Banking Reform in India[*]

Abhijit V. Banerjee[†], Shawn Cole[†], and Esther Duflo[‡]

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1 Introduction

Measured by share of deposits, 83 percent of the banking business in India is in the hands of state or nationalized banks, which are banks that are owned by the government, in some, increasingly less clear-cut way. Moreover, even the non-nationalized banks are subject to extensive regulations on who 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. While there are those who 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 the 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.[1]"

There is now a body of direct and indirect evidence showing that credit markets in developing countries often fail to deliver credit where its social product might be the highest, and both

[†]Department of Economics, MIT
[‡]Department of Economics, MIT, NBER, and CEPR

[1]From the "Bank Company Acquisition Act of 1969." Quoted by Burgess and Pande (2003).

agriculture and small industry are often mentioned as sectors that do not get their fair share of credit.[2] If nationalization 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 is not very encouraging. For example, La Porta et. al. find in a cross-country setting that government ownership of banks is negatively correlated with both financial development and economic growth.[3] They interpret this as support for their view, which holds 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: cronyism, leading to the deliberate misallocation of capital, bureaucratic lethargy, leading to less deliberate, but perhaps equally costly errors in the allocation of capital, as well as inefficiency in the process of mobilizing savings and transforming them into credit.

Unfortunately the interpretation of this type of cross-country analysis is never easy, and never more so than the case of something like bank nationalization, which typically occurs as part of a package of other policies. For example, Bertrand et. al. study a 1985 banking deregulation in France, which gave banks much greater freedom to compete for clients.[4] They find that deregulated banks respond more to profitability when making lending decisions. After the reform, firms that suffer a negative shock are much more likely to undertake restructuring measures, and there is more entry and exit in bank-dependent industries.

Micro studies of the effect of bank nationalization are rare: an important exception is Mian who examines the privatization of a large public bank in Pakistan in 1991.[5] He finds that the privatized bank does a better job both at choosing profitable clients and monitoring existing clients, than the commercial banks that remained public.

Our previous paper uses micro data from a nationalized bank to evaluate the effectiveness of the Indian banking system in delivering credit.[6] The conclusion from that paper was that the Indian financial system is characterized by under-lending in the sense that there are many firms

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[2] See Banerjee (2003) for a review of the evidence.
[3] La Porta et. al. (2002).
[4] Bertrand et. al. (2003).
[5] Mian (2000).
[6] Banerjee, Cole and Duflo (2003).

that could earn large profits if they were given access to credit at the current market prices.

This paper builds on the previous work with the aim of using that evidence and evidence from other research by ourselves and others, to come to an assessment of the appropriate role of the Indian government vis a vis the banking sector. We first provide a very brief history of banking in India.

Section 3 investigate the quality of intermediation. We begin by presenting evidence that there is substantial under-lending in India. To understand what role public ownership of banks may play in underlending, we identify differences between public and private banks in the sectoral allocation of credit between public and private banks. In particular, we focus on the question of whether being nationalized has made these banks more responsive to what the Indian government wants them to do. We report results, based on work by Cole showing that on many of the declared objectives of "social banking," the private banks were no less responsive than the comparable nationalized banks, with the exception of agricultural lending.[7] Finally, the last sub-section compares the performance of public and private banks as financial intermediaries and concludes that the public banks have been less aggressive than private banks both in lending, in attracting deposits and in setting up branches, at least since 1990.

In section 4, we dig deeper into the lending processes used by the nationalized banks, in an attempt to understand under-lending. We find that official lending policy is very rigid. Moreover, loan officers do not appear to use what little flexibility they have. We argue that the evidence suggests that bankers in the public sector have a preference for what we may call passive lending. To understand why this is the case, 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.

The penultimate section compares 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 try to say something about the sensitive issue of NPAs and bailouts. While the dataset 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

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[7]Cole (2004).

in size between the public and private banks, it is less clear-cut.

We conclude in section 6 with a short discussion of the implications of these results for the future of banking reform.

2   Background

India has a long history of both public and private banking. Modern banking in India began in the 18th century, with the founding of the English Agency House in Calcutta and Bombay. In the first half of the 19th 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 20th century saw the introduction of joint stock banks. In 1935, the presidency banks were merged together to form the Imperial Bank of India, which was subsequently renamed the State Bank of India. Also that 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.

The post-war development strategy was in many ways a socialist one, and the Indian 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, resulting in the nationalization of 54 percent more of the branches in India, and bringing the total number 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

4

banking authority, adding up, in the final analysis, to social control and nationalization.[8]

After nationalization, the breadth and scope of the Indian banking sector expanded at a rate perhaps unmatched by any other country. Indian banking has been remarkably successful at achieving mass participation. Between the time of the 1969 nationalizations and the present, over 58,000 bank branches were opened in India; these new branches, as of March 2003, had mobilized over 9 trillion Rupees in deposits, which represent the overwhelming majority of deposits in Indian banks.[9]. This rapid expansion is attributable to a policy which required banks to open four branches in unbanked locations for every branch opened in banked locations.

Between 1969 and 1980, the number of private branches grew more quickly than public banks, and on April 1, 1980, they accounted for approximately 17.5 percent of bank branches in India. In April of 1980, the government undertook a second round of nationalization, placing under government control the 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. The share of private bank branches stayed fairly constant between 1980 to 2000.

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

Since 1980, 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 towards 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 previously extant financial institutions. The new private banks have grown quickly in the past few years, and one has grown to be the second largest bank in India. India has also seen the entry of over two dozen foreign banks since the

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[8]Tandon (1989, p. 198).

[9]Statistical Tables Relating to Banks in India, 2003

commencement of financial reforms. While we believe both of these types of banks deserve study, our focus here is on the older private sector, and nationalized banks, since they represent the overwhelming majority of banking activity in India.

The Indian banking sector has historically suffered from high intermediation costs, due in no small part to the staffing at public sector banks: as of March 2002, there were 1.17 crores of deposits per employee in nationalized banks, compared to 2.05 crores per employee in private sector banks. As with other government-run enterprises, corruption is a problem for public sector banks: in 1999, there were 1,916 cases which attracted attention from the Central Vigilance Commission. While not all of these 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, it is potentially a dangerous time to evaluate its performance using historical data. Nevertheless, data from the past is all we have, and we believe things are not changing so quickly that the lessons learned are not useful.

3   Quality of Intermediation

3.1   Is there under-lending?

3.1.1   Identifying under-lending

A firm is getting too little credit if the marginal product of capital in the firm is higher than the rate of interest the firm is paying on its marginal rupee of borrowing. Under-lending therefore is a characteristic of the entire financial system: the firm has not been able to raise enough capital from the market as a whole. In other words, while we will focus on the clients of a 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.

However, we know 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 some extra credit at a rate below what it is paying on the market, then the best way to make use of the new loan must be to pay down the firm's current market borrowing, rather than to invest more. This is because, by the definition of not being credit constrained, any additional investment will drive the marginal product of capital below what the firm is paying on its market borrowing. It follows that a firm that is not facing any credit constraint will expand its investment in response to additional subsidized credit becoming available, 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 we do not see a gap in these growth rates, the firm must be credit constrained. Of course, revenue could increase slower than credit even for non-constrained firms, if the technology has declining marginal return to capital.

These predictions are more robust than the traditional way of measuring credit constraints as the excess sensitivity of investment to cash flow.[10] Our approach inscribes itself in a literature

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

that tries to identify specific shocks to wealth in order to identify credit constraints.[11]

In Banerjee and Duflo we test these predictions by taking advantage of a recent change in the so-called "priority sector" rules in India: all banks in India are required to lend at least 40 percent of their net credit to the priority sector, which includes small scale industry (SSI), at an interest rate that is required to be no more than 4 percentage points above their prime lending rate.[12] If banks do not satisfy the priority sector target, they are required to lend money to specific government agencies at low rates of interest. In January, 1998, the limit on total investment in plants and machinery for a firm to be eligible for inclusion in the small scale industry category was raised from Rs. 6.5 million to Rs. 30 million. Our empirical strategy focuses on the firms that became newly eligible for credit in this period, and uses firms that were always eligible for priority sector credit as a control. The results from our analysis are reported briefly in the next sub-section.

