Bank Financing in India*

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1 Introduction

The Indian banking sector has been remarkably successful in some respects. Its immense size and enormous penetration in rural areas are exemplary among developing countries, as is its solid reputation for stability among depositors. The penetration in rural areas has been associated with a reduction of poverty and a diversification out of agriculture (Burgess and Pande, 2003). However in recent years it has been widely viewed as being both expensive and inept. In particular it has been argued that most banks are overstaffed, that a large fraction of their assets are non-performing (NPA) and that they under-lend, in the sense of not putting enough effort into their primary task of financing industry (Narasimhan committee, Government of India, 1991). A wide range of remedies have been suggested ranging from strengthening the legal system to punish defaulters, to abolishing the targeted lending programs (the so-called priority sector rules), to privatization of the entire banking system.

Many of these recommendations have been controversial, partly because there is relatively

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little hard evidence directly supporting the implied judgments or even confirming the diagnoses that lead to them. The problem is two-fold: first, these problems are mutually reinforcing, which makes it difficult to identify the primary cause (if any). For example, under-lending and high NPAs lead to banks having high operating costs, which they cover by setting high interest rates. This leads to further under-lending by these banks. Or to take another example, banks with a large existing stock of NPA naturally attract more public scrutiny. This makes their loan officers adopt a more conservative stance, leading to under-lending.

Second, and more importantly, most of these judgments are made without an appropriate counterfactual. Credit-deposit ratios could be low because banks are not trying to lend, or because there is insufficient demand, because marginal loans would be too risky, or because banks had to meet Basel capital adequacy norms. It is also not clear why we should necessarily believe that privatization would alleviate the problem of under-lending or NPAs (it *would* almost surely eliminate the problem of over-staffing, but in all likelihood the government will still have to pay for it through some voluntary retirement scheme that will be made a condition of the sale). The comparison of public and private banks today is not the appropriate comparison because so far the private banks have, for the most part, limited themselves to dealing just with what one might call the elite corporate sector.

This paper pulls together a recent a body of evidence on the question of under-lending and argues that there is clear evidence that socially and even privately profitable lending opportunities remain unexploited in the current environment. It then discusses the evidence for some of the reasons why this might be the case. It concludes with a discussion of the relevant policy responses, including the possibility of foreign investment.[1]

2 Is there under-lending?

2.1 Identifying under-lending

The Strategy: A firm is getting too little credit if the marginal product of capital in the firm is higher than the rate of interest that firm is paying on its marginal rupee of borrowing. We

[1] There is a literature on credit constraints in the OECD, see for examle Fazarri, Hubbard and Petersen (1998), or Lamont (1997). For more on the theory of credit markets in developing country context, see Banerjee (2003).

propose identifying credit constraints by the following observation: if a firm that is *not* credit constrained is offered some extra credit at a rate below what it is paying on the market, the best way to make use of the new loan must be to pay down the firm's current market borrowing, rather than to invest more. Since a non-constrained firm would invest until the marginal product of capital equaled the , additional investment would yield a lower return. By contrast, constrained firms would increase investment.

In Banerjee and Duflo (2002) we test these predictions by taking advantage of a recent change in the so-called priority sector rules in India: all banks in India are required to lend at least 40% of their net credit to the "priority sector," which includes small scale industry (SSI), at an interest rate of no more than 4% above their prime lending rate. In January, 1998, the limit on total investment in plants and machinery for a firm to be eligible for inclusion in the small scale industry category was raised from Rs. 6.5 million to Rs. 30 million. Our empirical strategy focuses on the firms that became newly eligible for credit in this period, and uses firms that were always eligible for priority sector credit as a control. The results from our analysis are reported briefly in the next sub-section.

Data: We use data from loan portfolios of a better-performing Indian public sector bank. The loan folders include information on profit, sales, credit sanctions, and interest rates, as well as figures loan officers are required to calculate (e.g. his projection of the bank's future turnover, his calculation of the bank's credit needs, etc.) to determine the amount to be lent. Our sample includes 253 firms (including 93 newly eligible firms), from 1997 to 1999.

Specification: Through much of this section we will estimate an equation of the form

$$y_{it} - y_{it-1} = \alpha_y BIG_i + \beta_y POST_t + \gamma_y BIG_i * POST_t + \epsilon_{yit}, \tag{1}$$

with y taking the role of the various outcomes of interest (credit, revenue, profits, etc.) and the dummy $POST$ representing the post January 1998 period. We are in effect comparing how the outcomes change for the big firms after 1998, with how they change for the small firms. Since y is always a growth rate, this is, in effect, a triple difference—we can allow small firms and big firms have different rates of growth, and the rate of growth to differ from year to year, but we assume that there would have been no differential changes in the rate of growth of small and large firms in 1998, absent the change in the priority sector regulation.

Using, respectively, the log of the credit limit and the log of next year's sales (or profit) in place of y in equation 1, we obtain the first stage and the reduced form of a regression of sales on credit, using the interaction $BIG * POST$ as an instrument for credit.

