

What Drives Bank Performance?

An Analysis for the Post-Reform Period in India

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This paper examines the impact of ownership, competition and productivity on profitability and spreads in India's commercial bank sector following the 1991 reforms. Our main results are that private sector banks show significant gains relative to public sector banks in terms of profitability and foreign banks outperform Indian private sector banks. We find that profitable banks are more likely to have a diverse range of output, to be operationally efficient, and to have high spreads. Productivity has increased across all bank categories, but its impact is relatively small in magnitude when compared to the output expansion variables. This leads us to conclude that banks in India have resorted to output expansion rather than efficiency enhancement as a strategy to boost profits. We also find that the profitability of public sector banks has improved in response to greater competition. In addition, when competition is taken into account, we find that private banks have lower spread than public banks and there is no difference between old and new private banks. Also, all categories of domestic banks have lower spreads than their foreign counterparts. Last, productivity lowers spreads, although the magnitude is relatively small.

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1. Introduction and Background

This paper studies the impact of ownership and competition on performance of 89 Indian banks in the post-deregulation period (1990-2001). The 1991 balance of payments crisis marked the beginning of a phase of financial deregulation. The Reserve Bank of India (RBI) adopted a three-pronged approach aimed at creating a more profitable, efficient, and sound banking system. Based on the first Narasimham Committee on Financial Sector Reforms, the strategy was to focus on (a) deregulation (b) competition and (c) reliability. The objective was to create a competitive environment that, in the medium and long run, would lead to substantial gains in efficiency, profitability, and productivity.

It is clear that the reforms have had some positive outcomes, such as a fall in the share of non-performing loans, increased entry of new private sector banks, branch expansion or financial widening as well as deepening, and the achievement of the capital adequacy ratio by ninety per cent of domestic banks (Ahluwalia 2002). Whether the reforms have achieved their objective of transforming the Indian banking system is doubtful, though there is strong evidence that the sharp increase in growth post 1994 was bank credit led (Mor *et al* 2005).

We analyze the extent to which the “three pillars” of financial reforms have affected bank performance. Specifically, we address three questions. Which banks if any have become more profitable in the post-reform period? Is the source of the increased profitability output expansion or improved productivity? What has been happening to spreads? Our main results are that private sector banks show significant gains relative to public sector banks in terms of profitability and foreign banks outperform Indian private sector banks. We find that profitable banks are more likely to have a diverse range of output, to be operationally efficient, and to have high spreads. Productivity has increased

across all bank categories, but its impact is relatively small in magnitude. This leads us to conclude that banks in India have resorted to output expansion rather than efficiency enhancement as a strategy to boost profits. We also find that the profitability of public sector banks has improved in response to greater competition. In addition, when competition is taken into account, we find that private banks have lower spread than public banks and there is no difference between old and new private banks. Also, all categories of domestic banks have lower spreads than their foreign counterparts. Last, productivity lowers spreads, although the magnitude is relatively small. The policy conclusions are that the financial sector reforms have been effective but the next phase must entail a serious effort to reduce public sector banks' market share while strengthening regulatory and supervisory mechanisms in order to maintain an efficient risk-return profile of banks' portfolios.

The literature focuses largely on developed countries and transition economies. The experience of the latter has typically been a change in bank ownership due to a large influx of foreign capital. In India, regulation remained restrictive on foreign acquisitions in banking even after the reforms. As a result, most foreign investment in banking is green-field and not through mergers and acquisitions. Additionally, public sector banks still tower over India's financial system, nearly fifteen years after the deregulation.

The empirical literature on Indian banks therefore largely examines differences in operational efficiency and profitability across private and state-owned banks as opposed to differences across foreign and domestic banks (Sabi 1996; Weill 2003). The general perception is that public sector involvement in the banking sector blunts incentives to effectively respond to market-based reforms (Bhattacharya and Patel, 2003; Kumbhakar and Sarkar, 2003) so that deregulation benefits private banks. There is some evidence that private banks in India are more profitable than the public sector banks (excluding the State Banks of India and their branches) (De, 2003). However, Koeva (2003)

finds that even though nationalized banks appear to be less profitable than private and foreign banks, ownership is not the key determinant of efficiency and profitability. Intermediation costs, according to her, depend on operating costs, priority sector lending, nonperforming loans, investment in government securities, and the composition of deposits. Kumbhakar and Sarkar (2003) use a cost function approach to find that deregulation has not yet yielded efficiency gains in general, though private banks have increased profitability by expanding output. Koeva (2003) finds that profitability declines with concentration in India; however, there is little empirical evidence that this relationship need remain consistently positive over time in general (Smirlock, 1985) or that causality need only be in one direction (Berger, 1995). This is because while concentration can lower the costs of collusion and generate monopoly rents, it can also be the result of greater efficiency (Brozen, 1982) or equity enhancement through retained earnings (Berger, 1995). The correct measurement of competition therefore becomes important. Shaffer (1993) shows that the number of banks, or market shares, does not capture the degree of competition as effectively as price setting behavior. He finds that there was no loss of competitiveness over the 1965 through 1989 period in the Canadian banking sector in spite of bank consolidation following regulatory changes in 1980. In the Indian context, in particular, a research agenda focused on the interaction between competitiveness, banking costs, and profitability would be a significant contribution to the literature.

Price-setting behavior may be endogenous not just to market structure, but also to size and deregulation. Interest rate deregulation may lead to an increase in bank funding costs and a fall in bank profitability. This could be countered through an increase in the number and price of services offered by banks (Humphrey and Pulley, 1997), a strategy that is easier for larger banks to effect. This is consistent with a fall in spreads for large banks with high non-interest expenditure and income. It should be noted here that interest rate deregulation in India was phased, with several changes

implemented in 2000. As of 2005, the only administered interest rate is on small savings, but this does feed into the terms on certain kinds of government borrowing and bank lending rates.

Kumbhakar et al (2001) study whether and how deregulation, assumed to generate increased competition, affected the profitability of Spanish savings banks between 1986 and 1995. Their panel study uses a flexible variable profit function and incorporates time-varying technical efficiency. Output is proxied by total loans and deposits. They find declining levels of output technical efficiency, high rates of technical progress, and increasing trend growth in productivity. Interesting results are already starting to emerge from research on cost efficiency for India as well (for example Das and Sanmugam 2004). This study employs the stochastic frontier function methodology for panel data and finds that foreign banks are more technically efficient than their counterparts over the 1992-1999 period.

Liberalization of volume and interest rates has been observed to raise profitability in the banking sectors of Norway (Berg, Forsund, and Jansen, 1992) and Turkey (Zaim, 1995). Berger and Humphrey (1997) point out however that the effects of deregulation may depend on industry conditions prior to reform and on the type of measures implemented. There is empirical evidence that shows a decline in cost productivity immediately after deregulation (Berger and Mester, 2003; Humphrey and Pulley, 1997; Bauer, Berger, and Humphrey, 1993) though improved output and quality of output led to higher profit productivity (Berger and Mester, 2003). Bhattacharyya, Lovell, and Sahay, 1997 find that the impact of deregulation depends on ownership in the Indian case, though researchers point out that in most developing countries deregulation occurred after public sector banks became too dominant to be motivated to change (Sarkar and Bhaumik, 1998; Denizer, 1997).

Several studies for US banks suggest that liberalization of deposit rates has little or no effect (Bauer, Berger, and Humphrey, 1993; Elyasiani and Mehdiian, 1995). Hughes et al. (1996) find that

geographical expansion has affected profitability in the US, as do Jayaratne and Strahan (1998). In India however, the huge expansion in branch banking occurred after the 1969 nationalization of the sector and was largely directed, as opposed to being market and/or shareholder interest driven. Over 58000 branches were added between 1969 and 2003, nearly 48000 before deregulation. Additionally, researchers have controlled for macroeconomic trends and organizational structure (Fukuyama, 1995), foreign investment in the banking sector (Claessens et al, 2001), or size (Wheelock and Wilson, 1999).

The rest of this paper is divided into the following sections: 2 describes the background and recent evolution of the Indian banking sector, 3 discusses the data, 4 outlines the econometric methodology and the advantages to using the techniques employed in this paper, and discusses the results, while 5 concludes.

2. Recent Developments in the Indian Financial Sector

Policymakers chose to implement deregulation gradually, with changes spread over almost the entire decade of the 1990s. This was largely because of the need to establish political consensus (Ahluwalia 1993) and because of the fear that a big bang approach would endanger macroeconomic stability. The reforms combined broad changes designed to correct macroeconomic incentives with bank sector specific measures. A detailed account of the reforms overall is provided in Mohan (2005).