3.1.2 The evidence for under-lending

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

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

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

with y taking the role of the various outcomes of interest (credit, revenue, profits, etc.) and the dummy $POST$ representing the post January 1998 period. We are in effect comparing how the outcomes change for the big firms after 1998, with how they change for the small firms. Since

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

[12] Banerjee and Duflo (2002).

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 $BIG * POST$ 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.

[TABLE 1 ABOUT HERE]

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 $BIG * POST$ is 0.95, with a standard error of 0.033. Column (1) estimates the probability that a firms credit limit was changed: the coefficient on $BIG * POST$ is close to zero and insignificant, suggesting that the reform did not affect *which* firms limits were changed. This corresponds to the general observations that whether or not a firm's file is brought out for a change in limit has nothing to do with the needs of the firm, but respond to internal dynamics of the bank. We will make use of this fact to partition the sample into two groups on the basis of whether there was a change in the credit limit or not: the sample where there was no change in limit can be used 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 $BIG * POST$ 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 $BIG * POST$. The additional credit limit thus resulted in an increase in bank credit utilization by the firms.

[TABLE 2 ABOUT HERE]

Table 2 presents the impact of this increase in credit on sales and profits. The coefficient of the interaction $BIG*POST$ 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 $BIG * POST$ 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 $BIG * POST$ 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 non-bank credit as a result of the reform, and that firms are credit constrained.

Additional evidence is provided in column (2). We restrict the sample to firms which 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 $BIG * POST$, 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 only estimate the impact on firms whose profits were positive. The effect is even bigger than that of sales: 0.54, with a standard error of 0.28. Here again, we see no effect of the interaction $BIG * POST$ 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

10

the reduced form and first stage estimates in columns (1), and (3) are presented in panel B 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 which 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. This 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 8,6800. Therefore, and increase of Rs. 1,000 in the loan corresponds to a 1.15% 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% increase in profit. At the mean profit (which is Rs. 36,700, this would correspond to an increase in profit of Rs. 756.[13]

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. In order 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 firm's loan had become non-performing 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% of the big firms and 7.29% of the small firms (who were not already NPA), default on their loan in 2000 or 2001. Among the firms in Mumbai, 2.5% of the large firms, and 5.96% 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,

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[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 in Rs 1,000 in the loans leads to an increase in Rs 730 in profits.

11

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[14]), we compute that the interest rate banks should charge to these firms is close to 22% (rather than the 16% they are charging on average). This means that the gap between the social marginal product of capital is at least 66%. These results provide clear evidence of very substantial under-lending: some firms clearly can absorb much more capital at high rates of return. Moreover the firms in our sample are by Indian standards quite substantial: these are not the very small firms at the margins of the economy, where, even if the marginal product is high, the scope for expansion may be quite limited.

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 loans enhancements to the most profitable firms. This is consistent with evidence reported in Dasgupta[15], that the interest rate paid by firms and by implication the marginal product of capital varies enormously within the same sub-economy.[16] It is also consistent with the more direct evidence in Banerjee and Munshi showing that there is very substantial variation in the productivity of capital in the knitted garment industry in Tirupur[17]. Furthermore, while we have no direct data on this point, banker's lore suggests that the firms that have relatively easy access to credit tend to be the bigger and longer established firms.

The underprovision 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 while the public sector banks provide relatively little credit to SSI firms, private banks are even worse. In the next sub-section we examine the effect of bank ownership on bank allocation of credit.

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[14]Banerjee and Duflo (2001).

[15]Dasgupta (1989).

[16]Banerjee (2003) summarizes this evidence.

[17]Banerjee and Munshi (2004).

3.2 Bank Ownership and Sectoral Allocation of Credit

As mentioned above, an important rationale for the Indian bank nationalizations was to direct credit towards 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, indicating that both public and private sector banks must provide at least one-third of their aggregate advances to the priority sector by March 1979. In 1980, it was announced that this quota would be increased to 40 percent by March 1985. Sub-targets were also specified for lending to agriculture and weaker sectors within the priority sector. Since public and private banks faced the same regulation, in this section we focus on how ownership affected credit allocation.

The comparison of 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.[18] After 1980, the nationalized banks remained corporate entities, retaining most of their staff, though the board of directors was replaced by nominees of the Government of India. Both the banks that got nationalized under this rule and the banks that missed being nationalized, continued to operate in the same environment, and face the same regulations and therefore ought to be directly comparable.

Even this comparison between banks just nationalized and just not nationalized may be invalid, because policy rule means that banks nationalized in 1980 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 Cole, we adopt an approach in the spirit of regression discontinuity design, and compare banks that were just above the 1980 cutoff to those that were just below the 1980 cutoff, while control-

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[18]While the 1969 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.

13

ling for bank size in 1980.[19] 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.

In order 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, etc.), 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,[20] and share of bank lending to the following areas: agriculture, rural credit, small scale industry, government credit, and "trade, transport and finance." 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 $\mathrm{BG}_1, ..., BG_G$ bank group dummy variables. Specifically, we estimate:

$$y_{b,d,t} = \sum_{i=1}^{G} \gamma_i \mathrm{BG}_i + \sum_{i=1}^{G} \delta_i \mathrm{District}_i + \varepsilon_{b,d,t} \tag{2}$$

[TABLE 3 ABOUT HERE]

The estimated bank group effects, $\hat{\gamma}_1, ..., \hat{\gamma}_G$ give the average share each bank gives to each sector, after controlling for differences across districts. These coefficients are presented in Table 3. (We use data from 1992, 1993, 1999, and 2000.) For example, the estimated $\hat{\gamma}$ for the average loan size from banks in the State Bank of India group is Rs. 56,190. Compared to the average loan size of the State Bank of India, nationalized banks gave slightly smaller loans (an average of

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[19] Cole (2004).

[20] The residual interest rate is obtained by regressing the interest rate on a wide range of control variables, such as: small scale industry indicators, borrower occupation dummies (at a 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.

14

6,430 Rs. lower), while marginal nationalized banks gave slightly larger loans (the average was 8,350 Rs. greater), marginal private banks gave much larger loans (35,310 Rs. more), and small private banks gave loans much larger on average (58,500 Rs. 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 the former were nationalized while the latter weren't. 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), four percentage points more credit to rural areas (compared to a national average of 12 percent), and slightly more to government enterprises (.7 percent more; the India-wide figure is 3 percent.). These increases come at the expense of credit trade, transport, and finance (nationalized banks gave 6 percent points less, compared to 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 one percent level.

While this is suggestive 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 $\hat{\beta}_1, ... \hat{\beta}_B$. 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 $\widehat{\beta}_b$ on log deposits of the bank in 1980 $(size_b)$, an indicator variable (Nat_b), which takes the value of one 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:

$$\widehat{\beta}_i = \alpha + \delta_1 size_i + \gamma_1 Nat_i + \delta_2 (Nat_b * size_b) + \varepsilon_i \qquad (3)$$

[FIGURE 1 ABOUT HERE]

[FIGURE 2 ABOUT HERE]

Figure 1 presents the average share each bank provides to small-scale industry (top panel) and "trade, transport and finance" (bottom panel). 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.[21] The left line gives the relationship $\hat{\alpha} + \hat{\delta}_1 * size_i$, while the right line gives the relationship $\hat{\alpha} + \hat{\gamma} + \left(\hat{\delta}_1 + \hat{\delta}_2\right) * size_i$. Contrary to 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 that are 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 had the effect of lowering 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 by the top panel of Figure 2. 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 cut-off: 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 presented in the bottom panel of Figure 2.

