

**WILLFUL DEFAULT IN DEVELOPING COUNTRY BANKING SYSTEM:  
A THEORETICAL EXERCISE**

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We construct a sequential game to highlight the incidence of ‘willful default’ in a developing country banking system where the borrowing unit underreports its true financial position and defaults willfully. Specifically, the paper deals with the implications of willful default for profitability and ultimate loan decision-making process of the banks. It shows that if limited liability condition holds and the conditions of willful default are satisfied, the bank will extend maximum possible amount of loan. However, it also follows that higher the loan capacity of the bank, the higher is the incidence of willful default. These would imply important policy lessons for the regulator. In fact, the regulator faces a trade-off between higher incidence of willful default and higher profitability of the bank. What we observe in reality depends on the objective of the regulator.

*Keywords:* Commercial Banks, Loan Default, Bank Regulation

*JEL classification:* G20, G21, G28

## 1. INTRODUCTION

Standard debt contract specifies among other things, the borrower’s promise to offer a repayment of loans constant over states, with the bank being allowed to seize the whole cash flow when the repayment cannot be guaranteed. Most of the debt contracts are characterized by asymmetric information between the lender and the borrower which is thought to be the key to the persistent problem of loan default and the resulting accumulation of NPAs in the balance sheet of banks. In the context of debt contract, it may arise, in general, for two reasons. First, it may arise because borrowers who take out loans from the lender usually have much better information than the lender about the potential risk and return associated with the investment project that the borrower plans to

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undertake. Second, if the actual cash flow generated from the investment project is the private information only of the borrower, then default may arise.

The borrowing unit may default 'willfully' for several reasons such as deliberate non-payment of dues despite adequate cash flow, underreporting of cash flow, diversion of funds, siphoning off funds etc. Whatever be the reason, when willful default occurs, this highlights the fact that direct truth revelation does not work in equilibrium debt contract. The literature on costly state verification claims that this kind of moral hazard problem can be solved if the lender can commit to verify ex-post the borrowers' cash flow and/or if the agents can contractually agree on large penalties for those borrowers who strategically default on their debt. In particular, with infinite penalties, the first-best allocation may be achieved. Intuitively, very large penalties provide the right incentive for borrowers to report their financial situation truthfully to the creditor, even if the latter audits only with a very small probability. Consequently, the asymmetric information can be eliminated at a cost, which tends to zero as the audit probability becomes sufficiently small (Becker, 1968). Thus it is easy to prevent untruthful reporting in the auditing zone and, therefore, truthful reporting need not be rewarded. However, following the real life examples, most existing models consider an exogenous upper limit to the penalty that can be imposed to defaulters (see Townsend, 1979; Mookerjee and Png, 1989; Border and Sobel, 1987) or assume that there is limited liability on the part of the borrower (Gale and Hellwig, 1985). Townsend (1979) and Gale and Hellwig (1985) show that debt contract may be so designed that it satisfies the incentive compatibility constraints and the truth revelation of the borrower's cash flow is the dominant strategy and, therefore, standard debt contract appears to be the optimal contract from the efficiency perspective. In contrast, in our analysis of willful default, standard debt contract does not appear to be optimal contract and so, in equilibrium there exists a positive amount of willful default. We argue that willful default may occur in equilibrium for a number of reasons. First, if a probability structure is attached to the principle of auditing, it may not be possible to identify a threshold bankruptcy point as in standard non-random costly verification models. It is true that there exists some cash flows reported by the borrower that are always audited with probability one. However, in such cases, it is also always profitable to reduce these probabilities that would strictly reduce the expected cost of auditing without affecting the incentive compatibility conditions of the debt contract. Hence any mechanism with sure probability of auditing in some cases would be sub-optimal. Second, in non-random auditing strategy of Townsend (1979) and Gale and Hellwig (1985), untruthful reporting of cash flow is highly penalized and truthful reporting is not penalized at all. Therefore, it is easy to prevent falsification of reports in the auditing zone and the borrower need not be rewarded for truthful reporting. However, under stochastic verification scheme, if the borrower is rewarded for truthful reporting rather than not punished whenever the probability of auditing is less than one, the threshold bankruptcy point in the sense of standard models does not exist (Mookherjee and Png, 1989). Third, our framework differs from Gale and Hellwig (1985) in another respect. In case of Gale and Hellwig (1985), the repayment function is necessarily

constant in the no audit zone because otherwise the borrower could cheat by announcing a message of cash flow that corresponds to the minimum repayment in the no-audit zone. This makes the debt contract incentive compatible in standard models. However, in our analysis of willful default, repayment function is not necessarily constant over states. This happens because here auditing takes place with some probability. If there is auditing and it is found that there is untruthful reporting of the actual cash flow position, the borrower must pay a penalty. Optimal repayment to the principal is a function of the reported income returns, given that the probability of auditing is everywhere lower than one. As a consequence, since in the optimal incentive scheme, the probability that the report will not be audited successfully is positive, the agent will not pay a constant transfer across all states of solvency. In developing countries, however, willful default occurs at the equilibrium as (1) the data to verify and cross check the actual cash flow is unavailable. (2) auditing is costly and therefore random; and (3) punishment is lagged due to inefficient legal system. Also, it may not be easy to prevent untruthful reporting in the auditing zone if the borrower colludes with the internal auditor of the bank so that the auditor does not truly audit the borrower's actual cash flow position<sup>1</sup>. In this paper, we consider random auditing strategy followed by the banks with commitment. Consequently, willful default appears at the equilibrium. We follow this model in order to show the tradeoff between default and profit regulation of banks.

