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## Banking Reform in India

Measured by share of deposits, 83 percent of the banking business in India is in the hands of state or nationalized banks, banks owned by the government in some increasingly less clear-cut way. Moreover, even non-nationalized banks are subject to extensive regulations on whom they can lend to, in addition to the more standard prudential regulations.

Government control over banks has always had its fans, ranging from Lenin to Gerschenkron. Although some advocates have emphasized the political importance of public control over banking, most arguments for nationalizing banks are based on the premise that profit-maximizing lenders do not necessarily deliver credit where the social returns are highest. The Indian government, when nationalizing all the larger Indian banks in 1969, argued that banking was “inspired by a larger social purpose” and must “subserve national priorities and objectives such as rapid growth in agriculture, small industry and exports.”<sup>1</sup>

A body of direct and indirect evidence now shows that credit markets in developing countries often fail to deliver credit where its social product might be the highest, and both agriculture and small industry are often mentioned as sectors that do not get their fair share of credit.<sup>2</sup> If nationalization

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1. From the “Bank Company Acquisition Act of 1969.” Quoted by Burgess and Pande (2003).

2. See Banerjee (2003) for a review of the evidence.

succeeds in pushing credit into these sectors, as the Indian government claimed it would, it could indeed raise both equity and efficiency.

The cross-country evidence on the impact of bank nationalization, however, is not encouraging. For example, Rafael La Porta and colleagues find in a cross-country setting that government ownership of banks is negatively correlated with both financial development and economic growth.<sup>3</sup> They interpret this as support for their view that the potential benefits of public ownership of banks, and public control over banks more generally, are swamped by the costs that come from the agency problems it creates—problems such as cronyism, which leads to the deliberate misallocation of capital; bureaucratic lethargy, which leads to less deliberate but perhaps equally costly errors in the allocation of capital; and inefficiency in mobilizing savings and transforming them into credit.

Interpreting this type of cross-country analysis is never easy, especially in the case of something like bank nationalization, which is typically part of a package of other policies. Microeconomic studies of the effect of bank nationalization are rare. One exception is Atif Mian's examination of the 1991 privatization of a large public bank in Pakistan.<sup>4</sup> He finds that the privatized bank did a better job both at choosing profitable clients and monitoring existing clients than the commercial banks that remained public. Studying a liberalization episode in France, Marianne Bertrand and colleagues find that after deregulation banks responded more to profitability when making lending decisions, and that borrowing firms were more likely to exit or restructure following a negative shock.<sup>5</sup>

In a 2003 paper we used micro data from a nationalized bank to evaluate the effectiveness of the Indian banking system in delivering credit.<sup>6</sup> Our conclusion was that the Indian financial system is characterized by under-lending in the sense that many firms could earn large profits if they were given access to credit at the current market prices.

This paper builds on previous work of our own and of others to assess the role of the Indian government in the banking sector. We begin by providing a brief history of banking in India. Next we investigate the quality of intermediation. We first present evidence of substantial under-lending in India. To understand what role public ownership of banks may play in under-lending, we identify differences between public and private banks in the sectoral allocation of credit. In particular, we focus on whether being

3. La Porta, Lopez-de-Silanes, and Shleifer (2002).

4. Mian (2000).

5. Bertrand, Schoar, and Thesmar (2003).

6. Banerjee, Cole, and Duflo (2003).

nationalized has made these banks more responsive to what the Indian government wants them to do. We report results, based on work by Shawn Cole, showing that on many of the declared objectives of “social banking,” with the exception of agricultural lending, the private banks were no less responsive than the comparable nationalized banks.<sup>7</sup> And we compare the performance of public and private banks as financial intermediaries and conclude that the public banks have been less aggressive than private banks in lending, in attracting deposits, and in setting up branches, at least since 1990.

To understand under-lending, we dig deeper into the lending processes of nationalized banks and find that official lending policy is very rigid. Moreover, loan officers do not appear to use what little flexibility they have. Bankers in the public sector appear to have a preference for what we may call passive lending. To understand why, we examine the incentives and constraints faced by public loan officers. We focus on whether vigilance activity impedes lending and whether public sector banks prefer to lend to the government, rather than private firms.

Next we compare the performance of public and private banking in two other areas. First, we examine how nationalization of banks has affected the availability of bank branches in rural areas and find that, if anything, nationalization appears to have inhibited the growth of rural branches. Second, we address the sensitive issue of nonperforming assets and bailouts. While the data set we have now is rather sparse, it appears that the bailouts of the public banks have proved more expensive for the government, but once we control for differences in size between the public and private banks, this conclusion is less clear-cut.

We conclude with a short discussion of the implications of these results for the future of banking reform.

## Background

India has a long history of both public and private banking. Modern banking in India began in the eighteenth century, with the founding of the English Agency House in Calcutta and Bombay. In the first half of the nineteenth century, three presidency banks were founded. After the 1860 introduction of limited liability, private banks began to appear, and foreign banks entered the market. The beginning of the twentieth century saw the

7. Cole (2004).

introduction of joint stock banks. In 1935 the presidency banks were merged to form the Imperial Bank of India, subsequently renamed the State Bank of India. That same year, India's central bank, the Reserve Bank of India (RBI), began operation. Following independence, the RBI was given broad regulatory authority over commercial banks in India. In 1959 the State Bank of India acquired the state-owned banks of eight former princely states. Thus, by July 1969, approximately 31 percent of scheduled bank branches throughout India were government-controlled as part of the State Bank of India.

India's postwar development strategy was in many ways a socialist one, and the government felt that banks in private hands did not lend enough to those who needed it most. In July 1969, the government nationalized all banks whose nationwide deposits were greater than Rs. 500 million, nationalizing 54 percent more of the branches in India and bringing the total share of branches under government control to 84 percent.

Prakesh Tandon, a former chairman of the Punjab National Bank (nationalized in 1969) describes the rationale for nationalization as follows:

Many bank failures and crises over two centuries, and the damage they did under "laissez faire" conditions; the needs of planned growth and equitable distribution of credit, which in privately owned banks was concentrated mainly on the controlling industrial houses and influential borrowers; the needs of growing small-scale industry and farming regarding finance, equipment and inputs; from all these there emerged an inexorable demand for banking legislation, some government control and a central banking authority, adding up, in the final analysis, to social control and nationalization.<sup>8</sup>

After nationalization, the Indian banking sector expanded in breadth and scope at a rate perhaps unmatched by any other country. Indian banking has been remarkably successful at achieving mass participation. Since the 1969 nationalizations, more than 58,000 bank branches have opened in India. As of March 2003, these new branches had mobilized more than Rs. 9 trillion in deposits, the overwhelming majority of deposits in Indian banks.<sup>9</sup> This rapid expansion is attributable to a policy requiring banks to open four branches in unbanked locations for every branch opened in banked locations.

Between 1969 and 1980, private branches grew more quickly in number than public banks, and on April 1, 1980, they accounted for approximately 17.5 percent of bank branches in India. In April 1980, the government undertook a second round of nationalization, placing under its control the

8. Tandon (1989, p. 198).

9. Reserve Bank of India, *Statistical Tables Relating to Banks in India* (2003).

six private banks whose nationwide deposits were above Rs. 2 billion, or a further 8 percent of bank branches, leaving approximately 10 percent of bank branches in private hands. That share stayed fairly constant between 1980 and 2000.

Nationalized banks remained corporate entities, retaining most of their staff, with the exception of the boards of directors, who were replaced by appointees of the central government. The political appointments included representatives from the government, industry, and agriculture, as well as the public. (Equity holders in the national bank were reimbursed at approximately par.)

Since 1980, there has been no further nationalization, and indeed the trend appears to be reversing itself, as nationalized banks are issuing shares to the public in what amounts to a step toward privatization. The considerable accomplishments of the Indian banking sector notwithstanding, advocates for privatization argue that privatization will lead to several substantial improvements.

Recently, the Indian banking sector has witnessed the introduction of several "new private banks," either newly founded or created by existing financial institutions. The new private banks have grown quickly in the past few years, and one is now the nation's second largest bank. India has also seen the entry of more than two dozen foreign banks since the commencement of financial reforms in 1991. Although we believe both these types of banks deserve study, our focus here is on the older private sector and on nationalized banks, because they represent the overwhelming majority of banking activity in India.

The Indian banking sector has historically suffered from high intermediation costs, in no small part because of the staffing at public sector banks. As of March 2002, nationalized banks had 1.17 crore of deposits per employee, as against 2.05 crore per employee for private sector banks. As with other government-run enterprises, corruption is a problem for public sector banks. In 1999, 1,916 cases of possible corruption attracted attention from the Central Vigilance Commission. Although not all these cases represent crimes, the investigations themselves may have a harmful effect if bank officers fear that approving any risky loan will inevitably lead to scrutiny. Advocates for privatization also criticize public sector banking as unresponsive to credit needs.

In the rest of the paper, we use recent evidence on banking in India to shed light on the relative costs and benefits of nationalized banks. Throughout this exercise, it is important to bear in mind that the Indian banking sector is going through something like a transformation. Thus, evaluating

its performance using historical data requires caution. Nevertheless, data from the past are all we have, and change is not so rapid as to invalidate the lessons learned.

## **Quality of Intermediation**

In this section, we carefully examine how credit is allocated in India. We focus initially on small-scale industries (SSI), because small firms typically turn to banks for external financing and because providing credit to this sector is an important objective of Indian banking policy. Finding that small firms are indeed constrained, we then ask how bank nationalization has affected the flow of credit to small-scale industry and other sectors. Finally, we take a longer view of financial development, comparing how quickly public sector banks grew compared with their private counterparts.

### *The Problem of Under-Lending*

A firm is getting too little credit if the marginal product of its capital is higher than the rate of interest it is paying on its marginal rupee of borrowing. A firm's inability to raise enough capital is a problem involving not merely its own bank but the market as a whole. Under-lending therefore is a characteristic of the entire financial system. Although we focus in this paper on the clients of a single public sector bank, if these firms are getting too little credit from that bank, they should in theory have the option of going elsewhere for more credit. If they do not or cannot exercise this option, the market cannot be doing what, in its idealized form, we would have expected it to do.

We know, however, that the Indian financial system does not function as the ideal credit market might. Most small or medium firms have a relationship with one bank, which they have built up over some time. They cannot expect to walk into another bank and get as much credit as they want. For that reason, their ability to finance investments they need to make does depend on the willingness of that one bank to finance them. In this sense the results we report below might very well reflect the specificities of the public sector banks, or even the one bank that was kind enough to share its data with us, though given that it is seen as one of the best public sector banks, it seems unlikely that we would find much better results in other banks in its category. On the other hand, we do not have comparable data from any private bank and therefore cannot tell whether under-lending is as much of

a problem for private banks. We will, however, later report some results on the relative performance of public and private banks in terms of overall credit delivery.

Our identification of credit-constrained firms is based on the following simple observation: if a firm that is *not* credit constrained is offered extra credit at a rate below what it is paying on the market, then the best way to use the new loan must be to pay down the firm's current market borrowing, rather than to invest more. Because any additional investment by a firm that is not credit constrained will drive the marginal product of capital below what the firm is paying on its market borrowing, it follows that such a firm will expand its investment in response to the availability of additional subsidized credit only if it has no more market borrowing. By contrast, a firm that is credit constrained will always expand its investment to some extent.

A corollary to this prediction is that for unconstrained firms, growth in revenue should be slower than the growth in subsidized credit. This is a direct consequence of the fact that firms are substituting subsidized credit for market borrowing. Therefore, if these growth rates are the same, the firm must be credit constrained. Of course, revenue could increase more slowly than credit even for nonconstrained firms, if the firm faces declining marginal returns to capital.

These predictions are more robust than the traditional way of measuring credit constraints as the excess sensitivity of investment to cash flow.<sup>10</sup> Our approach inscribes itself in a literature that tries to identify specific shocks to wealth in order to identify credit constraints.<sup>11</sup>

In an earlier paper, two of us (Banerjee and Duflo) tested these predictions by taking advantage of a recent change in the "priority sector" rules: all banks in India are required to lend at least 40 percent of their net credit to the priority sector, which includes small-scale industry, at an interest rate no more than 4 percentage points above their prime lending rate.<sup>12</sup> Banks that do not satisfy the priority sector target are required to lend money to specific government agencies at low rates of interest. In January 1998, eligibility for inclusion in the small-scale industry category was expanded, and the limit on a firm's total investment in plants and machinery 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;

10. See Bernanke and Gertler (1989), Fazzari, Hubbard, and Petersen (1998), and the criticism in Kaplan and Zingales (2000).

11. See, *inter alia*, Blanchflower and Oswald (1998), Lamont (1997).

12. Banerjee and Duflo (2003).

we use firms that were already eligible as a control. The results from our analysis are reported briefly below.

*Data:* Our data are from one of the better-performing Indian public sector banks. The bank's loan folders report on profit, sales, credit lines and utilization, and interest rates, as well as all numbers that the banker was required to calculate (for example, his projection of the bank's future turnover and his calculation of the bank's credit needs) in order to determine the amount to be lent. We record these and will use them in the analysis described in the next section. We have data on 253 firms (including 93 newly eligible firms); for 175 of these firms, the data are available for the entire 1997 to 1999 period.

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

$$(1) \quad y_{it} - y_{it-1} = \alpha_y BIG_t + \beta_y POST_t - \gamma_y BIG * POST_t + \varepsilon_{yit}$$

with  $y$  taking the role of the various outcomes of interest (credit, revenue, profits, and so forth) 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. Because  $y$  is always a growth rate, this is, in effect, a triple difference. We can allow small firms and big firms to 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  $POST * BIG$  as an instrument for credit. We will present the corresponding instrumental variable regressions.

*Results:* The change in the regulation certainly had an impact on who got priority sector credit. The credit limit granted to firms below Rs. 6.5 million in plant and machinery (henceforth, small firms) grew by 11.1 percent during 1997, while that granted to firms between Rs.6.5 million and Rs. 30 million (henceforth, big firms) grew by 5.4 percent. In 1998, after the change in rules, small firms had 7.6 percent growth while the big firms had 11.3 percent growth. In 1999, both big and small firms had about the same growth, suggesting they had reached the new status quo.

