
WORKING PAPER 111/2015

**THE CONUNDRUM OF PROFITABILITY
VERSUS SOUNDNESS FOR BANKS BY
OWNERSHIP TYPE: EVIDENCE FROM THE
INDIAN BANKING SECTOR**

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The Conundrum of Profitability Versus Soundness For Banks by Ownership Type: Evidence from the Indian Banking Sector

Sreejata Banerjee and Malathi Velamuri

Abstract

Banks pursue profit like any business, but in their role as custodians of domestic savings, they are required to be cautious. Riskier but profitable advances may cause asset quality deterioration, thus affecting the long-term viability of the entity. Financial sector reforms in India from the early 1990s, have raised the level of competition for banks of different ownerships - public sector (PSB), old private banks, new private banks and foreign banks. We use panel data on 75 banks across the ownership spectrum, for the period 2000-13, to examine their performance vis-à-vis these two measures – profitability and soundness. We find evidence of significant heterogeneity in performance across ownership type. Overall, we find that there is a negative association between the profitability and soundness measures, though these effects vary by ownership type. PSBs' business constrained by social outreach commitments perform comparatively worse. The smaller old private banks appear to be the strongest with dedicated client base despite the pressure of non-performing assets have consistent profits reflected in the return on equity and return on assets. Foreign banks maintain high capital adequacy ratio and relatively higher return on assets. The results provide evidence that good human resource policy is vital for bank performance.

Keywords: Profitability, Soundness, Ownership effect

JEL Codes: G21 ,G28, C 33

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INTRODUCTION

Banks pursue profit like any business. But as custodians of the nation's savings and primary intermediary in the financial sector, they are required to tread cautiously, maintaining a delicate balance between profitability and stability. Minimizing cost and maintaining healthy revenues without asset quality deterioration is a universal challenge for banks in a competitive setting. The ongoing global financial crisis underscores the need to assess banks' operations not merely from the limited lens of profitability but also in terms of long-run sustainability. There is a substantial international literature linking financial market deregulation with increased risk-taking behaviour by firms in the financial sector. Hellman et al. (2000) develop a theoretical model where the opening up of the financial sector increases competition, which in turn erodes profits. The pressure from reduced profits induce banks and financial firms to make risky advances. Easterly et al. (2000) Giannone et al. (2011) empirically support this argument. Their cross-country regression analysis reveals that policies that favor liberalization in credit markets are negatively correlated with countries' resilience to the 2008 global financial crisis (GFC), as measured by output growth in 2008 and 2009. Thus, there exists evidence of financial market liberalization being associated with increased risk of financial crises.

Historically, India's financial sector did not offer a level-playing field for all the players. While public sector banks (PSBs) were constrained in some ways, they also enjoyed some privileges, and dominated the banking sector for several decades (Rajan, 2009). The liberalization and deregulation of the banking sector since 1990-91 has significantly changed this sector's operational environment. The thrust of these reforms was market orientation with a shift to market-determined interest rate from the earlier administered rate regime, and opening up the sector further to private sector participation through new licenses, and to foreign banks. Hence the establishment of new large private

sector banks to usher in competitiveness in the banking industry was a dramatic shift in the regulatory regime.

In the current liberal regime, PSBs have to compete with three other groups of banks: old private banks, new private banks and foreign banks. All banks are subject to the same prudential norms and regulatory requirements like the cash-reserve ratio, statutory liquidity ratio etc. They are allowed to operate freely in domestic markets, and earlier controls on products and pricing were lifted. Importantly, there is a significant decline in the extent of support that PSBs received from the government. Despite such efforts to create a level-playing field, the banks of different ownership structure are still fairly diverse.

Of the four types of banks the PSB have majority shareholding by the government. They play a social role by providing loans at discounted interest rates under priority sector lending to disadvantaged members of the society. The PSBs are required to have branches in remote rural areas for financial inclusion and outreach, raising their cost of operations. The old private sector banks have survived for almost a century, but are much smaller than the PSBs. They largely cater to the different business communities that have promoted them. The new private banks are diametrically different, having been promoted by large financial institutions. Presently there are only 7 such banks, which are large, modern, and technology oriented with a sizeable branch network. The foreign banks operate as subsidiaries created by the parent bank in the home country. Presently 43 foreign banks are operating in India. These banks face some additional restrictions such as a ceiling on the number of branches they can operate. The obvious diversity across the ownership is likely to be reflected in their operational efficiency.

There is a strong consensus in the international literature that private banks or newly privatized banks, are more cost efficient than public banks. Papers that document this include Villalonga (2000) for

Spanish banks, Philippatos and Yildirim (2003), Bonin et al. (2005) and Fries and Taci (2005) for European banks in transition economies, Hasan and Morton (2003) for Hungarian banks, Berger et al. (2005) for Argentinian banks, Nakane and Weintraub (2005) for Brazilian banks, Berger et al. (2007) for Chinese banks, Anis and Yosra (2012) for Tunisian banks, and Yangli, Hu and Chui (2004) for Taiwanese banks. There is also evidence of a positive association between foreign ownership and profitability. Hasan and Marton (2003) find that Hungarian banks with higher foreign ownership are more profitable. Moreover, most foreign banks have a higher level of profitability compared to public banks (Berger, 2009, Fries and Taci, 2005). Claessens (2001), examining the performance of domestic and foreign banks both in developed and developing economies in the late 1900's, finds that foreign participation improves the profit efficiency of domestic banking.

Given the weight of evidence in favor of more competition, policy-makers, researchers and commentators are interested in learning how different types of banks would perform in the new liberalized environment in India. Would PSBs cope with the challenge of competing in a market-oriented environment, pursuing profits without jeopardising their asset portfolio? Would the new comers – new private and foreign banks – be able to overcome the historical advantages enjoyed by the incumbent banks? The evidence thus far answers this question only partially.

Bhaumik and Dimova (2004), using Indian banking data from 1995-96 to 2000-01, find that while private sector and foreign banks were performing better than PSBs in 1995-96, the latter had closed the gap by 1999-00, suggesting that PSBs outperformed their private sector and foreign counterparts in the newly unleashed competitive environment. The authors concluded that ownership was not an important determinant of performance by the end of the 1990s. They used return on assets (RoA) as the performance measure.

Das et al. (2005) apply the data envelope analysis (DEA) to analyze various efficiency scores for Indian banks during the 1997-03 period. They find that PSBs improved considerably in terms of profit efficiency over this time. Foreign banks, while having higher average profit efficiency scores compared to PSBs, did not show much improvement, while private banks' performance on this score was inconsistent. The authors did not find a strong ownership effect with respect to cost, revenue and technical efficiencies.

Sathye (2003) also uses a DEA to examine productive efficiency of banks in India using data from 1997-98. He finds that while the mean efficiency score of Indian banks compares well with the world average, private sector banks are less efficient than PSBs and foreign banks. The author attributes the efficiency gains of PSBs to their successful effort in reducing non-performing assets, and to the policy of rationalizing staff and branches.

Much has changed in the banking sector since the evidence presented above – most notably, regulatory changes introduced since the Basel Capital Accord and the impact of the GFC. This provides a strong motivation for re-examining banks' performance in India over this turbulent period. Moreover, there is very little evidence on what impact the pursuit of profitability by banks has had on their soundness or sustainability, where the latter may be defined as a situation where the bank is solvent, and is expected to remain so. This seems particularly relevant now, as non-performing assets (NPAs) have increased sharply in recent years; during 2009-12, the ratio of NPAs to total loans rose from 2.3 percent to 3.6 percent. Notably, the PSBs accounted for about 85 percent of the NPAs in the banking sector in 2013 (Gynedi, 2014). The government of India pledged over \$1 billion in 2015, to recapitalize PSBs.¹

¹ See *Financial Express*, New Delhi, Feb 8, 2015.