Against this background, this paper highlights on the incidence of 'willful default' in developing country banking systems such as India, where the borrowing unit underreports its true financial position and defaults willfully. We construct a sequential game to address this problem. Given the above criterion of willful default and the borrower's objective to maximize its profit, we show that willful default occurs in equilibrium due to underreporting of its actual cash flow. We also explore the relation between the profit of a bank and the amount of willful default that occurs at the equilibrium consequent on the loan advancement process. We argue that there is a trade-off between the two. This highlights the dilemma in the objective of the regulator whether to control the extent of willful default thereby allowing a fall in the profitability of the bank or to allow the bank to increase its profit along with the mounting burden of NPAs due to willful default.

The rest of the paper is organised as follows. In Section 2, we present a brief review of literature. Section 3 discusses why willful default is a problem typical to the developing country financial system. Section 4 highlights on certain aspects of lending, default and its regulation in Indian banking system. Section 5 presents the basic model. In sub-section 5.1, we state the borrower's problem. In sub-section 5.2, we state the bank's problem. In Section 6 we discuss the policy implications of the results. Section 7 concludes the paper.

<sup>1</sup> The current analysis, however, does not consider the possibility of collusion between the auditor and the borrower.

## 2. SURVEY OF LITERATURE

Theoretical literature on credit risk in banking focuses on solving asymmetric information problems associated with the risk of loan default. In fact, there are two sources of asymmetric information: adverse selection and moral hazard. Adverse selection and moral hazard problems largely explain the sources of loan default in banking system across countries and accordingly, various regulatory mechanisms are suggested to mitigate this problem of default risk. One set of theories explain the risk of loan default in terms of adverse selection. Adverse selection is an asymmetric information problem that appears before the loan transaction occurs. In such a framework, the borrowers who are the most likely to produce an adverse outcome are also most likely to be selected. Here, low quality borrowers with high credit risk are those who are most willing to take out a loan and pay the highest interest rate. Since adverse selection makes it more likely that loans might be disbursed to bad borrowers with high risk of default, in order to mitigate the risk of loan default, lenders may decide not to extend any loan at all. As the type of the borrower is unknown to the lender, banks resort to credit rationing and equilibrium in the credit market occurs such that interest rates are adjusted typically below market clearing levels resulting in excess demand for credit (See for example, Stiglitz and Weiss, 1981).<sup>2</sup> Another set of theories explain the risk of loan default in term of the moral hazard problems (See for example, Diamond, 1984; Gale and Hellwig, 1985). It is argued that bankers face the moral hazard in that borrowers engage themselves in activities that make it less likely that loans will be repaid. In fact, a borrower has incentive to invest in projects with high risk in which the borrower does well if the project succeeds but the lender bears the cost if the project fails. The borrowers can also misallocate funds for their personal use or channelise funds in unprofitable investment projects. Both these phenomena would give rise to the growing incidence of loan defaults of banks. The analysis of ‘willful default’ presented in this paper is carried out in tune with the costly state verification (CSV) paradigms based on moral hazard problem because it seems to offer more clear understanding of the role of both debt and intermediaries in financial contracting than adverse selection type models (Frexias and Rochet, 1997; chapter 4). The seminal contributions to the literature on costly state verifications paradigm are those of Townsend (1979) and Gale and Hellwig (1985). These models assume that due to asymmetric information between the lender and the borrower, the realisation of borrower’s cash flow is not observable

<sup>2</sup> In the context of developing country banking systems such as India, two issues become relevant and significantly related to credit rationing in recent times. The pressure on banks to reduce NPAs seems to result in a cautious approach towards lending policies and the levels of risks taken by the banks. On the other hand, since many banks prepare themselves for higher capital requirements in the emerging era of Basel II, this added burden of capital requirements cannot be met simultaneously with the additional provisions necessary for more risky projects (Ramasastri and Unnikrishnan, 2006).

unless the lender undertakes an audit at certain costs. The rules of the debt contracts in such models are such that direct revelation mechanism works and it is always in the interest of the borrowers to report truthfully. Here, auditing of borrower's cash flow is suggested as a regulatory instrument in the context of moral hazard. Diamond (1984) shows the optimality of standard debt contract in presence of moral hazard where the objective is also to obtain truthful reporting of the borrower's cash flow. However, in Diamond's model, cash flow of the borrower is not observable and a debt contract in this model involves a non-pecuniary penalty that the lender can inflict on the borrower for loss of reputation. Here, we also obtain optimality of standard contract. Chang (1990) suggests a two-period extension of the CSV model of Townsend and Gale and Hellwig and determine optimal dynamic debt contract under risk neutrality as a two period standard debt contract. Krasa and Villamil (2000), similar to the standard CSV models also show that standard debt contract is the optimal contract and there is truth revelation. However, in contrast to standard models, Krasa and Villamil (2000) identify the probability of auditing as in Gale and Hellwig, with the probability of enforcement in a model with commitment.

However, the literature also indicates that in many situations the optimality of standard debt contract may not be ensured. Mookherjee and Png (1989) introduce random auditing in contrast to deterministic auditing in basic CSV models and show that under stochastic verification scheme, the optimal contract may not be the standard debt contract. This happens because they show that in any nontrivial optimal incentive scheme, it is not possible to identify a bankruptcy point. Moreover, when auditing is not performed, repayments turn out not to be constant over states. An analysis of the propositions confirm that the existence of standard debt contract is doubtful with respect to random auditing. The first proposition<sup>3</sup> of Mookherjee and Png (1989) actually denies the existence of a threshold bankruptcy point. The second proposition<sup>4</sup> induces the optimal repayment to the principal to be a function of the reported income returns, given that the probability of auditing is everywhere lower than one. As a result, since in the optimal incentive scheme, the probability that the report will not be audited is never

<sup>3</sup> The first proposition of Mookherjee and Png (1989) states that all income reports that are audited, are audited randomly i.e., the probability of auditing is less than one and it follows that in any optimal incentive scheme, the agent has a positive consumption in every income state. It is also stated in the first proposition that every optimal incentive scheme has the property that if the agents report is audited and verified to be truthful, the agent must be rewarded rather than punished.