Macro Environment

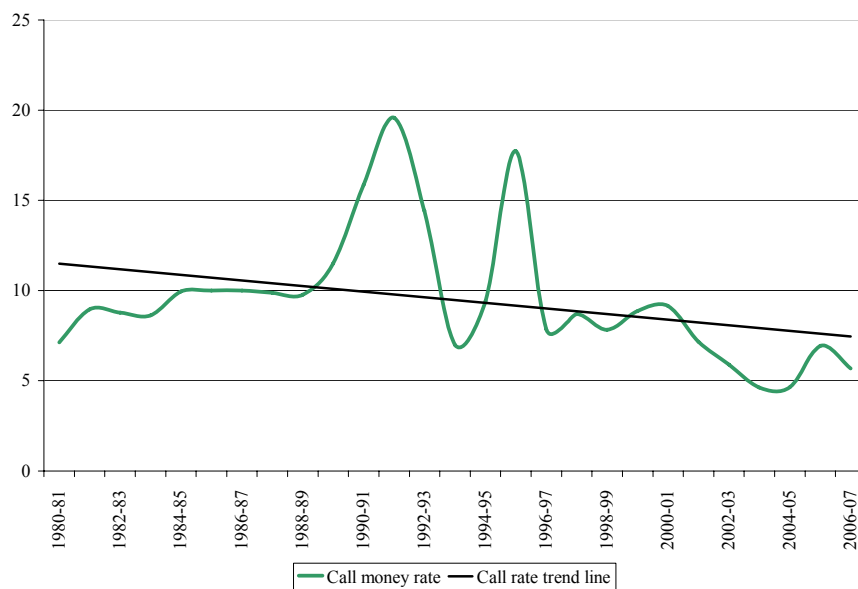
A significant feature of India's macro economy is the special nature of the constraints on the Reserve Bank of India (RBI). Traditionally, the RBI's primary responsibility was the management of government debt and the monetization of the government's fiscal deficit (Reddy, 2002) through the extension and rolling over of short-term credit, typically non-marketable treasury bills. RBI credit to

the government was nearly 92 percent of the monetary base in 1990, suggesting a high degree of financial repression.

A large part of debt management involved turning commercial banks into a captive market for low interest government paper through the statutory liquidity ratio requirement imposed by the RBI. Along with the cash reserve requirement, this pre-empted nearly two-thirds of the banks' deployable resources. In recent years, monetary and credit policy announcements place increasing emphasis on stabilizing inflation, which is in line with the recommendations of the Narasimham Committee, the Chakravarty Committee, and the Vaghul Working Group. The RBI is now required to regulate money supply in accordance with inflation and growth objectives. As a result, the institutional arrangements that allowed the government to borrow from the RBI through the issuance of ad hoc treasury bills were eliminated in 1997. The RBI would now focus on the development and deepening of the money, bond and forex markets and would move to using indirect monetary instruments such as market-based interest rates and open-market operations. India switched to a floating exchange rate in 1993 and to a convertible current account in 1994. The stock market bubble of 1992-93 revealed the absence of adequate regulatory institutions in both the financial sector and capital markets, and led to a serious attempt to fill this gap as well.

The policy has been of phased interest rate deregulation and gradual integration of the Indian forex market with global financial markets. By 2000, all other interest rates in the system, except that on small savings, were linked to the bank rate.

Figure 1: Interest rates have been declining

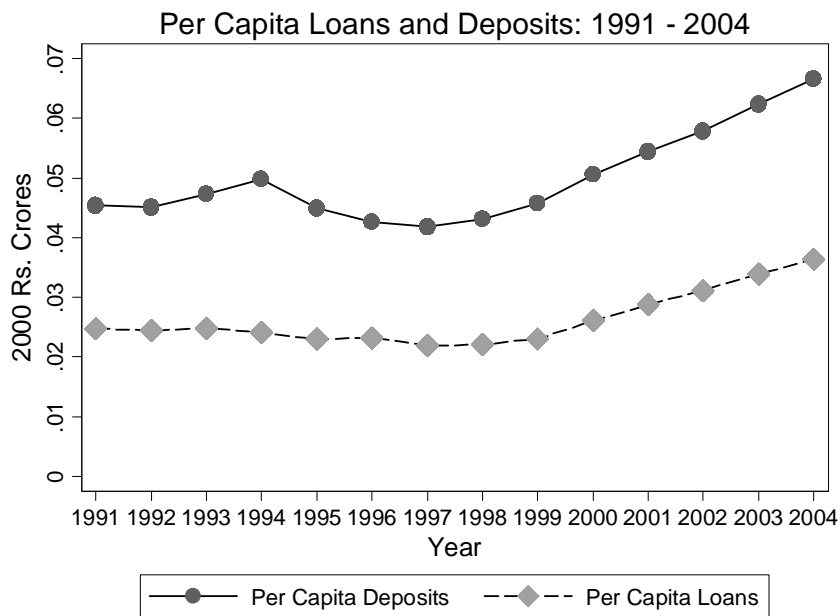


Banking Background and Reform

The significant developments in the banking sector pre-reforms were the nationalization of the fourteen largest commercial banks in 1969 and rapid branch expansion with the purpose of increasing credit to agriculture and small industry. Regional Rural Banks were set up in 1975 with the purpose of providing agricultural credit and an additional six private banks were nationalized in 1980. Specialized financial institutions such as NABARD (agriculture and rural development), EXIM (export finance), SIDBI (small industries), and NHB (housing finance) are specialized and state-financed institutions set up in the eighties. In addition to changing the sectoral composition of credit, the RBI stipulated lending targets to priority sectors, set up sector based refinance windows and credit guarantee schemes, and encouraged the expansion of banks into rural and semi-urban areas. The total number of commercial banks nearly quadrupled from 73 to 272 between 1969 and 1991. The number of offices in rural and semi-urban areas expanded from 5,172 to 46,550 over the same period: a nine-fold increase.

The RBI also specified maximum deposit rates on savings and time deposits and differential lending rates linked to borrowers' income and type of business. By 1990, not only had there been impressive growth in deposits and credit advanced, public sector banks accounted for nearly 90 percent of total deposits and advances, with the residual evenly split between Indian private and foreign banks. Figure 2 below shows the steadily increasing per capita loans and deposits by all banks in India.

Figure 2

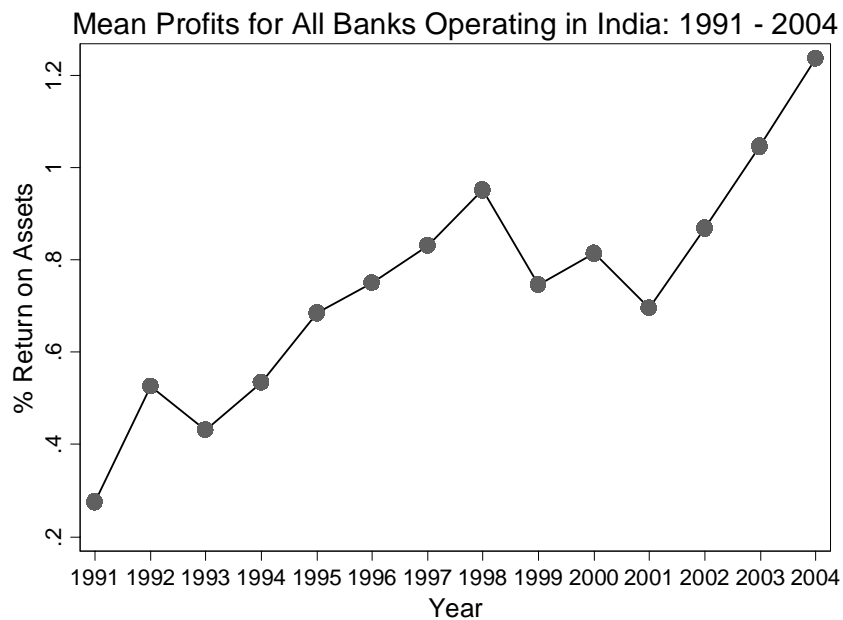


The dominance of the public sector and state ownership continued until the 1991 crisis. Regulation, administered interest rates, poor asset quality, and market segmentation severely compromised banking profitability. Many banks had low capital adequacy and were earning less than reasonable rates of returns.

The RBI also aimed to improve bank profitability through the gradual reduction of the Cash Reserve Ratio (CRR) and the Statutory Liquidity Ratio (SLR), thereby reducing the extent to which the banking system was monetizing the government's fiscal deficit by providing credit at highly subsidized terms. As seen from Figure 3 average profitability has been increasing over the sample

period. In 1991, the CRR fell from 15 percent to 10 percent, and the SLR to 25 percent from 38.5% a year later. The RBI announced it would improve sector resilience by implementing Bank of International Settlements' (BIS) norms such as maintaining a capital adequacy ratio of eight per cent, stringent income recognition, and provisioning rules.

