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Abstract

We present a theory of banking regulation affecting procedural compliance in monitoring collateral in secured debt contracts. The theory suggests an externality which creates a gap between the socially optimal level of monitoring and the bank's privately optimal level. Banks can not be punished ex post for lack of monitoring or otherwise in the bad state of nature. Hence, no ex post strategy is available to the regulator once the bad state has occurred. We argue that the collateral value is monitored optimally when banks are regulated through an ex post auditing and penalty schemes in the good state of nature. In a way it suggests that to avoid bank failure, successful projects should undergo randomised auditing.

Introduction

Recent years have seen an increasing concern over the financial health of banks in different economies. The "NPA" problem has secured an important place not only in the limited sphere of regulatory policy discussion in banking but also in general public discussions on the safety and soundness of financial institutions. The present paper is an attempt to understand an aspect of this important problem and to contribute to a better understanding of potential regulatory policy which can mitigate this problem.

The fundamental risk in banking stems from the risk of default by borrowers. The risk of default or more broadly speaking, the credit risk increases with the degree of asymmetric and private character of information posing a serious problem for banks. Different instruments and methods in default and credit risk management have been explored by banks to solve these adverse selection and moral hazard problems and the theoretical literature on banking reflects these developments. One important solution concept in the case of adverse selection is screening through contracts which satisfy self selection constraints leading to credit rationing (see Stiglitz and Weiss (1981), Rothschild and Stiglitz (1974) etc.). Loan commitments with upfront fees and loan covenants are important in the context of moral hazard (see Frexias and Rochet (1997)) as well as monitoring (Diamond (1984)), auditing (Gale and Hellwig (1985)) and incentive based

credit contracts. Making borrowers disclose proprietary information is often the key to the problem and has resulted in "relationship banking". However, all these measures, while deemed necessary to manage credit and default risk problems, have not been found sufficient under all circumstances. In particular, the necessity of making the borrower pledge a valuable asset as a collateral have been deemed another necessary safeguard and often the primary one with respect to the risks mentioned above. In the context of the theoretical literature, the classic work is that of Bester (1987) who showed that collateral does away with the need for inefficient credit rationing. A more recent work is that of Schwartz and Torous (1992) who showed that collateral reduces default risk and increases efficiency of credit allocation. While the results discussed above are reassuring and implies an increase in welfare both for the borrower (who has private information about a good project and an asset which he can pledge) and the bank (which gains through resolution of the information asymmetry problem and in terms of monitoring costs), the economic allocation problem is not entirely solved at this point. Indeed, the collateral solution leads to some further questions? One of them has to do with the question what happens when a potential borrower has a good project but about which he has private information only and cannot credibly transfer this information in the absence of an asset which is valuable enough to be a satisfactory collateral. This directly leads to imperfect credit markets and has been discussed by numerous authors (see in particular the classic by Hammond (1992)). The other question is whether pledging the collateral is a sufficient condition for satisfactory resolution of the default risk problem. Collateral may turn out to be necessary but not sufficient in the absence of other important instruments. A third, and indeed, more disturbing thought is whether securitised lending

has distortions of it's own. What guarantees that collateral can be recovered efficiently? Will collateral be monitored optimally or depreciate in value due to physical wear and tear, theft, loss in liquidity? Our concern in this paper is with these kind of distortions. It must be mentioned that even these distortions have different facets and it would not be possible to cover all under the present exercise[1]. The immediate objective is to alert the reader about the possibilities of distortions and a warning not to consider securitised lending as an unmitigated blessing.

In this paper we suggest a kind of externality which generates distortions. The idea is simply that the rest of the economy cares about the ex post health of the banking sector in and therefore the socially optimal welfare level requires more monitoring of collateral in a standard credit relationship than the representative bank privately finds optimal.[2] We investigate the necessary regulatory scheme which can eliminate this gap between social optimum and private optimum with respect to collateral monitoring. Essentially it can be a set of incentives for monitoring or a set of disincentives for not monitoring or a combination of both. For reasons discussed below we restrict our choice to disincentives. The disincentives approach is problematic in the sense that it usually requires penalty which is higher in the bad state and therefore it loses it's effectiveness if it the penalty becomes too large to be paid by the bank. But at the same time if it is not too large then it is hardly an effective disincentive. What is the efficient resolution of this paradox? Our proposal is to have a procedural compliance scheme with respect to the monitoring of the

[1] In a different context we are working with the litigation aspect of the collateral recovery problem (See Marjit and Mallick (2001), and with the level of ex ante screening of the collateral (Mallick and Marjit (2001)) as opposed to ex post monitoring which is the theme of the present paper.

collateral(s). Based on this scheme we propose a regulatory mechanism which will penalize the bank in the good state if the bank is found not to have monitored adequately. This way the penalty can be sufficiently high and at the same time capable of being repayed.