In this paper, we estimate the operational efficiency of banks in India using a sample of data on public sector, private sector and foreign banks over the period 2000-13. We segregate operational efficiency into three aspects: competitive efficiency, profitability and financial stability. Banks of different ownership types are subject to different constraints that have a direct impact on their cost efficiency, profitability and stability. For instance, PSBs have more social objectives such as financial inclusion and outreach, relative to other types of banks. Foreign banks may be constrained by directives from their parent body. Moreover, most public sector and some private sector banks have been operating in the country for a very long time, while foreign banks are a relatively more recent phenomenon. For all these reasons, we estimate our relationships of interest separately by ownership type. Our contribution lies in highlighting the dilemma of banks in maintaining robust profit profile without eroding their asset base. We use a diverse set of criteria for evaluating bank performance in terms of the two criteria of profitability and soundness. The basic hypothesis we are testing is whether there is an inverse relationship between profitability and financial stability of banks.

Our data covers a period (2000-13) when many notable changes in international banking regulations were introduced (in the Basel rounds). More importantly, it covers one of the most turbulent phases in the international financial sector – GFC – that continues to have a significant impact in the real and financial sectors in many developed as well as developing countries. Therefore, our findings have important implications for enhancing banks' performance in India, in a backdrop of dynamic changes in both domestic and international financial sectors. Our findings can offer insights for other countries that have a similar banking structure and have launched major regulatory reforms in their financial sector.

To our knowledge, our paper is the first to analyse determinants of both profitability and stability for Indian banks by type of ownership. We take a holistic approach, keeping in mind a competitive scenario where profit is a driving force that may push banks into adopting a risky business strategy that can have serious consequences for soundness. It also provides useful tool for policy makers of banks and the Central Bank. We use accounting ratios that are routinely used by researchers and policy-makers, to capture our outcomes of interest. We use Cost-to-Income ratio (CIR) as a measure of overall competitiveness, return on equity (RoE) and return on assets (RoA) as measures of profitability, and the capital adequacy ratio (CAR) and net non-performing assets (NNPA) to evaluate soundness. We define these ratios and discuss their aptness as our outcome measures in the following section. We use panel data models to estimate our relationships of interest, while accounting for unobserved heterogeneity.

The rest of the paper is organised as follows: the following section discusses our sample data and presents some summary statistics, including trends over time of key outcome variables. In the third section 'Empirical Strategy', we outline our estimation model and the specifications for the various regressions. Findings are reported in the 'Results' section and the conclusions with discussion of the results are presented in the 'Conclusions'.

Data and Summary Statistics

Data and Variable Definitions

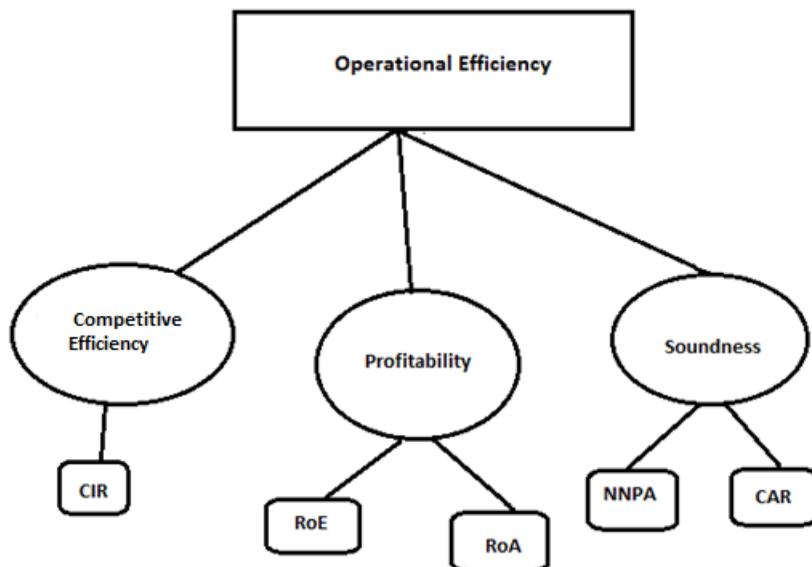
The data for the study comprises a panel of 75 banks operating in India during the period 2000-13. The sample includes all the domestic scheduled commercial banks, of which 26 are public sector banks with more than 50% share held by the government, 13 are old private sector banks that have been operating since the beginning of the 20th century, 7 are new private banks, mostly that were launched in the 21st century, and 29 foreign banks, which operate as a subsidiary of the home country

bank. The sources of the data are the Reserve Bank of India's (RBI) 'Current Statistics', 'Handbook of Statistics on the Indian Economy' and the 'Profile of banks', Indian Bank Association's 'Key Business Statistics' and the Capitaline database.²

Outcome variables

We segregate operational efficiency into three aspects: competitive efficiency, profitability and financial stability. We use the cost-to-income ratio (CIR) to measure competitive efficiency, the return on assets (RoA) and return on equity (RoE) to measure profitability while capital adequacy ratio (CAR) and net non-performing assets (NNPA) are used to assess banks' soundness, The following Figure 1 gives a schematic representation of the criteria.

Figure 1: Schematic Diagram of Operational Efficiency



² In this paper, we do not distinguish between universal investment banks that serve both retail and corporates and retain active treasury desk and the traditional deposit-lending banks.

Cost-to-income ratio (CIR): The CIR is defined as operating expenses divided by operating income. The cost of operations from the competitive side includes broadly two aspects: the cost of managing a branch, which includes overheads (rent, electricity charges, etc.) and the wages and salary of staff and officers.

Historically, PSBs have had a higher CIR than private banks and foreign banks (Mohan, 2006), at least in part because of the limited discretion they had over their operations. Following liberalization, there was an expectation that PSBs would lower their CIRs, and they did achieve this: the CIR of PSBs declined from 73.7 in 1993 to 45.1 in 2004 (Mohan, 2006).

Hess and Francis (2004) and Ghosh, Narain and Sahoo (2003) find an inverse relationship between CIR and profitability. This finding matches with expectations. However, while lowering costs might lead to increased profitability in many industries, this is not always the case in banking. The banking industry in many countries, including India, still depends on the strength of personal relationships and networks for its business. Despite significant inroads of information technology in banks, the client-staff interface continues to be vital for bank business. The critical role of assessing loan disbursement too rest in the hands of bank managers who should be motivated enough to make sound business decisions. Thus, drastic cost cutting through retrenchment could deprive banks of their experienced and knowledgeable staff, causing a long-run adverse impact on the bottom line (Bhaumik and Dimova, 2004; Tripe, 1998).

Return on Assets (RoA): The RoA is the ratio of net income to average total assets. It measures the profitability of a bank relative to its total assets and demonstrates the bank's efficiency to generate earnings from

assets. RoA is the chosen metric of bank performance by a number of authors.³

Inevitably, different stakeholders in a bank view performance from different angles. Debt holders look at a bank's ability to repay its obligations, a concern taken up by rating agencies. Equity holders focus on profit generation, and they are usually focused on the return to equity as a measure of performance.

Return on Equity (RoE): This is the ratio of net income to average total equity. Being a performance measure of shareholder value, RoE is by far the most popular measure of performance since: (a) it enables a direct assessment of the financial return of a shareholder's investment; (b) it is easily available for analysts, only relying upon public information; and (c) it is a standardized measure that allows for comparison between different companies or different sectors. This is also a versatile measure of performance; as Pattabhiraman (2008) asserts, "...the RoE of a financial institution can be expressed as the product of operational efficiency (net income/ revenue) and capital efficiency (revenue/ average equity)." He also comments on the relationship between CIR and RoE, contending that the CIR acts as a bridge between banks' internal business metrics and the RoE, which is the external metric. The RoE is likely to come under pressure in the coming years as banks endeavor to comply with Basel-III norms which require them to bring in more capital, relative to their loans. A healthy RoE is necessary to attract investors. Both RoA and RoE are used in the literature to measure profitability of banks. See, for instance, Bhaumik and Dimova (2004), Gilbert and Wheelock, 2007, and Christian, Moffit and Suberly (2008).⁴

³ See Bhaumik and Dimova (2004) and references therein.

⁴ The RBI used the RoA and RoE as the twin criteria for deciding which public sector banks would receive capital infusion, for strengthening their capital base. See *Financial Express*, New Delhi, Feb 8, 2015.