Figure 3

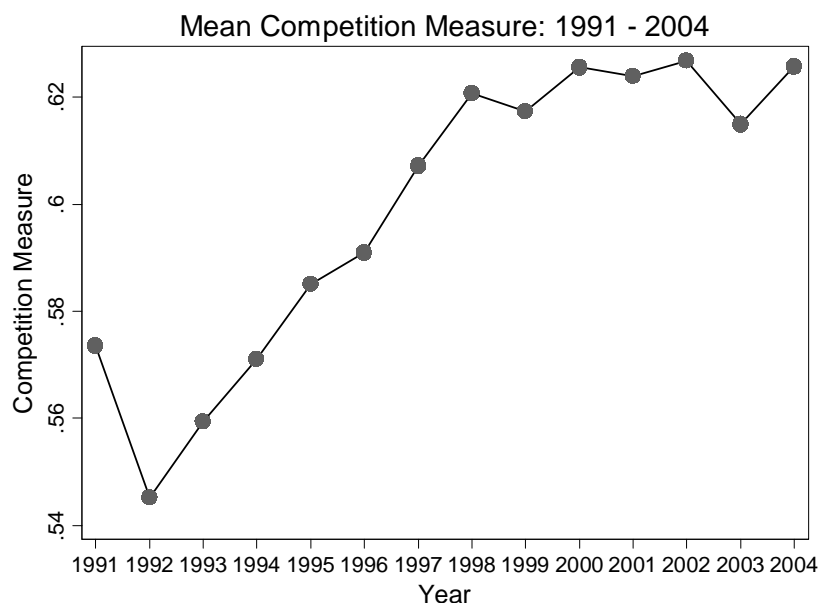


In order to introduce greater competition into the banking system, the RBI deregulated entry of new private and foreign banks into the sector starting 1993. The government had to recapitalize public sector banks to the tune of Rs. 40 billions¹ between 1985 and 1992, a considerable fiscal drain. The RBI therefore allowed public sector divestment up to 49%. There is a move to raise this to 67 percent, which in effect would allow privatization of public banks. While change in ownership has not been a significant feature of Indian banking, as of 2002 the RBI has permitted foreign direct investment in the banking sector up to a maximum share of 49 percent in the bank's equity. Even more credible is the fact that the increase in total assets and total loans is against a backdrop of improved competition

¹ Nearly USD 1 billions at current exchange rates and prices.

(Figure 4).² This trend held throughout the nineties and clearly captures changes in regulation that liberalized entry and operations of private banks.

Figure 4



To improve operational efficiency, sector-specific refinance aimed at directing the flow of credit to priority areas was replaced with a general refinance window in 1997. In 1997, the share of non-performing loans in total advances was 10.6 percent for nationalized banks and 5.9 percent for private banks. This would be at the high end of comparable figures for emerging markets in Latin America and East Asia. The RBI introduced a number of institutional measures such as debt recovery tribunals, asset reconstruction companies, settlement advisory committees, and people's courts to assist in recovery and debt restructure. In 2001, the proportions were 7.5 and 6.9 percent respectively.

Some issues remain unresolved however, even in 2005. A major problem is, for example, the implementation of contractual law. The government has moved to introduce an international standard

² Competition measure is based on the 4 bank concentration ratio. As a robustness check we also computed a measure based on the Herfindahl Index and the results is largely unchanged. Later we provide a more detailed discussion of the competition variable.

bankruptcy law, but there is need for reforms in court procedures to secure creditors' rights and eliminate costly delays. The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act of 2002 empowers secured creditors to enforce collection without the intervention of any court or tribunal. While the government has implemented measures such as more liberal licensing of private banks and freer expansion of foreign banks, public sector banks continue to dominate the financial sector. This puts the onus of raising overall efficiency on the public sector banks. The periodic recapitalization of weak public sector banks obstructs the market from working effectively to promote survival of the fittest.

Public sector banks still account for 76 percent of the assets of the banking sector and the weaker performance of public banks therefore remains a burden on the financial system. International comparisons across bank assets per capita suggest there is tremendous scope for financial widening still (Hawkins and Mihaljek 2001), though India is doing well in terms of capital adequacy and public sector profitability relative to several emerging markets as shown in Table 1a.

Financial policy in India is rooted in the conviction that an effective financial sector is a key component of growth and development. Pre-reforms the development strategy took the form of centralized planning with emphasis on rural development and small industry. Post-reforms, entirely out of necessity, the paradigm has shifted to the market, though the emphasis on priority sector development remains strong. The market-based reforms have yielded high growth rates through the nineties and early 2000s. What is the financial sector's role going to be in ensuring that growth accelerates and is sustainable? Indian banks will have to integrate with global financial markets, continue to mobilize savings, achieve higher productivity, and continue to widen the range of services they offer. None of this will be possible without an increase in the profitability of public sector banks, given their continued dominance of the market.

3. Data and Descriptive Statistics

Our dataset covers 89 banks over the decade immediately following the reforms. The main source of data is the Reserve Bank of India (RBI). Balance sheets and profit and loss statements are available for all banks in a consistent format over the period 1989-90 through 2004. As discussed earlier, we are interested in the impact of ownership and competition on bank *profitability* (return on assets or ROA) and *spreads* (interest income/interest bearing assets – interest expenditure/interest-bearing liabilities). In addition, we also want to investigate whether output expansion strategies or productivity enhancement strategies have been used by banks to improve performance. Table 1b describes the variables included in the econometric specifications.

Ownership variables are constructed as dummies that capture bank type. As of 2004, banks in India are classified into five categories: seven State Banks of India, nineteen nationalized or public sector banks, thirty-three foreign banks (up from twenty-three in 1990), and thirty Indian private banks, further split up into “old private” and “new private” banks. We construct four dummy variables: (a) *private bank dummy* (equals 1 if the bank is either foreign or Indian private), (b) *Indian private bank dummy* (equals 1 if the bank is Indian private), (c) *new Indian private bank dummy* (equals 1 if it is a new Indian private bank) and (d) *domestic bank dummy* (equals 1 if the bank is not a foreign bank). In the econometric specification we use these to compare the performance of private versus public banks, foreign versus domestic banks and new Indian private banks versus old Indian private banks and foreign banks.

The next variable of interest is the *competition measure* competition. To measure competition we first compute four different market shares based on total income of the bank, total assets owned, loans and loans plus deposits. Then we create two alternative measures of market concentration: the

four bank concentration ratio and the Herfindahl Index.³ The competition measure is created by subtracting the concentration measure from 1, the upper bound for these measures. The main results of the paper are largely robust to alternative definitions of market share and concentration measures. For the tables presented, we use the *four bank concentration ratio* since the distribution of banks in India is quite skewed and this measure does a better job of capturing such a distribution. One of the primary goals of the bank reforms was to introduce competition in the hitherto protected Indian banking sector in the hope that this would introduce market discipline and improve performance of the existing banks. To analyze this question we include an interaction of the competition measure and the ownership variable to see if different types of banks react differently to competition.

The next set of variables that we are interested in, are those that capture the *output expansion* and *productivity* enhancing strategies. The variables that proxy for output expansion are: the *size* of the bank (as measure by the log of total assets), *diversification variable* (share of non-interest income in total income), *share of non-interest expenditure in total* and *market share*. The diversification variable may be interpreted as a measure that indicates the range of bank output. Previous literature has used the share of non-interest expenditure as a measure of operational efficiency. For stable economic environments with mature banking systems, this interpretation has merit. However, for a growing economy such as India, where financial reforms are changing the operational landscape and the banking sector is expanding, both because of new entry and existing banks expanding operations, it is not clear that the share of non-interest expenditure measures efficiency. Output expansion requires expenditure of infrastructure, deposit mobilization and advertising. For a growing bank these items may outweigh the interest-expenditure. Thus we interpret this measure as a proxy for output

³ These are calculated as follows: Concentration Ratio = $\sum (\text{market share of bank } i)$ where i denotes the 4 largest banks (by market share). Herfindahl Index = $\sum (\text{market share of bank } i)^2$ where i = individual bank.

expansion by banks. The market share variable is a measure of market power of an individual bank and is based on loans plus deposits.

To capture productivity enhancing strategies we use the *productivity index*. The productivity estimates in this paper are based on a two-stage modified version of the Olley-Pakes (1996)⁴ firm production function estimation that was developed by Levhinson and Petrin (2003)⁵. We use loans plus deposits as the measure of output.⁶ The input vector for the production function comprises labor (number of employees), capital (fixed capital) and an intermediate input (expenditures on communication and advertising). We use non-linear least squares to estimate the production function coefficients, correcting for endogeneity of capital. Total factor productivity (TFP) is calculated as the residual (difference between the estimated and observed productivity). However, we do not use the raw TFP estimates as our explanatory variable since they do not control for differences in initial conditions for each individual bank or the initial level of individual bank productivity and hence may contaminate the results. Hence to make the productivity estimates comparable across banks, we compute a productivity index ($pindx_{it}$). 1992 is assumed to be the base year for all banks except the new Indian private banks, for which the base year is 1996. The productivity index is derived by netting out base year productivity for a particular bank type from current year productivity. This measure is the de-measured incremental productivity after ($pindx_{ijt} = prodv_est_{ijt} - prodv_est_{j,1992}$) where i = individual bank and j=bank type.