[TABLE 4 ABOUT HERE]

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[21] To avoid disclosing bank-specific data, we have grouped banks with similar deposit size in 1980 into pairs or groups of three. Thus, while our sample includes 42 banks that were private or nationalized in 1980, there are only 19 points on the graph. The statistical analysis presented in Table 4 provides esimates based on individual bank-level data.

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 .084, with a standard error of .029: 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 nine 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 two-percentage point difference is particularly large in light of the fact credit to government borrowers represents only two percent of bank credit. Public sector banks appear to lend at slightly lower interest rates, though the point estimate, seventy 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 and transport and finance from -11 to -6 percentage points.

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, 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. though, Surprisingly, there was no effect on credit to small scale industry. Lending differences shrunk over the 1990s, and in 2000 were about half of what they were in

the early 1990s. This might reflect 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.

3.3   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 cut-off, using data from the Reserve Bank of India, for the period 1969 to 2000. We include the six above, which were nationalized, and the nine largest below, which were not.[22] Since we have data from both the pre and post period, 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 (1980-1991 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 (β_i). We thus regress:

$$
\begin{aligned}
\ln \left(y_{b,t}/y_{b,t-1}\right) \quad = \quad & \beta_i + \theta_1 Post_t + \theta_2 * Nineties_t + \\
& \gamma_1 \left(Post_t * Nat_b\right) + \gamma_2 \left(Nineties_t * Nat_b\right) + \varepsilon_{b,t}
\end{aligned}
\tag{4}
$$

The parameters of interest are γ_1 and γ_2, which capture the differential behavior of nationalized banks after the nationalization. Standard errors are adjusted for auto-correlation within each bank.

[TABLE 5 ABOUT HERE]

Table 5 presents the results for growth in credit, deposits and bank branches. The results suggest that while the overall rate of growth in deposits and credit slowed substantially in the

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

period 1980-1990 relative to the 1969-1979 period, 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 down more than the private banks: deposits grew 7.3 percent slower, while credit grew 8.8 percent less quickly. These results are significant at the ten and five percent level, respectively.

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 prior to nationalization, we re-estimate 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 suggests that credit, deposit 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 interaction terms $(Post_t * Nat_b)$ and $(Nineties_t * Nat_b)$ 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.

In the next section, we look for features of public banks that may explain the above results, examining both official lending policies, and other incentives faced by employees of public sector banks.

4 Bank Ownership and the Quality of Intermediation

4.1 Limitations on Public Sector Banks

4.1.1 Official Lending Policies

While public sector banks in India are nominally independent entities, they are subject to intense regulation by the Reserve Bank of India (RBI). This includes rules about how much a bank should 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:

$$0.75 * \text{CURRENT ASSETS} - \text{OTHER CURRENT LIABILITIES} \tag{5}$$

The sum of all loans from the banking system was supposed not to exceed this amount.[23]

This definition of the maximum permissible bank finance applied to loans above Rs. 20 million. For loans below 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, i.e. 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, following the recommendation of the committee on financing of the small scale industries (the Nayak committee), the RBI decided to give each bank the flexibility

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[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 over 1.33, and the rule is often formulated as the requirement that the current ratio exceeds 1.33.

to evolve its own lending policy, under the condition that it be made explicit. Moreover the Nayak committee recommended that the turnover rule be used to calculate the lending limit for all loans under Rs. 40 millions.

Given the freedom to choose the rule, different banks went for slightly different strategies. The bank we studied adopted a policy which 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:

$$\min(0.20 * \text{Projected turnover}, 0.25 * \text{Projected turnover} - \text{available margin}) \qquad (6)$$

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 only needs to finance 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 6 would be equal.

The rule did not stop here. For all loans below Rs 40 million (all the loans in our sample are below 40 million), the loan officer was supposed to use both equation 6 and the older rule represented by 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 USA. However the view in the USA 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, since profitable companies are less likely default. Second, in the USA the role of finding promising firms and promoting them is carried out, to a significant extent, by venture capitalists. In India the venture capital industry is still nascent and it will be a while before it can play the role that we expect of its US equivalent. Therefore banks may have to be more pro-active in promoting promising firms. Following a rule that does not put any weight

on profits may not be the way to favor the most promising firms: while 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.

4.1.2   Actual Lending Policy

The lending policy statements give us the outside limits on what the banks can lend. There is nothing in the policies that stops them from lending less, though bankers are always enjoined to lend as much as possible in official documents.[24] 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 banker had lent too much given that he is given the task of estimating expected turnover. In this sub-section, based on work by Banerjee and Duflo, we therefore look at the actual practice of lending in our sample of loans.[25]

Data: We use the same data source that was used in previous work by Banerjee and Duflo (and described in the previous section) to look at what bankers actually do.[26] Since we have data on current assets and other current liabilities, it is trivial to calculate the limit according to the traditional, working capital gap-based method of lending (henceforth LWC). We can also calculate the limit on turnover basis (henceforth LTB). The maximum of LTB and LWC is, according to the rules, the real limit on how much the banker can lend to the firm.

[TABLE 6 ABOUT HERE]

Results: In Table 6, we show the comparison of the actual limit granted with $\max(LTB, LWC)$.

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[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)

[26]Banerjee and Duflo (2002).

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 the amount granted in the previous period (it is smaller 4 percent of the times, and goes up only in 34 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 and 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 despite the fact that 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 time: in 1997, the limit was equal to the previous granted limit 53 percent of the time. In 1999, it did not change in 70 percent of the cases.

[TABLE 7 ABOUT HERE]

In Table 7, we regress the actual 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) past loan amount and the (log) limit according to the 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 one 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 3 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), 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, since 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 are 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 actually rational and results from the fact that the past loan amount picks up all the information that the loan officer has accumulated about the firm that we do not observe. Prima facie, this explanation does not fit very well with the fact that the loan amount remains exactly the same–the past may be important but, as we already 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 banks experience with the firm: the fact that the weight is so high presumably reflects the fact that the past is very informative, suggesting a very stable environment. But a very 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 found 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.[27] 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 actual 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 (past loans, etc...) are not: the only good predictor of future negative profit is current negative profit.[28] Negative profits, in turn predict default, [29] while past loans, LTB and LWC do not.

Conclusion: This sub-section 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 they do take a decision to make a fresh loan the beneficiaries tend to be firms whose turnover is growing, irrespective 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 pay even lip service to 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 the variables that do 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 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 towards firms that have been able

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[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.

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to finance growth out of internal resources and therefore do not need the capital nearly as much.

4.2 Why is there 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 reason for why this happens is that the loan officers in these banks have no particular incentive to lend. They are government employees on a more or less fixed salary and promotion schedule and the rewards are at best weakly tied to their success in making imaginative lending decisions. On the other hand, failed loans, as discussed below, can lead to investigations by the Central Vigilance Commission, which is the body entrusted to investigate potential cases of fraud in the public sector. They therefore have a lot to lose and little to gain from being brave in lending. Not taking any new decisions may dominate any other course of action and moreover, this is especially likely to be true if there are attractive alternatives to lending (such as putting your money in government bonds).

The next sub-section examines the role that the fear of prosecution plays in discouraging 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.