Results: Estimation of equation 1 using bank credit as the outcome shows that the change in the regulation greatly affected who got priority sector credit. In column (2) of Table 1, for the sample of firms where there was a change in credit limit, the coefficient of the interaction $BIG * POST$ is 0.24, with a standard error of 0.09.

This increase in credit was not accompanied by a change in the rate of interest (column (3)). It did not lead to reduction in the rate of utilization of the limits by the big firms (column (4)): the ratio of total turnover (the sum of all debts incurred during the year) to credit limit is not associated with the interaction $BIG * POST$. The additional credit limit thus resulted in an increase in bank credit utilization by the firms.

This additional credit in turn led to an increase in sales. The coefficient of the interaction $BIG * POST$ in the sales equation, in the sample where the limit was increased, is 0.21, with a standard error of 0.09 (column (5)). By contrast, in the sample where there was no increase in limit, the interaction $BIG * POST$ is close to zero (0.05) and insignificant (column (8)), which suggests that the result in column (4) is not driven by a failure of the identification assumption. The coefficient of the interaction $BIG * POST$ is 0.24 in the credit regression, and 0.21 in the sales regression: thus, sales increased almost as fast as loans in response to the reform. This is an indication that there was no substitution of bank credit for non-bank credit as a result of the reform, and that firms are credit constrained.[2]

In column (7), we present the effect of the reform on profit. The effect is even bigger than that of sales: 0.75, with a standard error of 0.38. Note that the effect of the reform on profit is due to the gap between the marginal product of capital and the *bank* interest rate: in other words, it combines the subsidy effect and the credit constraint effect. Even if firms were not credit constrained, their profit would increase after the reform if more subsidized credit is made available to them, because they substitute cheaper capital for expensive capital. Here again, we see no effect of the interaction $BIG * POST$ in the sample without a change in limit (column

[2] A similar result holds also for the sample of firms which borrowed from the market both before and after the reform, and thus had not completely substituted bank borowwing for market borrowing.

(9)), which lends support to our identification assumption.[3]

The instrumental variable (IV) estimate of the effect of loans on sales and profit implied by the reduced form and first stage estimates in columns (2), (5) and (7) are presented in columns (5) and (7) of panel B.[4] Note that the coefficient in column (5) is a lower bound of the effect of working capital on sales, because the reform should have led to some substitution of bank credit for market credit. The IV coefficient is 0.896, with a standard error of 0.46. Note that it suggests that the effect of working capital on sales is very close to 1, a result which implies that there cannot be an equilibrium without credit constraints.

The IV estimate of the impact of bank credit on profit is 2.7. We can use this estimate to get a sense of the average increase in profit caused by every rupee in loan. The average loan is 96,000 Rupees. Therefore, and increase of Rs. 1,000 in the loan corresponds to a 1.04% increase. Using the coefficient of loans on profits, an increase of Rs. 1,000 in lending therefore causes a 2.7% increase in profit. At the mean profit (which is Rs. 37,000), this would correspond to an increase in profit of Rs. 999. The increase in profits resulting from a Rs. 1,000 increase in loans is essentially Rs. 1000, *net of interest.* This gap is far too large to be explained by the subsidy in the interest rate to SSI firms.

These results provide definite evidence of very substantial under-lending: some firms clearly can absorb much more capital at high rates of return. Moreover the firms in our sample are by Indian standards quite substantial: these are not the very small firms at the margins of the economy, where, even if the marginal product is high, the scope for expansion may be quite limited.

In the next section we try to investigate the connection between these results about the pattern of lending and the way lending is carried out in India.

[3] Column 1 of table 1 shows that probability that the limit was changed is not affected by the reform, suggesting the use of firms whose loan limits were not changed as a control group to test our identification assumption.

[4] The regression presented in column (2) is not the actual first stage, because it uses the entire sample. The actual first stage is very similar: the coefficient of the interaction is 0.23 in the sample used in the sales equation.

3 Lending Practice in India

3.1 Official Lending Policies

While nominally independent, public sector banks are subject to intense regulation by the Reserve Bank of India (RBI), including rules about how much a bank should lend to borrowers. In this section, we describe the policy rule, examine to what extent it is followed, and determine which non-policy variables influence lending decisions.

Lending Policy: Historically, two methods have been used to calculate the maximum permissible bank finance of a firm, the "working capital" approach and the turnover approach. The working capital approach is based on the presumption that firms current assets are illiquid, and firms should finance 25% of the gap from equity, and 75% from bank credit.[5] Maximum permissible bank finance is thus defined as

$$0.75 * \text{CURRENT ASSETS} - \text{OTHER CURRENT LIABILITIES} \tag{2}$$

The second approach defines the firms financing need to be 25% of projected turnover, and allows the firm to finance 80% of this need from banks, i.e. up to 20% of turnover. Turnover-based maximum permissible finance is thus

$$\min(0.20 * \text{Projected turnover}, 0.25 * \text{Projected turnover} - \text{available margin}) \tag{3}$$

where the available margin is Current Assets − Current Liabilities, calculated from the firm's balance sheet. The margin is deducted because it is presumed that the firms other financing will continue to be available. Note that if the turnover based rule were followed exactly, the firms available margin would be precisely 5% of turnover, and the two amounts in 3 would be equal.