⁴ The authors outline a strategy that corrects for the endogeneity of capital stock and selection issues that an OLS estimation of the production function would not take into account.

⁵ These authors show that in the absence of an ‘investment’ variable (or when there are zero or missing values for investment), one can use an intermediate input (such as electricity for manufacturing firms) as an instrument if a monotonicity condition holds. We use expenditures on communication and advertising as the intermediate input. This includes expenditures on postage, telephone, internet and advertising. This has a monotonic relationship with capital since the bigger the capital stock, the bigger will be this expenditure. It has features similar to electricity in that it cannot be stored and is not produced by the bank and is critical in converting the inputs to output.

⁶ In Sanyal & Shankar, 2007[a, b] we have used 3 alternative measures of output: total income, loans and loans plus deposits. For current purposes loans plus deposits seem to be the best measure to use. However, the other measures do not yield significantly different results in terms on our variables of interest. For a more detailed analysis please refer to Sanyal & Shankar, 2007a.

We also included other bank-specific controls such as a new bank dummy to capture whether a bank has been incorporated after 1995 and a leverage ratio that captures the risk profile of a bank. In addition, we include two macro variables to capture the overall health of the economy. These are a GNP per capita term to control for business cycle effects and a stability measure (1 - inflation). All explanatory variables (other than size) are lagged by one year. We also include a regime change dummy that indicates the rule changes in 2003, to account for structural changes in the economy. Mor *et al* (2006) presents evidence that serious micro restructuring of firms and banks began in mid-1996, after the "low quality" investment boom which followed the 1991 reforms. 2003 marks the end of that first phase and can be said to be the beginning of real improvements in productivity, at least in other firms, though we don't know if this is true for banking, where so much of the growth has been because of booming retail business.

The overall trends in Indian banking in the deregulation period have been positive. Figure 5 suggests steady positive growth rates in total assets, loans and deposits, with peaks around 1996 and remaining high until 2001, when there was a considerable slowing down in non-food bank credit growth accompanied by an outflow from non-resident Indian bank deposits. This was at least partly due to a fall in the share of investments in government and other approved securities by private banks, which led to a sharp increase in government borrowing in direct competition with the private sector and an increase in the interest rate. Additionally, growth rates were exceptionally high during the post-crisis recovery period and could be perceived as having normalized since the early 2000s. The same pattern is reflected in the productivity estimates shown in Figure 6 which plots the productivity index for years 1992 – 2004. We observe that there is exceptional growth till 2000, a slowing down between 2001 and 2003 and then another upturn.

Figure 5

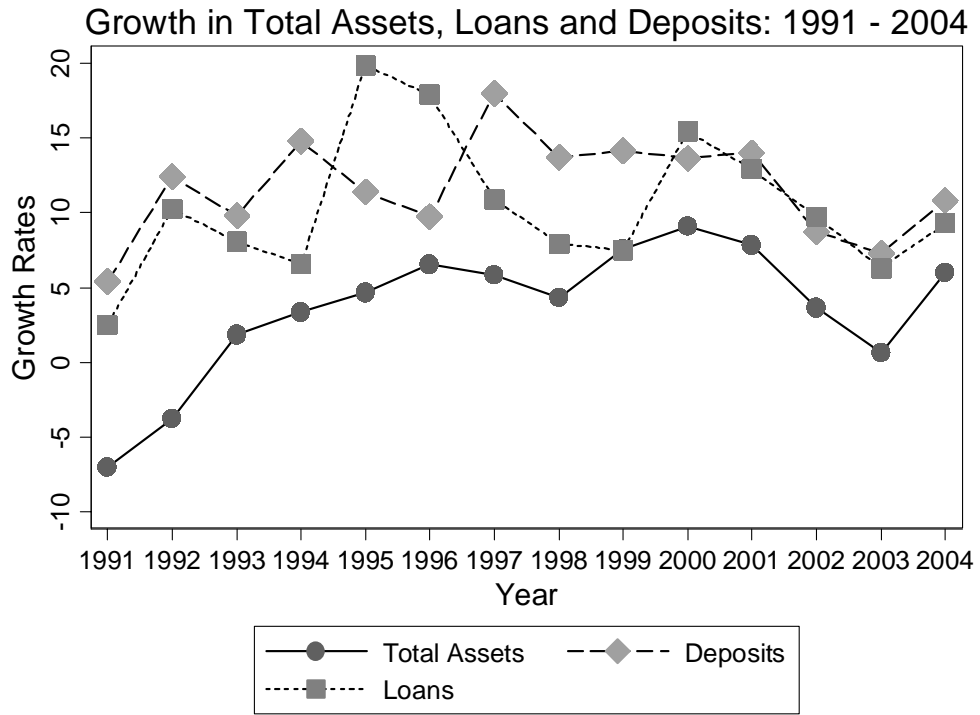
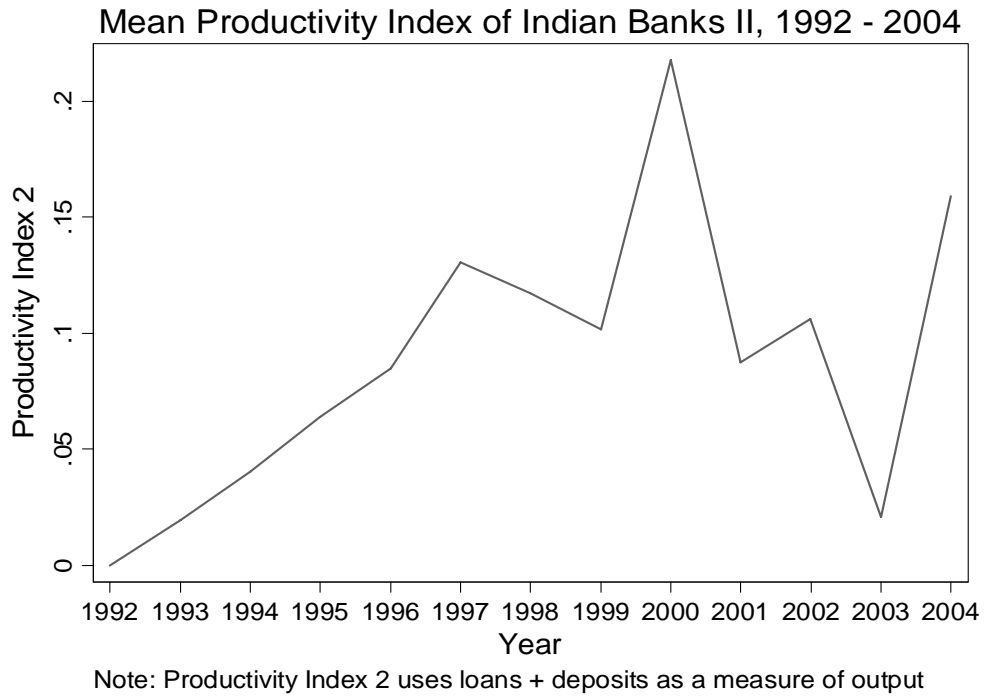


Figure 6



Tables 2a and 2b present descriptive statistics by bank type and for the aggregate regression sample. In table 2a we present statistics on total assets, profitability, spreads and productivity by bank type. Recovery after the 1991 crisis was rapid overall. A comparison of average profitability over the 1995-2001 period shows that new private banks outperform nationalized banks and old private banks. The t-tests (differences in means and variances) and Kruskal-Wallis equality-of-populations rank test suggest differences significant at 5 percent between Indian private and foreign banks, and between all public sector and all private banks over all variables in our estimation sample (results not shown here).

4. Methodology and Results

4.1 Econometric framework

We test five hypotheses: (a) ownership is the critical determinant of bank profitability and interest spread (b) if the post-deregulation gains have been due to productivity improvements and not just output expansion (c) increased competition has reduced rates of return at the margin (d) new banks have been better able to develop profitable strategies in response to the greater market orientation following the reforms and (e) operational efficiency allows banks to cut interest spreads given size and age while higher spreads are associated with greater profitability We can test these five hypotheses in a single feasible GLS model, controlling for bank specific characteristics and time fixed effects and correcting for panel heteroskedasticity and serial correlation.

$$h_{it} = \alpha + \delta_j + \beta x_{it} + \chi T_t + \varepsilon_{it-1} \quad (8)$$

h_{it} contains the variables ROA and spreads. δ_j is a dummy variable that captures the i^{th} banks ownership category such that the coefficient indicates the impact of ownership j relative to the excluded ownership category, x_{it} contains the explanatory variables listed in Table 1b as well as the

productivity index, α is the intercept, and ε_{it-1} is the error term. All standard errors are corrected for panel level autocorrelation and heteroskedasticity. Ownership categories are the State Banks of India, nationalized banks, old private banks, foreign banks, and new private banks (incorporated after 1995). “ j ” therefore goes from 1 to 5, “ i ” from 1 to 299, and “ t ” from 1994 to 2004. To control for endogeneity issues, several of the right hand variables in x_{it} are included with a lag. We interact ownership with competition and with productivity and present corrected z-statistics in the regression tables. Elasticities and semi-elasticities are discussed in Section 5.