The Model

A borrower F takes loan from Bank B at interest rate r. The rate of the interest that B pays to it's depositors is d where $r > d > 0$. With probability p the project of the borrwer is a success in which case he can repay r (we assume no state verification problem here unlike Gale and Hellwig (1985)), and with probability 1-p the project is a failure and yields nothing. The borrower pledges a collateral of value V to bank B. However B has to exert monitoring effort m for properly assessing the value of the collateral. Given monitoring intensity m, B can expect to recover with probability $\alpha(m)$the value V of the collateral value where $1 > \alpha(m) > 0$. Marginal recovery probability increases with screening effort ($\alpha'(m) > 0$) and is invariant with effort ($\alpha''(m) = 0$). The bank B maintains a collateral evaluation cell which has the cost function c(m) where $c'(m) > 0$ and $c''(m) > 0$. One should mention that apart from the time and effort involved in the monitoring of borrowers there are also the problems of internal organization and incentive problems resulting from potential moral hazard problems for loan officers, evaluators, information processing officers. One paper noteworthy in this context is that

[2] Other more ingenuous sources of distortions are suggested in the last section and we report on some working results and conjectures developed.

by Cerasi and Daltaung (1994) which examines the issue of delegated monitoring in a bank. It is particularly this internal information problem which increases the marginal cost of monitoring as one increases the level of monitoring activities.

The problem for the bank is to maximize the profit function

$p(r-d) + (1-p)\max[\alpha(m)V - d, 0] - c(m)$

with respect to m.

Solution yields m* which satisfies the first order condition $(1-p)\alpha'(m^*)V = c'(m^*)$ (the second order condition is satisfied given the assumptions about curvature of the functions).

Note that the higher is p the lower will be the screening effort and also that limited liability ensures that B will earn at least zero.

Depositors expect to get (in the absence of deposit insurance)

Case1: $[\alpha(m^*)V - d] < 0$

Proposition 1: Since in this case the limited liability constraint is binding there will be no screening.

Case2: $[\alpha(m^*)V - d] > 0$

Proposition 2: In this case $m^* > 0$ and the F.O.C. holds provided

$p(r-d) + (1-p)\max[\alpha(m^*)V - d, 0] - c(m^*) > 0$

(If the above inequality is reversed then $m^* = 0$)

Welfare and Regulation

We assume that the financial health of the bank in the bad state exerts a positive externality on the rest of the economy. Welfare function is

$W = B[\alpha(m)V] - c(q)$ where $c(q)$ is the cost of monitoring the procedural compliance in the bank. Obviously the compliance refers to the screening intensity.

The regulator has a choice of providing a set of incentives. Monetary incentives (carrots) are less preferred by the regulator than disincentives like penalties (sticks) since regulator is concerned with it's budget constraint and has to worry about how to raise the cost of monitoring banks. Therefore the regulator focuses on audit and a penalty based on the degree of compliance or monitoring.

Regulators problem is to devise a scheme defined by the pair (q, F) where q stands for for the regulatory technology i.e. the probability at which B is audited and F is the penalty charged in case B is found to have entertained a bad collateral. Naturally F is a function of m with $F'(m) < 0$.

Bs expected payoff is

$\prod_B(m) = p\,[(1-q)(r-d) + q(r-d-F(m))] + (1-p)\max[\alpha(m)V - d, 0] - c(m)$

The f.o.c. is

- $pqF'(m^{**}) + (1-p)\,\alpha'(m^{**})V = c'(m^{**})$

the s.o.c. is satisfied. The following proposition is immediate given $F' < 0$:

Proposition 3 : m** > m*

Now we find the optimal penalty function. For simplicity we restrict ourselves to linear rules.

Let the optimal function be F(m) = a – bm where a and b are the unknowns.

For m = m_{max} (the maximum value of m)

F(m) = 0 is the fairness rule

Which implies that

0 = a – b

or a = b

Also, for m = 0 (the minimum value of m)

The maximum penalty is F^u = a

which implies

F^u = r – d = a = b.

Therefore the optimal penalty function is

F(m) = (r – d) (1-m)

The regulator maximizes (given F)

W = B([α(m)V]) – c(q)

F.O.C.

B'([α(m)V])Vα'(m)[dm/dq] = c'(q*)

Thus we have a set optimal (F* and q*) which maximizes welfare.

Final Remarks

In this paper one could generate distortion in another way. If the probability of the state of nature is conditional on effort made by the borrower and that effort is non contractible because of noise (moral hazard) then a low monitoring can induce a lower effort by raising the marginal return in the bad state for the borrower. This of course, requires that the unrecovered part of the collateral goes to the borrower.

A second question arises as to how to regulate banks when they are free to choose between secured and non secured lending. In our scheme, the return to secured lending falls and if it falls too much then banks may go for risky but unregulated unsecured lending.

Finally, one should try to understand the collateral monitoring problem not only in isolation but in a framework where collateral and interest rates are endogenously determined, and there exist other kind of regulatory concerns like capital requirements or deposit insurance.

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