In our bank, for all loans below Rs 40 million (including all loans in our sample), the loan officer was supposed to calculate both equation 3 and the older rule represented by 2. The largest permissible limit on the loan was the maximum of these two numbers.

While a turnover-based approach is common in the USA, inventories serve as collateral: in India, inventories do not seem to provide adequate security, as evidenced by high default rates.

[5] This includes credit from all banks. Following this rule implies that the current ratio will be over 1.33, and the rule is often formulated as the requirement that the current ratio exceeds 1.33.

Second, venture capitalists, who in the USA provide significant financing to promising firms, are largely absent in India. It thus may be desirable for banks to lend more to profitable firms (as they do not default), and to quickly growing firms (current rules in India prohibit projecting turnover to grow at a rate above 15%).

Because nothing prohibits banks from lending less than the limit, and it is not clear how (or how often) these rules are enforced, we turn to the actual practice of lending (based on Banerjee and Duflo (2001)).

Data: We use the same data source (described above) to look at what bankers actually do. Since we have data on current assets and other current liabilities, it is trivial to calculate the limit according to the traditional, working capital gap-based method of lending (henceforth LWC). We can also calculate the limit on turnover basis (henceforth LTB). The maximum of LTB and LWC is, according to the rules, the real limit on how much the banker can lend to the firm.

Results: In table 2, we show the comparison of the actual limit granted with $\max(LTB, LWC)$. In 78% of the cases, the limit granted is smaller than the amount permitted. Most strikingly, in 64% of the cases for which we know the amount granted in the previous period, the amount granted is exactly equal to the amount granted in the previous period. Given that that inflation rate was 5% or higher, the real amount of the loans therefore decreases between two adjacent years in a majority of the cases and to make matters worse, in 73% of these cases the firm's sales had increased, implying, one presumes, a greater demand for working capital. Further, this is the case despite the fact that according to the bank's own rules, the limit could have gone up in 64% of the cases (note that getting a higher limit is simply an option and does not cost the firm anything unless it uses the money).

In table 3, we regress the actual limit granted on information that might be expected to play a role in its determination. Not surprisingly, past loan amount is a very powerful predictor of today's loan. In column (1), we regress (log) current loan amount on (log) past loan amount and the (log) limit according to the rules. Even though the bank's rule never refers to past loan as a determinant of permissible sanction, the coefficient of past loan is 0.757, with a t-statistic of 18. The maximum permissible limit is also significant, with a coefficient of 0.256. This suggests that a change in the previous granted limit increases the granted limit by three times as much

as a change in the maximum limit as calculated by the bank.

In column (2), we "unpack" the official limit, including separately the bank's limit on turnover basis (LTB), the limit based on the traditional method (LWC), and profits. As in the previous regression, past loan is the most powerful predictor of current loan. Both limits enter the regression. Neither profits nor a dummy for negative profit enter the regression. Columns (4) and (5) do the same thing for interest rates: past interest rates are the only significant determinant of current interest rates.

In sum, the actual policy followed by the bank seems to be characterized by systematic deviation from what the rules permit in the direction of inertia. To the extent that limits do change, what seems to matter is the size of the firm, as measured by its turnover and outlay, and not profitability or the client's loan utilization.

It could be argued that inertia is actually rational and results from the fact that the past loan amount picks up all the information that the loan officer has accumulated about the firm that we do not observe. There are at least three reasons this is probably not the case. First, firms needs change, if only because of inflation, while loan levels are often constant in nominal dollars. Second, the importance of past loans is no different for young firms, about which the bank presumably has less information. Finally, past loans do not predict future profits, while past profits do. This is important because negative profits predict default, while past loans, LTB, and LWC do not. (Banerjee and Duflo (2001)).

Conclusion: This section suggests an extremely simple explanation of why many firms in India seem to be starved of credit. Banks seem remarkably reluctant to make fresh lending decisions: in two-thirds of the cases, there is no change in the nominal loan amount from year to year. While the rules are indeed rigid, this inertia goes substantially beyond what the rules dictate. Moreover, loan enhancement is unrelated to profits. Loan officers' indifference to profits is entirely consistent with the rules that bankers work with, which do not pay even lip service to the need to identify profitable borrowers. Yet current profits predict future losses and therefore future defaults, while turnover does not. In other words, a banker who made better use of profit information would likely do a better job at avoiding defaults. Moreover, he would also better identify firms whose marginal product of capital is the highest. Lending based on turnover, by contrast, may skew the lending process towards firms that have been able to finance growth out

of internal resources and therefore do not need the capital nearly as much.