<sup>4</sup> The second proposition states that in any optimal incentive scheme, reports corresponding to the highest transfer will not be audited, all other reports must be audited with positive probability and reports corresponding to higher transfers will be audited with equal or lower probability if  $C_k > C_1$  and  $p_1 < 1$ , then  $p_k < p_1$  where  $C_k$  and  $C_1$  are the transfers from the agent to the principal in states  $k$  and 1. Here,  $k$  and 1 are the states of actual and untruthful reporting and  $p_k$  and  $p_1$  are the probabilities of auditing in actual and false states.

zero, the agent will not pay a constant transfer across all states of solvency. Border and Sobel (1987) also show that optimal contract may be characterised by low probability of verification and large reward for truthful reporting.

There is another situation where optimal contract does not correspond to standard debt contract and direct truth revelation mechanism does not work. Strategic default may exist in equilibrium if it is not easy to the lender to commit to an audit when the borrower defaults<sup>5</sup> (Khalil and Parigi, 1998; Simmons and Garino, 2003). They show that size of a loan is an important determinant of the incentives to repay in a CSV framework. When the banks cannot commit to audit a defaulting borrower, it can be useful for them to raise the loan size and use this as a commitment device. Alary and Gollier (2004) explain the competitive equilibrium in the context of consumer credit market when borrowers are assumed to be risk averse and show that strategic default may or may not exist in equilibrium. In doing so, they also consider a costly state verification framework similar to Khalil and Parigi (1998) where lenders cannot undertake auditing strategies. However, in contrast to Khalil and Parigi (1998), they assume that the audit is subject to errors. Based on costly state verifications models, they show that credit contracts that appear in equilibrium is characterised by a fine imposed in case of default which is not exogenously given but arise as an outcome of the game. It also shows that when the audit technology is imperfect, strategic default may or may not exist in equilibrium mainly depending upon the borrowers' attitude toward risk.<sup>6</sup>

In this paper, we consider random auditing strategy followed by the banks with commitment. Consequently, willful default appears at the equilibrium. We adopt this model to show the trade-off between the default and profit regulation of the bank.

### 3. WILLFUL DEFAULT AS A TYPICAL PROBLEM OF DEVELOPING COUNTRY FINANCIAL SYSTEM

According to the Global Financial System Report (Table 1), the aggregate rate of nonperforming loans varies considerably among the countries.

<sup>5</sup> The existence of strategic default is necessary to induce lenders to audit loan defaulters. On the contrary, without strategic default, lenders would not want to audit ex-post, which in turn would induce borrowers to strategically default. As a result, there may not exist any equilibrium without strategic default.

<sup>6</sup> In case of constant absolute risk aversion, this entails risk neutrality as a special case and proved that the equilibrium loan contract is such that the contractual penalty will be large enough to induce borrowers to never strategically default on their debt. This result also holds even if absolute risk aversion is increasing in wealth. However, when the utility function exhibits decreasing absolute risk aversion, strategic default may exist in equilibrium with limited punishment determined by the value of the parameters.

**Table 1.** Country-wise Ratio of Non-Performing Loans to Total Loans  
(Figures in per cent)

Countries	98	99	00	01	02	03	04	05	06	07	08	09	10
Brazil	10.2	8.7	8.4	5.7	4.8	4.8	3.8	3.5	3.5	3	3.1	4.2	3.8
Chile	1.5	1.7	1.7	1.6	1.8	1.8	1.2	0.9	0.7	0.8	1.0	3.0	3.3
Mexico	11.3	8.9	5.8	5.1	4.6	3.7	2.5	1.8	2.0	2.7	3.2	3.1	2.8
USA	1.0	0.9	1.1	1.4	1.6	1.3	0.8	0.7	0.8	1.4	2.9	5.4	5.5
Japan	5.4	5.8	6.1	6.6	8.9	7.2	2.9	1.8	1.5	1.4	1.6	1.7	-
France	6.3	5.7	5.0	5.0	5.0	4.9	4.2	3.5	3	2.7	2.8	3.6	-
Greece	13.6	15.5	12.3	9.2	8.1	8.4	7.0	6.3	5.4	4.5	5	7.7	9.0
Italy	9.1	8.5	7.7	6.7	6.5	6.6	6.5	5.3	4.9	4.6	4.9	7.0	-
Russia	17.3	13.4	7.7	6.3	6.5	6.1	3.8	2.6	2.4	2.5	3.8	9.7	9.5
Turky	6.7	9.7	9.2	29.3	17.6	14.2	6.0	5	3.9	3.6	3.8	5.6	4.9
Argentina	5.3	7.1	8.7	13.2	17.5	22.7	10.7	5.2	3.4	2.7	2.7	3.0	2.7
China	-	28.5	22.4	29.8	25.5	22.0	15.6	8.6	7.1	6.2	2.4	1.6	-
India	14.4	14.7	12.7	11.4	10.4	8.8	7.2	5.2	3.3	2.5	2.3	2.3	-
Indonesia	48.6	32.9	18.8	11.9	5.8	19.4	14.2	7.4	6	4.1	3.2	3.3	-
Korea	7.4	8.3	6.6	2.9	1.9	2.3	1.9	1.2	0.8	0.7	1.1	1.2	1.5
Malaysia	18.6	16.6	15.4	17.8	15.9	14.8	11.7	9.6	8.5	6.5	4.8	3.7	3.5
Philippines	11.0	12.7	14.9	16.9	15.4	15.2	24.7	10.0	7.5	5.8	4.5	4.1	
Thailand	42.9	38.6	17.7	10.5	15.8	15.5	11.8	9.1	8.1	7.9	5.7	5.3	5.0
Sri Lanka	16.6	16.6	15	16.9	15.7	13.9	9.1	9.6	-	-	-	-	-
Bangladesh	40.7	41.1	34.9	31.5	28	22.1	17.6	13.2	12.8	14.5	11.2	-	-
Pakistan	23.1	25.9	23.5	23.3	23.7	20.7	11.6	8.3	6.9	7.6	10.5	12.2	13.1
Germany	4.5	4.6	5.1	4.9	5	5.3	5.1	4.0	3.4	2.6	2.8	3.3	-
UK	3.2	3.0	2.5	2.6	2.6	2.2	1.9	1.0	0.9	0.9	1.6	3.5	-

