/(n-1) - p_i\right)$, and ii) bank *i*'s success probability, i.e., its effective monitoring investment, is given by $P_i = p_i + \kappa\alpha\left(\sum_{j\neq i=1}^{n} p_j/(n-1) - p_i\right)$, with $\kappa \in [0,1/\alpha]$.

These reduced-form specifications warrant justification. Part i), in which the source and destination of the information spillovers are regarded as different activities, is especially unorthodox. On the one hand, property $dY_i/dp_i = -\alpha < 0$ of the profit margin (Y_i) indicates how the transparency requirement leads to an information leakage from bank *i* and reduces bank revenues. Although we do not model the loan market competition explicitly, this may occur, for instance, when a bank generates revenues from the private information on its customers' investment projects (Rosengren (1998)).[8] One can also argue that as the level of transparency increases, the amount of loan risk

[7] It would be tempting to follow the extensive literature on the information spillovers in R&D industries (see De Bondt (1997) for a survey) and to model information in banking as a public good. In such a case, there would be positive externalities to information disclosure as in Admanti and Pfleiderer (2000). It is, however, reasonable to regard banking as inherently different from high-tech industries (see also Anand and Galetovic (2000)). In addition, using the public good assumption complicates the analysis without giving substantial additional insights (Hyytinen and Takalo (2000)).

[8] We acknowledge that in a model where there is no asymmetric information and banks do not compete for loans, it is arguable whether the profits of a bank can depend on the monitoring effort of the other banks. A more satisfactory approach would explicitly model the indirect transparency costs to distinguish properly between the private and public good assumptions (see also footnote 7). Such an extension is however beyond the scope of this paper.

information spilling over to rival banks increases. Consequently, the information set across banks becomes more correlated, intensifying loan market competition. The spillovers may of course work in both directions, as loans granted by rival banks are indicators of acceptable loan risk. The transparency requirement may hence also increase bank *i*'s opportunity to exploit the monitoring information gathered by its rivals (Bhattacharya and Chiesa (1995) and Yosha (1995)). This leads to property $dY_i / dp_j = \alpha /(n-1) > 0$ of the profit margin.

When the source and destination of the spillover is the monitoring effort as in part ii) and when there are *common* factors driving the creditworthiness of firms (Millon and Thakor (1985)), enhancing transparency creates a free-riding opportunity. For example, the information disclosed may deal with average loan quality, general business conditions, or other loan risk factors common to banks. This argument underlies property $dP_i / dp_j = \kappa\alpha /(n-1) > 0$ of the effective monitoring investment (P_i). Property $dP_i / dp_i = (1-\kappa\alpha) > 0$ reflects the notion that transparency may also reduce the marginal productivity of monitoring investment. Such a property may emerge from the increased transparency of monitoring operations, because it may make it hard to prevent other banks from hiring away the best employees, especially the best credit officers and risk modellers. For instance, Petersen and Rajan (1994) report that an extensive use of relationship lending concentrates the monitoring information and skills in a few employees, rendering banks vulnerable to the departure of key personnel.

In sum, it is difficult to say whether the main destination of information spillovers is the profit margin or success probability. As we are unwilling to be biased in either direction, we consider a general model in which parameter κ differentiates between the two destinations. We also think that the private good assumption on information is appropriate to the banking industry and, accordingly, that transparency regulation may be harmful for banks that gather more monitoring information than an average bank. It is therefore hypothesized in assumption 2 that if $\sum_{j\neq i=1}^{n} p_j/(n-1) - p_i < 0$, then $dY_i/d\alpha < 0$ and $dP_i/d\alpha < 0$.

The advantage of these reduced forms is that incorporating indirect transparency costs into the basic model of section 2 is straightforward, because there are no direct effects of transparency in equilibrium (*P* = *p* and *Y* = *y*). Inserting Y_i and P_i from assumption 2 into the basic model and then proceeding as in (1)-(6) leaves the first-order condition for *r* ((4b)) unchanged. The first-order condition for *p* should be slightly modified to

$$(1-\kappa\alpha)\left[\frac{\alpha(1-\sigma)\,pA}{\tau}+V+\frac{\partial A}{n\partial p}\right]-\frac{\alpha}{n}\left(\kappa\frac{\partial c}{\partial p}+p\right)-\frac{\partial C}{\partial p}=0\,, \tag{7}$$

where, as before, $A=p(y-r)-\rho-c(p)$ and $V=\delta[A/n-C(p)]/(1-\delta p)$. Because the equilibrium deposit interest rate only indirectly depends on α through *p*, equation (7) determines the sign of $dp/d\alpha$.