Net Non-performing Assets (NNPA): An asset becomes non-performing when the borrower defaults in the payment of interest and/or principal according to the agreed terms. NNPA is computed by deducting the capital provisions from the Gross Non-Performing Assets and dividing by the total assets of the bank. It is a clear indicator of the banks' financial stability because it shows the extent to which the banks' assets have deteriorated, or the proportion of borrowers' loans that are expected to default. This is reported in percentage terms. Till 2003, a loan was considered non-performing if it was overdue by 180 days. In March 2003, the Reserve Bank of India (RBI) enforced a more stringent definition, classifying a loan as non-performing if it was overdue by 90 days.

It is usually difficult to assess banks' soundness because the measures of soundness are usually pro-cyclical. Banks are prone to lend aggressively in booms and hold back from lending when a downturn is on the horizon; thus evaluation of banks' soundness tends to be lost in their pro-cyclical proclivity (Mishra and Dhal, 2010). In this regard, the Basel II prescriptions with regard to regulatory capital also came under criticism for not taking account of the pro-cyclical nature of such capital (Gordy and Howells, 2006; Catarineu-Rabell et al., 2005).

Despite the difficulties, there is considerable evidence linking bank failures to non-performing and doubtful loans and write-offs. The Global Financial Stability Report (IMF, 2009) claimed that recapitalization of weak banks and resolution of failed institutions was related to non-performing assets, indicating that deterioration of asset quality has a direct bearing on the bank's stability.

Capital Adequacy Ratio (CAR): The second factor for measuring financial stability is the CAR, or the capital to risk weighted assets ratio (CRAR). The CAR was proposed by the Bank for International Settlement

(BIS) in Basle that measures a bank's risk of insolvency from excessive losses. It is calculated as:

$$\text{CAR} = (\text{Tier 1 capital} + \text{Tier 2 capital}) / \text{Risk-weighted assets},$$

and expressed as a percentage. Tier 1 capital (or 'core capital') comprises stockholder equity capital and disclosed reserves, and Tier 2 capital (or 'supplementary capital') includes undisclosed reserves and subordinated term debt instruments provided that their original fixed time to maturity does not exceed five years. The difference between Tier 1 and Tier 2 capital thus reflects the degree to which capital is explicit or permanent. The BIS, in the Capital Accord, has mandated a minimum capital ratio as provision for unanticipated loan loss. This capital has to be maintained by all banks in countries that are signatories to the Basel Accord. The Basel Committee for Banking Supervision mandated that the CAR should be a minimum of 8 percent of the risk weighted assets. In India, the RBI mandates 9 percent.

There is an obvious trade-off between the CAR and profitability. While capital provisions provide a cushion against losses, they also represent an opportunity cost since they are unavailable for productive investment. Hellman et al. (2000) demonstrate that by themselves, capital requirements are an insufficient tool for prudential regulation. However, Mathuva (2009) presents evidence of a positive association between profitability and CAR in Kenya. In his interpretation, this suggests that an increase in capital may lower expected costs of financial distress (including bankruptcy) and thus raise expected earnings. However, he documents a negative relationship between equity capital ratio and profitability. While quite the opposite is proposed by Latrey et al (2013) for banks in Ghana who find weak positive relation between the two.

Control Variables

Our control variables are identified to reflect either the operational or competitive factors associated with bank function, and/or core business activity and source of profit. Under the first group are profit per employee, number of offices/branches and wages as a percentage of total expenses. Deposits, advances, investments, interest spread, Tier 1 and Tier 2 Capital and credit deposit ratio (CDR), standard deviation of Bankex (index of bank shares in the Bombay Stock Exchange) come in the second group. Some of these variables are converted to their natural logarithm values, for scaling purposes. Variable definitions are presented in Table 1 below.

Table 1: Variable Definitions

Variables	Definition	Application
CIR	Operating Expense/Total Income	Competition
RoE	Net Income / Average Total Equity	Profitability
RoA	Net Income / Average Total Assets	Profitability
NNPA	Gross non-performing Assets-Provisions/ Total Assets	Soundness
CAR	$\frac{\text{Tier 1} + \text{Tier 2}}{\text{Risk Weighted Assets}}$	Soundness
Tier 1 Capital	Paid-up capital + statutory reserves + disclosed free reserves – (equity investments in subsidiary + intangible assets + current and brought forward losses)	Soundness
Tier 2 Capital	Undisclosed reserves + revaluation reserves + general provisions + hybrid instruments + subordinated term debt	Soundness
Advances	Loans disbursed by the bank in the financial year	Profitability
Investments	Funds used by banks to purchase Government Debt /financial Assets	Profitability
Deposits	Funds that banks take from public on which they pay an interest	Profitability
Interest Spread	$\frac{\text{Interest earned} - \text{interest expended}}{\text{interest expended}}$	Profitability
No. of Offices	Number of branches per bank	Competition
CDR	$\frac{\text{Total Deposits}}{\text{Total Advances}} * 100$	Profitability
SDBankex	Standard Deviation of BSE Index of Bank shares	Profitability
Wages	Wages as percentage to total expenses is computed as the ratio of payment to and provisions for employees to total expenses.	Competition
Profit/Employee	Profit per employee is computed by dividing total profit for the group by the number of employees.	Profitability and Soundness

Descriptive Statistics

Table 2 presents summary statistics by bank type across the sample period, for all the variables that will be used in the empirical analysis. There is strong heterogeneity between the various types of banks with respect to almost every single variable. In particular, the performance metrics of foreign banks are significantly different from those of domestic banks.

Table 2: Summary Statistics by Bank Ownership

(Amount in Rs Million)

	Public	Old Private	New Private	Foreign	All Banks
Cost-to-Income Ratio (CIR)	52.00	51.75	55.30	69.81	58.76
Return-on-Equity (ROE)	17.22	15.53	11.39	6.96	12.42
Return-on-Assets (ROA)	0.90	1.03	0.89	1.51	1.16
Non-Performing Assets (NNPA)	2.99	3.18	1.78	4.35	3.44
Capital Adequacy Ratio (CAR)	12.43	13.79	13.93	34.77	21.48
Tier 1 Capital	8.08	11.97	9.95	37.39	20.34
Tier 2 Capital	4.28	2.35	3.63	2.06	3.05
Log (Advances)	10.55	8.05	9.86	6.11	8.36
Log (Investments)	10.02	7.46	9.38	6.03	7.98
Log (Deposits)	11.00	8.52	10.17	6.52	8.78
CDR	65.03	60.59	67.09	109.43	75.54
Interest Spread	1.96	1.43	1.37	2.52	2.17
No. of Offices	2,106	317	497	9	819
Wages	18.10	16.34	12.55	18.88	17.59
Profit/Employee	3.07	2.81	19.32	28.15	14.20

Pattabiraman (2008) claims that the CIR of Asian banks, at an average of 50%, is significantly better than the global average of 60%. Foreign banks have a high CIR, which at nearly 70%, is well above the

international norm of 60%, while the domestic banks are well within the norm.

Outcome Variables: Trends over Time

Figure 2 depicting CIR shows how Indian banks had an average value around 80 in 2000, while foreign banks maintained much better ratio of 40 at that time. However, as the summary statistics reveal, foreign banks' CIR deteriorated since, with an average over the sample period of 69.81, well above the comfort level. As regards RoE, PSBs perform the best with a steady level above all the other groups after 2005 (see Figure 3). Foreign banks have the lowest RoE in the entire period. On the other hand, foreign banks outperform all in the RoA criterion in Figure 4, which can be corroborated with the values in summary statistics and resonates with the literature. The sudden drop in RoA for foreign banks after 2008 reflects, at least in part, their greater exposure to international forces, and in this case, reflects the erosion in their assets following the GFC.

On the soundness issue, all banks have dramatically reduced their NNPA after 2003. This is the year when the 90 days norm was enforced (see Figure 5). The NNPAs of all banks converged in 2008 but the signs of the GFC are reflected in the rising graph of the foreign banks after that year. There is an upturn in NNPAs for PSBs as well, after 2011. Foreign banks retain high capital so their CAR is the highest among all groups. Indian banks retained their capital just below 20 yet well above RBI's prescribed minimum of 9% (Figure 6). Hellman et al.'s (2000) claim that maintaining high levels of regulatory capital can be detrimental to profits, is evident in the case of foreign banks. We observe high CAR along with low RoE for this group.