*Sources:* (1) Global Financial Stability Report (April, 2004), IMF for the data from 1998-2003, (2) Global Financial Stability Report (April, 2006), IMF for the data for 2004, (3) Global Financial Stability Report (Oct, 2010), IMF for the data from 2005-2010.

*Note:* '-' indicates that data is not available.

However it is evident that the problem of nonperforming loans is much more severe in the developing countries of the world compared to their developed counterpart. As Allen and Gale (2004) compare the financial systems of the developed vis-à-vis the developing countries, they point out that the two systems differ as the former depends more on the financial markets and less on the banking system for financing the firms. The explanation for this broad institutional difference seems to be the strength of the underlying legal system (Rajan and Zingales, 2001). Since the banks are less dependent than the financial markets on the legal system, it is argued that banks do better when the legal system is weak. The weakness of underlying legal framework and widespread informality deprive the developing country financial system from enjoying the virtue of

an efficiently functioning financial market in bringing out the information about the performance of a firm. Moreover it suffers from the inherent weakness of the bank-based financial systems in the form of incompleteness of the debt contracts. The possibility of renegotiation on default shows off as low expected punishment. The thin demand for formal credit exacerbates the problem by establishing relation between the bank and the creditors. The willful default occurs as a consequence. The close bank-firm relationship where borrowers mainly rely on a single bank for finance is identified as the most important source behind the loan default and the consequent banking troubles in Asia. With such a relationship, banks would have an incentive to fund negative present-value projects (Krugman, 1998; Corsetti, Presenti and Roubini, 1999a and 1999b).<sup>7</sup> The idea of using of delegated monitors by the bank as propounded by Diamond (1984) though ideally could solve the problem, since this amounted to the use of strong incentive mechanisms by the banks, the institutional rigidities in the developing countries like lack of competition in the banking sector, government ownership of banks, strong unionism in formal labor market, corruption did not allow this to take off. Poor judicial enforcement of debt contract in some countries aggravates the problem of loan default and adversely affects the amount of bank lending. Castelar and Cabral (2001) and Cristini *et al.* (2001) found that in the context of the credit markets in Argentina and Brazil, loan default increases in the provinces with poor judicial enforcement and lending falls. Poor credit culture of banks having less information about the borrowers' credit-worthiness leads to inefficient credit allocation and high degree of underreporting of nonperforming loans in many developing countries compared to those in advanced economies (Delhaise, 1998). The sharing of defaulters' information among the banks is also at a very nascent stage in most of the developing countries due to their technological backwardness.

A strong regulation of banks could be a way out to the problems of the developing country banking system mentioned above. However bank regulations in most of the developing countries are weak compared to those in developed countries. Ranking of the countries in terms of the strength of the regulatory environment in the banking system of different countries depict that UK, US, Switzerland, Canada, Australia, Hong Kong, China, and Singapore are the strongest banking systems and Indonesia, Pakistan, India, Sri Lanka and Russia are the weakest (Chan-Lee and Ahn, 2001). Minimum capital adequacy ratios as prescribed by the Basel Accord are in many of the developing countries, lower than the prescribed level. In some countries, banks do not comply with the minimum capital adequacy requirements. Loan classification requirements in many developing country banking systems are less strict than those in advanced economies. For, example, in Thailand, a loan could go 360 days past due before it is declared as

<sup>7</sup> Giannitti (2003) also shows that in an open economy banking system with close bank-firm relationship, there also may arise sequences of bank default even if banks perform desirable functions and do not lend negative present-value projects.



NPA and then they were allowed to be rolled over and treated as performing instead (Ward, 2002). This weak accounting standard not only weakens capital adequacy standards, but also weakens any standard based on capital base. The weak enforcement of bank regulations caused by low supervision, collusion, tolerance by the regulator and the poor judicial enforcement are the probable contributing factor to the high incidence of willful default in developing country banking systems.<sup>8</sup> Highly concentrated bank ownership structures in many developing countries, particularly in Asia, with a very powerful network controlling banks, act as an impediment to the enforcement and effective implementation of the regulations. Many of the developing countries have liberalized their banking systems but that has not been supplemented with strong supervision and enforcement mechanism which not only induces the bank managers to channelize funds to unprofitable investment projects but also enable them to divert funds for unproductive purposes (Demirguc-kunt and Detragiache, 1998).