4.2.1 Inertia and the fear of prosecution

Since public sector banks are owned by the government, employees of the bank are treated by law as public servants, and thus subject to government anti-corruption legislation. There is an impression among bankers that it is very easy to be charged with corruption, and that the law states that if any government functionary takes a decision which results in direct financial gain to a third party, the individual 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.[30] 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 N[on] P[erforming] A[ssets]. The group also noticed a marked reluctance at various level to take any credit decision.[31]"

In response to criticism from bankers, economists, and others, the Central Vigilance Commission (henceforth CVC), which is 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. While this new chapter was meant to reassure bankers, the language would probably not reassure anyone with experience working in a western bank. The manual reads, for example, that "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." (p. 5)

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, she may have been relieved of her duties, transferred, or passed over for promotion during the time of 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 no explicit incentives for making good loans, or 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 of them but central vigilance may be another, and the press may be yet another. In such circumstances, it

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

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

may be very difficult to provide effective incentives.[32] If this were the case, loan officers would prefer not to take new decisions. 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 they do take a decision, making sure that they did not deviate enormously from the precedent, is a way of covering themselves against charges of wrong-doing or worse.

Not surprisingly, the Central Vigilance Commission disputes the claim that there is a "fear psychosis," and, to bolster their position, released in 2000 a "critical analysis" of vigilance activity in public sector banks in 1999. The analysis reveals that in 1999, the Central Vigilance Commission received 1916 references, 72 percent of which were credit-related, recommending punishment in the majority of cases. Their 2000 report states "out of every 100 cases coming before it, the Commission would advice major penalty proceedings in 28 cases, minor penalty proceedings in 32 cases, and administrative warning/exoneration in 40 cases." (p. 9). 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.[33]"

The rest of this sub-section, based on work by Cole looks at whether there is any evidence for the so-called fear psychosis.[34] The basic idea is simple: we ask whether bankers who are "close to" bankers who have been subject to CVC action, slow down lending in the aftermath of that particular CVC action.

[TABLE 8 ABOUT HERE]

Data: Monthly credit data, by bank, were provided by the RBI. Data on frauds are naturally very difficult to come by. It is also the policy of the government of India to keep the data on vigilance activity confidential: while some aggregated statistics are published, they are too aggregated to be useful for econometric analysis. However, in 1998, in an effort 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

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[32]Dixit (1996) describes how the presence of multiple principles in bureacracies may lead to inaction.

[33]Government of India (2000), p.10.

[34]Cole (2002).

with major frauds. This list consists of eighty-seven officials in public sector banks between the years 1992 and 2001. While 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, while the balance is classified as kite-flying or "other." [35] Since our hypothesis is that vigilance results in a decrease in lending activity, the inclusion of spurious non-credit related vigilance activity should bias coefficients towards zero. Summary statistics for credit data, and the CVC fraud data are given in Table 8.

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,

$$y_{it} = \alpha_i + \beta_t + \sum_{k=0}^{w} \gamma_k D_{i,t-k} + \varepsilon_{it} \tag{7}$$

where y_{it} is log credit extended by bank i in month t, α_i is a bank fixed-effect, β_t is a month fixed effect, and $D_{i,t-k}$ is an indicator variable for whether vigilance activity was reported by the CVC for bank i in month t-k. Standard errors reported are adjusted for serial correlation and heteroscedasticity. The basic idea is to compare the bank that was 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 in which 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 at which the CVC provided advice on the case, and the date on which action was taken. Nor is it clear how long it should take before an effect appears, or for how long one would accept this effect to last. We therefore let the data decide, by estimating models which allow effects ranging from one month to four years.

[TABLE 9 ABOUT HERE]

Table 9 presents estimation results from several similar specifications. Columns (1), (2), and (3) provide estimates for windows of one, twelve, and 48 months. There appears to be a clear effect of vigilance activity on lending decisions. Vigilance activity in a specific bank results in a reduction of credit supplied by all the branches of that bank by about 3-5 percent. This effect is estimated precisely (and is significantly different from zero at the 5 percent level

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[35] Government of India, (2000).

for contemporaneous effect (column (1)), and at the 1 percent level for the joint parameters of zero to 24 months in columns (2) and (3)), and is quite persistent, appearing in the data at it's original level for up to eighteen months following the vigilance activity, finally becoming statistically indistinguishable from zero two years after the CVC decision or judgement.

This economic effect seems to be sizable for plausible values of the elasticity of gross domestic product with respect to money supply elasticity. For example, if the overall coefficient of .03 were accurate for a bank such as the State Bank of India, which provides approximately a quarter of the credit in the economy, decisions on whether to pursue vigilance cases could have measurable macroeconomic effects.

Columns (5) and (6) of Table 9 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 9 clearly indicates that there was a reduction in lending in banks prior to 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 CVC investigations, outlines a procedure that lists no binding time constraints, but suggests the entire process be completed within twenty months time. Reassuringly there is no discernable effect for vigilance activity farther out than one year ahead.

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

4.2.2 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 the interest rate on government securities. The problem is that the part of the variation that comes from changes in the rate paid by the government is the same for all banks and therefore is indistinguishable from any other time varying effect on lending. The part that comes from the rates charged by the banks does vary by bank, but cannot possibly be independent of demand conditions in the bank and other unobserved time varying bank specific factors. One cannot therefore hope to estimate the true elasticity of lending by regressing loans on the spread.

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

Data: The outcome we focus on is the ln(Credit/Deposit Ratio), at the end of March of each year, for 25 public sector and 20 private sector banks. Two minor public sector banks were excluded due to lack of data, while the new private sector banks were excluded for reasons of comparability. The data are from the Reserve Bank of India.

Data on the net state domestic product are from the Central Statistical Office. For our measure of interest rate spread, we subtract from the SBI prime lending rate, the rate given as the weighted average of central government securities. Both interest rate measures are from the RBI. as is the price index used to deflate them[36]

Specification: Two measures of growth are used. To measure the state growth rate ($\text{growth}_{it} = \ln(SDP_{it}) - \ln(SDP_{i,t-1})$), we use a moving average of the real growth rates of previous three

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[36]Data are from the 2001 Edition of RBI "Handbook of Statistics on Indian Economy." We use the CPI-UNME, for Urban Non-Manual Employees.

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:

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

where the weights ω_{bi} are the percentage of bank branches bank b had in state i in 1980: $\omega_{bi} = \frac{N_{bi}}{\sum_{s \in states} N_{bs}}$. Data on branch locations are from the Directory of Commercial Bank Offices in India.[37]

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 changes significantly beginning in the 1991-1992, we estimate our equations for the entire time period, 1985-2000, as well as the "post-reform period" of 1992-2000.

[TABLE 10 ABOUT HERE]

The results are reported in Table 10. Columns 1 and 2 report the results using the growth environment of the state in which a bank is headquartered, with the first column representing the results for the entire period and the second, results for the post-reform era. Specifically, we estimate

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

[37]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, Chandigrah, Dadra and Nagar Haveli, Chattisgarh, and Lakhsadeep. Rather than drop any bank that had a branch in one of these states, the ω_{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 indices in the absence of this data, namely (i) not using those states when constructing state weights, and thus not using the growth information from 1985-1997, and (ii) using one set of weights ω_{bi}^1 from 1985-1997, which includes these states, and a second set ω_{bi}^2 which exclude 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 the 1985-1998 period.

where $I_{Spread_t > 0}$ (resp. $I_{Spread_t < 0}$) are indicator variables for whether the spread is positive (resp. negative), θ_i is a state fixed effect, and δ_t is a year fixed effect. Avgrowth$_{bit}$ is the smoothed growth rate for the state in which 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 γ^- and γ^+, which measure how banks in different growth environments differentially react to changes in the spread between the commercial lending rate. Because a negative spread occurs only twice, and is a quite particular situation (in a perfectly flexible market, banks facing a negative spread should eliminate all credit from their portfolios), we allow a separate coefficient on (Spread$_t$ * $avgrowth_{bit}$) when the spread is negative.