This is confirmed when we estimate equation 1 using bank credit as the outcome. The result is presented in column 2 of table 1 for the entire sample of firms. The coefficient of the interaction term  $POST * BIG$  is 0.095,

**TABLE 1. Regressions Estimating the Effect of the 1998 Reform of Bank Regulation on Changes in Bank Credit to Firms<sup>a</sup>**

Independent variable	Sample and dependent variable <sup>b</sup>				
	Whole sample		Sample with change in credit limit		
	Dummy for any change in limit	Change in bank lending to firm	Change in bank lending to firm	Change in interest rate to firm	Change in firm utilization of credit limit
<i>POST</i> <sup>c</sup>	0.000 (0.05)	-0.034 (0.026)	-0.115 (0.074)	-0.007 (0.015)	-0.030 (0.336)
<i>BIG</i> <sup>d</sup>	-0.043 (0.052)	-0.059 (0.028)	-0.218 (0.088)	-0.002 (0.014)	0.257 (0.362)
<i>POST * BIG</i>	-0.022 (0.087)	0.095 (0.033)	0.271 (0.102)	0.009 (0.02)	-0.128 (0.458)
No. of observations	487	487	155	141	44

Source: Authors' regressions using data on client firms of a public sector bank in India.

a. Each column reports regression coefficients for a single regression using ordinary least squares. Standard errors, corrected for heteroskedasticity and for clustering at the sectoral level, are in parentheses.

b. All dependent variables (except in the first column) are calculated as differences in logarithms (for example, the logarithm of lending in the current period minus the logarithm of lending in the previous period).

c. Dummy variable taking a value of 1 when the year is 1998 or later, following the change in regulation on lending to the priority sector.

d. Dummy variable taking a value of 1 when the firm has plant and machinery valued at more than Rs. 6.5 million.

with a standard error of 0.033. Column 1 estimates the probability that a firm's credit limit was changed: the coefficient on *POST \* BIG* is close to zero and insignificant, suggesting that the reform did not affect which firm's limits were changed. This corresponds to the general observations that whether a firm's file is brought out for a change in limit responds not to the needs of the firm, but to internal dynamics of the bank. We use this fact to partition the sample into two groups on the basis of whether there was a change in the credit limit: we use the sample where there was no change in limit as a "placebo" group, where we can test our identification assumption. Finally, column 3 gives the estimated impact of the reform on loan size for firms whose limit was changed: the coefficient of the interaction *POST \* BIG* is 0.27, with a standard error of 0.10.

This increase in credit was not accompanied by a change in the rate of interest (column 4). It did not lead to reduction in the rate of utilization of the limits by the big firms (column 5): the ratio of total turnover (the sum of all debts incurred during the year) to credit limit is not associated with the interaction *POST \* BIG*. The additional credit limit thus resulted in an increase in bank credit utilization by the firms.

**TABLE 2. Regressions Estimating the Effect of Priority Sector Reform on Firm Sales, Sales-to-Loans Ratios, and Profits<sup>a</sup>**

Regression	Dependent variable and sample		
	Change in firm sales <sup>b</sup>		
	Complete sample	Sample without credit substitution	Change in firm profits <sup>b</sup>
<i>Reduced-form estimates</i>			
Sample with change in credit limit			
Coefficient on <i>POST</i> * <i>BIG</i>	0.194	0.168	0.538
Standard error	(0.106)	(0.118)	(0.281)
No. of observations	152	136	141
Sample with no change in credit limit			
Coefficient on <i>POST</i> * <i>BIG</i>	0.007	0.022	0.280
Standard error	(0.074)	(0.081)	(0.473)
No. of observations	301	285	250
Whole sample			
Coefficient on <i>POST</i> * <i>BIG</i>	0.071	0.071	0.316
Standard error	(0.068)	(0.069)	(0.368)
No. of observations	453	421	391
<i>Instrumental variables estimates</i>			
Sample with change in credit limit			
Estimate for change in lending <sup>c</sup>	0.75		1.79
Standard error	(0.37)		(0.94)
No. of observations	152		141

Source: Authors' regressions using data on client firms of a public sector bank in India.

a. Dummy variables *POST* and *BIG* are defined as in table 1. Standard errors, corrected for heteroskedasticity and for clustering at the sectoral level, are in parentheses.

b. Changes in sales and in profits are calculated as differences in logarithms from the previous to the current period.

c. Calculated as the difference in logarithms from the previous to the current period.

Table 2 presents the impact of this increase in credit on sales and profits. The coefficient of the interaction *POST* \* *BIG* in the sales equation in the sample where the limit was increased is 0.19, with a standard error of 0.11 (column 1). By contrast, in the sample where there was no increase in limit, the interaction *POST* \* *BIG* is close to zero (0.007) and insignificant (column 1, line 2), which suggests that the sales result is not driven by a failure of the identification assumption. The coefficient of the interaction *POST* \* *BIG* is 0.27 in the credit regression and 0.19 in the sales regression: thus, sales increased almost as fast as loans in response to the reform. This is an indication that there was little or no substitution of bank credit for nonbank credit as a result of the reform and thus that firms are credit constrained.

Additional evidence is provided in column 2. We restrict the sample to firms that have a positive amount of borrowing from the market both before

and after the reform and thus have not completely substituted bank borrowing for market borrowing. In this sample as well, we obtain a positive and significant effect of the interaction  $POST * BIG$ , indicating that these firms must be credit constrained.

In column 3, we present the effect of the reform on profit. Because our dependent variable is the logarithm of profit, we can estimate the impact only on firms whose profits were positive. The effect is even bigger than that on sales: 0.54, with a standard error of 0.28. Here again, we see no effect of the interaction  $POST * BIG$  in the sample without a change in limit (line 2), which lends support to our identification assumption.

The large effect on profit is not sufficient to establish the presence of credit constraints: even unconstrained firms should see profits increase when they gain access to subsidized credit, because they would substitute cheaper capital for more expensive capital. However, if firms were not expanding, we should not expect to see sales (column 1) or costs (not reported) expand as well.

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 1 and 3 are presented in the bottom panel of table 2. Note that the coefficient in column 1 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 0.75, with a standard error of 0.37. The effect of working capital on sales is very close to 1, a result that would imply that there cannot be an equilibrium without credit constraint.

The IV estimate of the impact of bank credit on profit is 1.79, though again the sample is limited to firms with positive profits. The estimate is substantially greater than 1, which suggests that the technology has a strong fixed-cost component. However, these coefficients also allow us to estimate the effect of credit expansion on profits.

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 Rs. 86,800. Therefore an increase of Rs. 1,000 in the loan corresponds to a 1.15 percent increase in loans. Taking 1.79 as the estimate of the effect of the log increase in loan on log increase in profit, an increase of Rs. 1,000 in lending causes a 2 percent increase in profit. At the mean profit (which is Rs. 36,700), this would correspond to an increase in profit of Rs. 756.<sup>13</sup>

13. This estimate may be affected by the fact that the firms with negative profits are dropped from the sample. We have also computed the estimate of the marginal product of capital using data on sales and cost instead of using profits directly. We found that an increase of Rs. 1,000 in the loans leads to an increase of Rs. 730 in profits.

A last piece of important evidence is whether big firms become more likely to default than small firms after the reform: the increase in profits (and sales) may otherwise reflect more risky strategies pursued by the large firms. To answer this question, we collected additional data on the firms based in the Mumbai region (138 firms, a bit over half the sample). In particular, we collected data on whether any of these firms' loans had become nonperforming assets (NPA) in 1999, 2000, or 2001, or were NPA before 1999. The number of NPAs is disturbingly large (consistent with the high rate of NPAs in Indian banks), but large and small firms are equally likely to have a non-performing loan: 7.7 percent of the big firms and 7.29 percent of the small firms (who were not already NPA) defaulted on their loans in 2000 or 2001. Among the firms in Mumbai, 2.5 percent of the large firms and 5.96 percent of the small firms had defaulted between 1996 and 1998. The fraction of firms that had defaulted thus increased a little bit more for large firms, but the difference is small and not significant. The increase in credit did not cause an unusually large number of big firms to default.

Default rate and the higher cost of lending to the firms in the priority sector are not sufficient to narrow significantly the gap between our estimate of the rate of returns to capital and the interest rate. Using these estimates and our previous estimates of the cost of lending to small firms (from previous work<sup>14</sup>), we compute that the interest rate banks should charge to these firms is close to 22 percent rather than the 16 percent they are charging on average. This means that the gap between the social marginal product of capital and the interest rate paid by firms is at least 66 percent. These results provide clear evidence of very substantial underlending: 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.

These data do not tell us anything directly about the efficiency of allocation of capital across firms. However, the IV estimate of the effect of loans on profit is strongly positive, while the OLS estimate is not different from zero. In other words, firms that have higher growth in loans do not generate faster growth in profits, suggesting that normally banks do not target loan enhancements to the most profitable firms. This is consistent with

14. Banerjee and Duflo (2001).

evidence reported in A. Das-Gupta,<sup>15</sup> that the interest rate paid by firms and by implication the marginal product of capital varies enormously within the same sub-economy.<sup>16</sup> It is also consistent with the more direct evidence in Banerjee and Kaivan Munshi showing substantial variation in the productivity of capital in the knitted garment industry in Tirupur.<sup>17</sup> Furthermore, although we have no direct data on this point, bankers' lore suggests that the firms that have relatively easy access to credit tend to be the bigger and longer established firms.

The under-provision of credit to small-scale industry was one of the key reasons cited for nationalization in 1969: thus, it might in fact be the case that although the public sector banks provide relatively little credit to small-scale industry firms, private banks are even worse. In the next subsection we examine the effect of bank ownership on bank allocation of credit.

### *Bank Ownership and Sectoral Allocation of Credit*

As noted, an important rationale for Indian bank nationalizations was to direct credit toward sectors the government thought were underserved, including small-scale industry, as well as agriculture and backward areas. Ownership was not the only means of directing credit: the Reserve Bank of India issued guidelines in 1974 requiring both public and private sector banks to provide at least one-third of their aggregate advances to the priority sector by March 1979. In 1980, the RBI announced that this quota would increase to 40 percent by March 1985. It also specified sub-targets for lending to agriculture and weaker sectors within the priority sector. In this section we focus on how ownership affected credit allocation in this situation with both public and private banks facing the same regulation.

Comparing nationalized and private banks is never easy: banks that fail are often merged with healthy nationalized banks, which makes the comparison of nationalized banks and non-nationalized banks close to meaningless. The Indian nationalization experience of 1980 represents a unique chance to learn about the relationship between bank ownership and bank lending behavior. The 1980 nationalization took place according to a strict policy rule: all private banks whose deposits were above a certain cutoff were nationalized.<sup>18</sup> Both the banks that were nationalized under this rule

15. Das-Gupta (1989).

16. Banerjee (2003) summarizes this evidence.

17. Banerjee and Munshi (2004).

18. Although the 1969 nationalization was larger and also induced a discontinuity, we do not use it because many of the banks just below the cut-off in 1969 were nationalized in 1980.

and those that were not continued to operate in the same environment and face the same regulations. Therefore they ought to be directly comparable.

Banks nationalized in 1980, however, are larger than the banks that remained private. If size influences bank behavior, it would be incorrect to attribute all differences between nationalized and private sector banks to nationalization. In this section, based on work by Cole, we adopt an approach in the spirit of regression discontinuity design and compare banks just above the 1980 cutoff with those just below it, while controlling for bank size in 1980.<sup>19</sup> The idea behind this comparison is that the relationship between size and behavior should not change dramatically around the cutoff, unless nationalization itself causes changes in bank behavior. This will allow for credible causal inference on the role of bank ownership on bank behavior.

To get a sense of the magnitude of lending differences among bank types, we first divide the banks into five groups, based on their size in 1980: State Bank of India and its affiliates, large nationalized banks (nationalized in 1969), "marginal" nationalized banks (nationalized in 1980), "marginal" private banks (relatively large, but just too small to be nationalized in 1980), and small private banks. Because the geographic districts in which banks are located vary (soil quality, rural population, and so forth) and face different economic shocks, we focus here on comparing differential bank behavior within each district. Our outcomes of interest include average loan size, residual interest rate, and share of bank lending to the following areas: agriculture, rural credit, small-scale industry, government credit, and "trade, transport, and finance."<sup>20</sup> The unconditional, India-wide means of these variables are given in column 1 of table 3. To estimate bank-group effects, we regress credit outcome variables for each bank group  $g$  in district  $d$  on  $D$  district dummy variables and  $BG_1, \dots, BG_G$  bank group dummy variables. The State Bank of India group is the omitted category. Specifically, we estimate:

$$(2) \quad y_{b,d,t} = \sum_{i=1}^G \gamma_i BG_i + \sum_{i=1}^G \delta_i \text{District}_i + \varepsilon_{b,d,t}$$

The estimated bank group effects,  $\hat{\gamma}_1, \dots, \hat{\gamma}_G$ , give the deviation in average share of credit of each bank from the average share of credit of the State Bank

19. Cole (2004).

20. The residual interest rate is obtained by regressing the interest rate on a wide range of control variables: an indicator variable for small scale industry, borrower occupation dummies (at the three-digit level), district fixed effects, size of loan, an indicator for whether the borrower is from the public or private sector, and dummies indicating whether the loan is given in a rural, urban, semi-urban, or urban area.

**TABLE 3. Regressions Estimating Differences in Loan Size and Sectoral Lending by Type of Bank**

Measure	Estimated bank group effects <sup>a</sup>					Test of difference <sup>b</sup>
	Unconditional mean	Large nationalized banks	Marginal nationalized banks	Marginal private sector banks	Small private sector banks	
Average loan size (thousands of rupees) <sup>c</sup>	48.32	-6.43 (1.27)	8.35 (2.68)	35.31 (7.37)	58.50 (9.21)	13.94 (0.00)
Sectoral share of total lending <sup>d</sup>						
Agriculture	0.11	0.00 (0.01)	-0.08 (0.01)	-0.13 (0.01)	-0.17 (0.01)	23.65 (0.00)
Small-scale industry	0.09	-0.02 (0.00)	-0.02 (0.01)	-0.04 (0.01)	-0.02 (0.01)	8.35 (0.00)
Rural areas	0.12	0.08 (0.01)	-0.03 (0.01)	-0.07 (0.01)	-0.12 (0.01)	4.38 (0.04)
Government enterprises	0.03	-0.01 (0.00)	-0.02 (0.00)	-0.02 (0.00)	-0.03 (0.00)	3.70 (0.05)
Trade, transport, and finance	0.21	0.01 (0.00)	0.07 (0.01)	0.13 (0.01)	0.13 (0.01)	36.70 (0.00)

Source: Authors' calculations using credit data from Reserve Bank of India, *Basic Statistical Returns*, 1992, 1993, 1999, and 2000.

a. Banks are divided into groups based on their status in 1980. "Large nationalized banks" comprises those banks that were nationalized in 1969; "Marginal nationalized banks" comprises those that were nationalized in 1980; "Marginal private sector banks" comprises the nine largest banks in 1980 that were not nationalized; "Small private sector banks" comprises the remainder of private sector banks in 1980.

b. F-statistics and (in parentheses) p values for the test of the hypothesis that the estimates for the "Marginal nationalized banks" and the "Marginal private sector banks" are the same.

c. The first column represents the unconditional average size of all bank loans in India issued over the time period; the second through the fifth columns report estimates of the average loan size by each bank group, after controlling for the district in which the loan was issued. Standard errors are in parentheses.

d. The first column reports the unconditional mean share of all bank credit to the indicated sector; the second through the fifth columns report the estimated deviation in the share lent by each bank group from the share lent by the State Bank of India group, after controlling for the district in which the loan was issued. Standard errors are in parentheses.