#### 4. WILLFUL DEFAULT: THE INDIAN CASE

Public sector banks (PSBs) in India provide the bulk of credit to the Indian economy and lending decisions in all PSBs are bound by a common set of guidelines issued by the RBI. Several reasons have been identified in the literature behind the growing incidence of default (Sarker, 1999; Tarapore, 1999; Rajaraman *et al.*, 1999; Rajaraman and Vasishtha, 2002; Muniappan, 2002; Mukherjee, 2003; Bardhan and Marjit, 2005). One natural question arises why the Indian banks are exposed to too much risk of default (see Table 1). One possible explanation to this phenomenon is that the guidelines under which commercial banks operate are too much lax leaving room for the banks to risk of default. Lending decisions are so guided that banks put too much emphasis on the amount of past loans because it is thought to be a good indicator of what was known about the borrower at the beginning of the previous period when the loan was granted. However, in practice, past loans sanctioned do not predict future profits, or the possibility of default, while current profits do (Banerjee and Duflo, 2002). Banks, in fact, set certain limits on how much credit (which is guided by certain rules)<sup>9</sup> they are willing

<sup>8</sup> See Herath and Kumar (2002) for empirical evidence on how weak supervision in the developing countries relative to the developed countries leads to relatively poor performance of the banks in the former group of countries. Recently similar empirical evidence has also been provided for the group of EU countries by Gaganis *et al.* (2013).

<sup>9</sup> This includes the rules about how much credit banks should give to individual borrowers-the Maximum Permissible Bank Finance (MPBF). The RBI introduced this rule in 1995. This rule was supposed to help the banks in shaping their credit limits as well as bring about discipline in the utilisation of bank credit by large borrowers. Until 1997, this rule was based on the difference between current assets and other current liabilities. The presumption is that current assets are illiquid in the very short-run and therefore, the firms

to disburse to their borrowers. Firms differ widely in their needs of credit depending on the size, type of business in which they operate etc. It often becomes difficult to rely on the borrowers' stated needs of credit and thus set a credit limit accordingly because borrowers who have greater need of credit are often found to be more susceptible to default (Banerjee and Duflo, 2002). In India, it is observed that big defaulters in banks are eventually the large firms in the industry. However, banks need to grant loans to those with genuine credit needs while avoiding those who are likely to default. At this point, it is important to point out one potential source of loan default. Banks in India mainly provide loans against collateral security. In case of short-term loan, firm's inventories serve as security and to that extent working capital loans are less likely to default. However, even in such cases, there is a significant amount of default arising from the fact that firms can easily dispose off the inventories that are supposed to be securing the loan before default and thus hide the proceeds. However, default-friendly legal system can take little actions against these defaulters, which results in lot of defaults in most of the PSBs in India.

In India, there was a debate about what should be the appropriate norm for defining willful default. The default in the banking system occurs due to various reasons like certain internal factors (e.g., weak credit appraisal or weak loan monitoring process etc.) as well as certain external factors (e.g., natural disaster, diversion of funds etc.). The RBI provided the first formal definition of willful default in its guideline issued in 1999.<sup>10</sup> In its definition, the RBI emphasised on the following points. (a) Deliberate non-payment of the dues despite adequate cash flows and good net worth. (b) Siphoning off funds to the detriment of the defaulting units, (c) purchasing as well as selling of assets financed by the banks and the misutilisation of proceeds, (d) misrepresentation and falsification of reports, (e) disposal and removal of records without bank's

need support to finance these assets. According to this rule, firms were supposed to finance a maximum of 25 per cent of their working capital needs from equity and the MPBF under this method is formulated as  $(0.75 * \text{current assets} - \text{other current liabilities})$ . Since mid 1997, banks have been given autonomy to determine their own credit limits. It is not, however, clear how adherence to these rules is supposed to be enforced by the RBI. The main form of enforcement seems to come from the fact that when a borrower defaults on a loan from a bank that has to be reported to the RBI and a significant fraction of these cases are then investigated by the Central Vigilance Commission for the possibility of corruption involved in violating the prescribed credit limits (Banerjee and Duflo, 2002; Das, Singh and Rao, 2006).

<sup>10</sup> Apart from prescribing the norms for declaring an individual borrower to be willful defaulter, the guideline issued by the RBI (1999a) also highlights on the penal measures that can be taken against a willful defaulter, roles and responsibilities of audit and inspecting teams while dealing with such accounts and a mechanism by which the grievance can be addressed if any party feels aggrieved on account of inclusion of its name in the willful defaulters list. The guideline of the RBI also deals with the criminal action that a bank can take against the willful defaulters and precautions that a bank can take in this regard before giving credit facilities to the borrowers.

knowledge and (f) fraudulent transactions by the borrowers. This guideline became operational from the beginning of 1999. Accordingly, banks and financial institutions (FIs) reported all cases of willful defaults, which occurred or were detected after 31st March, 1999 on a quarterly basis. It covered all non-performing borrowal accounts with an outstanding amount of Rs.25 lakhs and above identified as 'willful default'.

Later on, certain modifications were introduced in the definition of willful default following the recommendation of the Working Committee (2001) on Willful Default. Following the recommendations, the modified definition,<sup>11</sup> was put in place by the RBI (2002) which became operational since May 2002. According to the new guidelines, a willful default would have occurred in case of the following events: (a) the unit has defaulted in meeting its payment/repayment obligations to the lender even when it has the capacity to repay the same obligations, (b) the unit has defaulted its payment/repayment obligations to the lender and has not utilised the borrowed funds for specific purposes for which the loan was granted, rather the funds have been diverted<sup>12</sup> for other purposes, (c) the unit has defaulted in meeting its payment/repayment obligations to the lender and has siphoned-off<sup>13</sup> the funds and also the funds are not available in the form of other assets to the borrower. There are a number of important aspects of the above definitions of willful default. First, all the borrowing units identified as willful defaulters or the promoters involved in diversion/siphoning off funds as per the above definition are subject to penal measures.<sup>14</sup> Second, while dealing with the willful default of a single borrowing unit in a group, the banks and FIs considered the track record of the individual company with reference to its repayment performance to its creditors.