Proposition 2. (Indirect compliance costs): If the coverage of the DIS is sufficiently broad, an increase in the transparency requirement increases the probability of bank failures.

Proof: Assume first that the cost functions *c* and *C* are sufficiently convex to guarantee that the Jacobian matrix of the equation system (4b) and (7) is positive (see also appendix 1). Differentiating the equation system then shows that the sign of $dp/d\alpha$ is given by the sign of

$$\frac{(1-\sigma)r-p}{n}-\kappa\xi(\alpha,\sigma) \tag{8}$$

where $\xi(\alpha, \sigma)$≡V+[y-(1-σ)r(1-2α)]/n. Because $\xi(\alpha, \sigma)$ is always non-negative given (7), (8) is clearly negative when σ is sufficiently close to unity.

QED

The explanations of propositions 1 and 2 are similar. There are costs and benefits associated with transparency regulation. The familiar benefit is the increased market discipline, which is depicted by the term (1-σ)r/n. As to the cost of regulation we first focus on the profit margin by setting $\kappa = 0$. Although there is no impact on the equilibrium profit margin ($Y = y$) and thereby on the charter value, the information disclosure is costly, because it weakens the appropriability of the proprietary monitoring information. This static profit-reducing impact of the information leakage is captured by the term –p/n in (8). Nevertheless, we may conclude that when the coverage of the DIS is limited, transparency regulation has a stability-improving role.

When $\kappa > 0$ and information leakage affects the probability of success, it is likely that transparency regulation reduces financial stability. This can be explained by using $\xi(\alpha, \sigma)$ term in (8). Although in equilibrium $P = p$, the information leakage decreases the charter value. The reason is that the banks' ability to avoid bankruptcy by means of their own monitoring choices has diminished. There are also two static effects incorporated into the second term of $\xi(\alpha, \sigma)$. When the level of transparency requirement rises, a free-riding opportunity emerges and the marginal productivity of monitoring investment deteriorates. As a result, the equilibrium profit per deposit unit is less sensitive to monitoring effort by a bank, reducing the incentive to monitor. The second static effect is depositor response to the free-riding opportunity. They put less weight on bank i's monitoring decision, because the effective monitoring investment (P_i) is partially determined by the decisions of other banks. This undermines the effect of the increased transparency on the market discipline.

This finding confirms our main point: even if direct compliance costs were empirically unimportant, there are circumstances in which a transparency requirement may increase financial fragility.

4 CONCLUSIONS AND POLICY IMPLICATIONS

In this paper we examine the validity of the frequently raised argument that a stringent transparency requirement enhances market discipline and hence the soundness of the banking sector in the presence of a DIS. We provide plausible conditions under which this argument is and is not valid.

Though there are several limitations to our simple model, we boldly offer some policy recommendations based on our analysis. In the campaigns for increased transparency, the associated costs - be they direct or indirect compliance costs - should be given proper attention. The direct compliance costs stem from the incremental investments in information and book-keeping systems caused by the transparency regulation. They dilute the bank’s charter value and thereby reduce the private costs of increasing risk profile. The indirect costs may materialize because the protection of informational property is imperfect. Under extensive transparency requirements, it can be difficult to exclude banks from using the monitoring information of their rivals. Such appropriability problems can reduce bank profit margins and lead to pervasive free-riding. If monitoring information is primarily a private good, the indirect costs of transparency have the same negative impact on the charter value as direct costs.

Another policy recommendation arising from our model is that the disclosure requirements could in principle be designed so as to minimize the cost to banks. The mandatory production of information should be useful for banks in managing their risks (see also Mayes (1997)). As a result, significant economies of scope could arise in risk management and achieving transparency. In this case, neither direct compliance costs nor broad de facto coverage by the DIS would reduce the efficiency of stringent disclosure requirements.