Group of India, after controlling for differences across districts. These coefficients are presented in table 3. (We use data from 1992, 1993, 1999, and 2000.) For example, compared with the average loan size of the State Bank of India, nationalized banks gave slightly smaller loans (an average of Rs. 6,430 lower), while marginal nationalized banks gave slightly larger loans (the average was Rs. 8,350 greater), marginal private banks gave much larger loans (Rs. 35,310 more), and small private banks gave loans much larger on average (Rs. 58,500 more). These results appear to confirm conventional wisdom that nationalized and public banks give smaller loans than private banks.

The most informative comparison is between what we called the “marginal” nationalized and the “marginal” private bank, which were similar in size, but with the former nationalized and the latter not. Many of the differences between the marginal nationalized and the marginal private banks are large: the marginal private banks gave 5 percentage points less credit to agriculture than the marginal nationalized banks; given that the all-India share of credit to agriculture is 11 percent, this difference is substantial. The results also suggest that nationalization led to more credit to small-scale industry (an increase of 2 percentage points relative to the private banks; India-wide small-scale industry receives 9 percent of total credit), 4 percentage points more credit to rural areas (compared with a national average of 12 percent), and slightly more to government enterprises (0.7 percent more; the India-wide figure is 3 percent.). These increases come at the expense of credit to trade, transport, and finance (nationalized banks gave 6 percent points less, compared with the national average share of 21 percent). The final column in table 3 gives the results of an F-test of the hypothesis  $\gamma_{\text{Marginal Private}} = \gamma_{\text{Marginal Nationalized}}$ . The rural and government lending differences are significant at the 5 percent level, while all others are significant at the 1 percent level.

Although this finding suggests that private and public banks behave differently, the values in the table vary not only between marginal private and marginal nationalized banks, but across other bank groups as well. Thus, from this data alone, we cannot rule out the possibility that the difference in lending behavior is attributable to bank size, rather than ownership.

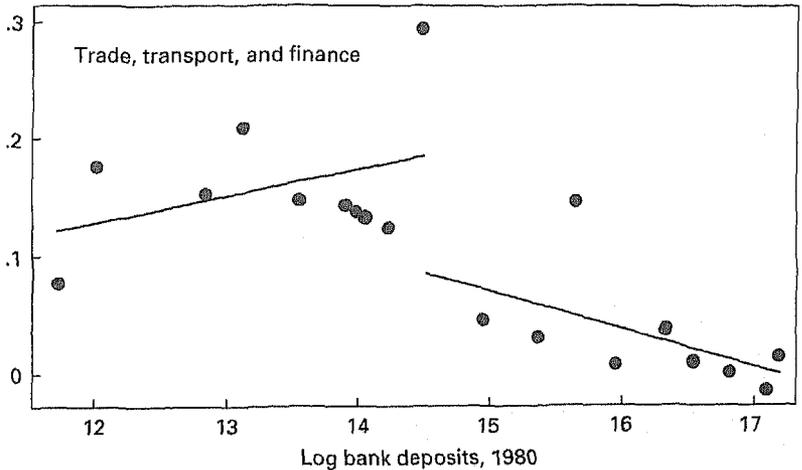
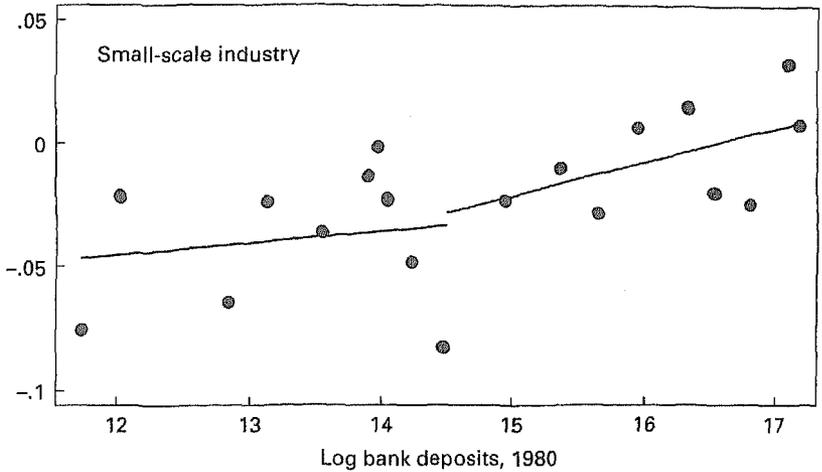
To obtain an accurate measure of the impact of nationalization, we examine lending behavior at the individual bank level, adopting a full-fledged regression-discontinuity approach. We first estimate bank effects analogous to the group effects estimated in equation 2, by replacing the bank group dummy indicators with individual bank dummy indicators, to obtain coefficients  $\hat{\beta}_1, \dots, \hat{\beta}_b$ . These coefficients tell us to what extent bank  $b$  behaves differently from other banks, after controlling for the characteristics of the districts in which each bank operates. We then regress the individual indicators  $\hat{\beta}_b$  on log deposits of the bank in 1980 ( $size_b$ ), an indicator variable ( $NAT_b$ ) which takes the value of 1 when the size was larger than the cutoff and the bank therefore nationalized, and an interaction term ( $NAT_b * size_b$ ). This specification thus allows for a break at the nationalization cutoff value, as well as differential slopes for banks below and above the cutoff:

$$(3) \quad \hat{\beta}_b = \alpha + \delta_1 SIZE_i + \gamma_1 NAT_i + \delta_2 (NAT_b * SIZE_b) + \epsilon_i .$$

Figure 1 presents the average share each bank provides to small-scale industry, “trade, transport, and finance,” agriculture, and in rural areas.

**FIGURE 1. Effects of Nationalization and Trade Credit<sup>a</sup>**

Share of credit, 1992

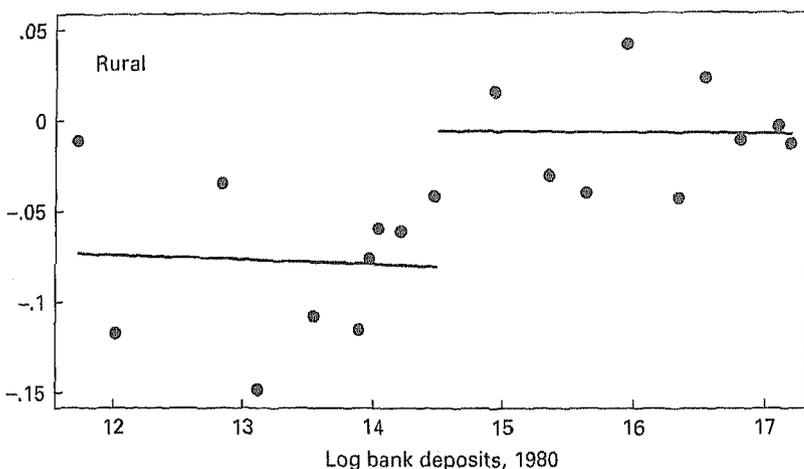
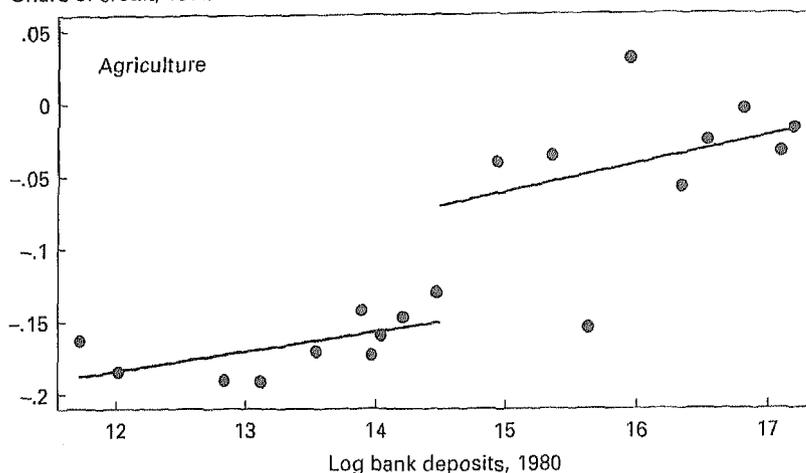


Source: Authors calculations, based on data from the Reserve Bank of India.

a. Each dot represents the average share of credit of two or three banks provided to the sector indicated in the title. The banks are ordered according to the log size of deposits in 1980, which is graphed along the x-axis. The left line gives the fitted relationship for the banks that were not nationalized, while the line on the right gives the fitted relationship for nationalized banks. The distance between the lines at 14.5 is the implied causal impact of nationalization. The sample includes 42 banks, which were aggregated into 19 groups to avoid disclosing any bank-specific information.

FIGURE 1. (continued)

Share of credit, 1992



In the figure, banks are ordered by the size of their deposits in 1980, so that banks below the cutoff of 14.5 are private, while banks above were nationalized in 1980.<sup>21</sup> The left line gives the relationship  $\hat{\alpha} + \hat{\delta}_1 * SIZE_t$ , while the right line gives the relationship  $\hat{\alpha} + \hat{\gamma}_1 + (\hat{\delta}_1 + \hat{\delta}_2) * SIZE_t$ . Contrary to

21. To avoid disclosing bank-specific data, we have grouped banks with similar deposit size in 1980 into pairs or groups of three. Thus, although our sample includes forty-two banks that were private or nationalized in 1980, there are only nineteen points on the graph. The statistical analysis presented in table 4 provides estimates based on individual bank-level data.

the results obtained by simple comparison of means, there does not appear to be any significant difference in lending to small-scale industry between public and private banks of similar size. That is, we cannot reject the hypothesis that nationalization had no effect on credit to small-scale industry. On the other hand, nationalization appears to have lowered the amount of credit banks provide to trade, transport, and finance.

Nationalization appears to have had a large effect on credit to agriculture, as indicated in that panel. There is a relationship between size in 1980 and lending to agriculture in 1992: larger banks lend more to agriculture. However, there is a visible break in the relationship at the nationalization cutoff: banks just above the cutoff lend substantially more to agriculture than banks just below, even after accounting for the effect of size. The analogous graph for rural credit is also presented.

Table 4 provides estimates of the size of the discontinuity,  $\hat{\gamma}_1 + \hat{\delta}_2 * 14.5$ , estimated on data from 1992 and 2000 separately. For example, for agriculture in 1992, the estimated break is .082, with a standard error of .030: the difference between nationalized and private banks is quite significant, both economically and statistically.

The point estimates of the structural break confirm some of the differences described above but suggest that others are merely functions of bank size. In particular, as measured by credit in 1992, nationalization had a causal effect on agricultural credit and rural credit, increasing each by about 8 percentage points. These numbers are large, given that the set of all banks lent only 11 percent of credit to agriculture and 12 percent to rural areas. These results are significant at the 1 percent level. Nationalization appears to have had no effect on the amount of credit banks lend to small-scale industry, but caused a 9 percentage point decrease in the credit banks issued to trade, transport, and finance. Not surprisingly, we see that nationalized banks lend more to government-owned enterprises; the 2 percentage point difference is particularly large in light of the fact that credit to government borrowers represents only 2 percent of bank credit. Public sector banks appear to lend at slightly lower interest rates, though the point estimate, 70 basis points, is not statistically significant. We also attempted to measure whether public sector banks gave more credit to industries that had been identified for support in various five-year plans after 1980, but found no evidence that these industries were favored.

The differences between the nationalized and private banks seem to have decreased over time: in the 2000 data, the point estimate on agricultural lending drops from 8 to 5 points, on rural lending from 7 to 3 points, and on trade, transport, and finance from -11 to -6 points.

**TABLE 4. Point Estimates of the Effect of Bank Nationalization on Average Loan Size, Sectoral Lending, and Interest Rates**

Measure	Estimate of discontinuity <sup>a</sup>	
	1992	2000
Average loan size	-24.753 (10.332)	-143.867 (69.784)
Share of total lending		
Agriculture	0.082 (0.030)	0.031 (0.021)
Rural areas	0.073 (0.027)	0.021 (0.023)
Small-scale industry	0.009 (0.017)	0.020 (0.026)
Trade, transport, and finance	-0.073 (0.040)	-0.037 (0.031)
Government enterprises <sup>b</sup>	0.020 (0.011)	
Interest rate (residual <sup>c</sup> )	-0.007 (0.008)	-0.007 (0.006)

Sources: Authors' calculations using data from Reserve Bank of India, *Basic Statistical Returns*, 1992 and 2000.

a. Calculated by estimating the relationship between bank lending behavior and bank size according to the following equation:

$$\beta_i = \alpha + \delta_i \text{SIZE}_i + \gamma_i \text{NAT}_i + \delta_2 \text{NAT} * \text{SIZE} + \epsilon_i$$

where  $\text{SIZE}_i$  is the logarithm of deposits of bank  $i$  in 1980 and  $\text{NAT}_i$  is a dummy variable taking the value of 1 if the bank was above the threshold for nationalization in 1980, and then evaluating the fitted regression equations for marginal nationalized and marginal private sector banks (as defined in table 3) at the threshold for nationalization (14.5, in logarithms) and subtracting. Standard errors are in parentheses.

b. Data on lending to government in 2000 were not available.

c. Estimated residual from a regression of the interest rate on a range of loan characteristic variables and district fixed effects. See the notes to the text for a list of all controls.