4.2 Results

The dependent variable in Tables 3a-1, a-2, b, and c is the return on assets (in percentage). This set of results therefore pertains to hypotheses a-d from section 4.1, namely that ownership is the critical determinant of bank profitability, post deregulation gains have been due to productivity improvements and not just output expansion, increased competition has reduced rates of return at the margin, and new banks have been better able to develop profitable strategies in response to the greater market orientation following the reforms. Table 3a-1 and 3a-2 present base specifications without controlling for productivity changes, while Tables 3b and 3c include the effects of productivity and productivity interacted with ownership respectively.

In the base regressions of Table 3a-1 and 3a-2, the ownership dummies are consistently significant and of robust sign. We control for competition, competition interacted with ownership in order to account for differential sensitivities to overall changes in market structure by bank type, year fixed effects, and bank characteristics such as size, non-linear scale effects, market share, diversification (share in total of non-interest income) and operational efficiency and cost management (share in total of non-interest expenditure).

Profitability

Table 3a-1 compares the profitability of public versus private banks and whether there is any difference between new and old Indian private banks. We find that privately owned banks are more profitable than public banks (column 1 and 2) and new Indian private banks outperform old Indian private banks (column 3). We also find that surprisingly, competition enhances profitability of all banks. This could be due to the fact that competitive pressures make banks more efficient by cutting out wasteful slack and this increases profitability. However, the coefficient on the interaction term (for competition and ownership) is negative, suggesting that competition has either a negative or no impact on private bank profitability (depending on the relative magnitude of the level and interaction term) when compared to public banks and new private banks fare even worse.

To get the overall effect of both ownership and competition, we compute the elasticities that take into account the interaction of the two variables. We find that on average, private banks are 0.3 percent more profitable than public banks and new private banks (entered post 1994) outperform old Indian private banks by about 0.25 percent. These quantities are economically significant since the average profitability is 0.6 percent. Therefore on average there is a 50 percent difference in profitability between private and public banks. For the competition measure, we find that on average, public banks profitability gets a boost with competition, while that of private banks remain unaffected. However, when we compare old and new Indian private banks, we find that the latter are adversely affected by competition. A 1 percent increase in competition increases profitability of old private banks by 2.6 percent for old banks while decreasing profitability by almost 6 percent for the new ones. We hypothesize that this could reflect the fact that competition affects the new private banks more severely and they have to spend more on things such as advertising to stay competitive. In addition,

these banks have relatively less experience in operating in the Indian market and less reputation and this may also contribute to the negative effect of competition.

In Table 3a-2 we compare the performance of domestic and foreign banks. We find that domestic banks in general, are much less profitable than foreign banks (column 1) and the profit of domestic banks is 0.16 percent lower⁷ than their foreign counterparts. To investigate whether the lower profitability of public banks is driving this result we compare Indian private banks to their foreign counterparts (column 2). We find that the former this is not the case, if anything Indian private banks fare even worse and have 0.21 percent lower profitability than the foreign banks. So the finding about the lower profits of domestic banks, are not being driven by the difference between the public banks alone. Last, we compare the new Indian private banks to the foreign ones to investigate whether there is any particular cohort of Indian private banks that is driving the above result. We find that the new Indian private banks look very similar to the foreign banks in terms of profits (column 3) when the interaction with competition is taken into account, and hence it is the old Indian private banks that are driving the earlier results.

We also find that the effect of competition is different for each bank type. When the interaction effect is taken into account we find that competition increases profits for domestic banks (2 percent) and Indian private banks (3 percent) and decreases profits of foreign banks (between 2 and 4 percent). This seems to suggest that when foreign banks compete aggressively they may be pursuing market share enhancement policies as a way of meeting the competitive threat and this may not always be favorable for the bottom line. One may stretch this logic a bit and argue that these foreign banks are already very close to their efficiency frontier and aggressive competition does very little to improve efficiency. Rather, it leads to unproductive rent-seeking behavior and lowers profits. For domestic banks however, competitive pressure may enhance profitability by getting rid of inefficiencies as

⁷ All elasticities are calculating taking into account the interaction term.

mentioned earlier. When we further decompose the Indian private banks into old and new banks and compare new Indian private banks to their foreign counterparts we find that both suffer a decrease in profits as competition increases.

In addition, for both Tables 3a-1 and 3a-2, we find that there are economies of scale and larger banks are more profitable. As size increases by 1 percent, profitability increases between 0.04 and 0.11 percent, depending on the sample. We also find that on average, more diverse banks are more profitable, market share has little impact of profitability and holding government securities has a positive impact of profitability. The last result should be interpreted with caution: structural weaknesses in bank portfolios could make riskless lending to the Government relatively profitable. Another curious result is the positive coefficient on the share of non-interest expenditure. If we interpret this variable as measuring operational efficiency (i.e. greater this ratio, the more inefficient a bank is), then this implies that less efficient banks are more profitable. However, as explained earlier, we believe that this variable is proxying for output expansion instead of capturing operational efficiency. When banks expand they need to spend on infrastructure, advertising and deposit mobilization. We believe that these are the quantities captured in the share of non-interest expenditure. Hence we can interpret our result as output expansion leading to greater profitability.

In addition, a strong macro environment increases profits as seen by the positive coefficient on the per capita GNP growth variable. One channel through which this may occur is the decline in the share of bad loans fall when the economy is strong and growing. The 1993 dummy is positive and significant in most specifications, showing that the 1993 reforms were successful. The new bank dummy is not significant in most specification. One puzzling result is that the share of non-interest expenditure, which is our proxy for operational efficiency and cost management issues, is positive and significant. Lower ratios indicate greater efficiency. Hence the *a priori* expectation is a negative

coefficient on this variable. Our positive coefficient may be due to the fact that these banks are upgrading with new technology and management practices, which in turn may lead to both an increase in the non-interest expenditure ratio and profitability.

In Table 3b we want to analyze how much of profitability is due to increases in underlying productivity and how much of it can be attributed to the other factors discussed in the earlier tables.⁸ For this analysis, narrow our focus to comparing three bank groups for parsimony. The coefficient of the productivity index, the main variable of interest in this table, is positive and significant, suggesting that profitability has improved not only through output expansion and improved economic growth but also through productivity gains. When this productivity enhancement effect is controlled for, the share of non-interest expenditure and non-interest earnings is not significant in any of the specifications and the market share variables show a U-shape. Profitability first falls with market share and then increases. Overall the impact of the market share variable is positive and economically large. Overall, compared to the output expansion effects, the productivity effect is economically small. Thus the evidence points to the fact that banks in India have increased profitability mainly through output expansion and not as much through productivity enhancement.⁹

Spreads

Table 4a examines the behavior and determinants of spreads post-reforms (hypotheses a and e from section 4.1). Spreads are a measure of operational efficiency and quality of asset management, but can also be interpreted as an indicator of competition. Although market concentration has declined post deregulation, we do not observe a significant decline in spreads. Interest rates have fallen since

⁸ The sample size is smaller since data on employees is available from 1992 and the productivity estimates begin from 1992.

⁹ These specifications investigate the average response of bank profitability to productivity enhancement. It may be the case that banks react differently to productivity depending on ownership. We also investigated (results not presented) whether productivity and ownership interact to affect profits in different ways for different cohort of banks. We find no such evidence.

1992, though the biggest changes occurred after 1999. If price-setting behavior is endogenous not just to market structure, but also to size and deregulation, then interest rate liberalization may lead to an increase in bank funding costs or in a decrease in interest earnings, and a fall in bank profitability. This could be countered through an increase in the number and price of services offered by banks (Humphrey and Pulley, 1997), a strategy that is easier for larger banks to effect.

The key question addressed by Table 4a1 through 4b is whether banks have been able to protect interest spreads and profitability, and if so, which strategies have worked and for whom? When competition is taken into account we find that private banks have lower spread than public banks and there is no difference between old and new private banks. In addition, all categories of domestic banks have lower spreads than their foreign counterparts. One seemingly contradictory result is that for all banks, spreads seem to increase with competition. One explanation is that the increase in spreads is driven by loan demand, rather than by increases in deposit rates. In a study of US banks, Hancock (1985), found that a 100 basis point increase in spreads increased variable profits by nearly 34 percent, but that deposit rate and lending rate increases were not equivalent at 5 percent level of significance. This is consistent with past profitability driving spreads wider: it could signal success in marketing loans and in providing services that attract clients. Clearly, a thorough analysis of the determinants of spreads in Indian banking would be an area for future research.