Our findings also support a partial DIS. Beside eroding market discipline, an extensive DIS destroys the *potential* of transparency for stabilizing the banking system. In line with this view, New Zealand's 1996 reform of banking supervision included stringent disclosure requirements and abolition of the DIS.

Perhaps the main shortcoming of our study is that we focus on the stability of financial systems instead of social welfare. For instance, we find that the banks can transfer the variable costs of regulation to the deposit interest rates. This partially eliminates the adverse impact of transparency on financial stability but leaves the depositors worse off, leaving the welfare effects ambiguous. Moreover, there may be other welfare justifications for transparency regulation in addition to the increased market discipline studied here. Matutes and Vives (1996, 2000) argue that deposit insurance is needed to avoid self-fulfilling crises arising from a minimum size requirement for banks. In Hyytinen and Takalo (2000) we prove that the same argument applies to the transparency requirement. If anything, our findings suggest that the evaluation of the benefits and costs of transparency regulation for society as a whole warrants careful further research.

Appendix 1: Proof of Proposition 1

Let us first explicitly write the first-order-conditions as functions of α:

$$F^p \equiv \frac{\alpha(1-\sigma)A(p,c(p,\alpha))}{\tau} - \frac{\partial A(p,\alpha)}{n\partial p} - \frac{\partial C(p,\alpha)}{\partial p} + \frac{\delta}{1-\delta p}\left[\frac{A(p,c(p,\alpha))}{n} - C(p,\alpha)\right] = 0\,, \qquad \text{(A1)}$$

$$F^r \equiv A(p,c(p,\alpha)) - \frac{\tau}{n} = 0\,, \qquad \text{(A2)}$$

where $A(p, c(p, \alpha)) = p(y\text{-r})\text{-}\rho\text{-}c(p, \alpha)$. As mentioned in the text, except for the argument α in the cost functions c and C, these first-order conditions are identical to (4a) and (4b). Equations (A1) and (A2) determine p and r as functions of α. The comparative statics can then be derived in a standard way:

$$\begin{bmatrix} \frac{\partial F^p}{\partial p} & \frac{\partial F^p}{\partial r} \\ \frac{\partial F^r}{\partial p} & \frac{\partial F^r}{\partial r} \end{bmatrix} \begin{bmatrix} dp \\ dr \end{bmatrix} = -\begin{bmatrix} \frac{\partial F^p}{\partial \alpha} \\ \frac{\partial F^r}{\partial \alpha} \end{bmatrix} d\alpha\,. \qquad \text{(A3)}$$

Then, by Cramer's rule,

$$\frac{dp}{d\alpha} = \frac{1}{|J|}\begin{vmatrix} -\frac{\partial F^p}{\partial \alpha} & \frac{\partial F^p}{\partial r} \\ -\frac{\partial F^r}{\partial \alpha} & \frac{\partial F^r}{\partial r} \end{vmatrix} \qquad \text{(A4)}$$

where

$$J = \begin{bmatrix} \frac{\partial F^p}{\partial p} & \frac{\partial F^p}{\partial r} \\ \frac{\partial F^r}{\partial p} & \frac{\partial F^r}{\partial r} \end{bmatrix}. \qquad \text{(A5)}$$

By assuming that the cost-functions c and C are sufficiently convex in p we know that $\partial F^p/\partial p < 0$ and $|J| = \frac{\partial F^p}{\partial p}\frac{\partial F^r}{\partial r} - \frac{\partial F^p}{\partial r}\frac{\partial F^r}{\partial p} > 0$. As a result, the sign of $dp/d\alpha$ is given by the sign of

$$\begin{vmatrix} -\frac{\partial F^p}{\partial \alpha} & \frac{\partial F^p}{\partial r} \\ -\frac{\partial F^r}{\partial \alpha} & \frac{\partial F^r}{\partial r} \end{vmatrix} = \frac{\partial F^p}{\partial r}\frac{\partial F^r}{\partial \alpha} - \frac{\partial F^p}{\partial \alpha}\frac{\partial F^r}{\partial r}\,. \qquad \text{(A6)}$$