The negative and marginally statistically significant coefficient on γ^+ suggests that banks in high-growth environments substitute towards government securities (away from loans) *less* when the spread falls. We interpret this to mean that banks in low growth states are more sensitive to government interest rates: because they face less attractive projects to finance, they are more likely to park money in government securities when government securities become more attractive. However, since the number of states in which 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 in which commercial banks are headquartered, we use the synthetic index described above, which takes into account all the states in which the bank is active. Columns (3) and (4) present results from:

$$
\begin{aligned}
\ln(CD_{bit}) \;=\; & \alpha + \beta * bkgrowth_{bit} + \gamma^+ (Spread_t * bkgrowth_{bit}) * I_{Spread_t > 0} \qquad (9) \\
& + \gamma^- (Spread_t * bkgrowth_{bit}) * I_{Spread_t < 0} + \theta_i + \psi_b + \delta_t + \varepsilon_{bit}
\end{aligned}
$$

where bkgrowth$_{bit}$ is the growth index, and ψ_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 (1) and (2), and this time we may say with some confidence that they are statistically significant.

Conclusion: The evidence seems to be consistent with the view that banks are especially inclined towards the easy life in states where lending is hard. This suggests that 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.

5 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.

5.1 Branch Expansion in Rural Areas

As mentioned in the introduction, in 1977 the government passed a regulation which required 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.

Burgess and Pande study the impact of this regulation over the period 1977-1990.[38] They find that a 1 percent increase in the number of rural banked locations, per capita, resulted in a .42 percent decline in poverty, and a .34 percent increase in total output.

Cole uses the empirical strategy described in Section 5 to study the impact of bank nationalization on rural bank growth.[39] He shows that between 1980 and 2000 there was a substantial drop in the growth rate of rural branches, of the order of twenty percent. The nationalized banks in our sample experienced an even sharper decrease, with rural branch growth rates 6.6 percent and 8.6 percent slower their private counterparts in the 1980s and 1990s. These results are reported in column four 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

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[38]Burgess and Pande (2003).
[39]Cole (2004).

5.2   Non-Performing Assets and Bailouts

Mounting Non-Performing Assets (NPAs) and resulting questions about the ability of the banks with high levels of NPA to honor their liabilities to their depositors has been an important concern in the 1990s.

Recent RBI figures suggest that public sector banks have substantially higher levels of non-performing assets than private banks. For example, for the year ending in March 2003, gross NPAs represented 4.6 percent of public sector banks total assets, compared to 4.3 percent of old private sector banks, and 3.7 percent of new private sector banks. However it is not clear 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 NPL do not yet meet international norms.

An informative check, conducted by Topalova, is to use data from corporate balance sheets to estimate the ability of firms to repay their loans.[40] Firms whose income (defined as earnings before interest, taxes, depreciation, and amortization) is less than their reported interest expense represent firms that 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 have 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 four percentage point increase in the share of NPLs in the banking system.

These high levels of NPAs raise obvious concerns about the stability of individual banks. However 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 Statistical Tables Relating to Banks in India, starting in 1969. Unfortunately, the data were collected for

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[40]Topalova (2004).

purposes other than conducting this exercise, and are not comprehensive.[41] Nonetheless, we are optimistic that the data can provide at least the correct order of magnitude

In 1969, we have deposits data for 45 private sector banks. Between 1969 and 2000, we are able to identify twenty-one cases of bank failure, which resulted either in the liquidation of the bank, or merging of the bank with a public sector bank. (An additional 20 banks were nationalized, 14 in 1969, and 6 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 2000 Rs.) of the deposits of these 21 banks.[42] The largest single failure was Laxhmi Commercial Bank, which was merged with Canara bank in 1985, and represents 18.5 percent of the share of real deposits of failed banks. The total value of deposits for banks that failed between 1969 and 2000 is approximately 45 Billion Rs., a substantial sum.[43]

The total cost of recapitalization is also unknown. We also conduct a back-of-the-envelope exercise, using figures from the 1999-2000 issue of "Trends and Progress of Banking in India.[44]" 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 require 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 2000-2001 issue of "Trends and Progress of Banking in India" reports the income

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[41]For example, the data may not correctly account for the possiblity 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.

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

[43]We stress again that this is an upper-bound: while 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, upon which depositors were able to draw.

[44]Reserve Ban of India (2001).

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 (1797 crores in 1998-1999) to cumulative capital contributed by the central government (19,803 crore in 1998-1999) 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 2000-2001 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 290 billion rupees.

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, 45 billion rupees–quite clearly, public sectors have many bad loans of their own). Second, and probably much more importantly, 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 the entire amount of capital subscribed by the government.

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 45 billion rupees of the failed private banks) gives a total cost of recapitalization of public banks of approximately 300 billion rupees.[45] A more realistic assessment might credit them for only one-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 540 billion rupees. [46]

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 over the

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[45] Starting from the figure of 290 billion rupees., we add the approximate subsidy for 2000-2003, 60 billion rupees., and subtract 45 billion rupees of losses possibly imparted by the private sector banks.

[46] We take the figure of 290 billion through 2000, subtact a 22.5 billion credit from the failed private sector banks, and add on a subsidy of 1950 crores per year for the next decade, giving us a final figure of 540 billion.

period 1969-2000 gives the following: from 1969-1980, the ratio of deposits in nationalized banks to deposits in private banks was approximately 5 to 1; from 1980 to 1993, the ratio was approximately 11-1; post liberalization, the ratio has been falling, and in 2000 stood at about 7.5 to 1.[47]

Thus, under the accounting that is 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 $6\frac{2}{3}$ to 1, less than the deposits ratio). However, using the estimate of 540 billion rupees 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.

6   The Future of Banking Reform

When we take this evidence together, where does it 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 that is being discussed is privatization. The evidence from Cole, discussed above, suggests that privatization would lead to an infusion of dynamism in to the banking sector: private banks have been growing 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.[48] It is not clear that we can extrapolate from this to what we could expect when the State Bank of India, which is more than an order of magnitude greater in size than the largest "old" private sector banks. The "new " private banks are bigger and in some ways would have been a better group to compare with. However while this group is also growing very fast, they have been favored by regulators in some specific ways, which, combined with their relatively short track record, makes the comparison difficult.

Privatization will also free the loan officers from the fear of the CVC and make them somewhat more willing to lend aggressively where the prospects are good, though, as will be discussed

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[47]Source, Reserve Bank of India figures. The ratio for 2000 excludes the new private sector banks.

[48]Cole (2004).

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 priority sector has mechanically increased the share of credit from both public and private sector banks that qualify as priority sector. 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 to the priority sector.[49]

Still, there are substantial differences between the 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 comply with what it wants them to do. 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 that it cannot honor its deposit liabilities. The government is, understandably, reluctant to let banks fail, since one of the achievements of the last forty years has been to persuade people that their money is safe in the banks. Therefore, it 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/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.

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[49]All numbers are from various issues of Report on Trends and Progress of banking in India.

Once again the fact that the "new" private banks pose a problem: So far none of them have defaulted, but they are also new, and as a result, 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, combined with tighter 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, since 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 towards 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 the very fact of the bank being big, 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 human judgment wherever possible, much as is currently done in Indian nationalized banks. Berger et al. have argued in the context of the US that this leads bigger banks to shy away from lending to the smaller firms.[50] Our presumption is that this process of consolidation and an 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 (like HDFC, ICICI) try to reach beyond their traditional clients in the housing, consumer finance and blue-chip sectors.