We also find that larger banks have lower spreads: this may be because of the dominance of public sector banks among the larger institutions. These banks may have lower incentives to provide the services necessary to push wider spreads at clients. The market share variable has a negative impact for banks. This implies that as banks attempt to increase market share, one avenue which they follow is to lower interest rates. In addition more leveraged banks have lower spreads as do newer banks. The degree of overlap between these two categories is high, i.e., leveraged banks tend to be

smaller and newer, and may keep spreads lower as they try and compete away market share from established banks. Last, from Tables 4b we find that productivity has a negative impact on spreads. This may signal that as banks become more efficient, it is reflected in the spread. All other results largely unchanged.

6. Conclusions

Nearly fifteen years after the reforms, the Indian financial sector is still dominated by public sector banks. At the same time, the market share of private and foreign banks has been growing and these considerably outperform the state-owned segment of banking. It is unlikely that the public sector will shrink significantly in the medium-run, largely because policy makers in India perceive, and perhaps rightly so, that financial intermediation is not merely a growth facilitator, but also a potential tool for development. However, the 1991 reforms recognized that there were serious flaws in banking regulation, that financial sector reforms would be a key component of the overall strategy for integrating India with global financial markets, and that public sector banks were a drain on fiscal resources. Indian reforms were characterized by gradualism in general. This was true of financial sector reforms as well. Crises in East Asia (1997) and Argentina (2001) threw the role of effective financial intermediation into focus and highlighted the importance of a resilient and effectively regulated banking sector in providing a buffer against external shocks. This is especially relevant for India since capital account liberalization and greater integration with global financial markets appears inevitable. Fear of exposure to external shocks continues to provide a rationale for not adopting a “big bang” approach to reforms. Nonetheless, considerable strides were made in the nineties and continue to be made to this day: interest rates were deregulated, entry of private and foreign banks liberalized, and a framework for divesting public sector banks was set up. At the same time, key policy makers

emphasized that for Indian banking to be effective, public sector banks would have to be made effective.

Given the constraints imposed by the special role of state-owned banks, the interaction of bank ownership with asset management, increased competition, output expansion and diversification, operational efficiency, and profitability are the key concerns of research on the Indian financial sector. We therefore implement an econometric strategy to establish the role of ownership, several bank specific characteristics, productivity and competition. The empirical strategy is developed in two steps. First, we construct four categories of variables that capture ownership, competition, productivity and output expansion. Next, controlling for bank specific characteristics and time fixed-effects, we estimate the effects of ownership, competition and output expansion versus productivity enhancement strategies on profitability and interest spread.

Our main results are that private sector banks show significant gains relative to public sector banks in terms of profitability even after controlling for productivity, size, leverage, cost management, diversification, time effects, and competition. Also, foreign banks outperform Indian private sector banks. We find that profitable banks are more likely to have a diverse range of output, to be operationally efficient, and to have high spreads. Productivity has increased across all bank categories, but its impact is relatively small in magnitude compared to the output expansion variables. This leads us to conclude that banks in India have resorted to output expansion rather than efficiency enhancement as a strategy to boost profits. We also find that the profitability of public sector banks has improved in response to greater competition. In addition, when competition is taken into account, we find that private banks have lower spread than public banks and there is no difference between old and new private banks. Also, all categories of domestic banks have lower spreads than their foreign

counterparts. Last, productivity lowers spreads, although the magnitude is relatively small. Lower concentration has lowered the profit rate, which is good for the consumer of banking services.

It is significant that private banks outperform public sector banks along every dimension considered. We would like to run our productivity and profitability tests again, after another decade of reform, to see if the productivity gap widens or if public sector banks rise to the challenge. The empirical evidence that public sector banks have reacted to increased competition with higher profitability suggests the prognosis is hopeful. Public sector banks will have to mirror the success achieved by the Indian private sector and foreign banks in asset and cost management if the stated policy objectives of higher efficiency and profitability, robustness to external shocks following the achievement of capital account liberalization, and greater mobilization of small savings to fuel the next round of growth are to be achieved.

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Appendix Tables

Table 1a: International Comparisons (1999)

	Concentration	Foreign banks ROA	Public banks ROA	No. of DTIs*	Risk-weighted capital ratio	DTI* assets per capita ('000s USD)
India	42	0.9	0.4	300	11.5	0.3
Korea	33	1.8	-5.2	3738	10.8	19.7
Indonesia	62	0.8	-19.9	9556	-8.1	0.6
Argentina	46	0.4	0	116	14	3.5
Brazil	51	0.4	-0.1	1542	15.8	2.9
Hungary	51	0.9	-27.1	254	15	3.1
Poland	48	0.5	1	858	13.1	2.3
Israel	93	0.3	0.5	45	9.2	27.8

*Deposit Taking Institutions;

Source: Hawkins, J and D. Mihaljek 2001

Table 1b: Dependent and Independent Variables

Dependent Variable	
Return on Assets (ROA = profits/total assets) in percentage	Spreads (SPR = interest income/interest bearing assets – interest expenditure/interest-bearing liabilities) Measure of asset management quality and profitability
Independent Variable	
<p>(a) <i>Bank Ownership Dummy</i> (bank type, i.e. public or private, domestic or foreign etc.)</p> <p>(b) <i>Competition Index</i> (1- market concentration) is defined over loans and captures the impact of market structure. Market concentration is measured by the four bank concentration ratio.</p> <p>(c) <i>Share of non-interest expenditure</i> is a measure of output expansion</p> <p>(d) <i>Share of non-interest earnings</i> is a measure of diversification</p> <p>(e) <i>Market Share</i> is a measure of market power of an individual bank and is based on loans plus deposits.</p> <p>(f) <i>Productivity Index</i> (Total Factor Productivity (TFP)=Actual output minus Predicted Output, Measures of output: loans plus deposits and total income, TFP Index=TFP_{ijt} – TFP_{j, 1992}), where i=bank and j=mean TFP by banktype</p> <p>(g) Other Bank characteristics: <i>size</i> (log of total assets), <i>investment in govt. approved securities</i> (extent to which the bank's investments are tied to government borrowing) <i>leverage ratio</i> (capital / total assets)</p>	

Table 2a: Key Descriptive Statistics by Bank Type (estimation sample)

State Banks of India and their branches									
Year	Asset Grwth	ROA	Spreads	Prod.Index	Year	Asset Grwth	ROA	Spreads	Prod.Index
1992	-9.335	0.179	-0.003	0	1992	1.984	1.153	0.004	0
1993	-3.262	0.163	-0.004	0.0000000001	1993	6.707	1.018	0.008	0.009
1994	0.041	0.172	0.001	0.0000000002	1994	5.604	1.193	0.019	0.024
1995	-1.632	0.297	0.015	0.000002	1995	1.112	1.291	0.025	0.017
1996	7.426	0.365	0.021	0.000003	1996	10.138	1.092	0.020	0.035
1997	-0.843	0.638	0.029	0.000002	1997	5.241	1.062	0.027	0.048
1998	-4.280	0.979	0.034	0.000003	1998	1.775	1.015	0.029	0.032
1999	8.927	0.631	0.036	0.000004	1999	5.496	0.945	0.033	0.043
2000	10.879	0.856	0.038	0.000004	2000	4.311	0.878	0.033	0.060
2001	11.336	0.678	0.038	0.000003	2001	5.861	0.813	0.031	0.045
2002	7.040	1.049	0.040	0.000002	2002	0.702	0.888	0.029	0.034
2003	6.071	1.282	0.044	0.000002	2003	-4.565	0.989	0.039	0.030
2004	8.745	1.538	0.048	0.000002	2004	1.497	1.145	0.040	0.038
Nationalized Banks					Foreign Private Banks				
Year	Asset Grwth	ROA	Spreads	Prod.Index	Year	Asset Grwth	ROA	Spreads	Prod.Index
1992	-12.090	0.153	-0.003	0	1992	1.984	1.153	0.004	0
1993	-3.755	0.034	-0.004	0.0000000001	1993	6.707	1.018	0.008	0.009
1994	-1.353	0.099	0.000	0.0000000001	1994	5.604	1.193	0.019	0.024
1995	2.592	0.239	0.012	0.0000000002	1995	1.112	1.291	0.025	0.017
1996	-1.676	0.302	0.021	0.0000000002	1996	10.138	1.092	0.020	0.035
1997	-2.448	0.515	0.025	0.0000000002	1997	5.241	1.062	0.027	0.048
1998	2.022	0.649	0.033	0.0000000003	1998	1.775	1.015	0.029	0.032
1999	6.649	0.548	0.038	0.0000000003	1999	5.496	0.945	0.033	0.043
2000	8.406	0.533	0.040	0.0000000003	2000	4.311	0.878	0.033	0.060
2001	7.366	0.427	0.044	0.0000000002	2001	5.861	0.813	0.031	0.045
2002	4.386	0.709	0.045	0.0000000002	2002	0.702	0.888	0.029	0.034
2003	3.360	1.081	0.048	0.0000000002	2003	-4.565	0.989	0.039	0.030
2004	7.369	1.355	0.051	0.0000000002	2004	1.497	1.145	0.040	0.038
Old Domestic Private Banks					New Domestic Private Banks				
1992	-0.225	0.315	0.002	0	1992				
1993	3.318	0.264	0.000	0.053	1993				
1994	6.204	0.370	0.009	0.102	1994				
1995	11.834	0.676	0.019	0.183	1995				
1996	6.483	0.778	0.024	0.236	1996	17.807	1.457	0.012	0
1997	9.668	0.788	0.026	0.233	1997	24.577	1.311	0.024	0.620
1998	8.278	0.882	0.031	0.246	1998	21.527	1.307	0.023	0.572
1999	8.342	0.684	0.032	0.277	1999	20.682	0.939	0.030	0.248
2000	12.638	0.848	0.037	0.322	2000	24.715	0.923	0.026	1.582
2001	8.596	0.704	0.040	0.322	2001	14.557	0.714	0.031	-0.082
2002	3.722	0.998	0.040	0.298	2002	13.699	0.713	0.033	0.318
2003	3.802	1.077	0.043	0.331	2003	3.112	0.979	0.040	-0.832
2004	6.330	1.197	0.045	0.387	2004	15.384	1.109	0.044	0.620