Profitability versus Soundness

We motivate our analysis by presenting pair-wise correlation coefficients between our five chosen outcome variables, by type of bank as well as for the pooled sample of all banks. These correlations are presented in Table 3.

Figure 2: Cost-to-income Ratio, by Bank Type (2000-13)

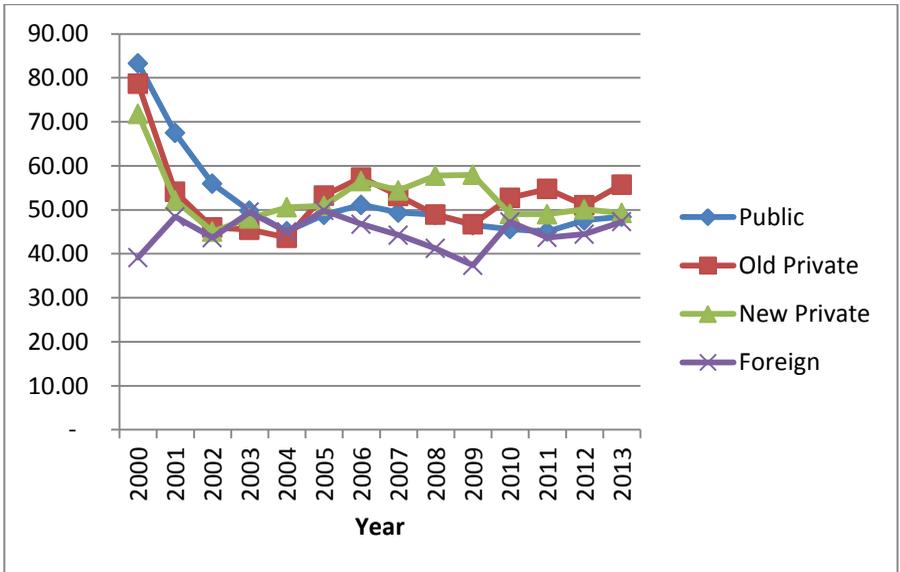


Figure 3: Return on Equity, by Bank Type (2000-13)

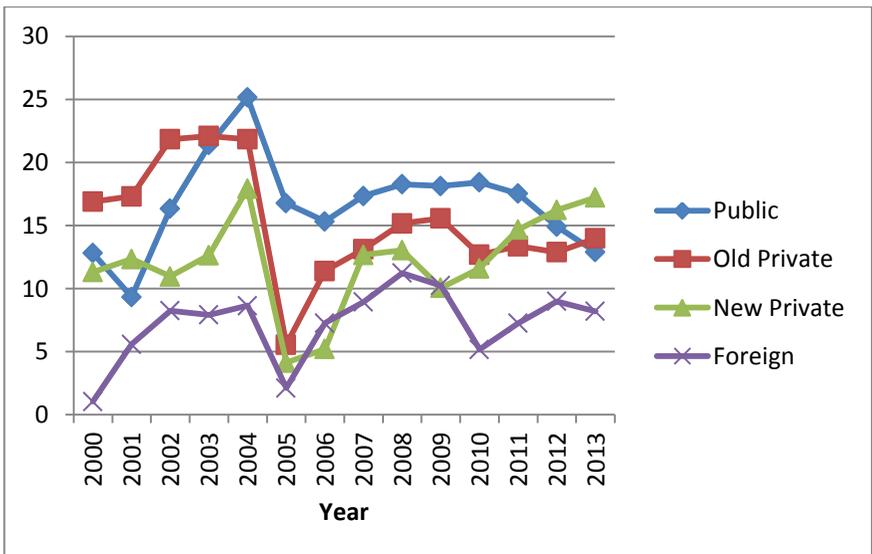


Figure 4: Return on Assets, by Bank Type (2000-13)

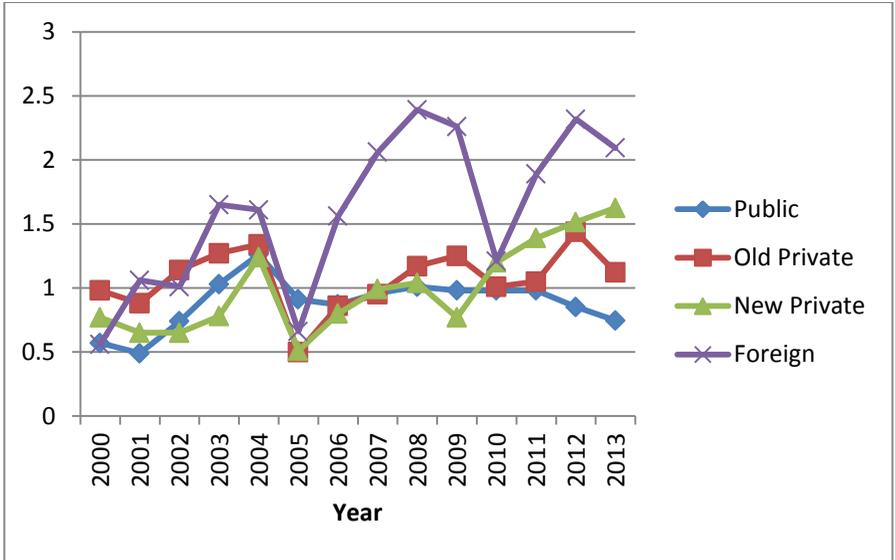


Figure 5: Net Non-performing Assets, by Bank Type (2000-13)

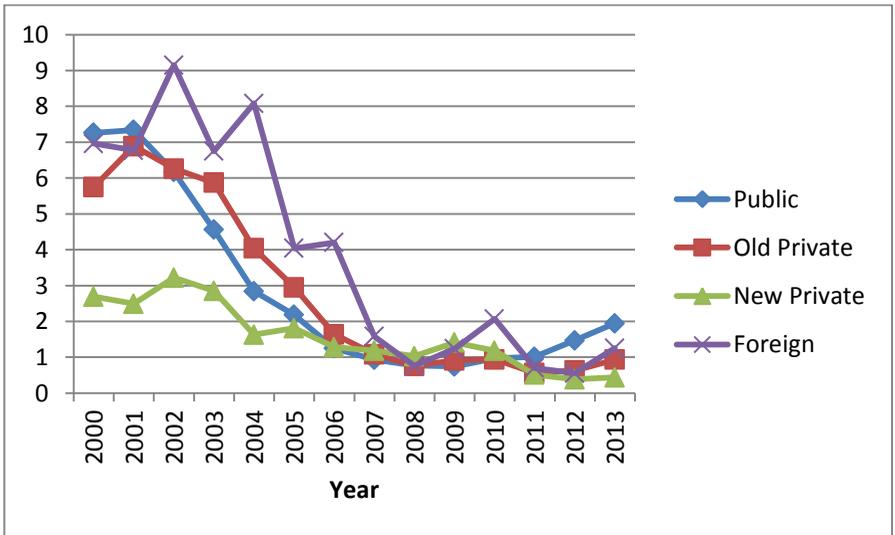


Figure 6: Capital Adequacy Ratio, by Bank Type (2000-13)