This 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

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[50]Berger et. al. (2001).

current profits and projections of future profits. This may be a way to both target better and guard against potential NPAs, largely because poor profitability seems to be a good predictor of future default. It is clear however that choosing the right way to include profits in the lending decision will not be easy. On one side there is the danger that unprofitable companies default. On the other side, there is the danger of pushing a company into default by cutting its access to credit exactly when it needs it the most, i.e. 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: (1) 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. (2) Marginally profitable to loss-making firms that used to be highly profitable in the recent past but have been hit by a temporary shock (e.g. an increase in the price of cotton because of crop failures, etc.). For these firms the existing rules for lending might work well. (3) Marginally profitable to loss-making firms that have been that way for a long time or have just been hit by a permanent shock (e.g., the removal of tariffs protecting firms producing 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 shocks from the temporary. In particular, what should we make of the firm that claims that it has put in place strategies that help it survive the shock of Chinese competition, but that they will only work 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. The loan officer would now have to also judge whether the profitability of a company (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 is consistent with the view that the loan officers worry about the possibility of being falsely accused of corruption and that this pushes them in the direction of avoiding taking any decisions if they can help it. It is clear that it would be difficult to achieve better

targeting of loans without reforming the incentives of the loan officers.

There are probably a number of steps that can go some distance towards 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, etc.) 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 life-time performance of the loan officer across all the loans where he made decisions and weight should be given both to successes and failures. A loan officer with a good track record should be allowed a number of mistakes (and even suspicious looking mistakes) before he is open to investigation.

Banks should also create a division, staffed by bankers with high reputations, which 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 while in this division. This may not be enough, and some extra effort to reach out more effectively to the smaller and less well-established firms will probably be needed, not just on equity grounds, but also because these firms may have the highest returns on capital. A possible step in this direction would be to encourage established reputable firms in the corporate sector as well as multinationals to set up small specialized companies whose only job is to lend to smaller firms in a particular sector (and possibly in particular location). In other words these would be the equivalents of the many finance companies that do extensive lending all over India, but with links to a much bigger corporate entity and therefore creditworthiness. The banks would then lend to these entities at some rate that would be somewhat below the cost of capital (instead of doing priority sector lending) and these finance companies would then make loans to the firms in their domain, at a rate that is at most x per cent higher than their borrowing rates. By being small and connected to a particular industry, these finance companies would have the ability to acquire detailed knowledge of the firms in the industry and the incentive to make loans that would appear adventurous to outsiders.

Finally we feel that giving banks a stronger incentive to lend by cutting the interest rate on government borrowing will also help. The evidence reported above is only suggestive but it does suggest that where lending is difficult, making lending to the government less lucrative can have a strong effect on the willingness of 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.

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Table 1: Effect of the priority sector reform on credit (OLS regressions) [a]

Sample:	Complete sample		Sample with change in limit		
Dependent variables:	Dummy: Any change in limit	$Log(loan_t)$ $-Log(loan_{t-1})$	$Log(loan_t)$ $-Log(loan_{t-1})$	$Log(\text{interest rate})_t$ $-Log(\text{interest rate})_{t-1}$	$Log(turnover/limit)_{t+1}$ $-Log(turnover/limit)_t$
	(1)	(2)	(3)	(4)	(5)
PANEL A: OLS					
post	0.000	-0.034	-0.115	-0.007	-0.030
	(.05)	(.026)	(.074)	(.015)	(.336)
big	-0.043	-0.059	-0.218	-0.002	0.257
	(.052)	(.028)	(.088)	(.014)	(.362)
post*big	-0.022	0.095	0.271	0.009	-0.128
	(.087)	(.033)	(.102)	(.02)	(.458)
# Observations	487	487	155	141	44

Source: Authors' calculations based on data from a Public Sector bank in India.

a- Each column represents a regression. The coefficients are reported for the main effects post (data from 1998 on) and big (firm with plant and machinery above Rs. 6.5 million), and the interaction. Standard errors (corrected for heteroskedasticy and clustering at the sector level) are in parentheses below the coefficients.

Table 2: Credit constraints: Effect of the reform on sales, sales to loan ratios, and profits (OLS regressions) [a]

	Dependent variables		
	Log(sales)$_t$-log(sales)$_{t-1}$		Log(profit)$_t$
	Complete Sample	Sample without substitution	-log(profit)$_{t-1}$
	OLS	OLS	OLS
	(1)	(2)	(3)
A. Reduced Form Estimates[b]			
1. Sample with Changes in limit			
post*big	0.194	0.168	0.538
	(.106)	(.118)	(.281)
	152	136	141
2. Sample without Change in limit			
post*big	0.007	0.022	0.280
	(.074)	(.081)	(.473)
	301	285	250
3. Whole sample			
post*big	0.071	0.071	0.316
	(.068)	(.069)	(.368)
	453	421	391
B. IV Estimates			
1. Sample with Changes in limit			
Log(loans)t-log(loans)t-1	0.75		1.79
	(.37)		(.94)
	152		141

Source: Authors' calculations from account-level data from a Public Sector bank in India.

a-The regression include a dummy for whether the firm has investment in plant and machinery above Rs 6.5 Million, and a dummy for whether the data is for 1998 and later. The interaction between the two variables is used as the instrument. Standard errors (corrected for clustering at the sector level and heterosckedasticity) in parentheses below the coefficients. The number of observations is given below the standard error.

b-In Panel A, each entry gives the coefficient on the post*big interaction in the reduced form regression. In panel B, the IV estimate is given.

Table 3: Lending Behavior of Banks by Type of Bank

	Unconditional Mean[b]	Estimated Bank Group Effects[a]				
		Large Nationalized	Marginal Nationalized	Marginal Private	Small Private	Test of Difference[c]
Average Loan Size	48.32	-6.43	8.35	35.31	58.50	13.94
		(1.27)	(2.68)	(7.37)	(9.21)	0.00
Agriculture Share	0.11	0.00	-0.08	-0.13	-0.17	23.65
		(0.01)	(0.01)	(0.01)	(0.01)	0.00
Small Scale Industry Share	0.09	-0.02	-0.02	-0.04	-0.02	8.35
		(0.00)	(0.01)	(0.01)	(0.01)	0.00
Rural Areas Share	0.12	0.08	-0.03	-0.07	-0.12	4.38
		(0.01)	(0.01)	(0.01)	(0.01)	0.04
Gov. Enterprises Share	0.03	-0.01	-0.02	-0.02	-0.03	3.70
		(0.00)	(0.00)	(0.00)	(0.00)	0.05
Trade Tran. & Finance Share	0.21	0.01	0.07	0.13	0.13	36.70
		(0.00)	(0.01)	(0.01)	(0.01)	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. "State banks" comprises the State Bank of India and its affiliates; "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.

c. The first column reports the unconditional average share of 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, clustered by district, are in parentheses.

c. F-statistics and (in brackets) 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.

Table 4: Estimate of the Causal Effect of Nationalization on Lending

	Estimate of Discontinuity[b]	
	1992	2000
Average loan size:	-24.753 **	-143.867 **
	(10.332)	(69.784)
Share of bank's credit to:		
Agriculture	0.082 ***	0.031
	(0.030)	(0.021)
Rural areas	0.073 ***	0.021
	(0.027)	(0.023)
Small scale industry	0.009	0.020
	(0.017)	(0.026)
Trade, transport and finance	-0.073 *	-0.037
	(0.040)	(0.031)
Government credit[c]	0.020 *	
	(0.011)	
Intere rate (residual)	-0.007	-0.007
	(0.008)	(0.006)

Sources: Based on authors' calculations, using credit data from the 1992 and 2000 Basic Statistical Returns, from the Reserve Bank of India.

a The relationship between bank lending behavior and bank size was estimated according to the following equation:

$$\hat{\beta}_i = \alpha + \delta_1 size_i + \gamma_1 Nat_i + \delta_2(Nat_b * size_b) + \varepsilon_i$$

$Size_i$ is the log of the banks deposits in 1980, while Nat_i is a dummy varaible taking the value of one if the bank was larger than the nationalization cutoff, and zero otherwise.