4 Understanding Lending Practices

The abiding puzzle is why the bankers choose to behave in this particular way. The rules are stringent, but rarely bind. Banks decline to lend to firms with very high marginal products of capital. The bank we study did not lack capital: between 1996 and 2001, total nominal deposits in our bank grew at an annual rate of 23%, while advances grew only 19% per annum.

In the next section, we report new evidence on three commonly discussed reasons for the above results. First, many feel that because lending officers in public sector banks face the wrong incentives, and may be more concerned about making bad loans and appearing corrupt, than finding profitable opportunities. Second, it is suggested that bankers may prefer to make risk-free loans to the government, rather than exert the effort to screen and monitor borrowers. Finally, it is possible that the marginal default rate is high enough to make it unprofitable to increase lending.

4.1 Inertia and the fear of prosecution

Since public sector banks are owned by the government, employees of the bank are treated by law as public servants, and thus subject to government anti-corruption legislation. Though the Central Vigilance Commission argues honest bankers have nothing to fear, there is an impression among bankers that it is very easy to be charged with corruption if loans go bad. Since bankers face at best weak rewards for making successful loans, bankers may prefer to simply approve past loan limits, rather than take a new decision. [6]

The rest of this sub-section, based on Cole (2002), looks at whether there is any evidence for the so-called fear psychosis. The basic idea is simple: we ask whether bankers who are "close to" bankers who have been subject to CVC action slow down lending in the aftermath of that

[6] See for example the the Economic Times (1999), or Tannan (2001). The latter source quotes a working group on banking chaired by M.S. Verma as saying "The [working group] observed that it has received representations from the managements and the unions of the banks complaining about the diffidence in taking credit decisions...This is due to investigations by outside agencies on the accountability of staff in respect to some of the NPAs." (p. 1579)

particular CVC action.

Data: Monthly credit data by bank were provided by the RBI. Data on frauds are naturally very difficult to come by, but, in an effort to punish corruption through stigma, the CVC has published a list containing the name, position, employing bank, and punishment of individual officers of government agencies charged with major frauds. The list consists of eighty-seven officials in public sector banks between the years 1992 and 2001. Approximately 72% of these frauds relate to illegal extension of credit. Summary statistics for credit data and the CVC fraud data are listed in table 4.

Empirical analysis: We use bank level monthly lending data to estimate the effect of vigilance activity on lending, using the following equation,

$$y_{it} = \alpha_i + \beta_t + \sum_{k=0}^{w} \gamma_k D_{i,t-k} + \varepsilon_{it} \tag{4}$$

where y_{it} is log credit extended by bank i in month t, α_i is a bank fixed-effect, β_t is a month fixed effect, and $D_{i,t-k}$ is an indicator variable for whether there vigilance activity was reported by the CVC for that bank i in month t-k. Standard errors reported are adjusted for serial correlation and heteroscedasticity. The basic idea is to compare a bank that was affected by the vigilance activity with other public sector banks, before and after the vigilance event. Since it is not clear precisely which event window to use, we let the data decide, estimating models which allow effects of vigilance activity to take from one month to four years to appear.

Table 5 presents estimation results from three similar specifications. Columns (1), (2), and (3) provide estimates for windows of one, twelve, and 48 months. There appears to be a clear effect of vigilance activity on lending decisions. Vigilance activity in a specific bank results in a reduction of credit supplied by all the branches of that bank by about 3-5%. This effect is estimated precisely (and is significantly different from zero at the 5% level for contemporaneous effect (column (1)), and at the 1% level for the joint parameters of zero to 24 months in columns (2) and (3)), and is quite persistent, appearing in the data at it's original level for up to eighteen months following the vigilance activity, finally becoming statistically indistinguishable from zero two years after the CVC decision or judgement.

This economic effect seems to be a sizable for plausible values of the elasticity of gross domestic product to money supply. For example, if the overall coefficient of .03 were accurate

for a bank such as the State Bank of India, which provides approximately a quarter of the credit in the economy, decisions on whether to pursue vigilance cases could have measurable macroeconomic effects.

Conclusion: There seems to be some evidence that the fear of being investigated is reducing lending by a significant extent: banks where someone is being investigated slow down lending relative to their own mean level of lending. This leaves open the question of whether this is a desirable reaction, since it is possible that the loans that are cut are the loans that are unlikely to be repaid. But it does raise the possibility that honest lenders are being discouraged by excessively stringent regulations.

4.2 Lending to the government and the easy life

The ideal way to look at the easy life hypothesis would be to estimate the elasticity of bank lending to the private sector with respect to the interest rate on government securities or the spread between the interest rate on private loans and the interest rate on government securities. The problem is that the part of the variation that comes from changes in the rate paid by the government is the same for all banks and therefore is indistinguishable from any other time varying effect on lending. The part that comes from the rates charged by the banks does vary by bank, but cannot possibly be independent of demand conditions in the bank and other unobserved time varying bank specific factors. One cannot therefore hope to estimate the true elasticity of lending by regressing loans on the spread.