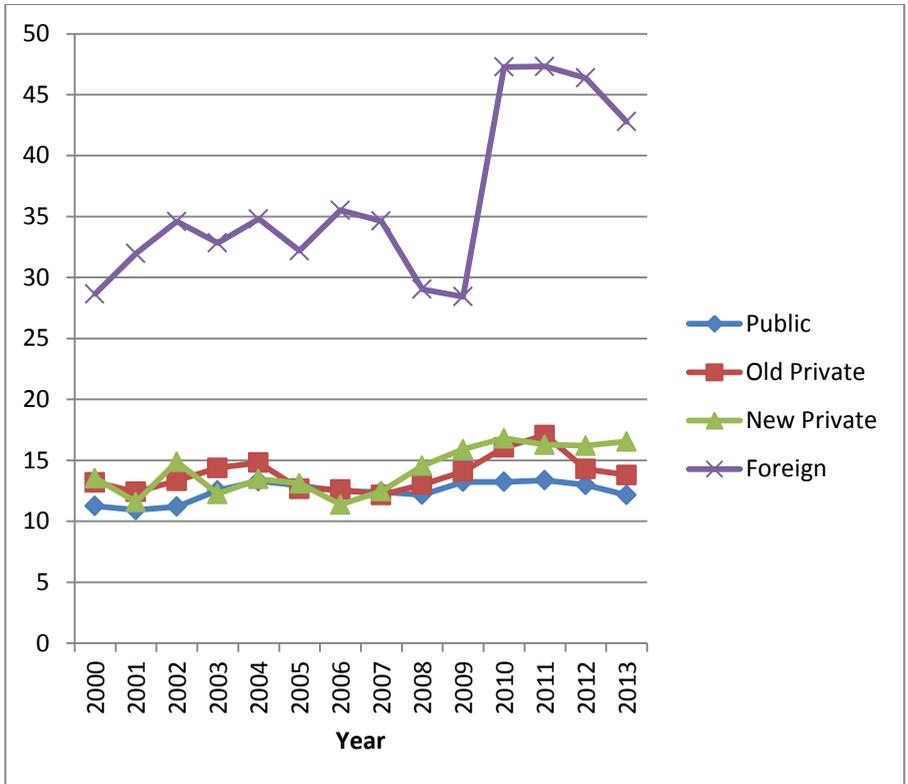


Table 3: Pair-wise Correlation Coefficients Between Outcome Variables

	CIR	RoE	RoA	NNPA
<i>Public-sector banks:</i>				
NNPA	0.6500**	-0.4465**	-0.5591**	
CAR	-0.4860**	0.3638**	0.5065**	-0.4972**
<i>Old private-sector banks:</i>				
NNPA	0.0385	0.1755**	-0.1557**	
CAR	-0.1429	0.0723	0.2701**	-0.2410**
<i>New private-sector banks:</i>				
NNPA	0.1258	-0.2662**	-0.3867**	
CAR	-0.0969	-0.0888	0.0739	-0.3961**
<i>Foreign banks:</i>				
NNPA	0.2355**	-0.2990**	-0.2934**	
CAR	-0.0183	-0.0764	0.0263	-0.0262
<i>All banks:</i>				
NNPA	0.2275**	-0.2659**	-0.2694**	
CAR	-0.0041	-0.1647**	0.0956**	-0.0014

** - significant at 5% level.

There is a negative and significant correlation between RoE and NNPA for all types of banks, except for old private banks where the association is positive and significant. The relationship between RoA and NNPA, on the other hand, is negative and significant across bank types. In terms of magnitude, these relationships are strongest for PSBs, weakest for old private sector banks and moderate for new private sector and foreign banks. The relationship between CAR and RoE is positive and significant only for PSBs, that between CAR and RoA is positive for both PSBs and old private sector banks though much stronger for PSBs. The two soundness variables – CAR and NNPA – have a negative and significant association for all except foreign banks. There is also a positive association between CIR and NNPA for PSBs and foreign banks only, though the magnitude is again much bigger for PSBs.

Thus, going by the raw data, there is not much evidence of any strong tension between profitability and soundness. However, these correlations may be spurious, and do not take account of other countervailing factors that influence these relationship. For this purpose, we need a regression framework that tests for the relationship between profitability and soundness, while controlling for other offsetting factors. We undertake this analysis in the following section. Our basic hypothesis is that the relationship between our chosen profitability measures and soundness measures is negative. We overcome endogeneity concerns by taking lagged values of key variables in the analyses.

Empirical Strategy

We want to estimate linear models of the form:

$$Y_{it} = X'_{it}\beta + \alpha_i + \varepsilon_{it}$$

where Y_{it} is one of our 5 outcome measures (measuring competitive efficiency, profitability and soundness criteria) for bank i in period t , X is a vector of control variables, α_i are random bank-specific effects and ε_{it} is an idiosyncratic error term. We assume that α_i are uncorrelated with the X s, and estimate random effects models (Cameron and Trivedi, 2010). For the CAR, which is mandated to be not less than 9% by RBI, we use the random effects Tobit regression model to factor for the censored variable. We estimate all models separately for each type of bank, as well as one using the pooled sample.

Our rationale for choosing the random effects over the fixed effects model stems primarily from the fact that we estimate all our models separately by bank type. As such, we are trying to test if the effects we estimate differ by bank ownership type. Among banks of the same ownership type, we do not believe that there is significant unobserved heterogeneity.

The various specifications we use are listed below:

(1) Cost-to-income ratio (CIR)

$$\text{CIR}_{it} = \beta_0 + \beta_1 (\text{Lagged NNPA})_{it} + \beta_2 \text{Log (Advances)} + \beta_3 (\text{Log Profit/Employee})_{it} + \beta_4 (\text{Interest Spread})_{it} + \beta_5 (\text{Log Number of Offices})_{it} + \beta_6 (\text{Wages})_{it} + \beta_7 (\text{Log Investment})_{it} + \alpha_i + \varepsilon_{it} \quad (1)$$

(2) Return on Equity (RoE)

$$\text{RoE}_{it} = \beta_0 + \beta_1 (\text{Lagged NNPA})_{it} + \beta_2 (\text{Log Deposits})_{it} + \beta_3 (\text{Log Advances})_{it} + \beta_4 (\text{Interest Spread})_{it} + \beta_5 (\text{Log Investment})_{it} + \beta_6 \text{SDBankex}_{it} + \alpha_i + \varepsilon_{it} \quad (2)$$

(3) Return on Assets (RoA):

(i) $\text{RoA}_{it} = \beta_0 + \beta_1 (\text{Lagged NNPA})_{it} + \beta_2 (\text{Log Deposits})_{it} + \beta_3 (\text{Log Advances})_{it} + \beta_4 (\text{Interest Spread})_{it} + \beta_5 (\text{Log Investment})_{it} + \beta_6 \text{SDBankex}_{it} + \alpha_i + \varepsilon_{it} \quad (3)$

(ii) $\text{RoA}_{it} = \beta_0 + \beta_1 (\text{Lagged NNPA})_{it} + \beta_2 (\text{Log CDR})_{it} + \beta_3 (\text{Interest Spread})_{it} + \beta_4 (\text{Log Investment})_{it} + \beta_6 \text{SDBankex}_{it} + \alpha_i + \varepsilon_{it} \quad (4)$

(4) Net Nonperforming Assets (NNPA):

$$\text{NNPA}_{it} = \beta_0 + \beta_1 (\text{Lagged RoA}) + \beta_2 (\text{Log Deposits})_{it} + \beta_3 (\text{Log Advances}) + \beta_4 (\text{Interest Spread})_{it} + \beta_5 (\text{Log Investment})_{it} + \beta_6 (\text{Log Profit/Employee})_{it} + \beta_7 (\text{Log Number of Offices})_{it} + \beta_8 (\text{Wages})_{it} + \alpha_i + \varepsilon_{it} \quad (5)$$

(5) Capital Adequacy Ratio (CAR):

$$\text{CAR}_{it} = \beta_0 + \beta_1 (\text{Lagged RoA}) + \beta_2 (\text{Lagged NNPA})_{it} + \beta_3 (\text{Log CDR})_{it} + \beta_4 (\text{Interest Spread})_{it} + \beta_5 (\text{Log Investment})_{it} + \beta_6 (\text{Log Deposits})_{it} + \beta_7 (\text{Log Advances}) + \alpha_i + \varepsilon_{it} \quad (6)$$

RESULTS

In this section, we report our estimates and discuss the findings.