$\hat{\beta}_i$ is the estimated share of credit bank i lends to a specific sector, after controlling for a district fixed effect.

b The table presents the estimate and standard error of the discontinuity:

$$\hat{\gamma}_1 + \hat{\delta}_2 * 14.5$$

c Figures for government lending in 2000 were not available.

Table 5: Growth of Nationalized and Private Banks, 1970-2000

| | Log Real Growth of:[b] | | | Growth of: | |
	Deposits	Credit		Branches	Rural Branches
Post (1980-1990)	-0.085 ***	-0.078 ***		-0.114 ***	-0.181 ***
	(0.014)	(0.015)		(0.017)	(0.024)
Post*Nationalization	-0.026	-0.012		-0.044	-0.066 **
	(0.033)	(0.036)		(0.033)	(0.031)
Nineties (1990-2000)	-0.040 ***	-0.027		-0.122 ***	-0.219 ***
	(0.014)	(0.017)		(0.018)	(0.022)
Nineties * Nationalization	-0.073 *	-0.088 **		-0.053	-0.086 ***
	(0.039)	(0.041)		(0.034)	(0.028)
R2	0.15	0.11		0.48	0.31
N	440	440		420	434
Clusters	15	15		14	14
Bank FE	Y	Y		Y	Y

Sources: Authors' calculations based on data from the 1970-2000 Reserve Bank of India publications, "Statistical Tables Relating to Banks in India." Branch data are from the RBI "Directory of Commercial Banks in India," 2000.

a - This table presents results on the growth rate of credit, deposits, and bank branches, for banks just above or just below the size cutoff for nationalization in 1980. Branch data were not avialable for the Lakshmi Commercial Bank, which failed in 1985 (and was merged with Canara bank, a large bank nationalized in 1969, not in our sample).

Specifically, the following equation is estimated:

$$\ln(y_{b,t}/y_{b,t-1}) = \beta_i + \theta_1 Post_t + \theta_2 * Nineties_t +$$
$$\gamma_1 (Post_t * Nat_b) + \gamma_2 (Nineties_t * Nat_b) + \varepsilon_{b,t}$$

b - Deposit and credit growth rates are in log real terms, while branch growth rates are log growth rates.

Table 6: comparison of granted limit, maximum authorized, and previous limit

	granted limit vs limit on turnover basis		granted limit vs official policy		granted limit vs previous granted limit		official policy vs previous official policy	
smaller	255	0.62	542	0.78	22	0.04	153	0.35
same	81	0.20	9	0.01	322	0.64	6	0.01
larger	74	0.18	142	0.20	158	0.31	281	0.64

Source: Authors' calculation from account level data from one bank. Data include years 1997-1999.

Table 7: Determinants of working capital limit and interested rate[a]

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

Source: Authors' caculation from account level data from a Public Sector bank in India.

a - All variables in logarithm. Standard errors (corrected for clustering at the account level), in parentheses below the coefficient.

b - The maximum limit as per bank's rule is max(ltb calculated by bank, lwc).

Table 8: Summary Statistics for Corruption Study

Panel A: Credit Data[a]

January 1992 (Real 1984 Rs.)

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

January 2000 (Real 1984 Rs.)

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

Sample Size

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

Source: Credit data are from the Reserve Bank of India
a - Standard deviations are given in parentheses

Panel B: Central Vigilance Committee Data

Yearwise Distribution of Cases

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

Distribution of Content of CVC Advice and Orders (Percentage)

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

Table 9: The Effect of Vigilance Activity on credit[a]

Dependent Variable: Log Credit	Past Months			Future Months	
	(1)[b]	(2)[c]	(3)[c]	(4)[d]	(5)[d]
Indicator for Vigilance Activity Indicator for fraud in:					
Contemporaneous	-0.055	-0.040	-0.037	-0.042	-0.037
	(0.027)	(0.019)	(0.019)	(0.020)	(0.020)
Indicators for Vigilance Activity(4)					
Three Months		-0.039	-0.032	-0.035	-0.031
		(0.018)	(0.016)	(0.016)	(0.016)
Six Months		-0.031	-0.023	-0.029	-0.027
		(0.016)	(0.014)	(0.015)	(0.014)
Twelve Months		-0.036	-0.018	-0.018	-0.015
		(0.016)	(0.012)	(0.014)	(0.010)
Eighteen Months			-0.028		-0.006
			(0.013)		(0.010)
Twenty-Four Months			-0.012		-0.001
			(0.013)		(0.011)
Thirty-Six Months			-0.014		0.009
			(0.015)		(0.008)
Forty-Eight Months			-0.022		0.022
			(0.028)		(0.015)
Month Fixed Effects	Y	Y	Y	Y	Y
Bank Fixed Effects	Y	Y	Y	Y	Y

 Source: Authors' cacluations from data from the Reserve bank of India and Central Vigilance Commission

a - Columns (1)-(6) present panel regressions of log credit extended by twenty-seven public sector banks, over a period of 111 months, giving 2997 observations. Standard errors (robust to heteroskedasticity and serial correlation) are reported in parentheses. The independent variable of interest is a dummy variable indicating whether the CVC had charged or punished an officer of a particular bank in a particular month.
b - Column (1) displays the results of regressing log credit on bank and year fixed effects, as well as a dummy for whether there was vigilance activity in a particular bank that month.
c - Columns (2) and (3) examine how the effect persists over time. In column (2), log credit is regressed on dummies for whether there was vigilance activity in a bank for the previous one, two, three, …, twelve months. For readability, only the coefficients for contemporaneous, three, six, and twelve months are reported. Column three traces the effects over the past 48 months: again, only coefficients for the contemporaneous effect, and months 3, 6, 12, 18, 24, 36, and 48 are reported.
d - Columns (5) and (6) measure the effect of *future* vigilance activity on lending. For example, the "Three Months" coefficient in column 5 and six is a dummy for whether there is vigilance activity at time t+3. Dummies are included for each future month up to twelve months ahead in column (5), and up to 48 months ahead in column (6).

Table 10: Government Securities Interest Rate and Bank Credit[a]

Time Period	State Growth		Synthetic Growth Index	
	1985-2000	1992-2000	1985-2000	1992-2000
	(1)	(2)	(3)	(4)
Growth	1.412	1.538	2.195	2.634
	(0.624)	(1.209)	(0.970)	(1.165)
Spread * Growth, when spread > 0	-0.175	-0.137	-0.257	-0.219
(γ+ in equations 5 and 6)	(0.110)	(0.119)	(0.104)	(0.103)
Spread * Growth, when spread < 0	0.480	0.592	-0.079	0.473
(γ- in equations 5 and 6)	(0.521)	(0.405)	(0.791)	(0.562)
R^2	0.46	0.43	0.71	0.63
Nobs	415	730	402	710
Year Fixed Effects	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	No	No
Bank Fixed Effects	No	No	Yes	Yes