In sum, bank ownership does seem to have had a limited impact on the government's ability to direct credit to specific sectors. Through the early 1990s, the credit environment in India was very tightly regulated. The government set interest rates and required both public and private banks to issue 40 percent of credit to the priority sector and to meet specific sub-targets within the priority sector. Nevertheless, banks controlled by the government provided substantially more credit to agriculture, rural areas, and the government, at the expense of credit to trade, transport, and finance. Surprisingly, there was no effect on credit to small-scale industry. Lending differences shrunk over the 1990s and in 2000 to about half what they were in the early 1990s. This might reflect either the increasing dynamism of the

private sector banks in the liberalized environment of the 1990s or the loosening grip of the government on the nationalized banks.

### *Bank Ownership and Speed of Financial Development*

To determine whether public ownership of banks inhibits financial intermediation, we again compare banks just above and just below the 1980 nationalization cutoff, using data from the Reserve Bank of India, for the period 1969 to 2000. We include the six banks above, which were nationalized, and the nine largest below, which were not.<sup>22</sup> Because we have data from both before and after the 1980 nationalization, we adopt a difference-in-differences approach. Specifically, we regress the annual change in bank deposits, credit, and number of bank branches on a dummy for post-nationalization ( $POST_t = 1$  if year  $\in (1980 - 1991)$ ) and a dummy for post-nationalization in a liberalized environment ( $NINETIES_t = 1$  if year  $\in (1992 - 2000)$ ). We break the post-nationalization analysis up into two periods (1980–91 and 1991–2000) because the former period was characterized by continued financial repression, while substantial liberalization measures were implemented in the beginning of the 1990s. Public and private banks could well behave differently before and after liberalization. Because larger banks may grow at different rates than small banks, we include bank fixed effects ( $\beta_i$ ). We thus regress:

$$(4) \quad \ln(y_{b,t}/y_{b,t-1}) = \beta_i + \theta_1 POST_t + \theta_2 * NINETIES_t + \gamma_1 (POST_t * NAT_b) + \gamma_2 (NINETIES_t * NAT_b) + \varepsilon_{b,t}$$

The parameters of interest are  $\gamma_1$  and  $\gamma_2$ , which capture the differential behavior of nationalized banks after the nationalization. Standard errors are adjusted for auto-correlation within each bank.

Table 5 presents the results for growth in credit, deposits, and bank branches. The results suggest that although the overall rate of growth in deposits and credit slowed substantially during 1980–90 relative to 1969–79, there was no differential effect for nationalized and private banks. In the nineties, deposit and credit growth slowed further still. In this liberalized environment, deposits and credit of the nationalized banks slowed more than those of the private banks: deposits grew 7.3 percent more slowly, while credit grew 8.8 percent more slowly. These results are significant at the 10 percent and 5 percent level, respectively.

22. In 1985, the Lakshmi Commercial Bank was merged with Canara Bank, a large public sector bank, because of financial weakness. In 1993, the New Bank of India (nationalized in 1980) was merged with the Punjab National Bank. Because both the Canara and Punjab National banks were nationalized in 1969, they are not in our sample.

**TABLE 5. Regressions Estimating the Effect of Nationalization on Growth of Deposits, Credit, and Number of Branches<sup>a</sup>**

Independent variable	Dependent variable			
	Log real growth of		Log growth rate of	
	Deposits	Credit	No. of branches	No. of rural branches
<i>POST</i>	-0.085 (0.014)	-0.078 (0.015)	-0.114 (0.017)	-0.181 (0.024)
<i>POST</i> * <i>NATIONALIZATION</i>	-0.026 (0.033)	-0.012 (0.036)	-0.044 (0.033)	-0.066 (0.031)
<i>NINETIES</i>	-0.040 (0.014)	-0.027 (0.017)	-0.122 (0.018)	-0.219 (0.022)
<i>NINETIES</i> * <i>NATIONALIZATION</i>	-0.073 (0.039)	-0.088 (0.041)	-0.053 (0.034)	-0.086 (0.028)
<i>R</i> <sup>2</sup>	.15	.11	.48	.31
No. of observations	440	440	420	434
No. of clusters	15	15	14	14

Source: Authors' calculations from data in Reserve Bank of India, *Statistical Tables Relating to Banks in India, 1970-2000*, and *Directory of Commercial Banks in India, 2000*.

a. The sample includes the six banks just above and the nine just below the cutoff for nationalization in 1980. Branch data were not available for the Lakshmi Commercial Bank, which failed in 1985 and was merged with Canara Bank, a large bank nationalized in 1969, which is not in the sample. Underlying data for deposits and credit are in rupees adjusted for inflation, and data for branches are annual growth rates (all in logarithms). The variable *POST* takes a value of 1 when the year is from 1980 to 1991 inclusive; *NINETIES* takes the value of 1 when the year is from 1992 to 2000 inclusive; *NATIONALIZATION* takes the value of 1 if the bank was nationalized in 1980. All regressions include bank fixed effects. Standard errors, adjusted for serial correlation, are in parentheses.

The growth rate in bank branches generally tracked credit and deposits, though the decline after 1980 was more severe. While the growth rates for nationalized banks were slightly lower in both periods, the differences are not statistically significant.

To answer the question of whether there was a significant difference between public and private banks before nationalization, we reestimate equation 4, replacing the bank fixed effects with a nationalization dummy, and a control function  $(K_{b,80}) = \pi_1 K_{b,80} + \pi_2 K_{b,80}^2$ , which controls for the effect of 1980 log deposits of each bank in 1980 (denoted  $K_{b,80}$ ). (These results are not reported but are available from the authors.) The control function allows bank growth to depend on bank size, while the nationalization dummy will pick up any differences between the nationalized and non-nationalized banks that are not related to size. The estimates suggest that credit, deposits, and number of branches grew at the same speed between 1969 and 1979 for banks that were going to be nationalized in 1980 and those that were not. The coefficients on the inter-

action terms ( $POST_t * NAT_{it}$ ) and ( $NINETIES_t * NAT_{it}$ ) remain negative and are virtually unchanged from the specification we present in table 5. Thus, it is only *after* the 1980 nationalization that banks nationalized in 1980 started to grow more slowly. These results provide some evidence that nationalization hindered the spread of intermediation in the 1990s, but not earlier.

## Constraints on Public Sector Lending

Having established that small-scale firms in India are credit constrained, and that, if anything, bank nationalization exacerbated these constraints, we now attempt to determine *why* public sector banks appear so reluctant to lend. We first look at the rules public sector banks use to allocate credit, and then examine how the incentives for loan officers affect lending decisions.

### *Lending Policy*

We begin by examining the official rules used by public sector banks to allocate credit. We find the rules surprisingly conservative. Because theory and praxis often differ, we then examine actual lending decisions and find that the conservative character of the rules is exacerbated by conservative deviations from the rules.

**OFFICIAL LENDING POLICIES.** Although public sector banks in India are nominally independent entities, they are subject to intense regulation by the Reserve Bank of India (RBI). Among the rules is one that limits how much a bank can lend to individual borrowers—the so-called “maximum permissible bank finance.” Until 1997, the rule was based on the working capital gap, defined as the difference between the current assets of the firm and its total current liabilities excluding bank finance (other current liabilities). The presumption is that the current assets are illiquid in the very short run and therefore the firm needs to finance them. Trade credit is one source of finance, and what the firm cannot finance in this way constitutes the working capital gap.

Firms were supposed to cover a part of this financing need, corresponding to no less than 25 percent of the current assets, from equity. The maximum permissible bank finance under this method was thus:

$$(5) \quad 0.75 * CURRENT ASSETS - OTHER CURRENT LIABILITIES$$

The sum of all loans from the banking system was supposed not to exceed this amount.<sup>23</sup>

This definition of the maximum permissible bank finance applied to loans greater than Rs. 20 million. For loans less than Rs.20 million, banks were supposed to calculate the limit based on the projected turnover of the firm. Projected turnover was to be determined by a loan officer in consultation with the client. The firm's financing need was estimated to be 25 percent of the projected turnover, and the bank was allowed to finance up to 80 percent of what the firm needs, that is, up to 20 percent of the firm's projected turnover. The rest, amounting to at least 5 percent of the projected turnover, has again to be financed by long-term resources available to the firm.

In the middle of 1997, the RBI set up a committee, headed by P. R. Nayak, to make recommendations regarding the financing of small-scale industries. Following the committee's advice, the RBI decided to give each bank the flexibility to evolve its own lending policy, under the condition that it be made explicit. Moreover, they adopted the recommendation that the turnover rule be used to calculate the lending limit for all loans less than Rs. 40 million.

Given the freedom to choose the rule, different banks went for slightly different strategies. The bank we studied adopted a policy that was, in effect, a mix between the now recommended turnover-based rule and the older rule based on the firm's asset position. First the limit on turnover basis was calculated as:

$$(6) \quad \min(0.20 * \text{Projected turnover}, 0.25 * \text{Projected turnover} \\ - \text{Available margin}).$$

The available margin here is the financing available to the firm from long-term sources (such as equity) and is calculated as *CURRENT ASSETS* - *CURRENT LIABILITIES* from the current balance sheet. In other words, the presumption is that the firm has somehow managed to finance this gap in the current period and therefore should be able to do so in the future. Therefore the bank needs to finance only the remaining amount. Note that if the firm had previously managed to get the bank to follow the turnover-based rule exactly, its available margin would be precisely 5 percent of turnover and the two amounts in equation 6 would be equal.

23. Thus, a particular bank had to deduct from this amount the credit limits offered by other banks. Following this rule implies that the current ratio will be more than 1.33, and the rule is often formulated as the requirement that the current ratio exceeds 1.33.

The rule did not stop here. For all loans less than Rs. 40 million (as all loans in our sample are), the loan officer was supposed to use both equation 6 and the older rule represented by equation 5. The largest permissible limit on the loan was the maximum of these two numbers.

Two comments about the nature of this rule are in order. First, this turnover-based approach to working capital finance is relatively standard even in the United States. However, the view in the United States is that working capital finance is essentially financing inventories and is therefore backed by the value of the inventories. In India, the inventories do not seem to provide adequate security, as evidenced by the high rates of default. In such cases it may be much more important to pay attention to profitability, because profitable companies are less likely to default. Second, in the United States the role of finding promising firms and promoting them is carried out largely by venture capitalists. In India the venture capital industry is still nascent and is not yet able to play the role that we expect of its U.S. equivalent. Therefore banks may have to be more proactive in promoting promising firms. Following a rule that puts no weight on profits may not be the way to favor the most promising firms: although the projected turnover calculation does favor faster-growing firms, the loan officer is not allowed to project a growth rate greater than 15 percent. This may be enough to meet the needs of a mature firm, but a small firm that is growing fast clearly needs much more than 15 percent. It is important that the rules encourage the loan officers to lend more to companies on the basis of promise.

**ACTUAL LENDING POLICY.** The lending policy statements give us the outside limits on what the banks can lend. Nothing in the policies stops them from lending less, though official documents always enjoin bankers to lend as much as possible.<sup>24</sup> It is also possible, given that it is not clear how these rules are enforced, that the banks sometimes exceed the limits—it is, for example, often alleged that loan officers in public sector banks give out irresponsibly large loans to their friends and business associates. It is not even clear how one would necessarily know that a banker had lent too much given that he is given the task of estimating expected turnover. In this subsection, based on work by Banerjee and Duflo, we therefore look at the actual practice of lending in our sample of loans.<sup>25</sup>

24. For example, a document prepared for the board meeting of the bank we studied reads “The busy season credit policy announced by the Reserve Bank of India stresses on increase in credit off-take by imparting further liquidity into the system and by rationalizing some of the existing guidelines. Banks have, therefore, to pay special attention to this aspect in the coming months and locate all potential/viable avenues so as to accelerate the path of credit expansion.”

25. Banerjee and Duflo (2001).

**TABLE 6. Actual Credit Limits Granted to Firms Compared with Permissible Limits**

	<i>Limit actually granted versus limit on turnover basis</i>		<i>Limit actually granted versus limit officially permitted<sup>a</sup></i>		<i>Limit actually granted versus previous limit granted<sup>b</sup></i>		<i>Limit officially permitted versus limit previously permitted<sup>c</sup></i>	
	<i>No. of firms</i>	<i>Percent of total</i>	<i>No. of firms</i>	<i>Percent of total</i>	<i>No. of firms</i>	<i>Percent of total</i>	<i>No. of firms</i>	<i>Percent of total</i>
Smaller	255	62	542	78	22	4	153	35
Same	81	20	9	1	322	64	6	1
Larger	74	18	142	20	158	31	281	64

Source: Authors' calculations from account-level data from one large public sector bank in India during 1997-99.

a. Maximum officially permitted credit limit is the larger of the limit calculated by the turnover method or that calculated by the working capital gap method.

b. "Previous limit granted" is the amount offered to the same firm the year before.

c. "Limit previously permitted" is the value of the official limit for the firm in the previous year.

*Data:* Our data source is the same used in previous work by Banerjee and Duflo (and described in connection with equation 1).<sup>26</sup> Because we have data on current assets and other current liabilities, it is simple 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 6, we compare the actual limit granted with LTB, LWC. In 78 percent of the cases, the limit granted is smaller than the amount permitted. Most strikingly, in 64 percent of the cases for which we know the amount granted in the previous period, the amount granted is exactly equal to that granted in the previous period (it is smaller 4 percent of the time and goes up only in 31 percent of the cases). Given that that inflation rate was 5 percent or higher, the real amount of the loans therefore decreases between two adjacent years in a majority of the cases. To make matters worse, in 73 percent of these cases the firm's sales had increased, implying, one presumes, a greater demand for working capital. Further, this is the case even though according to the bank's own rules, the limit could have gone up in 64 percent 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). Finally, this tendency seems to become more pronounced over

TABLE 7. Regressions Explaining Actual Credit Limits and Interest Rates<sup>a</sup>

Independent variable	Dependent variable				
	Actual credit limit granted			Interest rate	
	(1)	(2)	(3)	(4)	(5)
Limit granted in previous year	0.757 (0.04)	0.540 (0.059)	0.455 (0.084)	-0.198 (0.108)	-0.260 (0.124)
Previous interest rate				0.823 (0.038)	0.832 (0.041)
Maximum limit under bank's internal rule <sup>b</sup>	0.256 (0.042)				
Limit on turnover basis as calculated by the bank		0.145 (0.036)		-0.019 (0.102)	
Limit on turnover basis as calculated by authors <sup>c</sup>			0.102 (0.025)		-0.025 (0.09)
Limit based on working capital gap		0.240 (0.046)	0.279 (0.061)	0.091 (0.083)	0.083 (0.084)
Ratio of profits to firm's assets		0.021 (0.017)	-0.001 (0.021)	-0.048 (0.043)	-0.036 (0.044)
Dummy variable for negative profits		-0.037 (0.115)	0.053 (0.129)	-0.045 (0.272)	-0.037 (0.266)
Ratio of tangible net worth to firm's debt		-0.104 (0.029)	-0.112 (0.032)	-0.064 (0.076)	-0.087 (0.07)
Assets		0.080 (0.056)	0.143 (0.065)	0.063 (0.104)	0.168 (0.118)
Interest paid as share of year-before granted limit			0.005 (0.037)		
Constant term	0.011 (0.079)	-0.009 (0.154)	-0.021 (0.195)	2.547 (0.749)	2.180 (0.843)
R <sup>2</sup>	.952	.955	.962	.878	.881
No. of observations	298	241	145	198	194

Source: Authors' calculations from account-level data from one large public sector bank in India.

a. All data except interest rates and dummy variables are in logarithms. Standard errors, corrected for clustering at the account level, are in parentheses.

b. Higher of limit based on turnover as calculated by the bank or limit based on working capital gap.

c. Using bank's projection of turnover.

time: in 1997, the limit was equal to the previous granted limit 53 percent of the time. In 1999, it remained unchanged in 70 percent of the cases.