Cost-to-income ratio (CIR)

**Table 4: Random-Effects Generalized Least Squares Estimates
(Dependent Variable: Cost-to-Income Ratio)**

	Public	Old Private	New Private	Foreign	All Banks
Lagged Net NPA	0.003	-0.002	0.032*	0.008***	0.007***
	(0.003)	(0.004)	(0.018)	(0.003)	(0.002)
Log Advances	0.059*	0.240***	-0.230**	0.008	0.048***
	(0.032)	(0.041)	(0.106)	(0.025)	(0.015)
Log Profit/Employee	-0.163***	-0.157***	-0.033	-0.17***	-0.146***
	(0.015)	(0.018)	(0.036)	(0.019)	(0.009)
Interest Spread	0.001***	-0.456***	0.031	-0.005	-0.002
	(0.003)	(0.103)	(0.138)	(0.005)	(0.003)
Log Number of Offices	0.014	-0.083***	-0.087	0.130***	-0.020**
	(0.037)	(0.029)	(0.099)	(0.051)	(0.010)
Wages	-0.0041*	0.025***	0.031***	0.002	-0.000
	(0.0023)	(0.004)	(0.009)	(0.003)	(0.002)
Log Investment	-0.059	-0.203***	0.314***	-0.078***	-0.045***
	(0.041)	(0.036)	(0.122)	(0.029)	(0.015)
Constant	3.959***	4.359***	3.315***	4.421***	4.114***
	(0.161)	(0.245)	(0.405)	(0.139)	(0.0684)
σ_u	0.044	0.000	0.000	0.221	0.162
σ_e	0.115	0.130	0.190	0.260	0.193
Observations	254	124	58	225	661
Groups	26	13	7	28	74
R ² Within	0.4873	0.3470	0.2070	0.3810	0.3276
Between	0.6693	0.9314	0.7296	0.4902	0.4006

*** - significant at 1% level; ** - significant at 5% level; * significant at 10% level Standard error in brackets

Table 4 presents the regression estimates based on equation (1). We find that CIR is negatively influenced by profit per employee for all

types of banks, except new private banks. This is intuitive, since higher profit per employee increases the bank's income thus increasing the denominator of CIR. The number of offices has an interesting effect on the CIR; it has a negative impact on CIR for old private and all banks and a positive impact for foreign banks. In our interpretation, this is capturing a non-linear effect of number of offices on the CIR, presumably working through economies of scale in operations.

Advances are the banks' core activity of loan disbursal. The regression coefficients for this variable are positive and significant for PSBs, old private and for the pooled sample, whereas for the new private sector banks, the estimate is negative; it may be surprising but plausible. While higher advances reflect more business, they also imply higher cost. New private banks are well capitalized such that the cost of advances does not adversely impact operating expenses. Investments, on the other hand, are the banks' investment in financial assets, which are made substantially in government debt instruments (through SLR). Although the returns are low, they add to income thus reducing CIR. This is true for old private, foreign and overall banks but not the new private banks. The coefficient of lagged NNPA for new private, foreign banks and all banks show positive and significant impact on CIR; the backlog of substandard loans has a strong impact on banks' CIR even after a year. The σ_{μ} gives the standard deviation of the individual effect (α_i) while the σ_e gives the standard deviation of the idiosyncratic effect. From Table 4, it is clear that the idiosyncratic component of the error is more important than the random effect. Also, for each type of bank, the variation between banks (R^2 Between) explains more of the overall variation in CIR than the variation within each bank over time (R^2 Within).⁵

⁵ See Cameron and Trivedi (2010).

Return on Equity

**Table 5: Random-Effects Generalized Least Squares Estimates
(Dependent Variable: Return on Equity)**

	Public	Old Private	New Private	Foreign	All Banks
Lagged Net NPA	-0.779**	0.300	-3.979***	-0.285***	-0.324***
	(0.280)	(0.433)	(1.082)	(0.0616)	(.0584)
Log Deposits	-0.020	0.818	-2.183	-0.032	0.379
	(0.386)	(0.697)	(2.257)	(0.481)	(0.298)
Log Advances	0.113	-0.937	1.444	1.118*	0.529
	(0.420)	(0.633)	(2.257)	(0.438)	(0.294)
Interest Spread	0.031**	0.056	-0.108	-0.217	0.040**
	(0.015)	(0.044)	(-.0987)	(0.071)	(0.014)
Log Investment	-1.002**	-0.649	1.446	0.191	-0.064
	(0.509)	(0.734)	(1.898)	(0.459)	(0.313)
SD Bankex	-0.002***	0.001	-0.003	0.002**	0.000
	(0.008)	(0.001)	(0.003)	(0.000)	(0.000)
Constant	25.856	12.525	27.178	-0.499	7.199
	(4.751)	(8.322)	(24.227)	(3.940)	(3.018)
σ_u	2.378	5.982	0	4.630	5.408
σ_e	5.879	6.516	11.183	7.594	7.415
Observations	260	130	64	285	739
Groups	26	13	7	29	75
R ² Within	0.0579	0.0736	0.1040	0.1231	0.0390
Between	0.03134	0.0790	0.5546	0.0751	0.2618

*** - significant at 1% level; ** - significant at 5% level; * significant at 10% level.
Standard error in brackets.

Estimates based on Equation (2), reported in Table 5, indicate that the impact of lagged NNPA is negative and significant for all banks, except for old private banks. This highlights the issue of the trade-off between profitability and soundness. It is thus in line with our expectations and resonates with the existing literature. Interest spread is

positive and significant for PSBs and all banks; higher interest spread contribute to RoE. The risk of banks' portfolio is factored by taking the standard deviation of the Bankex. This coefficient is negative and significant for PSBs but positive for foreign banks. This is not unexpected because greater risk in the banks' portfolio will negatively influence the RoE, but foreign banks' shares are not included in the Bankex index. Here again, the idiosyncratic component of the error is dominant. The importance of the within-group and between-group variation differs across bank types; for PSBs and foreign banks, within-group variation explains more of the variation in RoE, while for the other bank types and for the pooled sample, the reverse is the case.

We also added Tier 1 capital and Tier 2 capital to equation (2) and estimated the augmented model. However, the coefficients on Tier 1 and Tier 2 capital were not significant, and the estimates of the other variables were qualitatively similar. Hence, we do not report those estimates here.

Return on Assets

RoA is the second criterion for measuring profitability, and is a commonly used measure of profitability in the literature, as discussed in Section 2. Results of the first specification using the RoA as the dependent variable, based on Equation (3), are presented in Table 5. As with the RoE specification, in both specifications for RoA (Tables 6 and 7), we control for the volatility of the banking sector's equity index.

In Table 6, we find that, not surprisingly, lagged NNPA is negative and significant for all groups except for old private banks, reinforcing our concern about the trade-off between profitability and soundness. Old private banks largely serve specific business communities, as mentioned in the introduction. As such, they have better information on their customers through the community networks. As the summary statistics in Table 2 revealed, these banks have relatively high

NNPA but also relatively high RoA, which presumably reflects the effect of their superior information. Advances do not appear to significantly affect the RoAs for any type of bank.

Table 6: Random-Effects Generalized Least Squares Estimates (Dependent Variable: Return on Assets)

	Public	Old Private	New Private	Foreign	All Banks
Lagged Net NPA	-0.053*** (0.013)	-0.036 (0.037)	-0.293*** (0.063)	-0.070*** (0.014)	-0.080*** (0.09)
Log Deposits	0.015 (0.018)	-0.043 (0.061)	-0.141 (0.131)	-0.210* (0.109)	-0.041 (0.047)
Log Advances	0.000 (0.019)	-0.020 (0.055)	0.035 (0.132)	0.131 (0.100)	0.053 (0.046)
Interest Spread	0.002*** 0.000	0.003 (0.004)	-0.015** (0.006)	0.055*** (0.016)	-0.003 (0.002)
Log Investment	-0.059** (0.023)	-0.045 (0.064)	0.034 (0.111)	0.325** (0.105)	0.108** (0.049)
SD Bankex	-0.0001** (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000* (0.016)	0.000 (0.000)
Constant	1.346 (0.218)	1.548 (0.720)	3.101 (1.417)	-0.012 (0.867)	0.844 (0.467)
σ_u	0.140	0.477	0	0.756	0.737
σ_e	0.264	0.570	0.638	1.725	1.153
Observations	260	130	64	285	739
Groups	26	13	7	29	75
R ² Within	0.1083	0.0218	0.2272	0.2030	0.1407
Between	0.3206	0.1731	0.6877	0.1347	0.0023

*** - significant at 1% level; ** - significant at 5% level; * significant at 10% level.
Standard error in brackets

Investments are negative and significant for PSBs but positive and significant for foreign banks. The negative effect for PSBs is possibly a reflection of the heavy weightage given to government securities in their investment portfolios (Mohan, 2003). As Bhaumik and Dimova (2004) note, "...despite level playing field, legacy may have left the different types of banks differently placed in terms of portfolio composition and exposure to banking activities."