<sup>11</sup> The RBI after examining the recommendations of the Committee redefined the term 'willful default', which appeared to be more or less the same as the previous definition laid down by the RBI in 1999 with certain precisions.

<sup>12</sup> "Diversion of funds" is defined in terms of: (i) utilisation of short-term working capital funds for long-term purposes, (ii) deploying borrowed funds for creation of assets other than those for which the loan was sanctioned, (iii) transferring funds to the subsidiaries/group companies or other corporate bodies, (iv) channelising the funds to any bank other than the lender bank without prior permission of the lender, (v) investment in other companies by way of acquiring equities/debt instruments without approval of lenders, (vi) shortfall in deployment of funds vis-à-vis the amounts disbursed/drawn and the difference not being accounted for.

<sup>13</sup> "Siphoning off" is deemed to occur if any funds borrowed from banks or financial institutions are utilised for purposes unrelated to the operations of the borrower, to the detriment of the financial health of the entity or of the lender.

<sup>14</sup> Penal measures include (a) no additional facilities should be granted to the listed wilful defaulters. Moreover, firms/promoters of companies where banks/financial institutions have identified siphoning off or diversion, misrepresentation or falsification of reports should be debarred from institutional finance. (b) The lenders may initiate criminal proceedings against the wilful defaulters. (c) The banks/FIs can adopt a change in the management of the defaulting units.

However, in cases where a letter of guarantees furnished by the companies within the group on behalf of the willfully defaulting firm are not honored when appealed by the banks/FIs, these group companies are also reckoned as the willful defaulters. Third, while identifying willful defaulters, banks and financial institutions put emphasis on the role of the auditors of the borrowing units. If it is found there is a falsification of reports on the part of the borrowers, banks and financial institutions lodge formal complaints against the auditors of the borrowing units. While monitoring the end-use of the funds, the lenders can also desire a specific certification from the auditor of the borrowing units regarding the diversion/siphoning off funds by the borrower.

However, the RBI's decision to create the list of willful defaulters were subject to mounting criticism in that banks were made sick by corporate who deliberately refused to pay their dues. In some quarters, it is felt that at least a portion of default was due to weakening of the indigenous industrial sector and the national economy as a result of economic reforms and the efforts to globalization. To that extent default might not qualify as willful. There are some other views which advocate that firms, which have a strong asset base and market position, could be facing a cash flow problem as a result of market cycles and other phenomena and these cases should not be qualified as willful.

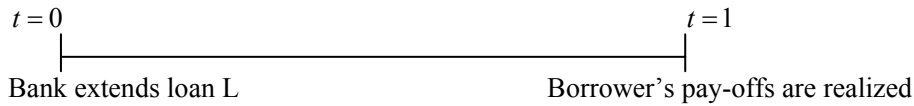
## 5. THE MODEL

We assume that the production process of a firm (the borrower) involves two dates. At  $t = 0$ , the borrower decides to invest the amount  $L$  in an investment project. Suppose the borrower does not have its own resources and, therefore, borrows the entire amount from the bank.  $L$  is designated as the incremental amount of loan mobilised from the bank. The borrower is supposed to pay back  $\tilde{L} = L(1 + r)$  at the end of period 1 where  $r$  is the rate of interest on loans disbursed by the bank. We assume  $r$  is exogenously fixed in this model. We also assume that the bank cannot extend more than  $\bar{L}$  amount of loan i.e.,  $\tilde{L} \leq \bar{L}$  where the credit limit or the loan capacity of the bank is  $\bar{L}$ . Once the project is undertaken, only the borrower can observe the cash flow at no cost. At  $t = 1$ , the cash flow  $R$  is realised by the borrower which is not observable to the bank. This gives rise to moral hazard problem that can be solved by monitoring the borrower's cash flow. However, the borrower defaults willfully by announcing a cash flow  $\tilde{R}$  such that  $\tilde{R} < \tilde{L} < R$ . We can now define NPA for 'willful default' as

$$W_d = \tilde{L} - \tilde{R}. \quad (1)$$

The bank, however, does not know whether the default has been 'willful' or not, because it cannot observe  $R$ . Cash flow of the borrower can be verified once auditing is performed. So the bank undertakes an audit of cash flow reported by the borrower. It appoints an auditor to find out the nature of default. We assume that  $p$  is the probability

with which the auditor can detect the underreporting of cash flow. With probability  $(1 - p)$ , the auditor cannot detect it and the borrower escapes. If the borrower is found to default ‘willfully’, the bank can take resort to various mechanisms to cope with the default. The bank can use collateral to recover the due amount or the bank can impose a pecuniary/ non-pecuniary penalty on the defaulting borrower. It can either debar the borrower from future loans for a specific period of time or it can impose a fine. In this model, we assume that if there is untruthful reporting, the bank imposes a fine,<sup>15</sup>  $v(0 < v < 1)$  on the defaulting unit. We assume that limited liability condition holds. So, it must satisfy the condition that  $R - \tilde{L} - v(\tilde{L} - \tilde{R}) \leq R$ . Finally, we assume that the borrower is risk averse whose preferences are represented by Von Neumann-Morgenstern (VNM) utility function,  $u(\cdot)$  which is strictly increasing and concave in its argument while the bank is assumed to be risk neutral. Both the agents derive utility for consumption in the final period. The timing of the events is as follows:



The problem that we state above is very much in tune with the costly verification models based on moral hazard. Like the standard costly verification models of Townsend (1979) and Gale and Hellwig (1985), here we assume, when the realisation of borrower's cash flow is not observable to the lender, the lender undertakes an audit at certain costs. However, unlike these models, the auditing strategy in our case is random rather than non-random. This non-random auditing strategy may not lead to the direct truth revelation mechanism. As a result, it may not be possible to identify the threshold bankruptcy point as in Gale and Hellwig (1985). This might lead to the existence of willful default in equilibrium even if the auditing takes place. The next section elaborates on the borrower's problem in our context and identifies the conditions under which willful default will occur in equilibrium.