Note: *ROA and total assets growth is in percentage and the productivity index is in logs. Differences across bank type (private vs. public and Indian private vs. foreign) are significant for all variables at 5% according to t-tests and Kruskal-Wallis equality-of-populations rank test.

Table 2b: Summary Statistics for Regressions

Dependent Variables	Obs.	Mean	Median	S.D.	Min	Max
ROA	1146	0.797	0.742	0.615	0	1.779
Spread	1141	0.027	0.030	0.018	-0.005	0.052
Regressors						
Competition Measure	1146	0.600	0.607	0.026	0.545	0.627
Productivity Index (Lag 1 Yr.)	990	0.087	0.004	0.541	-7.177	3.475
Size (Log(Total Assets))	1146	7.925	8.093	1.885	3.152	12.566
Sh. of Non-Interest Expenditure (Lag 1 Yr.)	1146	0.321	0.297	0.114	0.051	1
Diversification Variable: Sh. of Non-Interest Earnings (Lag 1 Yr.)	1146	0.149	0.132	0.114	-0.166	0.843
Sh. of Govt. Securities (Lag 1 Yr.)	1146	0.218	0.209	0.096	0	0.949
Market Share	1146	0.011	0.003	0.026	0	0.246
Leverage (Lag 1 Yr.)	1145	0.068	0.011	0.153	0	1.015
GNP Per Capita Growth (Lag 1 Yr.)	1146	4.208	3.633	2.131	0.231	7.359

Table 3a-1: Ownership and Profitability - Base Specification I
(Public versus Private Banks and Old v/s New Indian Private Banks)
Dependent Variable: Profitability (Percentage)

	(1)	(2)	(3)
Base category for ownership	Public Banks	Public Banks	Old Indian Private Banks
Private Bank Dummy	3.703*** (0.637)		
Indian Private Bank Dummy		2.101*** (0.702)	
New Indian Private Bank Dummy			8.816*** (2.922)
Competition Measure (Lag 1 Yr.)	5.109*** (1.228)	3.956*** (1.139)	4.327** (1.883)
Interaction: Owner. Dum. & Competition	-5.686*** (1.066)	-3.042*** (1.173)	-14.296*** (4.794)
Bank Characteristics			
Size	0.093*** (0.019)	0.095*** (0.027)	0.112** (0.045)
Sh. of Non-Interest Expenditure (Lag 1 Yr.)	0.490*** (0.129)	0.523*** (0.178)	0.528** (0.220)
Diversification Variable (Lag 1 Yr.)	0.361** (0.162)	0.360 (0.269)	0.306 (0.407)
Sh. of Govt. Securities (Lag 1 Yr.)	0.337* (0.203)	-0.153 (0.294)	-0.118 (0.473)
Market Share	-2.196 (1.988)	-2.775 (2.315)	2.437 (23.261)
Market Share Square	4.011 (7.987)	5.718 (8.966)	-197.174 (424.952)
New Bank Dummy	0.326*** (0.053)	0.086 (0.108)	
Other Controls			
GNP Per Capita Growth (Lag 1 Yr.)	0.032*** (0.006)	0.034*** (0.006)	0.043*** (0.009)
1993 Dummy	0.179*** (0.039)	0.195*** (0.038)	0.069 (0.069)
Constant	-57.792** (27.157)	-88.296*** (27.465)	-41.815 (42.233)
Observations	1146	730	377
Rho(AR1)	0.540	0.621	0.630
Wald Stat.: Chi-Sq.	684.321	664.037	172.679

Note: Panel FGLS estimation with correction for first order autocorrelation and panel heteroskedasticity. Standard errors in parentheses. Specification contains bi-annual dummies and a time trend. Wald statistic (Prob. > chi-square) implies that all variables are jointly significant. 'Rho (AR1)' denotes the common autocorrelation coefficient. Range: 1991-2004. *, ** & *** denote significance at 10%; 5% & 1%.

Table 3a-2: Ownership and Profitability - Base Specification II

(Domestic v/s Foreign Banks)

Dependent Variable: Profitability (Percentage)

	(1)	(2)	(3)
Base category for ownership	Foreign Banks		
Domestic Bank Dummy	-6.543*** (1.064)		
Indian Private Bank Dummy		-5.532*** (1.137)	
New Indian Private Bank Dummy			6.854** (3.037)
Competition Measure (Lag 1 Yr.)	-6.513*** (1.958)	-3.326 (2.261)	0.640 (3.528)
Interaction: Owner. Dum. & Competition	10.644*** (1.763)	8.849*** (1.886)	-11.228** (4.976)
Bank Characteristics			
Size	0.040** (0.018)	0.082** (0.032)	-0.003 (0.047)
Sh. of Non-Interest Expenditure (Lag 1 Yr.)	0.481*** (0.130)	0.631*** (0.138)	0.454*** (0.174)
Diversification Variable (Lag 1 Yr.)	0.253 (0.165)	0.298* (0.175)	0.490** (0.194)
Sh. of Govt. Securities (Lag 1 Yr.)	0.259 (0.208)	0.466* (0.255)	0.690** (0.297)
Market Share	-3.999* (2.222)	8.489 (16.753)	42.632** (21.364)
Market Share Square	12.749 (8.863)	-271.120 (349.728)	-695.621* (388.658)
New Bank Dummy	0.262*** (0.093)	0.141 (0.094)	
Other Controls			
GNP Per Capita Growth (Lag 1 Yr.)	0.030*** (0.006)	0.035*** (0.009)	0.020 (0.016)
1993 Dummy	0.176*** (0.038)	0.049 (0.058)	0.091 (0.100)
Constant	-55.680** (26.631)	-14.363 (39.357)	40.700 (77.551)
Observations	1146	793	477
Rho(AR1)	0.583	0.551	0.442
Wald Stat.: Chi-Sq.	576.081	208.547	53.382

Note: Panel FGLS estimation with correction for first order autocorrelation and panel heteroskedasticity. Standard errors in parentheses. Specification contains bi-annual dummies and a time trend. Wald statistic (Prob. > chi-square) implies that all variables are jointly significant. 'Rho (AR1)' denotes the common autocorrelation coefficient. Range: 1991-2004. *, ** & *** denote significance at 10%; 5% & 1%.