Our strategy is to focus on a more limited question which we may hope to answer somewhat more convincingly: are banks more responsive to the central bank interest rates in slow growing environments? We start by identifying the banks that are particularly likely to be heavily invested in the "easy life." These are banks that, for historical reasons, have most of their branches in the states that are currently growing slower than the rest. Our hypothesis is that it is these banks that have a particularly strong reason to invest heavily in government securities, since in a slow-growing environment it is harder to identify really promising clients. They also probably have more "marginal" loans, that they are willing to cut and reduce (or not increase) when the interest rates paid to government bonds increases. It is therefore these banks that should be particularly responsive to changes in the interest rate paid by the government.

Data: The outcome we focus on is the ln(Credit/Deposit Ratio), at the end of March of each year, for 25 public sector and 20 private sector banks. Two minor public sector banks were excluded due to lack of data, while the new private sector banks were excluded for reasons of comparability. The data are from the Reserve Bank of India. For our measure of interest rate spread, we subtract from the SBI prime lending rate, the rate given as the weighted average of central government securities.

Specification: Defining $growth_{it} = \ln(SDP_{it}) - \ln(SDP_{i,t-1})$, we calculate average state growth rates as a moving average of the previous three years (i.e., $avgrowth_{it} = \sum_{t-3}^{t-1}(growth_{it})$. Bank environment growth is a weighted average of the growth rates in the states in which a bank operates:

$$bkgrowth_{bit} = \sum_{i \in states} \omega_{bi} * avgrowth_{bit}$$

where the weights ω_{bi} are the percentage of bank branches bank b had in state i in 1980: $\omega_{bi} = \frac{N_{bi}}{\sum_{s \in states} N_{bs}}$[7]

Results: We test this hypothesis using linear regression. To measure the effect of interest rates and growth environment faced by banks on lending, we estimate the following equation:

$$\begin{aligned} \ln(CD_{bit}) &= \alpha + \beta * bkgrowth_{bit} + \gamma^{+}(Spread_t * bkgrowth_{bit}) * I_{Spread_t>0} \\ &\quad + \gamma^{-}(Spread_t * bkgrowth_{bit}) * I_{Spread_t<0} + \theta_i + \psi_b + \delta_t + \varepsilon_{bit} \end{aligned} \tag{5}$$

where $I_{Spread_t>0}$ (resp. $I_{Spread_t<0}$) are indicator variables for whether the spread is positive (resp. negative)[8], bkgrowth$_{bit}$ is the bank growth environment index, ψ_b is a bank fixed effect, θ_i is a state fixed effect, and δ_t is a year fixed effect. Standard errors are adjusted for serial correlation.

While we see that the C/D is higher in states with more favorable growth rates, we are most interested in the coefficients γ^{-} and γ^{+}, which measure how banks in different growth environments differentially react to changes in the spread between the commercial lending rate.

[7] State Domestic Product data are from the CSO; interest rate and branch location data are from the RBI.

[8] Because a negative spread occurs only twice, and is a quite particular situation (in a perfectly flexible market, banks facing a negative spread should eliminate all credit from their portfolios), we allow a separate coefficient on (Spread$_t * avgrowth_{bit}$) when the spread is negative.

The negative and statistically significant coefficient on γ^+ suggests that banks in high-growth environments substitute towards government securities (away from loans) *less* when the spread falls. We interpret this to mean that banks in low growth states are more sensitive to government interest rates: because they face less attractive projects to finance, they are more likely to park money in government securities when government securities become more attractive.

Conclusion: The evidence seems to be consistent with the view that banks are especially inclined towards the easy life in states where lending is hard. This suggests that high rates on government securities tend to hurt the firms that are relatively marginal from the point of view of the banks, such as firms in slow growing states and smaller and less established firms.

4.3 The risk of default

As noted above, the average annual default rate in the sample of firms (from a particular public sector bank) studied in the Banerjee-Duflo papers discussed above, is about 2.5%. Column (1) of Table 7 reports the cumulative default rate for the firms in that sample that were already in the priority sector in 1997 (what we called small firms in section 2). We see that about 2.5% of the firms that we started with in 1997 become NPA every year.

Column (2) reports the same numbers for the firms that come into priority sector in 1997– what we called big firms in section 2. We see that the cumulative default rate for these firms is lower than that for the small firms in 1997 and remains lower after these firms are included in the priority sector in 1998. When most of these firms are once again dropped from the priority sector in 2000, the default rate remains lower but climbs and in 2002 is only slightly higher (1%) than that of the small firms. It is therefore rather implausible that the firms that got the new loans as a result of being included in the priority sector have a default rate that is so much higher than that of the average firm that making new loans is not worthwhile.