In table 7, we regress the limit granted on information that might be expected to play a role in its determination. Not surprisingly, given everything we have said, past loan is a very powerful predictor of today's loan. The *R*-squared of the regressions is also very high (over 95 percent). In column 1, we regress (log) current loan amount on (log) limit granted in the previous year and the (log) maximum limit according to the bank's internal rules. Note that the bank's rule never refers to past loan as a determinant of

the loan amount to be given out. Yet the coefficient of past loan is 0.757, with a t statistic of 18 (a 1 percent increase in past loan is associated with a 0.756 percent increase in current loan, after controlling for the official rule). The maximum limit is also a significant determinant of loan amount, with a coefficient of 0.256. The standard deviation of these two variables is very close (1.50 and 1.499, respectively). These coefficients thus mean that a one standard deviation increase in the log of the previous granted limit increases the log of the granted limit by three times as much as a one standard deviation increase in the log of the maximum limit as calculated by the bank.

In column 2, we “unpack” the official limit: we include separately the bank’s limit on turnover basis (LTB) and the limit based on the traditional method (LWC) and now include the logarithm of profits. As in the previous regression, past loan is the most powerful predictor of current loan. Both limits enter the regression. Neither the log of profit nor the dummy for negative profit enter the regression, as might have been expected given the nature of the rules.

In column 3 we include in addition a measure of the utilization by the client of the limit granted to him in the previous year: the ratio of interest earned by the bank to the account limit. This is clearly of direct interest to the bank, because it loses money when funds are committed, but not used. This information is routinely collected on each client. Yet this variable is uncorrelated with granted limit. We tried other measures of utilization of the limit (turnover on the account divided by granted limit, and maximum debt divided by granted limit), and none of these measures is significant.

In columns 4 and 5 we investigate the determinants of interest rates. Past interest rates seem to be the only significant determinant of today’s interest rates. Past loans, LTB, and LWC do not enter the regression.

*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 utilization of the limit by the client.*

It could be argued that inertia is rational: the past loan amount picks up all the information that the loan officer has accumulated about the firm that we do not observe. But this explanation does not fit well with the fact that the loan amount remains exactly the same—the past may be important, but, as noted, the firm’s needs are changing, if only because of inflation.

There is also a simple test of this view. The weight on past loans represents the bank’s experience with the firm: the fact that the weight is so high

presumably reflects the fact that the past is very informative, suggesting a stable environment. But a stable environment necessarily implies that the bank knows a lot more about its old clients than it does about its newest clients. Therefore we should see the weight going up sharply with the age of the firm. Yet when we run the regressions predicting the loan amount separately for firms that have been the client of the bank for 5 years or more and for those who have been clients for less than 5 years, we find that banks do not put less weight on the past loans for recent clients than for old clients. If anything, when we include today's sales in the regression the bank seems to put more weight on past loans for recent clients than for old clients.<sup>27</sup> If there is a good reason for the inertia, it has to be something much more complicated.

It is also conceivable that it is rational to ignore profit information in lending if the projected turnover calculated by the bank and included in the calculation of LTB already takes into account any useful information contained in the profits. To examine this, we looked at whether current profitability has any role in predicting future profitability, delay in repayment, and default, once we control for the variables that seem to determine the level of lending—past loans, LTB, LWC. As reported in Banerjee and Duflo, current profit is a good predictor of future profit, and the variables that the bank uses are not: the only good predictor of future negative profit is current negative profit.<sup>28</sup> Negative profits, in turn, predict default, while past loans, LTB, and LWC do not.<sup>29</sup>

*Conclusion:* This subsection suggests an extremely simple *prima facie* explanation of why many firms in India seem to be starved of credit. The nationalized banks, or at least the one we study (but again, this is one of the best public banks), seem to be 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 for lending are indeed fairly rigid, this inertia seems to go substantially beyond what the rules dictate. Moreover, the deviations from the rules do not seem to reflect informed judgments, but rather a desire to do as little as possible.

Moreover, when banks take a decision to make a fresh loan, the beneficiaries tend to be firms whose turnover is growing regardless of profitability. This indifference to profitability is entirely consistent with the rules that bankers work with: none of the many calculations that bankers are supposed to do before they decide on the loan amount pays even lip service to

27. See Banerjee and Duflo (2001, table 5).

28. Banerjee and Duflo (2001).

29. There is some question about whether we have the right measure of default.

the need to identify the most profitable borrowers. Yet current profits do a much better job of predicting future losses and therefore future defaults, than do the variables that seem to influence the lending decision. In other words, it seems plausible that a banker who made better use of profit information would do a better job at avoiding defaults. Moreover, he or she might do a better job of identifying the firms where the marginal product of capital is the highest. Lending based on turnover, by contrast, may skew the lending process toward firms that have been able to finance growth out of internal resources and therefore do not need the capital nearly as much.

### *What Causes Under-Lending?*

Given that the rules for lending are quite rigid and largely indifferent to profitability, it is perhaps not surprising that there are opportunities for profitable investment that have not yet been exploited. What is surprising is that to the extent that there are deviations from the rules, they tend to be in the direction of lending less.

One plausible explanation is that the loan officers in these banks have no particular incentive to lend. As government employees on a more or less fixed salary and promotion schedule, their rewards are at best weakly tied to their success in making imaginative lending decisions. And failed loans, as discussed below, can lead to investigations by the Central Vigilance Commission, the body entrusted to investigate fraud in the public sector. Loan officers therefore have much to lose and little to gain from being aggressive in lending. Not taking any new decisions may dominate any other course of action, especially if there are attractive alternatives to lending, such as putting money in government bonds.

The next sub-section examines how the fear of prosecution discourages lending. The following sub-section asks whether the reluctance to lend is exacerbated when the rewards from putting money in government bonds become relatively more attractive.

**INERTIA AND THE FEAR OF PROSECUTION.** Because public sector banks are owned by the government, their employees are treated by law as public servants subject to government anti-corruption legislation. Bankers believe that it is easy to be charged with corruption and that the law states that any government functionary who takes a decision that results in direct financial gain to a third party is *prima facie* guilty of corruption and must prove her or his innocence.

The executive director of a large public sector bank was quoted saying "Fear of prosecution for corruption hangs over every loan officer's head

like the sword of Damocles." The *Economic Times of India* has attributed slowdowns in lending directly to vigilance activity.<sup>30</sup> A working group on banking policy set up by the Reserve Bank of India, and chaired by M. S. Verma, noted:

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 with which the banks are beset at present. This is due to investigations by outside agencies on the accountability of staff in respect of some of the NPA. The group also noticed a marked reluctance at various levels to take any credit decision.<sup>31</sup>

In response to criticism from bankers, economists, and others, the Central Vigilance Commission (CVC), the body entrusted to investigate potential cases of fraud in the public sector, introduced in 1999 a special chapter of the vigilance manual on vigilance in public sector banks. Although the new chapter was meant to reassure bankers, it may not have been entirely successful. The manual reads, for example, that although "every loss caused to the organization, either in pecuniary or non-pecuniary terms, need not necessarily become the subject matter of a vigilance inquiry . . . once a vigilance angle is evident, it becomes necessary to determine through an impartial investigation as to what went wrong and who is accountable for the same."<sup>32</sup>

Interviews with public sector bankers revealed widespread concern: the legal proceedings surrounding charges of corruption can drag on for years, leaving individuals charged with corruption in an uncertain state. Even if an individual is exonerated, he or she may have been relieved of duties, transferred, or passed over for promotion during the investigation. In theory, as well as practice, even one loan gone bad may be sufficient to start vigilance proceedings. The possible penalties stand in stark contrast to rewards. While banks are constantly urged by the Reserve Bank of India to lend as much as possible, there are neither explicit incentives for making good loans nor ways to penalize officers who make conservative decisions. In effect, bankers are accountable to more than one authority—the loan officer's boss is one, central vigilance may be another, and the press yet another. In such circumstances, it may be difficult to provide effective incentives.<sup>33</sup> If so, loan officers would prefer not to take new decisions.

30. "CVC Issues New Norms to Check Bank Frauds," *Hindustan Times* (1998), among others.

31. Quoted in Tannan (2001, p. 1579).

32. Government of India (2001, p. 5).

33. Dixit (1996) describes how the presence of multiple principles in bureaucracies may lead to inaction.

Simply renewing the loan without changing the amount is one easy way to avoid responsibility, especially if the original decision was someone else's (loan officers are frequently transferred). And when bankers do take a decision, making sure not to deviate enormously from the precedent is a way of covering themselves against charges of wrongdoing or worse.

Not surprisingly, the Central Vigilance Commission disputes the claim that there is a "fear psychosis" and to bolster its position released in 2000 a "critical analysis" of vigilance activity in public sector banks in 1999. The analysis reveals that in 1999 the commission received 1,916 references, 72 percent of which were credit-related, recommending punishment in the majority of cases. Their report states that "out of every 100 cases coming before it, the Commission would advise major penalty proceedings in 28 cases, minor penalty proceedings in 32 cases, and administrative warning/exoneration in 40 cases."<sup>34</sup> The author of the report, a CVC official, argued that this level of activity should not be enough to cause "fear psychoses": "These figures reveal that a person is not damned the moment his case is referred to the Commission. . . . These statistics appear to indicate a very fair and objective approach on the part of the Commission to the cases that were referred to it."<sup>35</sup>

The rest of this subsection, based on work by Cole, assesses the evidence for the fear psychosis.<sup>36</sup> The idea is simple: do bankers who are "close to" bankers who have been subject to CVC action slow down lending in the aftermath of that particular action?

*Data:* Monthly credit data, by bank, were provided by the RBI. Data on frauds are naturally difficult to come by. It is also the policy of the government of India to keep the data on vigilance activity confidential: although some statistics are published, they are too aggregated to be useful for econometric analysis. However, in 1998, in an effort to increase the penalty for fraud through stigma, the government authorized the CVC to publish the name, position, employing bank, and punishment of individual officers of government agencies charged with major frauds. This list consists of eighty-seven officials in public sector banks between 1992 and 2001. Although the nature of the fraud with which they are charged is not known, we do know that approximately 72 percent of frauds relate to illegal extension of credit, with the balance classified as kite-flying or "other."<sup>37</sup> Because our hypothesis is that vigilance decreases lending activity, the

34. Government of India (2000, p. 9).

35. Government of India (2000, p.10).

36. Cole (2002).

37. Government of India (2000).

inclusion of spurious non-credit-related vigilance activity should bias coefficients toward zero.

*Empirical Analysis:* The first approach is to use bank-level monthly lending data to estimate the effect of vigilance activity on lending, using the following equation,

$$(7) \quad y_{it} = \alpha_i + \beta_t + \sum_{k=0}^m \gamma_k D_{i,t-k} + \varepsilon_{it}$$

where  $y_{it}$  is log credit extended by bank  $i$  in month  $t$ ,  $\alpha_i$  is a bank fixed effect,  $\beta_t$  is a month fixed effect, and  $D_{i,t-k}$  is an indicator variable for whether vigilance activity was reported by the CVC for bank  $i$  in month  $t - k$ . Standard errors reported are adjusted for serial correlation and heteroskedasticity. The idea is to compare the bank affected by the vigilance activity with other public sector banks before and after the vigilance event. Which event window to use is not immediately clear: the appropriate start date would most likely be the month when it became known that vigilance proceedings were under way or perhaps the date bankers learned of the judgment. The data published by the CVC give only the date when the CVC provided advice on the case and the date on which action was taken. It is not clear how long it should take before an effect appears or how long one would expect this effect to last. We therefore let the data decide, by estimating models that allow effects ranging from one month to four years.

Table 8 presents estimation results from several similar specifications. Columns 1, 2, and 3 provide estimates for windows of one, twelve, and forty-eight months. There appears to be a clear effect of vigilance activity on lending decisions. Vigilance activity in a specific bank reduces credit supplied by all the branches of that bank by about 3-5 percent. This effect is estimated precisely and is significantly different from zero at the 5 percent level for contemporaneous effect (column 1) and at the 1 percent level for the joint parameters of zero to twenty-four months in columns 2 and 3. The effect is quite persistent, appearing in the data at its original level for up to eighteen months following the vigilance activity, finally becoming statistically indistinguishable from zero two years after the CVC decision or judgment.

This economic effect seems to be sizable for plausible values of the elasticity of gross domestic product with respect to money supply elasticity. For example, if the overall coefficient of 0.03 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.