### 5.1. The Borrower's Problem

The borrower's pay-off function can be written as follows:

$$P = pu\{R - \tilde{L} - v(\tilde{L} - \tilde{R})\} + (1 - p)u(R - \tilde{R}) . \quad (2)$$

The first term on the R.H.S. of (2) denotes the payoff of the borrower if he is caught

<sup>15</sup> The limited liability condition ensures that if the borrower is detected for underreporting, it must be true that  $R - \tilde{L} - v(\tilde{L} - \tilde{R}) \leq R$ . This is also true for any value of  $v > 0$ .

underreporting as a result of auditing and the second term denotes the borrower's payoff if it succeeds in manipulating its cash flow. The payoff of the borrower in case he is detected for underreporting is smaller than the payoff in case where the borrower is not detected because the borrower has to pay a fine  $v$ , where  $v$  is the fine rate. Here, the fine imposed on the defaulting borrower is assumed to be an increasing function of the amount of willful default. Now the problem of the borrower is to maximise its total pay-off given by (2) by choice of  $\tilde{R}$ .

Assuming interior solution, the optimum solution to the borrower's problem:

$$\tilde{R}^* = \tilde{R}^*(R, \tilde{L}, v, p),$$

must satisfy the first order condition for maximisation as:

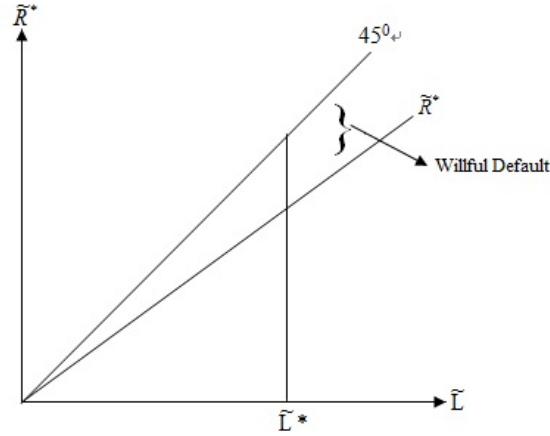
$$(1-p)u'(R - \tilde{R}^*) = pu'[(R + v\tilde{R}^*) - (1+v)\tilde{L}]v. \quad (3)$$

L.H.S of Equation (3) denotes the marginal benefit of underreporting of cash flow and the R.H.S of (3) denotes the marginal cost of underreporting of cash flow. The higher the value of  $p$ , the detection probability, the greater is the efficiency of the bank while dealing with willful default. So the lower will be the marginal benefit of the borrower from underreporting of cash flow. On the other hand, higher  $p$  implies that the marginal cost of underreporting of cash flow increases. The second order condition is satisfied given the assumption that the borrower is risk-averse (i.e.,  $u'' < 0$ ).

Taking total differential of Equation (3) and setting  $dR = 0$ ,  $dp = 0$ ,  $dv = 0$ , we have

$$\frac{\partial \tilde{R}^*}{\partial \tilde{L}} = \frac{pv + pv^2}{(1-p) + pv^2} = \frac{pv(1+v)}{(1-p) + pv^2}. \quad (4)$$

Equation (4) denotes the reaction function of the borrower. It shows the responsiveness of the optimal reporting of cash flow by the borrower to the changes in repayments to be made to the bank. It follows from Equation (4) that the reaction function of the borrower is positively sloped as depicted in Figure 1. The vertical difference between the  $45^\circ$  line and the line depicting  $\tilde{R}^*$  in Figure 1 measures the extent of willful default in our framework.



**Figure 1.** The Borrower's Reaction Function

Since  $0 < p < 1$ ,  $0 < v < 1$ , it must be  $\frac{\partial \tilde{R}^*}{\partial \tilde{L}} > 0$  i.e., as  $\tilde{L}$  increases,  $\tilde{R}^*$  also increases. Observe, for willful default to occur at the equilibrium it must be that the following inequality is true:

$$\tilde{R}^* < \tilde{L}. \quad (5)$$

Equation (5) implies:

$$\frac{\partial \tilde{R}^*}{\partial \tilde{L}} < 1.$$

It follows from Equation (4) that

$$\frac{\partial \tilde{R}^*}{\partial \tilde{L}} < 1, \text{ iff } p < \frac{1}{1+v}. \quad (6)$$

We assume that the values of  $p$  and  $v$  are such that the inequality  $p < \frac{1}{1+v}$  is satisfied and willful default occurs at the equilibrium. Observe, the willful default that occurs in equilibrium is sensitive to the probability of auditing and the fine imposed on the borrower for untruthful reporting. Now, we look at the bank's problem.

## 5.2. The Bank's Problem

The objective of the bank is to maximise its profit by choice of  $\tilde{L}$ , given the reaction of the borrower in Equation (4). The profit function of the bank is written as follows:

$$\Pi_B = p[\tilde{L} + v(\tilde{L} - \tilde{R})] + (1-p)\tilde{R} - C(p), \quad (7)$$

where  $\Pi_B$  denotes the profit level of the bank. The first term on the R.H.S. of (7) denotes the bank's pay-off when the auditor employed by the bank can successfully detect the underreporting of cash flow. In this case, the bank acquires the loan amount as well as imposes a fine  $v$ , which is proportional to the difference between  $\tilde{L}$  and  $\tilde{R}$ . The second term on the R.H.S. of Equation (7) denotes the pay-off of the bank when the auditor cannot detect underreporting of cash flow. In this case, the bank receives only the entire reported cash flow.  $C$  is the cost of auditing the borrower's report. The cost of auditing is assumed to be a function of  $p$ , the probability of successful auditing. While choosing  $\tilde{L}$  to maximize  $\Pi_B$ , the bank internalises the borrower's reaction against its choice of  $\tilde{L}$ .