5 Conclusions: Policy Responses

Credit in India does not necessarily seem to flow to the people who have the greatest use for it. It seems that making lending rules more responsive to current profits and projections of future profits may be a way to both target better and guard against potential NPAs, largely because

poor profitability seems to be a good predictor of future default. But choosing the right way to include profits in the lending decision will not be easy. If a firm is and will continue to be unprofitable, it makes sense to for the bank to seek to wind up the firm. On the other hand, cutting off credit to a profitable firm suffering a temporary shock may push it into default. The difficulty lies in distinguishing the two. One solution may be to categorize firms into three groups: (1) Profitable to highly profitable firms. Here, lending should respond to profitability, with more profitable firms getting more credit. (2) Marginally profitable to loss-making firms that were recently highly profitable, but have been hit by a temporary shock. For these firms the existing rules for lending might work well. (3) Firms with a long track record of losses, or which have been hit by a negative permanent shock (e.g., removal of tariffs for a good in which China enjoys a substantial cost advantage). For these firms, lending should be discontinued, though in a way that offers enough to the firm that it prefers to cooperate rather than default. Of course it is not always going to be easy to distinguish permanent shocks from the temporary, but loan officers should use information from previous performance, as well as the experience of the industry as a whole.

If loan officers are corrupt, or afraid to act for fear of appearing corrupt, it may not be advisable to give them this additional responsibility, without changing the incentive structure they face. A number of small steps that may go some distance towards this goal. First, to avoid a climate of fear, there should be a clear separation between investigation of loans and investigations of loan officers. The loan should be investigated first (could the original sanction amount have made sense at the time it was given, were there obvious warning signs, etc.). Only if a prima facie case that the failure of the loan could have been predicted can be made should the loan officer know of the investigation. The authorization to investigate a loan officer should be based on the most objective available measures of the life-time performance of the loan officer across all the loans where he made decisions and weight should be given both to successes and failures. A loan officer with a good track record should be allowed a number of mistakes (and even suspicious looking mistakes) before he is open to investigation.

Banks should also create a division staffed by bankers with high reputations with a mandate to make some high risk loans. Officers posted to this division should be explicitly protected from investigation for loans made while in this division.

Giving banks a stronger incentive to lend by cutting the interest rate on government borrowing will also help. The evidence reported above is only suggestive, but it does indicate that lower government interest rates can have a strong effect on the willingness of bankers to make loans to the private sector.

The one reasonably effective incentive system now in place is the rule that banks have to lend to the priority sector—most public banks do lend the legally stipulated 40% to the priority sector. While it is argued that priority sector loans are an inefficient allocation of capital[9], our evidence suggests the contrary: priority-sector in our sample have very high marginal products of capital, and while they are slightly more likely to default, the amount of the default is smaller. There is therefore no reason to believe that abolishing the priority sector will improve bank performance substantially, and it may end up reinforcing the tendency of the banks make only conservative loans. There is evidence that targeted lending programs in the US are effective. (Zinman, 2002).[10]

We do think the eligibility criteria for priority sector loans could be rationalized. For example, based on the evidence above, we favor a higher limit for value of plant and machinery. However, the increase of the limit could be combined with a time limit for eligibility: after a certain number of years, firms should establish a reputation as reliable borrowers, and begin borrowing from the market. A priority sector client that has borrowed from a bank for some time without convincing the bank of its creditworthiness is perhaps not worth saving. Second, the size of the gap between the marginal product of capital and the interest rate suggests the possibility of letting banks charge substantially higher interest rates to the priority sector than they are currently permitted, making it more attractive to lend to the priority sector. This increase could be gradual, making it easier for the firm to endure early growing pains.

There is however a basic incentive problem in bank lending: to diversify risks, banks should be large, but in large banks it is difficult for a loan officer to have any significant stake in the profitability of the bank.[11] Therefore bank privatization, and in particular sale to large multinationals, is unlikely to solve the problem of under-lending, though it will probably help

[9] Joshi and Little (1994)

[10] This is not to defend the other concessions to the priority sector—in particular the reservation of specific goods for the priority sector.

[11] See Berger et al. (2001) and Stein (2001).

remove some of the most egregious examples of inaction and surely reduce the degree of overstaffing. It is probably also true that the public sector banks are more responsive to the directives to carry out social banking than private banks will be: most of the new private banks do not lend to the priority sector, instead placing an equivalent amount of money in low-return government bonds. This simply transfers the responsibility to identify and nurture new talent back to the government. Privatization without stricter enforcement of the requirement to lend to the priority sector will probably end up hurting the smaller firms. This is not to say that privatization is not a reasonable option, but rather that it should be accompanied by some efforts to reach out more effectively to the smaller and less well-established firms, not just on equity grounds, but also because these firms may have the highest returns on capital.

A possible step in this direction would be to encourage established reputable firms in the corporate sector as well as multinationals to set up small specialized companies whose only job is to lend to smaller firms in a particular sector (and possibly in particular locations). In other words these would be the equivalents of the many finance companies that do extensive lending all over India, but with links to a much bigger corporate entity and therefore creditworthiness. The banks would then lend to these entities at some rate that would be somewhat below the cost of capital (instead of doing priority sector lending) and these finance companies would then make loans to the firms in their domain, at a rate that is at most x per cent higher than their borrowing rates. By being small and connected to a particular industry, these finance companies would have the ability to acquire detailed knowledge of the firms in the industry and would have incentives to make loans that would appear adventurous to outsiders.