Interest spread is positive and significant for PSBs and foreign banks but insignificant for old private banks. Interestingly, new private banks are known for having a higher ratio of non-interest income relative to interest income, compared to the PSBs and old private banks (Bhaumik and Dimova, 2004). However, interest spread is negative and significant (at the 5% level) for new private banks. One possibility is that these banks may be attempting to increase their market share by advancing loans to large corporates below their cost of capital or are pursuing non-core business like insurance etc.

Table 7 presents estimates of RoA based on Equation (4).

**Table 7: Random-Effects Generalized Least Squares Estimates
(Dependent Variable: Return on Assets with CDR)**

	Public	Old Private	New Private	Foreign	All Banks
Lagged Net NPA	-0.0689***	-0.045	-0.275***	-0.071***	-0.072***
	(0.014)	(0.041)	(0.066)	(0.014)	(0.009)
Log CDR	-0.422	-0.179	0.467	-0.332***	-0.0308***
	(0.122)	(0.540)	(0.537)	(0.126)	(0.086)
Interest Spread	0.001*	0.002	-0.159	0.063***	-0.003
	(0.000)	(0.004)	(0.006)	(0.016)	(0.002)
Log Investment	-0.053*	-0.024	0.718	0.090	0.025
	(0.022)	(0.058)	(0.105)	(0.119)	(0.050)
SD Bankex	-0.000**	0.0003	-0.000	0.000*	0.000
	(0.000)	((0.0001)	(0.000)	(0.000)	(0.000)
Constant	3.202	1.892	0.279	2.253	2.589
	(0.523)	(2.422)	(2.430)	(0.969)	(0.496)
σ_u	0.150	0.435	0	0.946	0.755
σ_e	0.257	0.569	0.646	1.660	1.100
Observations	260	130	64	277	731
Groups	26	13	7	29	75
R ² Within	0.1486	0.0158	0.2470	0.1728	0.1179
Between	0.2533	0.2021	0.6676	0.2693	0.0601

*** - significant at 1% level; ** - significant at 5% level; * significant at 10% level. Standard error in brackets

Here again, we find that lagged NNPA is negative and significant for all bank groups except old private banks. The CDR has a negative influence on RoA for the pooled sample of all banks, driven by a large negative effect for foreign banks alone. This is surprising, since higher CDR reflects greater credit growth and therefore should lead to more return on assets. However, if the credit is bad credit, then the result is not surprising. Interest rate spread is positive and significant at the 1 percent level for foreign banks. Volatility in the stock index of bank equities appears to have only a marginal effect on a bank's profitability, on average. In both specifications, the random effect is smaller than the idiosyncratic error component.

Net Non-Performing Assets

For soundness we turn to the Lagged NNPA, and regress it as the dependent variable according to equation (5). The results are presented in Table 8.

Lagged RoA is negative and significant for PSBs and all banks, indicating that profitability increases soundness. But for the other types of banks, the coefficient is not significant. Deposits have a strong negative effect on NNPA, which is an intuitive result. For the pooled sample, advances reduce NPAs though the effect for different types of banks is mixed. Surprisingly, investments have a strong, positive and significant effect on NPAs for all except new private banks. One possible explanation for this result is Indian banks' preference for investing in government securities beyond SLR requirements. As Mohan (2003) asserts, "Such large investments in government securities well beyond the statutory requirement reflect dissipation of banking knowledge capital with regard to credit appraisals." He termed this practice as 'lazy banking'. The implication here is that by being unwilling to increase lending to the commercial sector, for the fear of unanticipated defaults or inadequate skills required to assess risks accurately.

**Table 8: Random-Effects Generalized Least Squares Estimates
(Dependent Variable: Net Non-performing Assets)**

	Public	Old	New	Foreign	All Banks
Lagged RoA	-1.119***	0.156	0.076	-0.221	-0.254**
	(0.281)	(0.256)	(0.246)	(0.184)	(0.113)
Log Deposits	-3.427***	-	-2.518***	-1.648*	-2.329***
	(0.687)	(2.134)	(0.935)	(0.857)	(0.503)
Log Advances	-0.219	2.578**	1.207*	-0.795*	-0.880***
	(0.370)	(1.208)	(0.725)	(0.450)	(0.262)
Interest Spread	-0.004	0.014	0.062***	0.077	0.009
	(0.003)	(0.012)	(0.012)	(0.054)	(0.007)
Log Investment	3.457***	6.185***	-0.388	1.874***	2.087***
	(0.478)	(0.934)	(0.651)	(0.702)	(0.388)
Log Profit/ Employee	-1.529***	-0.244	0.375***	-1.332***	-0.970***
	(0.178)	(0.173)	(0.142)	(0.324)	(0.140)
Log Number of Offices	0.844*	6.286***	1.072**	-0.212	0.414
	(0.449)	(0.702)	(0.494)	(0.924)	(0.257)
Wages	-0.028	-0.237***	-0.100**	-0.128***	-0.094***
	(0.025)	(0.042)	(0.044)	(0.047)	(0.023)
Constant	4.896***	23.608***	9.906***	13.999***	15.319***
	(1.900)	(3.456)	(2.712)	(2.732)	(1.486)
σ_u	0.498	0.477	0.000	5.439	3.247
σ_e	1.172	1.723	1.107	5.043	3.348
Observations	325	162	74	314	875
Groups	26	13	7	29	75
R ² Within	0.7265	0.6557	0.51	0.1252	0.2153
Between	0.695	0.7189	0.92	0.4034	0.3374

They are therefore likely to make bad lending decisions, leading to high NPAs. New private banks appear to have performed better on this score, having a relatively large share of retail loans in their loan portfolios.⁶ Profit per employee lowers NNPA for all except new private banks.

Wages as a percentage of total expenses have a negative effect for all bank types. In our view, this underlines the significance of a sound human resource policy for banks. The negative association for wages indicates that higher wages motivate staff to perform their tasks diligently, assessing the credit-worthiness of clients accurately (Banerjee, 2012). Thus, reducing NNPA requires hiring and training effective staff and managers, offering competitive wages.

The idiosyncratic component of the error is more important than the individual component for PSBs, old and new private sector banks while the two components appear equally important for foreign banks. Except for PSBs where the within variation explains slightly more of the overall variation in NNPA, the between variation (R^2 Between) has more explanatory power in the case of the other bank types.

Capital Adequacy Ratio

The second criterion for assessing financial stability is CAR. We estimate a regression model with CAR as the dependent variable based on Equation (6). Since the CAR is a censored variable with a restricted value of minimum 9%, we estimate Equation (6) using a random effects Tobit regression model.

⁶ See B.S. Mishra, *Public sector banks had better buck up*, The Hindu Business Line, June 14, 2013.