Table 3b: Impact of Productivity on Profitability
Dependent Variable: Profitability (Percentage)

	(1)	(2)	(3)
Base category for ownership	Public Banks	Foreign Banks	Old Indian Pvt. Banks
Private Bank Dummy	3.872*** (0.707)		
Domestic Bank Dummy		-6.863*** (1.135)	
New Indian Private Bank Dummy			10.017*** (3.216)
Competition Measure (Lag 1 Yr.)	-3.314* (1.742)	-15.394*** (2.338)	-2.255 (2.746)
Interaction: Owner. Dum. & Competition	-6.242*** (1.187)	10.971*** (1.889)	-16.353*** (5.248)
Productivity Measure			
Productivity Index	0.047** (0.019)	0.050*** (0.017)	0.056*** (0.020)
Bank Characteristics			
Size	0.098*** (0.027)	0.085*** (0.028)	0.082 (0.052)
Sh. of Non-Interest Expenditure (Lag 1 Yr.)	0.229 (0.198)	0.369 (0.199)	-0.361 (0.439)
Diversification Variable (Lag 1 Yr.)	0.301 (0.193)	0.168 (0.191)	1.304*** (0.483)
Sh. of Govt. Securities (Lag 1 Yr.)	0.253 (0.267)	0.210 (0.260)	0.021 (0.487)
Market Share	-15.335** (7.321)	-21.034*** (6.928)	13.943 (25.011)
Market Share Square	180.310* (97.477)	248.690*** (93.126)	-327.071 (443.724)
New Bank Dummy	0.338*** (0.063)	0.128 (0.096)	
Other Controls			
GNP Per Capita Growth (Lag 1 Yr.)	0.048*** (0.006)	0.048*** (0.006)	0.061*** (0.010)
Observations	983	983	317
Rho(AR1)	0.605	0.629	0.657
Wald Stat.: Chi-Sq.	580.535	575.414	199.307

Note: Panel FGLS estimation with correction for first order autocorrelation and panel heteroskedasticity. Standard errors in parentheses. Specification contains bi-annual dummies, a dummy for 1993 and a constant. Wald statistic (Prob. > chi-square) implies that all variables are jointly significant. 'Rho (AR1)' denotes the common autocorrelation coefficient. Range: 1992-2004. *, ** & *** denote significance at 10%; 5% & 1%.

Table 4a-1: Ownership and Spread - Base Specification I
(Public versus Private Banks and Old v/s New Indian Private Banks)
Dependent Variable: Spread

	(1)	(2)	(3)
Base category for ownership	Public Banks	Public Banks	Old Indian Pvt. Banks
Private Bank Dummy	0.077*** (0.011)		
Indian Private Bank Dummy		0.034*** (0.012)	
New Indian Private Bank Dummy			-0.005 (0.051)
Competition Measure (Lag 1 Yr.)	0.320*** (0.023)	0.300*** (0.023)	0.222*** (0.033)
Interaction: Owner. Dum. & Competition	-0.132*** (0.019)	-0.061*** (0.020)	0.006 (0.082)
Bank Characteristics			
Size	-0.001* (0.0004)	-0.002*** (0.001)	-0.002 (0.0008)
Sh. of Non-Interest Expenditure (Lag 1 Yr.)	0.027*** (0.003)	0.032*** (0.004)	0.033*** (0.006)
Diversification Variable (Lag 1 Yr.)	-0.008** (0.003)	-0.016*** (0.005)	-0.020*** (0.007)
Sh. of Govt. Securities (Lag 1 Yr.)	0.010** (0.004)	0.025*** (0.006)	0.027*** (0.008)
Market Share	0.041 (0.035)	0.113*** (0.036)	-0.328 (0.347)
Market Share Square	-0.272* (0.140)	-0.480*** (0.143)	1.509 (6.565)
Leverage (Lag 1 Yr.)	-0.027*** (0.005)	-0.029*** (0.006)	-0.036*** (0.007)
Profitability (Lag 1 Yr.)	0.002*** (0.0001)	0.001* (0.0006)	0.002* (0.001)
New Bank Dummy	-0.00004 (0.0001)	-0.002 (0.002)	
Other Controls			
GNP Per Capita Growth (Lag 1 Yr.)	0.0009*** (0.0001)	0.001*** (0.0001)	0.0005*** (0.0002)
Observations	1140	730	377
Rho(AR1)	0.437	0.463	0.460
Wald Stat.: Chi-Sq.	5619.644	5348.165	1711.294

Note: Panel FGLS estimation with correction for first order autocorrelation and panel heteroskedasticity. Standard errors in parentheses. Specification contains bi-annual dummies, a 1993 dummy and a time trend. Wald statistic (Prob. > chi-square) implies that all variables are jointly significant. 'Rho (AR1)' denotes the common autocorrelation coefficient. Range: 1991-2004. *, ** & *** denote significance at 10%, 5% & 1%.

Table 4a-2: Ownership and Profitability - Base Specification II

(Domestic v/s Foreign Banks)

Dependent Variable: Spread

	(1)	(2)	(3)
Base category for ownership	Foreign Banks		
Domestic Bank Dummy	-0.136*** (0.018)		
Indian Private Bank Dummy		-0.105*** (0.021)	
New Indian Private Bank Dummy			-0.095* (0.054)
Competition Measure (Lag 1 Yr.)	0.070* (0.037)	0.055 (0.045)	0.095 (0.075)
Interaction: Owner. Dum. & Competition	0.218*** (0.030)	0.168*** (0.034)	0.149* (0.088)
Bank Characteristics			
Size	-0.0005 (0.0003)	-0.001* (0.0006)	0.0004 (0.001)
Sh. of Non-Interest Expenditure (Lag 1 Yr.)	0.036*** (0.003)	0.031*** (0.004)	0.028*** (0.005)
Diversification Variable (Lag 1 Yr.)	-0.013*** (0.004)	-0.008** (0.004)	-0.005 (0.005)
Sh. of Govt. Securities (Lag 1 Yr.)	0.010** (0.004)	0.004 (0.006)	-0.008 (0.008)
Market Share	0.046 (0.030)	0.288 (0.281)	0.289 (0.376)
Market Share Square	-0.298** (0.120)	-9.673* (5.870)	-12.100* (6.801)
Leverage (Lag 1 Yr.)	-0.031*** (0.004)	-0.031*** (0.00497)	-0.021*** (0.006)
Profitability (Lag 1 Yr.)	0.002*** (0.0005)	0.002*** (0.001)	0.003*** (0.001)
New Bank Dummy	-0.005*** (0.001)	-0.004*** (0.001)	
Other Controls			
GNP Per Capita Growth (Lag 1 Yr.)	0.0009*** (0.0001)	0.0007*** (0.0002)	0.001*** (0.0004)
Observations	1140	787	471
Rho(AR1)	0.347	0.394	0.308
Wald Stat.: Chi-Sq.	6057.403	1663.192	464.160

Note: Panel FGLS estimation with correction for first order autocorrelation and panel heteroskedasticity. Standard errors in parentheses. Specification contains bi-annual dummies, a 1993 dummy and a constant. Wald statistic (Prob. > chi-square) implies that all variables are jointly significant. 'Rho (AR1)' denotes the common autocorrelation coefficient. Range: 1991-2004. *, ** & *** denote significance at 10%; 5% & 1%.

Table 4b: Impact of Productivity on Spreads
Dependent Variable: Spread

	(1)	(2)	(3)
Base category for ownership	Public Banks	Foreign Banks	Old Indian Pvt. Banks
Private Bank Dummy	0.083*** (0.012)		
Domestic Bank Dummy		-0.154*** (0.021)	
New Indian Private Bank Dummy			0.008 (0.066)
Competition Measure (Lag 1 Yr.)	0.320*** (0.038)	0.038 (0.048)	0.181*** (0.054)
Interaction: Owner. Dum. & Competition	-0.142*** (0.020)	0.248*** (0.034)	-0.014 (0.106)
Productivity			
Log (Productivity Index) (Lag 1 Yr.)	-0.001** (0.0004)	-0.001** (0.0003)	-0.001* (0.0004)
Bank Characteristics			
Size	-0.0002 (0.001)	-0.0003 (0.001)	-0.001 (0.001)
Sh. of Non-Interest Expenditure (Lag 1 Yr.)	0.030*** (0.004)	0.039*** (0.004)	0.031*** (0.007)
Diversification Variable (Lag 1 Yr.)	-0.008* (0.004)	-0.011** (0.004)	-0.016* (0.009)
Sh. of Govt. Securities (Lag 1 Yr.)	0.008 (0.005)	0.010* (0.005)	0.024*** (0.008)
Market Share	0.041 (0.121)	0.079 (0.108)	-0.278 (0.366)
Market Share Square	-0.626 (1.565)	-0.996 (1.401)	-0.154 (6.775)
Leverage (Lag 1 Yr.)	-0.024*** (0.006)	-0.025*** (0.006)	-0.024 (0.024)
Profitability (Lag 1 Yr.)	0.002*** (0.001)	0.002*** (0.001)	0.002* (0.001)
New Bank Dummy	0.001 (0.001)	-0.004*** (0.001)	
Observations	976	976	317
Rho(AR1)	0.412	0.407	0.427
Wald Stat.: Chi-Sq.	3673.629	3783.149	1472.873

Note: Panel FGLS estimation with correction for first order autocorrelation and panel heteroskedasticity. Standard errors in parentheses. Specification contains a lagged GDP per capita growth term, bi-annual dummies, a 1993 dummy and a constant. Wald statistic (Prob. > chi-square) implies that all variables are jointly significant. 'Rho (AR1)' denotes the common autocorrelation coefficient. Range: 1992-2004. *, ** & *** denote significance at 10%; 5% & 1%.