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Table 1: Are firms credit constrained?

Sample:	Complete sample	Sample with change in limit						No Change in Limit	
Dependent variables:	Any change in limit	$Log(loan_t)$ -$Log(loant\text{-}1)$	$Log(\text{interest rate})_t$ -$Log(\text{interest rate})_{t-1}$	$Log(turnover/limit)_{t+1}$ -$Log(turnover/limit)_t$	$Log(sales)_{t+1}$-$log(sales)_t$ all firms	$Log(sales)_{t+1}$-$log(sales)_t$ no substitution	$Log(profit)_{t+1}$ -$log(profit)_t$	$Log(sales)_{t+1}$ -$log(sales)_t$	$Log(profit)_{t+1}$ -$log(profit)_t$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PANEL A: OLS									
post	-0.003	-0.115	-0.008	-0.115	0.021	0.005	0.172	0.030	-0.316
	(.049)	(.069)	(.014)	(.366)	(.093)	(.096)	(.201)	(.047)	153
big	-0.043	-0.218	-0.002	-0.105	-0.199	-0.191	-0.645	0.077	0.058
	(.053)	(.079)	(.014)	(.147)	(.094)	(.101)	(.219)	(.063)	(.309)
post*big	-0.008	0.244	0.012	0.267	0.209	0.184	0.752	0.052	0.034
	(.078)	(.099)	(.019)	(.355)	(.095)	(.099)	(.387)	(.109)	(.531)
# Observations	489	155	141	39	116	105	107	253	209
PANEL B: TWO STAGE LEAST SQUARES									
$Log(loan_t)$-Log(loant-1)					0.896		2.713		
					(.463)		(1.29)		
# Observations					116		107		

Note

1-OLS regressions in panel A, 2SLS regressions using BIG*POST in panel B. The regression in panel B controls for BIG and POST dummies.

2- Standard errors (corrected for heteroskedasticy and clustered at the sector level) are in parentheses below the coefficients

3- Source: authors' calculation from account level data from one bank.

Table 2: comparison of granted limit, maximum authorized, and previous limit

	granted limit vs limit on turnover basis		granted limit vs official policy		granted limit vs previous granted limit		official policy vs previous official policy	
smaller	255	0.62	542	0.78	22	0.04	153	0.35
same	81	0.20	9	0.01	322	0.64	6	0.01
larger	74	0.18	142	0.20	158	0.31	281	0.64
same, 1997	23	0.25	2	0.01	37	0.53	0	0.00
same, 1998	25	0.21	2	0.01	109	0.68	2	0.01
same, 1999	27	0.16	4	0.02	156	0.70	4	0.02

Source: authors' calculation from account level data from one bank

Table 3:
Determinants of working capital limit and interested rate

	Dependent variable				
	log(granted limit)			Interest rate	
Independent variables	(1)	(2)	(3)	(4)	(5)
log(previous granted limit)	0.757	0.540	0.455	-0.198	-0.260
	(.04)	(.059)	(.084)	(.108)	(.124)
previous interest rate				0.823	0.832
				(.038)	(.041)
log(maximum limit as per bank's rule)	0.256				
	(.042)				
log(ltb), calculated by the bank		0.145		-0.019	
		(.036)		(.102)	
log(ltb, calculated by us)			0.102		-0.025
using turnover projected by bank			(.025)		(.09)
log(LWC)		0.240	0.279	0.091	0.083
		(.046)	(.061)	(.083)	(.084)
log(profit/asset)		0.021	-0.001	-0.048	-0.036
		(.017)	(.021)	(.043)	(.044)
dummy for negative profit		-0.037	0.053	-0.045	-0.037
		(.115)	(.129)	(.272)	(.266)
log(tnw/debt)		-0.104	-0.112	-0.064	-0.087
		(.029)	(.032)	(.076)	(.07)
log(asset)		0.080	0.143	0.063	0.168
		(.056)	(.065)	(.104)	(.118)
log(interest earned/granted limit) for previous year			0.005		
			(.037)		
constant	0.011	-0.009	-0.021	2.547	2.180
	(.079)	(.154)	(.195)	(.749)	(.843)
r2	0.952	0.955	0.962	0.878	0.881
n	298	241	145	198	194

Notes:
1-All variables in logarithm
2-Standard errors (corrected for clustering at the account level), in parentheses below the coefficient
3-the maximum limit as per bank's rule is max(ltb calculated by bank, lwc)
4-Source: authors' caculation from account level data from one bank

Table 4: Summary Statistics for Corruption Study

Panel A: Credit Data

January 1992 (Real 1984 Rs.)

	Mean	Median
Loans, Cash Credit, and Overdrafts	156943	74942
	(214331)	
Log(Loans, Cash Credits and overdrafts)	16.98	16.65
	(0.830)	

January 2000 (Real 1984 Rs.)