**TABLE 8. Regressions Estimating Effect of Indicators of Vigilance Activity on Bank Credit<sup>a</sup>**

<i>Months before or after vigilance activity<sup>b</sup></i>	<i>Regressions measuring effect of previous vigilance activity</i>			<i>Regressions measuring effect of future vigilance activity</i>	
	(1)	(2)	(3)	(4)	(5)
Zero	-0.055 (0.027)	-0.040 (0.019)	-0.037 (0.019)	-0.042 (0.020)	-0.037 (0.020)
Three		-0.039 (0.018)	-0.032 (0.016)	-0.035 (0.016)	-0.031 (0.016)
Six		-0.031 (0.016)	-0.023 (0.014)	-0.029 (0.015)	-0.027 (0.014)
Twelve		-0.036 (0.016)	-0.018 (0.012)	-0.018 (0.014)	-0.015 (0.010)
Eighteen			-0.028 (0.013)		-0.006 (0.010)
Twenty-four			-0.012 (0.013)		-0.001 (0.011)
Thirty-six			-0.014 (0.015)		0.009 (0.008)
Forty-eight			-0.022 (0.028)		0.022 (0.015)
<i>R</i> <sup>2</sup>	.98	.98	.98	.98	.98
No. of observations	2,997	2,997	2,997	2,997	2,997

Source: Authors' calculations using data from the Reserve Bank of India and the Central Vigilance Commission of India.

a. The dependent variable in all regressions is the logarithm of credit extended by an individual bank in a given month. Data are for twenty-seven public sector banks over 111 months. Standard errors, corrected for heteroskedasticity and serial correlation, are in parentheses.

b. Vigilance activity is defined as the CVC bringing charges against or punishing an officer of a bank. The independent variable of interest is a dummy variable that takes the value of 1 when vigilance activity occurred with respect to a particular bank the indicated number of months before (columns 1-3) or after (columns 4-5) the current month. The regression in column (1) includes a month dummy for the month contemporaneous with the vigilance activity only. In columns (2) and (4), month dummies are included for each of the twelve months before or after the vigilance activity, respectively, and in columns (3) and (5), month dummies are included for each of the forty-eight months before or after (only selected month coefficients are reported). All regressions also include bank and year fixed effects.

Columns 4 and 5 of table 8 present the same specification as in equation 7, but this time with dummies indicating whether a given bank-month is exactly *n* months before CVC vigilance activity.

Table 8 clearly indicates that banks reduced lending before the announced vigilance action, as well as after it. This is not surprising, as the formal vigilance activity usually follows a lengthy investigation. The CVC vigilance manual, introduced in 1999 to streamline the process of investigations, outlines a procedure that lists no binding time constraints, but suggests the

entire process be completed within twenty months. Reassuringly, there is no discernable effect for vigilance activity farther out than one year ahead.

*Conclusion:* Evidence suggests that the fear of being investigated is reducing lending significantly: banks where someone is being investigated slow down lending relative to their own mean level of lending. This finding leaves open the question of whether this reaction is desirable; it is, after all, possible that the loans that are cut are those unlikely to be repaid. But the finding also raises the possibility that honest lenders are being discouraged by excessively stringent regulations.

LENDING TO THE GOVERNMENT AND THE EASY LIFE. Lending to the government is the natural alternative to lending to firms and offers the loan officers a secure vehicle for their money, with none of the legwork and headaches associated with lending to firms. The ideal way to measure how important high interest rates on government bonds might be in explaining under-lending 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 that 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: 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 more slowly than the rest. Our hypothesis is that these banks have a particularly strong reason to invest heavily in government securities, because 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 rate paid to government bonds increases. These banks therefore should be particularly responsive to changes in the interest rate paid by the government.

*Data:* The outcome we focus on is the  $\ln(\text{credit}/\text{deposit ratio})$  at the end of March of each year for twenty-five public sector and twenty private sector banks. Two minor public sector banks were excluded because of lack of

data, and the new private sector banks were excluded for reasons of comparability. The data are from the Reserve Bank of India.

Data on the net state domestic product are from the Central Statistical Office. For our measure of interest rate spread, we subtract from the State Bank of India prime lending rate, the rate given as the weighted average of central government securities. Both interest rate measures are from the RBI, as is the price index used to deflate them.<sup>38</sup>

*Specification:* Two measures of growth are used. To measure the state growth rate ( $growth_{it} = \ln(SDP_{it}) - \ln(SDP_{i,t-1})$ ), we use a moving average of the real growth rates of the previous three years (e.g.,  $avgrowth_{it} = \sum_{t-3}^{t-1}(growth_{it})$ ). Bank environment growth is a weighted average of the growth rates in the states in which a bank operates:

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

where the weights  $\omega_{bi}$  are the percentage of bank branches bank  $b$  had in state  $i$  in 1980:  $\omega_{bi} = \frac{N_{bi}}{\sum_{s \in \text{states}} N_{bs}}$ . Data on branch locations are from the of

Directory Commercial Bank Offices in India.<sup>39</sup>

*Results:* We test this hypothesis with two pairs of linear regressions. First, we consider using the location of a bank's headquarters as an indicator of the growth environment in which a bank operates. Because the regulatory environment in India changed significantly beginning during 1991–92, we estimate our equations for the entire time period, 1985–2000, as well as the “post-reform period” of 1992–2000.

The results are reported in table 9. Columns 1 and 2 report the results using the growth environment of the state in which a bank is headquartered,

38. Data are from the 2001 edition of RBI, “Handbook of Statistics on the Indian Economy.” We use the CPI-UNME, for Urban Non-Manual Employees.

39. Branch data are from Reserve Bank of India (2001). We have NSDP for all of the states in which bank headquarters are located. However, in constructing the index, NSDP for the following were not available: Jharkhand, Uttaranchal, Chandigarh, Dadra and Nagar Haveli, Chattisgarh, and Lakhsadeep. Rather than drop any bank that had a branch in one of these states, the  $\omega_{bi}$  weights are constructed using only the set of branches for which GSP data are available. A second problem is that the growth data are not available for a few states for 1998 and 1999 (Nagaland, Sikkim, Andaman and Nicobar) or 1999 (Goa, Jammu & Kashmir). The two most logical ways of constructing indexes in the absence of these data, namely (i) not using those states when constructing state weights, and thus not using the growth information during 1985–97, and (ii) using one set of weights  $\omega_{bi}^1$  during 1985–97, which includes these states, and a second set  $\omega_{bi}^2$ , which excludes these states in 1998 and 1999, produce essentially identical results. We choose the latter, because we feel Jammu and Kashmir and Goa warrant inclusion throughout 1985–98.

**TABLE 9. Regressions Explaining Bank Credit with Spreads on Credit and Economic Growth by State<sup>a</sup>**

Independent variable	Growth measure <sup>b</sup>			
	Growth in net state domestic product in state where bank is headquartered		Weighted average of growth rates in states where bank operates <sup>c</sup>	
	1992–2000	1985–2000	1992–2000	1985–2000
Growth rate	1.412 (0.624)	1.538 (1.209)	2.195 (0.970)	2.634 (1.165)
Growth rate * (spread > 0) ( $\gamma^+$ )	-0.175 (0.110)	-0.137 (0.119)	-0.257 (0.104)	-0.219 (0.103)
Growth rate * (spread < 0) ( $\gamma^-$ )	0.480 (0.521)	0.592 (0.405)	-0.079 (0.791)	0.473 (0.562)
State fixed effects?	Yes	Yes	No	No
Bank fixed effects?	No	No	Yes	Yes
$R^2$	.46	.43	.71	.63
No. of observations	415	730	402	710

Source: Authors' regressions using data from the Reserve Bank of India.

a. The dependent variable in all regressions is the logarithm of the ratio of credit extended to deposits. Data are annual data for twenty-five public sector and twenty private sector banks. Standard errors, corrected for heteroskedasticity and serial correlation, are in parentheses. All regressions include year fixed effects.

b. In all regressions growth is measured as a moving average of real growth rates over the previous three years.

c. Fewer observations are available for these regressions because data on branch locations were unavailable for one bank.

with the first column representing the results for the entire period and the second, results for the post-reform era. Specifically, we estimate

$$(8) \ln(CD_{bit}) = \alpha + \beta * avgrowth_{bit} + \gamma^+ (Spread_t * avgrowth_{bit}) * I_{Spread_t > 0} + \gamma^- (Spread_t * avgrowth_{bit}) * I_{Spread_t < 0} + \theta_i + \delta_t + \epsilon_{bit}$$

where  $I_{Spread_t > 0}$  (resp.  $I_{Spread_t < 0}$ ) are indicator variables for whether the spread is positive (resp. negative),  $\theta_i$  is a state fixed effect, and  $\delta_t$  is a year fixed effect.  $Avgrowth_{bit}$  is the smoothed growth rate for the state where the headquarters of bank  $b$  are located. Standard errors are adjusted for serial correlation.

The regression controls for state and year fixed effects. While we see that the C/D is higher in states with more favorable growth rates, we are most interested in the coefficients  $\gamma^-$  and  $\gamma^+$ , which measure how banks in different growth environments differentially react to changes in the spread between the commercial lending rate and the rate on government securities.

Because a negative spread occurs only twice, and in 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  $(Spread_i * avgrowth_{bit})$  when the spread is negative.

The negative and marginally statistically significant coefficient on  $\gamma^+$  suggests that banks in high-growth environments substitute toward 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 fewer attractive projects to finance, they are more likely to park money in government securities when government securities become more attractive. However, because the number of states where a bank is headquartered is relatively low, we have relatively low power once we account for serial correlation at the state level.

To achieve more precise estimates, we estimate the same equation, except that instead of measuring growth only in the states where commercial banks are headquartered, we use the synthetic index described above, which takes into account all the states where the bank is active. Columns 3 and 4 present results from:

$$(9) \ln(CD_{bit}) = \alpha + \beta * bkgrowth_{bit} + \gamma^+ (Spread_i * bkgrowth_{bit}) * I_{Spread_i > 0} + \gamma^- (Spread_i * bkgrowth_{bit}) * I_{Spread_i < 0} + \theta_i + \psi_b + \delta_t + \epsilon_{bit}$$

where  $bkgrowth_{bit}$  is the growth index and  $\psi_b$  is a bank fixed effect. Column 3 represents the entire sample, while column 4 represents the post-reform period. The results in columns 3 and 4 are similar in sign to columns 1 and 2, and this time we may say with some confidence that they are statistically significant.

*Conclusion:* The evidence seems consistent with the view that banks are especially inclined toward the easy life in states where lending is hard. This suggests that the opportunity for lending to the government tends 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.

### Some Final Issues: Rural Branches, NPAs and Bailouts

We conclude our study by examining two final arguments given in favor of public ownership of banks: that public banks are more willing to expand into rural areas and that public banks are less likely to fail and therefore cost the government (or public) less than private banks.

### *Branch Expansion in Rural Areas*

As mentioned in the introduction, in 1977 the government passed a regulation requiring both public and private banks to open four branches in unbanked locations for every branch they opened in banked locations. This regulation was repealed in 1990, though the Reserve Bank of India still maintained some authority of bank branch openings.

Robin Burgess and Rohini Pande have studied the impact of this regulation over the period 1977–90.<sup>40</sup> They find that a 1 percent increase in the number of rural banked locations, per capita, resulted in a 0.42 percent decline in poverty, and a 0.34 percent increase in total output.

Cole uses the empirical strategy described in the section on “Bank Ownership and Sectoral Allocation of Credit” to study the impact of bank nationalization on rural bank growth.<sup>41</sup> He shows that between 1980 and 2000 the growth rate of rural branches fell substantially, on the order of 20 percent. The nationalized banks in our sample fell even more sharply, with rural branch growth rates 6.6 percent and 8.6 percent slower than their private counterparts in the 1980s and 1990s. These results are reported in column 4 of table 5.

In summary, the regulation requiring the opening of rural banks may well have been beneficial, but, if anything, nationalization made banks slightly less responsive to the regulation.

### *Non-Performing Assets and Bailouts*

Mounting nonperforming assets and resulting questions about the ability of the banks with high levels of NPA to honor their liabilities to their depositors have been important concerns in the 1990s.

Recent RBI figures suggest that public sector banks have substantially higher levels of nonperforming assets than do private banks. For example, for the year ending in March 2003, gross NPAs represented 4.6 percent of public sector banks’ total assets, as against 4.3 percent of those of old private sector banks and 3.7 percent of those of new private sector banks. It is not clear, however, how well these numbers represent the true situation in these banks. There is some skepticism about the accuracy of reported NPA numbers: banks may engage in creative accounting or “evergreening,” and the current classification norms mapping loan repayment delay to NPA do not yet meet international norms.

40. Burgess and Pande (2003).

41. Cole (2004).

An informative check, conducted by Petia Topalova, is to use data from corporate balance sheets to estimate the ability of firms to repay their loans.<sup>42</sup> Firms whose income (defined as earnings before interest, taxes, depreciation, and amortization) is less than their reported interest expense are either defaulting, are very close to default, or would be defaulting if their loans were not “evergreened.” This share of “potential NPAs” has increased significantly in the past five years, while banks’ reported level of NPAs has stayed fairly constant. Topalova also finds that banks are exposed to substantial interest rate risk: a 200 basis point increase in the rate of interest could result in a 4 percentage point increase in the share of NPAs in the banking system.

These high levels of NPAs raise obvious concerns about the stability of individual banks. But the government’s policy so far has been to allay these concerns by simply taking over the uncovered liabilities of the failing banks, whether nationalized or private. Therefore we will measure the cost of the NPAs in terms of resources that have gone into bailing out these banks.

We are not aware of a systematic accounting of all bank failures in India since 1969. To calculate the cost of bank failures, we use data collected from annual issues of the RBI’s *Statistical Tables Relating to Banks in India*, starting in 1969. Although the data are not comprehensive, we are optimistic that they can provide at least the correct order of magnitude.<sup>43</sup>

In 1969, we have deposits data for forty-five private sector banks. Between 1969 and 2000, we are able to identify twenty-one cases of bank failure, which resulted either in a bank’s liquidation or its merger with a public sector bank. (An additional twenty banks were nationalized: fourteen in 1969, and six in 1980. We do not count these twenty nationalizations as failures.) The value of the deposits at the time the bank failed can be taken as an upper bound of the cost of a bank failure. Thus, we calculate the value (in Rs. 2000) of the deposits of these twenty-one banks.<sup>44</sup> The largest single failure was Laxhmi Commercial Bank, which merged with Canara Bank in 1985 and represents 18.5 percent of the share of real deposits

42. Topalova (2004).

43. For example, the data may not correctly account for the possibility that banks change their names or merge while healthy. We identify the failure of private sector banks by their disappearance from our data: in many cases, these failures can be confirmed by secondary sources, but it is possible (even likely) that we have missed some failures, or evaluated as bank failures some events that were not failures. We would welcome a more careful study of this issue.