Taking the partial derivatives of F^p and F^r with respect to α and r from (A1) and (A2) yields

$$\frac{\partial F^p}{\partial r} = \frac{(1-\sigma)\alpha}{\tau}(A - pr - \rho) - \frac{1-\sigma(1-\delta)}{n(1-\delta p)}, \tag{A7}$$

$$\frac{\partial F^p}{\partial \alpha} = \frac{(1-\sigma)\alpha r}{\tau}\left(A - \alpha\frac{\partial c}{\partial \alpha}\right) - \frac{\partial^2 c}{n\partial p\partial \alpha} - \frac{\partial^2 C}{\partial p\partial \alpha} - \frac{\delta}{1-\delta p}\left(\frac{\partial c}{n\partial \alpha} + \frac{\partial C}{\partial \alpha}\right), \tag{A8}$$

$$\frac{\partial F^r}{\partial r} = -\frac{p+(1-p)\sigma}{\tau}, \tag{A9}$$

$$\frac{\partial F^r}{\partial \alpha} = -\frac{\partial c}{\tau\partial \alpha}. \tag{A10}$$

Substituting (A7)-(A10) for (A6) and simplifying gives equation (5) after some straightforward but tedious algebra. The rest of the proof of proposition 1 can be found in the text. Note also from (A6)-(A10) that if the cost functions c and C are independent of α, the sign of the sign of $dp/d\alpha$ is given by the sign of $(1-\sigma)\alpha A/\tau$. This proves our claim at the end of section 2.

References

Admati, A. R. and Pfleiderer, P. (2000) Forcing firms to talk: Financial disclosure regulation and externalities, *Review of Financial Studies* **13**, 479–519.

Ahmed, A. S., Takeda, C., and Thomas, S. (1999) Bank loan loss provisions: A reexamination of bank capital management, earnings management and signaling effects, *Journal of Accounting and Economics* **28**, 1–25.

Anand, B. H. and Galetovic, A. (2000) Information, non-excludability, and financial market structure, *Journal of Business* **73**, 357-402.

Arrow, K. J. (1962) Economic welfare and allocation of resources for Invention, in R. Nelson (ed) *The Rate of Inventive Activity: Economic and Social Factors*, Princeton University Press, Princeton, New Jersey, pp. 609–625.

Basel Committee (1998) Enhancing bank transparency: Public disclosure and supervisory information that promote safety and soundness in banking systems, September 1998.

Basel Committee (1999) Best practices for credit risk disclosure, Consultative paper issued by the Basel Committee on banking supervision, July 1999.

Beatty, A., Chamberlain, S., and Magliolo, J. (1995) Managing rinancial reports of commercial banks: The influence of taxes, regulatory capital and earnings, *Journal of Accounting Research* **33**, 231–262.

Berlin, M., Saunders, A., and Udell, G. F. (1991) Deposit insurance reform: What are the issues and what needs to be fixed?, *Journal of Banking and Finance* **15**, 735–752.

Bhattacharya, S., Boot, A. W. A., and Thakor, A.V. (1998) The economics of bank regulation, *Journal of Money, Credit and Banking* **30**, 745–770.

Bhattacharya, S. and Chiesa, G. (1995), Proprietary information, financial intermediation, and research incentives, *Journal of Financial Intermediation* **4**, 328–357.

Billet, M. T., Garfinkel, J. A., and O'Neal, E. S. (1998) The cost of market versus regulatory discipline in banking, *Journal of Financial Economics* **48**, 333–358.

Boot, A. W. A. and Schmeits, A. (2000) Market discipline and incentive problems in conglomerate firms with applications to banking. *Journal of Financial Intermediation*, **9**, 240–273.

Boot, A. W. A. and Thakor, A., V. (2001) The many faces of information disclosure, *Review of Financial Studies* **14**, 1021–1057.

Calomiris, C. W. and Kahn, C. M. (1991) The role of demandable debt in structuring optimal banking arrangements, *American Economic Review* **81**, 497–513.