	Mean	Median
Loans, Cash Credit, and Overdrafts	296060	166431.2
	(382644)	
Log(Loans, Cash Credits and overdrafts)	12.24	12.02
	(0.753)	

Sample Size

Number of Public Sector Banks	27
Number of Months (Jan. 1992 - May 2001)	111
Number of Observations	2997

Note: Standard deviations are given in parentheses
Credit data from the Reserve Bank of India

Panel B: Central Vigilance Committee Data

Yearwise Distribution of Cases

	1993	1994	1995	1996	1997	1998	1999	2000
Advice	1	4	4	6	10	10	7	9
Order	1	3	2	6	6	7	9	3
Total	2	7	6	12	16	17	16	12

Distribution of Content of CVC Advice and Orders (Percentage)

	CVC Advice	CVC Order
Action		
Prosecution	12.2	
Charge Sheet Filed		1.1
Information Awaited		15.7
Dismissal of Employee	18.9	24.7
Compulsory Retirement	5.6	4.5
"Major Penalty"	45.6	2.3
Pay Reducation		
Unspecified reduction in Pay	4.4	4.49
Reduction in Pay 1 Grade	2.2	22.5
Reduction in Pay 2 Grades	7.8	2.3
Reduction in Pay 3 Grades	1.1	4.5
Reduction in Pay 4 Grades	2.2	16.9
Reduction in Pay 5 Grades		1.1

Table 5: The Effect of Vigilance Activity on credit

Indicator for Vigilance Activity	(1)	(2)	(3)
Indicator for fraud in:			
Contemporaneous	-0.055	-0.040	-0.037
	(0.027)	(0.019)	(0.019)
Indicators for Vigilance Activity in Past Months			
Three Months Back		-0.039	-0.032
		(0.018)	(0.016)
Six Months Back		-0.031	-0.023
		(0.016)	(0.014)
Twelve Months Back		-0.036	-0.018
		(0.016)	(0.012)
Eighteen Months Back			-0.028
			(0.013)
Twenty-Four Months Back			-0.012
			(0.013)
Thirty-Six Months Back			-0.014
			(0.015)
Forty-Eight Months Back			-0.022
			(0.028)
Month Fixed Effects	Y	Y	Y
Bank Fixed Effects	Y	Y	Y
Dependent Variable: Log Credit			

Notes

1 - Columns (1)-(3) present panel regressions of log credit extended by twenty-seven public sector banks, over a period of 111 months, giving 2997 observations. Standard errors (robust to heteroskedasticity and serial correlation) are reported in parentheses.

2 - The independent variable of interest is a dummy variable indicating whether the CVC had charged or punished an officer of a particular bank in a particular month.

3 - Column (1) displays the results of regressing log credit on bank and year fixed effects, as well as a dummy for whether there was vigilance activity in a particular bank that month.

4 - Columns (2) and (3) examine how the effect persists over time. In column (2), log credit is regressed on dummies for whether there was vigilance activity in a bank for the previous one, two, three, …, twelve months. For readability, only the coefficients for contemporaneous, three, six, and twelve months are reported. Column three traces the effects over the past 48 months: again, only coefficients for the contemporaneous effect, and months 3, 6, 12, 18, 24, 36, and 48 are reported.

5- Source: Authors' cacluation from data from the Reserve bank of India and Central Vigilance Commission

Table 6: Government Securities Interest Rate and Bank Credit

	Synthetic Growth Index	
Time Period	1985-2000	1992-2000
	(1)	(2)
Growth	2.195	2.634
	(0.970)	(1.165)
Spread * Growth, when spread > 0	-0.257	-0.219
(γ+ in equations 5 and 6)	(0.104)	(0.103)
Spread * Growth, when spread < 0	-0.079	0.473
(γ- in equations 5 and 6)	(0.791)	(0.562)
R^2	0.71	0.63
Nobs	402	710
Year Fixed Effects	Yes	Yes
State Fixed Effects	No	No
Bank Fixed Effects	Yes	Yes

Notes: Standard errors (robust to heteroskedasticity and serial correlation) are in parentheses.
The dependent varaible in all regressions is the natural log of the credit deposit ratio.
Data are a panel of 25 public sector, and 20 private sector banks, over the period 1985 to 2000.
The growth varaible in columns (1) and (2) are a weighted average of the growth rates
of states in which each bank operates. Data are described in the text.
Source: authors' calculation from Reserve Bank of India data.

Table 7:
Cumulative fraction of NPA for clients with investments below 3 crores, one bank.

	Cumulative fraction NPA Size of the firm	
	Small	Big
	(1)	(2)
1997	0	0.011
1998	0.026	0.011
1999	0.052	0.0229
2000	0.078	0.057
2001	0.118	0.0919
2002	0.125	0.137

Note:
Source: author's calculations from lngitudinal data from one public-sector bank, using accounts active in 1997.