Notes:
Sources: Authors' calcluations from data from the Reserve Bank of India
a - Standard errors (robust to heteroskedasticity and serial correlation) are in parentheses.
The dependent varaible in all regressions is the natural log of the credit deposit ratio.
Data are a panel of 25 public sector, and 20 private sector banks, over the period 1985 to 2000.
The growth varaible in columns (1) and (2) is growth in the state in which the headquarters
of each bank is located, while columns (3) and (4) use a weighted average of growth rates in
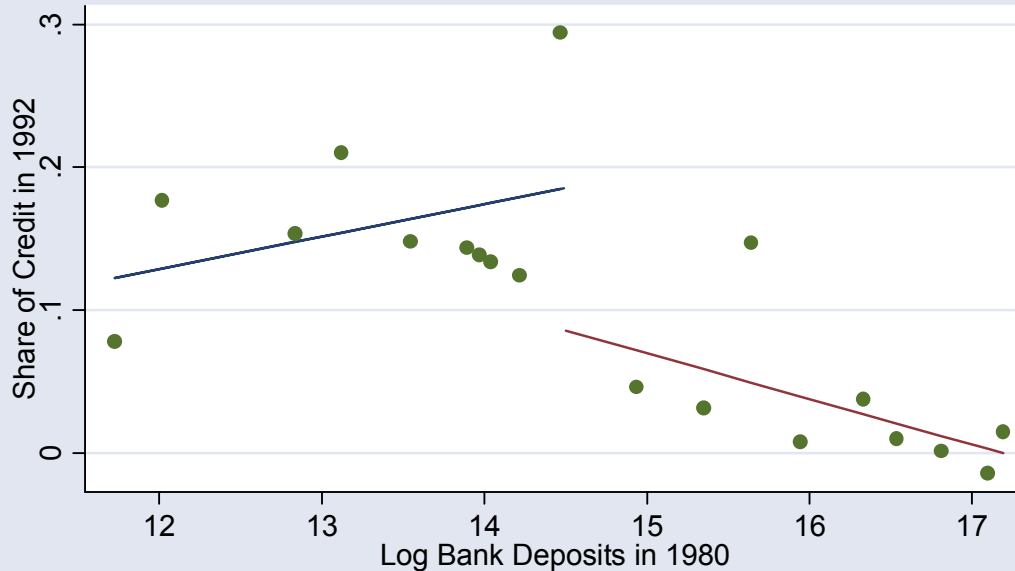which each bank operates. All data are described in the text.
There are fewer observations when we use the synthetic growth index because branch
location was not available for one bank.

Figure 1: SSI and Trade Credit

Nationalization and Credit to Small Scale Industry
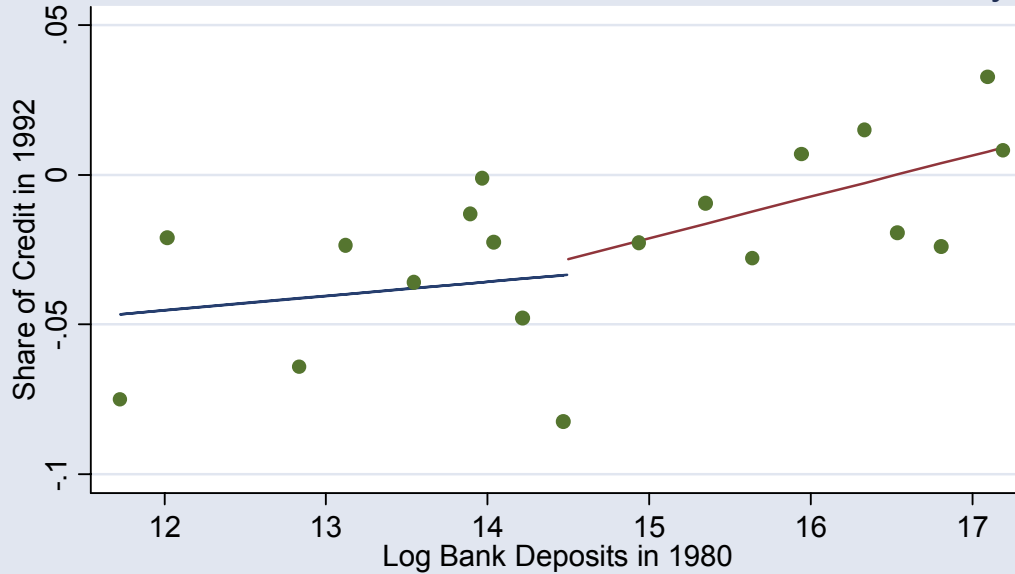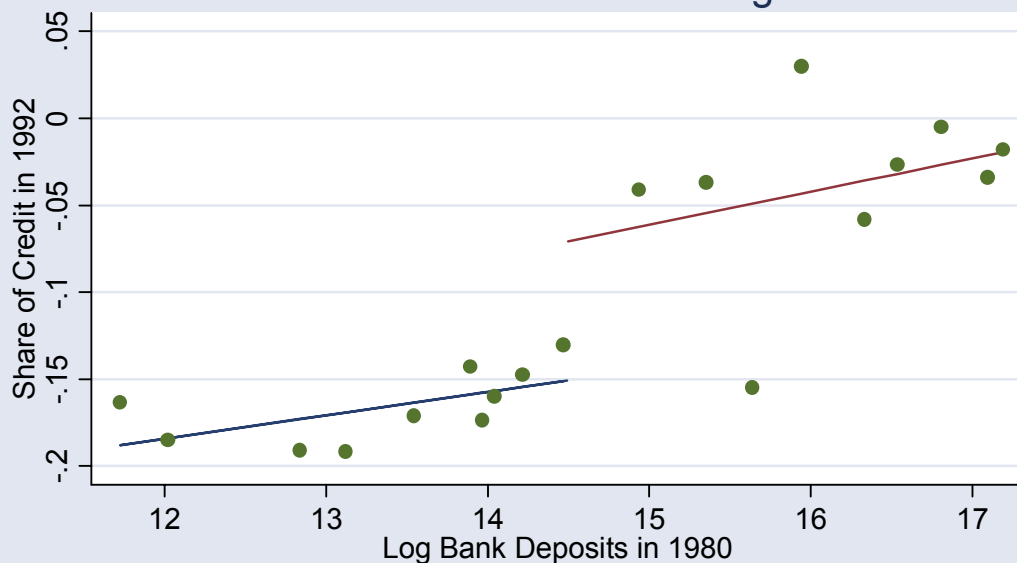

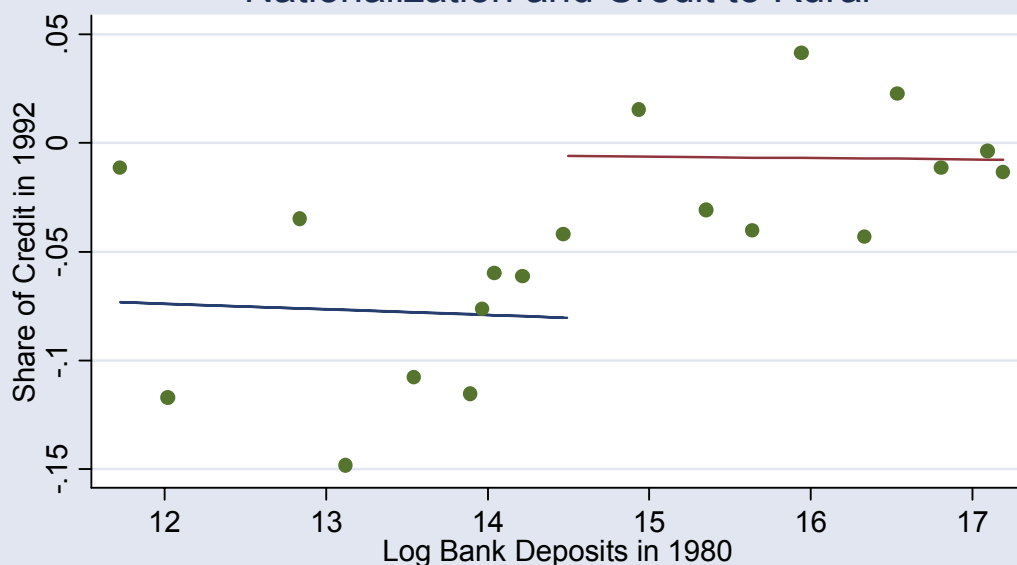## Nationalization and Credit to Trade, Trans. & Finance

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 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 2: Rural and Agricultural Credit

Nationalization and Credit to Agriculture

Nationalization and Credit to Rural

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.