44. For all price adjustments in this section, we use the consumer price index from the International Financial Statistics database of the International Monetary Fund.

of failed banks. The total value of deposits for banks that failed between 1969 and 2000 is approximately Rs. 45 billion, a substantial sum.<sup>45</sup>

The total cost of recapitalization is also unknown. We conduct a back-of-the-envelope exercise, using figures from the 1999–2000 issue of the RBI's *Report on Trends and Progress of Banking in India*.<sup>46</sup> These figures give the capital contribution of the central government to nationalized banks, as well as the amount of capital written down by the central government. While interpretation of the write-off is straightforward, the recapitalization funding requires a little work. Banks earned money from the recapitalization bonds. The recapitalization subscription will, at least in theory, be returned to the government (several public sector banks have already returned capital): thus, the true cost of recapitalization is best measured by the interest income forgone by the government. The 2000–01 *Report on Trends and Progress of Banking in India* reports the income from nationalized banks both as recorded on their books and after subtracting the income from recapitalization bonds. We take the difference between these two numbers as the implied subsidy from the government to the nationalized banks. To calculate this number for other years, we assume that the ratio of subsidized income (1,797 crore in 1998–99) to cumulative capital contributed by the central government (19,803 crore in 1998–99) was constant throughout the nineties, at approximately  $1757/19,403 = 9$  percent. Taking the total reported capital investment in each year from 1992 to 2000 (again from the 2000–01 *Trends and Progress*) and adjusting for inflation gives an estimate of the subsidy from recapitalization of approximately 13,607 crore. Combined with 15,421 crore of written-down capital, this amounts to a recapitalization cost to the government of approximately Rs. 290 billion.

This number requires three important adjustments. First, some of the weakness from the nationalized banks' balance sheets may come from the assets of the failed private banks that were merged with the nationalized banks (this amount can be bounded above by the figure derived above, Rs. 45 billion—quite clearly, public sectors have many bad loans of their own). Second, and probably much more important, this represents the cost up to the year 2000. It is an open question how long it will take for the banks to return this capital to the government. Finally, it is also possible that the public sector banks will be unable to return all the capital subscribed by the government.

45. We stress again that this is an upper bound: although the banks that failed were insolvent, the banks had other assets, such as reserves, other performing loans, and real property, as well as deposit insurance, on which depositors were able to draw.

46. Reserve Bank of India (2001).

Thus the most favorable accounting for public sector banks (in which they wean themselves completely from recapitalization income starting in fiscal year 2004 and are absolved of the entire value of the Rs. 45 billion of the failed private banks) gives a total cost of recapitalization of public banks of approximately Rs. 300 billion.<sup>47</sup> A more realistic assessment might credit them for only half the value of the losses and assume that recapitalization bonds will be held for ten more years, until 2014. This would give an approximate bail-out cost of Rs. 540 billion.<sup>48</sup>

Comparing the figures requires attention to the relative size of the two bank groups. A rough estimate of the ratio of deposits of nationalized banks to private sector banks during 1969–2000 gives the following: during 1969–80, the ratio of deposits in nationalized banks to deposits in private banks was approximately 5 to 1; during 1980–93, the ratio was approximately 11-1; post liberalization, the ratio has been falling; in 2000 it stood at about 7.5 to 1.<sup>49</sup>

Thus, under the accounting most favorable to public sector banks, they squeak by as less costly to the government than private sector banks (the ratio of money spent bailing out public vs. private banks would be 6.67 to 1, less than the deposits ratio). However, using the estimate of Rs. 540 billion total cost gives a 12-1 ratio, which would imply that the public sector banks lost a greater portion of their deposits to bad loans.

## The Future of Banking Reform

Where does this evidence, taken together, leave us? There are obvious problems with the Indian banking sector, ranging from under-lending to unsecured lending, which we have discussed at some length. There is now a greater awareness of these problems in the Indian government and a willingness to do something about them.

One policy option being discussed is privatization. The evidence from Cole, discussed above, suggests that privatization would lead to an infusion of dynamism into the banking sector. Private banks have been growing

47. Starting from the figure of Rs. 290 billion, we add the approximate subsidy for 2000–03, Rs. 60 billion, and subtract Rs. 45 billion of losses possibly imparted by the private sector banks.

48. We take the figure of Rs. 290 billion through 2000, subtract a Rs. 22.5 billion credit from the failed private sector banks, and add on a subsidy of 1950 crore a year for the next decade, giving us a final figure of Rs. 540 billion.

49. Reserve Bank of India figures. The ratio for 2000 excludes the new private sector banks.

faster than comparable public banks in terms of credit, deposits, and number of branches, including rural branches, though it should be noted that in our empirical analysis, the comparison group of private banks were the relatively small “old” private banks.<sup>50</sup> It is not clear that we can extrapolate from this how the State Bank of India, which is more than an order of magnitude greater in size than the largest “old” private sector banks, would change if it were privatized. The “new” private banks are bigger and in some ways would have been a better group to compare with. But while this group is also growing fast, it has been favored by regulators in some specific ways, which, combined with its relatively short track record, makes the comparison difficult.

Privatization will also free the loan officers from fear of the CVC and make them somewhat more willing to lend aggressively where the prospects are good, though, as will be discussed later, better regulation of public banks may also achieve similar goals.

Historically, a crucial difference between public and private sector banks has been their willingness to lend to the priority sector. The recent broadening of the definition of the priority sector has mechanically increased the share of credit from both public and private sector banks that qualify as priority sector lenders. The share of priority sector lending from public sector banks was 42.5 percent in 2003, up from 36.6 percent in 1995. Private sector lending has shown a similar increase from its 1995 level of 30 percent. In 2003 it may have surpassed for the first time ever public sector banks, with a share of net bank credit to the priority sector at 44.4 percent.<sup>51</sup>

Still, there are substantial differences between public and private sector banks. Most notable is the consistent failure of private sector banks to meet the agricultural lending sub-target, though they also lend substantially less in rural areas. Our evidence suggests that privatization will make it harder for the government to get the private banks to meet its goals. However, it is not clear that this reflects the greater sensitivity of the public banks to this particular social goal. It could also be that credit to agriculture, being particularly politically salient, is the one place where the nationalized banks are subject to political pressures to make imprudent loans.

Finally, one potential disadvantage of privatization comes from the risk of bank failure. In the past there have been cases where the owner of the private bank stripped its assets and declared it unable to honor its deposit

50. Cole (2004).

51. All numbers are from various issues of *Report on Trends and Progress of Banking in India*.

liabilities. The government is, understandably, reluctant to let banks fail, because one of the achievements of the past forty years has been to persuade people that their money is safe in the banks. Therefore, government has tended to take over the failed bank, with the resultant pressure on the fiscal deficit. Of course, this is in part a result of poor regulation—the regulator should be able to spot a private bank that is stripping its assets. Better enforced prudential regulations would considerably strengthen the case for privatization.

On the other hand, public banks have also been failing. The problem seems to be part corruption and part inertia and laziness on the part of the lenders. As we saw above, the cost of bailing out the public banks may well be larger (appropriately scaled) than the total losses incurred from every bank failure since 1969.

Once again the “newness” of the private banks poses a problem: So far none of them has defaulted, but because they are also new, they have not yet had to deal with the slow decline of once successful companies, which is one of the main sources of the accumulation of bad debt on the books of the public banks.

On balance, we feel the evidence argues, albeit quite tentatively, for privatizing the nationalized banks and tightening prudential regulations. On the other hand, we see no obvious case for abandoning the “social” aspect of banking. Indeed there is a natural complementarity between reinforcing the priority sector regulations (for example, by insisting that private banks lend more to agriculture) and privatization, because with a privatized banking sector it is less likely that the directed loans will get redirected based on political expediency.

However, there is no reason to expect miracles from the privatized banks. For a variety of reasons, including financial stability, the natural tendency of banks, public or private, the world over is toward consolidation and the formation of fewer, bigger banks. As banks become larger, they almost inevitably become more bureaucratic, because most lending decisions in big banks, by necessity, must be taken by people who have no direct financial stake in the loan. Being bureaucratic means limiting the amount of discretion the loan officers can exercise and using rules, rather than human judgment wherever possible, much as is currently done in Indian nationalized banks. Allen Berger and colleagues have argued in the context of the United States that this leads bigger banks to shy away from lending to the smaller firms.<sup>52</sup> Our presumption is that this consolidation

52. Berger and colleagues (2001).

and increased focus on lending to corporate and other larger firms is what will happen in India, with or without privatization, though in the short run the entry of a number of newly privatized banks should increase competition for clients, which ought to help the smaller firms.

In the end the key to banking reform may lie in the internal bureaucratic reform of banks, both private and public. In part this is already happening, as many of the newer private banks, such as HDFC Bank and ICICI Bank, try to reach beyond their traditional clients in the housing, consumer finance, and blue-chip sectors.

Such reforms will require a set of smaller step reforms, designed to affect the incentives of bankers in private and public banks. A first step would be to make lending rules more responsive to current profits and projections of future profits. This may be a way both to target better and to guard against potential NPAs, largely because poor profitability seems to be a good predictor of future default. It is clear, however, that choosing the right way to include profits in the lending decision will not be easy. On one side is the danger that unprofitable companies will default. On the other is the danger of pushing a company into default by cutting its access to credit exactly when it needs it the most, that is, right after a shock to demand or costs has pushed it into the red. Perhaps one way to balance these objectives would be to create three categories of firms. The first would be profitable to highly profitable firms. Within this category lending should respond to profitability, with more profitable firms getting a higher limit, even if they look similar on the other measures. The second category would be short-term marginally profitable to loss-making firms or once-profitable firms that have been hit recently by a temporary shock, such as an increase in the price of cotton because of crop failures. For these firms the existing rules for lending might work well. The third category would be long-term marginally profitable to loss-making firms or firms hit by a permanent shock, such as the removal of tariffs protecting firms in an industry in which the Chinese have a huge cost advantage. For these firms, there should be an attempt to discontinue lending, based on some clearly worked out exit strategy (it is important that the borrowers be offered enough of the pie that they feel that they will be better off by exiting without defaulting on the loans).

Of course, it is not always going to be easy to distinguish permanent and temporary shocks. In particular, what should we make of the firm that claims to have put in place strategies that help it survive the shock of Chinese competition, but that the strategy will work only in a couple of years? The best rule may be to use the information in profits and costs over several years and the experience of the industry as a whole.

One constraint on moving to a rule of this type is that it puts more weight on the judgment of the loan officer, who would now also have to judge whether a company's profitability (or the lack of it) is permanent or temporary. This increased discretion will obviously increase both the scope for corruption and the risk of being falsely accused of corruption. As we saw above, the data are consistent with the view that loan officers' fears of being falsely accused of corruption pushes them to avoid taking any decisions if they can help it. It would be difficult to achieve better targeting of loans without reforming the incentives of the loan officers.

Other steps can go some distance toward this goal, even within public banks. 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?), and a prima facie case that the failure of the loan could have been predicted must be made before the authorization to start investigating the officer is given. Ideally, until that point the loan officer should not know that there is an investigation. The authorization to investigate a loan officer should also be based on the most objective available measures of the lifetime performance of the loan officer across all the loans where he or she made decisions, and weight should be given both to successes and to failures. A loan officer with a good track record should be allowed some mistakes (even suspicious-looking mistakes) before he or she is open to investigation.

Banks should also create a separate division, staffed by bankers with high reputations, that is allowed to make a certain amount of high-risk loans. Officers posted to this division should be explicitly protected from investigation for loans made. Some extra effort will probably be needed 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 a particular location). These new companies would be the equivalent of the many finance companies that do extensive lending all over India, but with links to a much bigger corporate entity and therefore better 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 some fixed amount higher than their borrowing rates. Being small and

connected to a particular industry, these finance companies could acquire detailed knowledge of the firms in the industry and would have an incentive to make loans that would appear adventurous to outsiders.

Finally, giving banks a stronger incentive to lend by cutting the interest rate on government borrowing will also help. The evidence reported above suggests that where lending is difficult, making lending to the government less lucrative can strongly encourage bankers to make loans to the private sector. Thus it is the less obviously creditworthy firms that suffer most from the high rates of government borrowing.

## Comment and Discussion

**Urjit R. Patel:** The Banerjee, Cole, and Duflo paper presents a series of hypotheses that, strictly speaking, relate to banking *performance* in India rather than to reform, except in the limited sense of decisions taken regarding dilution and embellishment of stringent administrative dictates imposed earlier. More important, it does not adequately address the issue of *how* to proceed with even the limited changes that the authors suggest. Although the paper addresses the micro-behavior of the bank from which the data are drawn, the systemic “macro” implications of that behavior remain tenuous at best.

Most of my comments will deal with the paper’s conclusions and recommendations rather than the mechanics of the models themselves. As to the models, I will focus on the first one, not just because it is the most detailed but also because it is the most contemporary. Since the practice of banking changed so vastly in the latter half of the 1990s, conclusions regarding differences in the 1970s and 1980s, though interesting in themselves, are likely to have little “predictive utility” for policy in the current environment.

The results obtained by the authors are congruent with intuition—that is, there is little about them that is surprising. A statistical deconstruction of the estimation procedure, however, turned out to be surprisingly difficult, especially given the apparent simplicity of the estimation equations. I have to admit that although the language is a bit dense, the modeling steps are crafted methodically, and I enjoyed trying to second-guess the authors’ underlying reasoning. A clearer picture of the rationale of the constructs emerged on reviewing the authors’ 2002 working paper. Even then, the rationale and intuitiveness of the multiplicative term as an instrument for growth in credit is not completely convincing, but I suppose, in an elliptical way, it could capture the interaction of spatial and temporal distribution of firms. The periodicity of the dataset (1997–99) that the authors use is not self-evident: are the data periodic (annual, quarterly, or something else), or are they sporadic, in the sense that they were available when the bank made the loan decision and were then aggregated by the authors?

A brief description of the procedure the authors used to test their hypothesis of underlending is warranted. They look at under-lending from the viewpoint of firms, a clever “turning on its head” of the normal approach to credit constraints. If firms are not credit constrained, there is no underlending. A testable hypothesis is the corollary that for constrained firms revenue growth should be greater than growth in subsidized credit, and this is the hypothesis that the authors test. Equation (1) tests whether credit growth differed across types of firms (BIG or small), over time (POST) or as a combination of the two (BIG \* POST). In my understanding, the sequence is as follows: they filter out the differential treatment, if any, of “small” and “big” firms, of lending before and after the (“inclusion” of) policy change, and of interactions between the two. These are essentially the results in tables 1 and 2.

Were there some other extraneous policy changes during this period (apart from the higher credit limits that allowed segmentation of the sample) that might have changed the bank’s decisionmaking and thereby interfered with the control structure of equation (1)? Looking at the *Economic Survey of India* for 1998–99, one finds that indeed there had been changes in 1998 relating to loans to small-scale industry (SSI) units. For instance, ceilings for working capital (subject to 20 percent of annual turnover) were doubled from Rs. 2 crore to Rs. 4 crore. The powers of bank managers of specialized SSI branches had been “enhanced” to allow them to make credit decisions at the branch level. Following the report of a high-powered committee in June 1998, measures like enhancing composite loans from Rs. 2 lakh to Rs. 5 lakh, delegating more powers to branch managers for granting ad hoc facilities, and so forth were implemented. These policy relaxations are likely to have had an impact on banks’ lending decisions regarding both firms that were below and firms that were above the changed exclusion limit.