Chen, Y. (1999) Banking panics: The role of the first-come, first-served rule and information externalities, *Journal of Political Economy* **107**, 946–968.

Cordella, T. and Levy Yeyati, E. (1998) Public disclosure and bank failures, *IMF Staff Papers* **45**, 110-131.

Cordella, T. and Levy Yeyati, E. (2002) Financial opening, deposit insurance, and risk in a model of banking competition, *European Economic Review* **46**, 471–485.

Davis, P. E., Hamilton, R., Heath, R., Mackie, F., and Narai, A. (1999) Financial market data for financial stability, Centre for Central Bank Studies, Bank of England, June 1999.

De Bondt, R. (1997) Spillovers and innovative activities, *International Journal of Industrial Organization* **15**, 1–28.

Garcia, G. G. H. (1999) Deposit insurance: A survey of actual and best practices, IMF Working Paper, WP/99/54.

Genay, H. (1998) Assessing the condition of Japanese banks: How informative are accounting earnings?, *Federal Reserve Bank of Chicago Economic Perspectives* **22**, No. 4., 12–34.

Hellmann, T.F., Murdock, K. C., and Stiglitz, J. E. (2000) Liberalization, moral hazard in banking, and prudential regulation: Are capital requirements enough?, *American Economic Review* **90**, 147–165.

Herring, R. J. and Vankudre, P. (1987) Growth opportunities and risk-taking by financial intermediaries, *Journal of Finance* **42**, 583–600.

Hyytinen, A. and Takalo, T. (2000) Enhancing bank transparency: A re-assessment, Bank of Finland Discussion Papers, No. 10/2000.

Jordan, J. S., Peek, J., and Rosengren, E. S. (1999) The impact of greater bank disclosure amidst a banking crisis, Federal Reserve Bank of Boston Working Paper, No. 99-1.

Jordan, J. S., Peek, J., and Rosengren, E. S. (2000) The market reaction to the disclosure of supervisory actions: Implications for bank transparency, *Journal of Financial Intermediation* **9**, 298–319.

Kaminsky, G. L. and Reinhart, C. M. (1999) The twin crises: The causes of banking and balance-of-payments problems, *American Economic Review* **89**, 473–500.

Matutes, C. and Vives, X. (1996) Competition for deposits, fragility, and insurance, *Journal of Financial Intermediation* **5**, 184–216.

Matutes, C. and Vives, X. (2000) Imperfect competition, risk taking, and regulation in banking, *European Economic Review* **44**, 1–34.

Martinez Peria, M. S. and Schmukler S. L. (2001) Do depositors punish banks for bad behavior? Market discipline, deposit insurance, and banking crises. *Journal of Finance* **56**, 1029-1051.

Mayes, D. (1997) A market based approach to maintaining systemic stability: Experiences from New Zealand, Bank of Finland Discussion Papers, No. 18/97.

Mayes, D. (1998) Improving banking supervision, Bank of Finland Discussion Papers, No. 23/98.

Millon, M. H. and Thakor, A. V. (1985) Moral hazard and information sharing: A model of information gathering agencies, *Journal of Finance* **40**, 1403–1422.

Park, S. and Peristiani, S. (1998) Market discipline by thrift depositors, *Journal of Money, Credit and Banking* **30**, 347–364.

Petersen, M. and Rajan, R. (1994) The benefits of lending relationships: Evidence from small business data, *Journal of Finance* **49**, 3–37.

Rosengren, E. (1998) Will greater disclosure and transparency prevent the next banking crisis?, Federal Reserve Bank of Boston Working Paper, No. 98–8.

Salop, S. (1979) Monopolistic competition with outside goods, *Bell Journal of Economic*s **8**, 378–393.

United States General Accounting Office (1994) Depository institutions: Divergent loan loss methods undermine usefulness of financial reports, GAO/AIMD-95-8.

Williamson, S. (1987) Transaction costs, inflation and the variety of intermediation services, *Journal of Money, Credit and Banking* **19**, 484–498.

Yosha, O. (1995) Information disclosure costs and the choice of financing source, *Journal of Financial Intermediation* **4**, 3–20.

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