The bank maximises (7) such that  $\tilde{R}^* = \tilde{R}^*(R, \tilde{L}, v, p)$ . Substituting,  $\tilde{R}^* = \tilde{R}^*(R, \tilde{L}, v, p)$  in (7), we have

$$\Pi_B = p[\tilde{L} + v\tilde{L} - v\tilde{R}^*(R, \tilde{L}, v, p)] + (1-p)[\tilde{R}^*(R, \tilde{L}, v, p)] - C(p). \quad (8)$$

Differentiating (8) with respect to  $\tilde{L}$ , we have

$$\frac{\partial \Pi_B}{\partial \tilde{L}} = p(1+v) - (pv-1+p) \frac{\partial \tilde{R}^*}{\partial \tilde{L}}. \quad (9)$$

From Equation (9), it follows that  $\frac{\partial \Pi_B}{\partial \tilde{L}} > 0$  since  $p < \frac{1}{1+v}$  for  $0 < \frac{\partial \tilde{R}^*}{\partial \tilde{L}} < 1$ .

Since  $\frac{\partial \Pi_B}{\partial \tilde{L}} > 0$ , it must be the case that at the equilibrium,  $\tilde{L} = \bar{\tilde{L}}$ . Therefore, at

the equilibrium, the bank will extend maximum possible amount of loan i.e.,  $\bar{\tilde{L}}$ . This implies that as the loan capacity of the bank increases, its profit level also increases.

Here,  $\bar{\tilde{L}}$  is the credit limit of the bank.

**Proposition 1.** *If  $p < 1/(1+v)$  and limited liability condition holds, the bank extends loans to its capacity.*



*Proof.* The discussion above.

Hence, from Equation (1) it follows, at the equilibrium, the amount of ‘willful default’ is given by:

$$W_d^* = \bar{L} - \tilde{R}(\bar{L}, R, v, p)]. \quad (10)$$

Now, we find out the impact of a change in the credit limit on the equilibrium amount of willful default as laid down in Equation (10). Differentiating (10) w.r.t.  $\bar{L}$ , we have

$$\frac{\partial W_d}{\partial \bar{L}} = 1 - \frac{\partial \tilde{R}^*}{\partial \bar{L}}. \quad (11)$$

We already know that  $0 < \frac{\partial \tilde{R}^*}{\partial \bar{L}} < 1$ .

Hence, it must be  $\frac{\partial W_d}{\partial \bar{L}} > 0$ .

**Proposition 2.** *As the credit limit increases, the incidence of willful default also increases.*

*Proof.* The discussion above.

## 6. POLICY IMPLICATIONS

Weak monitoring and supervision of bank loans and poor enforcement mechanism characterise banking system in many developing countries such as India. These help increase the moral hazard problem associated with such loans (RBI, 1999a; Marjit and Mallick, 2004). Also, poor bankruptcy laws in these countries encourage banks not to pursue efficient screening procedures. All these phenomena together help the borrowers to default willfully on their loan accounts and this in turn, leads to the mounting burden of NPAs in the balance sheet of banks in these countries. On the otherhand, the government bailout programmes in these countries act as a safeguard against the failure of the banking system because it is assumed that such guarantees reduce the potential cost of default of the banking system and this in turn, reduces the likelihood of credit rationing by the banks. But, with banks secure in the knowledge that they have the protection of the government, there is weakening of financial discipline on their part and the threat of bankruptcy appears weak to them. This adversely affects the health of the

banking system. Therefore, the regulator has to decide whether to control NPAs in banking system due to willful default or to allow the banks to extend loans as much as possible for the maximisation of profit. In terms of the discussions in this paper, it follows that the regulator has one instrument at its disposal i.e., loan capacity. If the objective of the regulator is to control the NPA level of banks due to willful default, the regulator will choose a lower level of loan capacity. However, Equation (9) above shows that such a policy of the regulator will also exert a downward pressure on the profit level of the bank. So, the regulator faces a trade-off between higher incidence of willful default and higher profit of the bank. The instrument is chosen accordingly to the objective of the regulator.

## 7. CONCLUDING REMARKS

This paper deals with the problem of willful default and its implications for profitability and ultimate loan decision-making process of the banks. It specifically examines the case where the borrower takes loan from a bank and defaults willfully by underreporting its cash flow. We first derive the conditions under which willful default occurs in equilibrium and we argue that direct truth revelation mechanism does not operate in this framework. Then we examine how the loan decision-making process of the bank is affected given the fact that willful default occurs. One of the most important results of the paper is that if limited liability condition holds and if the condition of willful default is satisfied, the bank will extend loans to its capacity which is exogenously fixed (Proposition 1). Another important result of this paper is that as the loan capacity of the bank increases, the incidence of willful default also increases (Proposition 2). Finally, we analyse how the regulator can use the 'loan capacity' as a policy instrument. It follows from our analysis that if the objective of the regulator is to control the NPA level of banks due to willful default, the regulator will choose a lower level of loan capacity. However, such a policy of the regulator will also exert a downward pressure on the profit level of the bank. So, the regulator faces a trade-off between higher incidence of willful default and higher profit of the bank. The instrument is chosen according to the objective of the regulator.

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