As for column (2) in table 2, where the effect of borrowing from the market by small firms (that is, the substitution effect) is incorporated, it is unclear what it means by small firms borrowing from the market. It is unlikely that small firms are accessing the capital markets; maybe the authors mean loans from SIDBI, state finance corporations (SFCs), or other similar sources. Other financing modes available to SSIs—for example, bill discounting—also should be included in the definition of credit. Various directives and notifications from the RBI regarding these channels have the potential of distorting credit aggregates if all the components have not been factored in.

TABLE 10. Business Loan Rates, 1996–99

	<i>Minimum general loan rate of scheduled commercial banks</i>	<i>Prime lending rate of Industrial Development Bank of India</i>	<i>Rate charged to small-scale industries by state financial corporations</i>	<i>Cost of scheduled commercial bank funds (deposits)</i>
1996–97	14.5–15	16.2	12–27.5	11–12
1997–98	14.0	13.3	12–18	10.5–11
1998–99	12–13	13.5	12–18.5	9–11
<i>Average</i>				
1997–99	13.3–14	14.3	12–21.3	10.2–11.3

Source: Reserve Bank of India (2003, table 63, pp. 99–100).

There are multiple references to subsidized credit, and in some ways the key to identifying credit-constrained firms is their behavior on being able to access “subsidized” credit. We normally associate subsidized credit with priority sector lending; in this case, small firms (SSIs) would be the typical candidates for being credit constrained. At what rates have they been granted credit? Some figures from the 2003 RBI *Handbook of Statistics* are given in table 10.

In light of these numbers, it is rather difficult to judge whether SSIs indeed have had access to “subsidized” credit. One then has to be very careful about benchmarking these rates with banks’ published prime lending rates (PLRs), as the authors later seek to do for the interest rate spread with respect to the PLR of the State Bank of India (SBI). PLRs in Indian banking, unlike in other countries, are quite deceptive, with significant sub-PLR lending often taking place.

In the model for testing the effect on credit growth of vigilance activities, causality effects that could bias the coefficient estimates cannot, *prima facie*, be ruled out. For instance, higher credit growth could have been the result of increased “extra-commercial” considerations for disbursement, thereby leading to more vigilance investigations.

So much for the technical aspects of the models. Now let me address the authors’ conclusions and comments on the future of banking reform. I could not agree more with them about the need for privatization. Many of the incentives and disincentives that the authors mention, test, and attempt to quantify are considerably more likely to be correctly aligned with the goals of banking reform in a privatized environment.

Some of the authors’ observations might have benefited from elaboration of the underlying processes. For instance, it is not surprising that

priority sector lending of private sector banks surpassed that of public sector banks in 2003. This is patently due to the growth of individual housing loans (less than Rs. 10 lakh)—which, for urban areas, had already been included as part of priority lending since 1999;<sup>1</sup> as of April 2003, loans of less than Rs. 10 lakh in rural and semi-urban areas also were included. For private banks, the *Report on Trends and Progress in Banking in 2002–03* shows that the share of “others” (that is, other than agriculture and SSI) in priority sector loans—which include home loans—was the highest. Moreover, as of 2003, loans to NBFCs toward their SSI lending also count as priority sector loans. (This last measure, incidentally, is close to the authors’ prescription that banks be empowered to lend to specialized companies.)

The authors state that for the period between 1977 and 1990, studies have shown some improvement in rural poverty and output because of the increase in rural branch bank openings. Remember, though, that this was precisely the period when a whole slew of “development” programs rendered the public exchequer bankrupt. In addition, the tapering off of rural branch additions, especially for nationalized banks, after the “4 for 1” scheme was abolished does not tell us much about what—other than the high base levels—might have led to this phenomenon in terms of underlending. It is instructive that as of March 2003, despite the fact that 49 percent of bank branches were in rural areas, their share of credit was only 10 percent.<sup>2</sup> One can but conjecture that rural areas could, in fact, be considered “overbanked” in some sense.

The authors’ contention that “privatization will make it harder for the government to get private banks to comply with [agricultural lending sub-targets]” cannot be ignored. In this context, a proposal that merits consideration is a suitably designed mechanism to use “minimum subsidy bidding” to provide rural credit. Acquisition of financial resources from rural and semi-urban areas has already been accomplished quite efficiently through the various small savings schemes, which can be ramped up through greater collaboration with the extensive network of post offices. The problem is credit delivery. Some corporations are now beginning to explore underdeveloped rural markets to tap their latent purchasing power, and these markets might also be profitably explored as avenues for the use of funds from small savings schemes. Besides, an extensive network of regional rural banks already exists. While there are likely to be problems in

1. RBI Master Circular (March 2004), paragraph 1.8.1.1.

2. RBI Banking Statistics, Quarterly Handout (March 2003).

ensuring suitable deployment of funds, credit delivery mechanisms other than through commercial banks should be explored.

I have some disagreement with the authors on their seeming perception of a heightened risk of bank failure following privatization. First, is there something inherent in the risk profile of their portfolios, their lending processes, or their incentive structures that makes private banks more prone to failure (in the sense of bad loans eroding their net worth)? Prima facie, the lending processes of some public sector banks that I am aware of make them more vulnerable to bad decisions. Second, presuming that this is so, is it an empirically validated phenomenon, especially for India? Remember, we are talking of commercial banks, not the relatively less regulated cooperative banks or NBFCs.

Ownership of public sector banks remains a fundamental barrier to establishing the “correct” incentives in risk management—for instance, as the authors say, in making “lending rules more responsive to current profits and projections of future profits.” In a properly enforced regulatory environment and with the enhanced commercial discipline increasingly being demanded by shareholders, a focus on (risk-adjusted) return on equity is best achieved through profit maximization by intermediaries.

There can be no quarrel as such with the apparent remedial prescription for more tightly enforced prudential regulation. However, reading through the authors’ approach to regulation, I get a lingering “feeling” that they advocate a more intrusive ratio-based oversight, although admittedly I may be mistaken. I am a bit ambivalent about this; tighter enforcement is a must, but the approach should devolve risk management toward the banks. Regulation is moving away from stifling ratiocentric approaches toward a more decentralized risk management system (the Basle II approach), and, to its credit, the RBI already has embarked on a prompt corrective action approach—which ensures that regulators act in a timely fashion—with a pilot under way. Furthermore, both shareholder and depositor scrutiny need to be augmented, to bring greater commercial discipline to banks. One area that deserves rethinking in this regard is deposit insurance, which thus far has contributed to lulling depositors into an unwarranted, false sense of security.

The observations on establishing processes to give more discretion to public sector loan officers are very sensible, and the approach in my own institution points to taking collective responsibility in approving loans; in fact, all banks have credit committees, with various degrees of empowerment. While one may completely agree with the authors about banks’ need for internal bureaucratic reforms to advance loan disbursement, there have

to be concomitant reforms in bankruptcy and foreclosure laws to allow them to turn distressed assets around expeditiously.

The prescription regarding making holdings of government securities by banks less attractive is more open to criticism. Artificial tampering with interest rates is not desirable, interfering as it does with an authentic interest yield curve formation. Besides the obvious injunction to reduce government borrowing, the role of the RBI as sector regulator on the one hand and investment banker to the government's borrowing program on the other—and the consequent potential conflicts of interest—is what needs to be examined more closely.

## General Discussion

Suman Bery raised the issue of how the microeconomic analysis of the Banerjee paper could be related to macroeconomic questions, such as those about capital account convertibility and financial vulnerability. The question is whether India would be well served or badly served by the fact that public sector banks dominate the banking sector and private sector banks operate in their shadow. In response, Banerjee said that regarding financial vulnerability, when nothing responds to anything—for example, firms get the same loans whatever happens—the system is actually going to be pretty stable. This is a system that is going to be hard to hit through exchange rate changes. The way the economy gets hit in typical financial-flow crisis models is through the credit channel: if banks do not have enough liquidity, they stop lending. *But if the situation is one in which banks keep lending and firms keep borrowing regardless of the liquidity position, it is going to be a very static system that does not have the unstable dynamics of a more responsive system.*

Surjit Bhalla returned to the issue of nonperforming assets (NPAs), arguing that in view of the capital gains on the public debt held by banks, no matter how the level is calculated, the low level of NPAs reflected in the *official figures is quite accurate*. Rakesh Mohan joined in, making the point that whatever the definition used, NPAs are definitely coming down. The low level of lending to the industrial sector has helped in this.

Responding to other comments, Banerjee said that the paper did mention privatization as one of the options being discussed. Maybe the authors were too cautious, and they will state it more forcefully in the future. That said, the most important steps that need to be taken are to ensure better enforcement of loan contracts, better loan service history, and stiffer penalties. Any

other measures would be just a Band-Aid. Banerjee noted, however, that he had not given enough thought to what happens when public sector banks have to compete against private sector banks. Maybe such competition will transform public sector banks, but the outcome will very much depend on the stance the government takes. If it just raises salaries as it has done recently, fails to exercise forbearance, and refuses to close down banks that are unable to compete, that will be the worst deal possible.

In closing the session, Rakesh Mohan made several comments. First, the paper is about banking sector performance rather than banking reforms; in light of that, the authors might want to reconsider the title. Second, a very interesting experiment has been under way in India over the past dozen years. On one hand, private sector entry has been opened up; on the other, there has been a very conscious movement toward adoption of what might be called best practices in regulation and supervision. Today, the second-largest bank, ICICI, is a private sector bank that is very aggressive and is expanding fast. The interesting question is how this development interacts with the systematic introduction of such regulation and supervision. Third, under-lending is a real issue. The impression that there is under-lending is widespread, as evidenced by the recent proposals of the Ministry of Finance for large funds for agriculture, small-scale enterprises, and infrastructure lending. Fourth, based on Mohan's personal experience, even large banks seem not to have the credit histories of their borrowers. Finally, regarding vigilance, there is active discussion on making a clearer distinction between when the Central Vigilance Commission (CVC) goes into action because there is a prima facie evidence of wrongdoing and when it does so just because some loan has gone bad.

## References

- Banerjee, Abhijit. 2003. "Contracting Constraints, Credit Markets, and Economic Development." In *Advances in Economics and Econometrics: Theory and Applications, Eighth World Congress of the Econometric Society, Volume III*, edited by Mathias Dewatripont, Lars Hansen, and Stephen Turnovsky. Cambridge University Press.
- Banerjee, Abhijit, Shawn Cole, and Esther Duflo. 2003. "Bank Finance in India." *Mimeo*, MIT.
- Banerjee, Abhijit, and Esther Duflo. 2001. "The Nature of Credit Constraints. Evidence from an Indian Bank." *Mimeo*, MIT.
- . 2003. "Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program." Working Paper 2003-005. Cambridge, Mass.: Bureau for Research in the Economic Analysis of Development.
- Banerjee, Abhijit, and Kaivan Munshi. 2004. "Networks, Migration and Investment: Insiders and Outsiders in Tirupur's Production Cluster." *Review of Economic Studies* 71: 19–42.
- Berger, Allen, Nathan Miller, Mitchell Peterson, Raghuram Rajan, and Jeremy Stein. 2001. "Does Function Follow Organizational Form: Evidence from the Lending Practices of Large and Small Banks." *Mimeo*, Harvard University.
- Bernanke, Benjamin, and Mark Gertler. 1989. "Agency Costs, Net Worth, and Business Fluctuations." *American Economic Review* 79 (1):14–31.
- Bertrand, Marianne, Antoinette Schoar, and David Thesmar. 2003. "Banking Deregulation and Industry Structure: Evidence from the French Banking Reforms of 1985." *Mimeo*, MIT.
- Blanchflower, David, and Andrew Oswald. 1998. "What Makes an Entrepreneur." *Journal of Labor Economics* 16 (1): 16–60.
- Burgess, Robin, and Rohini Pande. 2003. "Do Rural Banks Matter? Evidence from the Indian Social Banking Experiment." *Mimeo*, Yale University, June.
- Cole, Shawn. 2002. "Corruption, Vigilance, and the Supply of Credit." *Mimeo*, MIT.
- . 2004. "The Effect of Ownership on Banking." *Mimeo*, MIT.
- Das-Gupta, Arindam. 1989. *Reports on Informal Credit Markets in India: Summary*. New Delhi: National Institute of Public Finance and Policy.
- Dixit, Avinash. 1996. *The Making of Economic Policy: A Transaction Cost Politics Perspective*. Munich Lectures in Economics. Cambridge: MIT Press.
- Fazzari, Steven, R. Glenn Hubbard, and Bruce Petersen. 1998. "Financing Constraints and Corporate Investment." *Brookings Papers on Economic Activity*, no. 1: 141–95.
- Government of India. 2000. *Cases Referred to the Central Vigilance Commission by Public Sector Banks: A Critical Analysis*. Delhi: Central Vigilance Commission.
- . 2001. *Special Chapter on Vigilance Management in Public Sector Banks*. Delhi: Central Vigilance Commission.

- Kaplan, Stephen, and Luigi Zingales. 2000. "Investment-Cash Flow Sensitivity Are Not Valid Measures of Financial Constraints." *Quarterly Journal of Economics* 115: 707-12.
- La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2002. "Government Ownership of Banks." *Journal of Finance* 57: 265-301.
- Lamont, Owen. 1997. "Cash Flows and Investment: Evidence from Internal Capital Markets." *Journal of Finance* 51 (2): 83-109.
- Mian, Atif, 2000. "Creditor Incentives and Privatization." Mimeo, MIT.
- Reserve Bank of India. 2000. *Directory of Commercial Bank Offices in India (Volume 1)*. Mumbai.
- . Various issues. *Statistical Tables Relating to Banks in India*. Mumbai.
- . Various issues. *Report on Trend and Progress of Banking in India*. Mumbai.
- Tandon, Prakesh, 1989. *Banking Century: A Short History of Banking in India*. New Delhi: Viking.
- Tannan, Mohan. 2001. *Banking Law and Practice in India*. New Delhi: India Law House.
- Topalova, Petia. 2004. "Overview of the Indian Corporate Sector: 1989-2002." Working Paper 04/64. Washington: International Monetary Fund.