Table 9: Random-Effects Tobit Regression Estimates (Dependent Variable: Capital Adequacy Ratio)

	Public	Old Private	New Private	Foreign	All Banks
Lagged RoA	1.797***	1.737**	0.195	0.161	0.481
	(0.215)	(0.732)	(0.362)	(0.525)	(0.308)
Lagged Net NPA	-0.008	0.02	0.034	0.211*	0.250***
	(0.024)	(0.101)	(0.147)	(0.123)	(0.070)
Log CDR	0.71	-1.716	1.038	-0.917	0.255
	(0.491)	(4.362)	(1.596)	(2.024)	(1.193)
Interest Spread	-0.004	0.03	-0.003	0.23	-0.048**
	(0.003)	(0.025)	(0.017)	(0.170)	(0.021)
Log Investment	1.611***	11.853***	-0.302	-0.549	-0.628
	(0.431)	(2.109)	(1.423)	(2.363)	(1.291)
Log Deposits	-2.085***	-27.431***	-4.017**	-7.570**	-5.424***
	(0.526)	(5.907)	(2.007)	(3.082)	(1.657)
Log Advances	0.724**	15.286***	4.895***	2.821	2.822**
	(0.344)	(4.778)	(1.779)	(2.008)	(1.173)
Constant	7.337***	39.177*	4.699	69.367***	49.009***
	(2.215)	(20.182)	(6.948)	(11.187)	(6.404)
σ_u	0.4312	2.087	1.353	12.291	9.572
σ_e	1.1861	3.584	2.056	17.112	10.865
Observations	309	154	75	324	862
Groups	26	13	7	29	75

*** - significant at 1% level; ** - significant at 5% level; * significant at 10% level. Standard error in brackets.

Lagged profits (RoA) increase CAR in the case of PSBs and old private banks, but have an insignificant effect in the case of the other types of banks. In the pooled sample, lagged NNPA increases CAR, suggesting that an increase in NNPA in one year causes banks to tread cautiously the following year by increasing the CAR. But we do not observe a strong effect of NNPA for any specific type of bank. Investments are positive and significant for PSBs and old private banks, while deposits are negative and significant for all types of banks.

Advances have a precautionary effect; increased disbursement of loans is accompanied by an increase in the CAR. The effect of advances, deposits and investments are particularly large in magnitude for old private banks. This is possibly because variables we have not included in the regression specification are correlated with these variables for old private banks but not for other groups. In general, given the importance of the community-oriented aspect for old private banks, it is difficult to draw strong conclusions for this group based on regression estimates; there are likely to be too many idiosyncratic factors affecting the outcome measures.

We also estimated a specification including lagged RoE, in addition to all the other controls in Equation (6). However, the coefficient of RoE is not significant for any type of bank and the other coefficients are qualitatively the same. The results are not reported here.

CONCLUSIONS

The motivation for this paper is to examine whether commercial banks in India face difficulties trying to balance profitability with stability. It is no secret that high returns are associated with high risk; hence banks have to pursue profitability while also trying to maintain long-term viability. Following extensive reforms introduced in the financial sector in India in 1991, the banking sector has undergone many changes that have increased competition in the sector; new private banks and foreign banks have entered the sector, offering innovative financial products and services, thus forcing existing banks to improve their performance or face bankruptcy. There is considerable evidence that following the reforms, Indian public sector banks did increase their profitability and became more cost-efficient. However, we know of no other study that tried to examine whether the drive for greater profitability came at the cost of financial stability. Our paper offers some evidence in this regard. Currently, there are four distinct types of banks in India, classified by

ownership. Banks of different ownership type vary in their scope, geographic coverage, in the range of products and services they offer etc. We therefore examine the profitability-stability conundrum by type of ownership. Our sample period covers the 2000-13 period, which saw many changes in the international banking regulations and witnessed one of the most turbulent periods in international financial markets, the turmoil of the GFC.

We find evidence of a trade-off between profitability and soundness for banks; for public sector banks (PSBs), new private sector banks and foreign banks, lagged NNPA's have a negative effect on both profitability measures - RoE and RoA. In the regressions for estimating soundness, we find that lagged RoA has a negative and significant effect on NNPA for PSBs and a positive and significant effect on CAR for PSBs and old private banks. However, the reason for this trade-off does not appear to be a reckless pursuit of profits, unmindful of the risk inherent in income-generating activities. If anything, banks in India appear to tread very cautiously, maintaining CAR at levels well above the regulated minimum over the entire sample period. Similarly, from Figure 5, it is clear that the NNPA's for all types of banks have declined sharply over the sample period, even around the GFC crisis period. In our interpretation, the negative association we find between soundness and profitability in our regression results arises from what Mohan (2003) claims the banks' unwillingness to increase commercial lending. Investing predominantly in government securities and not using funds to lend to the private sector is intended to minimise credit risk. However, such a risk-averse approach implies that banks do not develop the knowledge and skills required to assess the risks in the loans that they advance. Thus what we see is a paradox of cautious investment in government securities and maintenance of a high CAR, while at the same time the presence of NPAs that, though revealing a declining trend, are still high. Mohan's (2003) advice that "...banks should make efforts to increase commercial lending", which would require "...sound credit appraisals, adoption of

sophisticated risk management techniques, and better information sharing” from banks, appears to be relevant even today.⁷ New private banks appear to have performed better on this score, eschewing the cautious approach taken by PSBs.

Foreign banks, despite the advantage of newer technology and smaller number of employees, have high CIR. The high profit per employee in foreign banks however, indicates that their human resource policy is effective unlike the PSBs, whose average wages as a percent of total expenses is the same as that of foreign banks but their average profit per employee is one tenth that of foreign banks. Investments have a positive impact on foreign banks’ RoAs, unlike in the case of PSBs. Surprisingly though, investments also increase foreign banks’ NNPA, though the magnitude of this effect is about half the size for PSBs. This effect is contrary to intuition since foreign banks have an advantage over domestic banks in terms of managers being better trained in risk management techniques. A possible explanation is offered by Rajaraman et al. (1999), who find that the foreign banks’ performance in India in terms of NPA is related to the banking efficiency and technology parameters of these banks’ country of origin. Their results imply that foreign banks operating in India are a heterogeneous group, and understanding their performance with respect to NPAs requires information on banking variables of the origin countries, which we do not have.

The traditional old private banks are small players but have survived the test of time. They have pursued largely prudential business policies and served their communities, having better access to client information. This is reflected in the results; for this group, the profitability criteria of RoA and RoE are unaffected by the soundness factors. For the

⁷ This sentiment is echoed by B.S. Mishra, who states “PSBs should go for a diversified as well as well-managed asset portfolio when the next growth opportunity comes along, taking a cue from new private banks.”, in *Public sector banks had better buck up*, The Hindu Business Line, June 14, 2013.

PSBs, the new private banks - which are much larger in their scale of business -, and the foreign banks, profitability is adversely impacted by the risk inherent in their larger client base.

Our results also indicate that human resource policies matter significantly for all banks, a point made by other researchers as well (Banerjee2012). We find that a higher wage bill lowers NNPA for all types of banks. This underscores the need for banks to attract the best talent and to reward them with commensurate compensation. Together with the point made above, this suggests that recruiting talented, well-paid staff and providing adequate training in risk-management techniques would go a long way in lowering NPAs for banks.

The issue of NPAs is serious for all banks. The RBI has noted that though gross NPAs have shown a declining trend as a proportion of total advances, the stock of NPA (in value terms) has been increasing; between 2006 and 2010 the stock of NPAs grew by 63 per cent.⁸ This is particularly troubling for PSBs, as they have to mobilize significant amounts of capital in the coming years to comply with Basel-III norms. With high levels of NPAs, raising capital from the market will be a challenge as potential investors will perceive these banks as leaky buckets, with the bad assets significantly diluting their returns. While new capital infusion from the government is a possible solution for these banks, the declining asset quality problems will lead to fiscal drain. Secondly, RBI is reportedly set to impose constraints on lending for banks with high NPAs, which will also impact the PSBs' capital base.⁹ Our results are important not just for banks operating in India but for the banking sector of any country that is transiting from a highly regulated, closed financial sector dominated by public sector banks, to a more liberalized environment and increased competition. While we can expect

⁸ See Ramesh (2011), "Banks' return on equity will come under pressure: RBI", Nov 6.

⁹ "Banking on thin ice", *Business Standard* Volume XVII No 106 Chennai Friday 28th November 2014

most banks to do what is necessary to remain viable in the short-term in the face of increasing competition, long-term survival requires more proactive strategies – for instance, investing in new skills that are necessary to compete effectively. Existing literature and our own results suggest that the domestic banks have been slow to develop the human capital required for effective risk-management strategies that are necessary to reduce NPAs and to guarantee long-term survival.

REFERENCES

- Anis, O. and S. Yosra (2012), "Ownership Structure and Efficiency of Tunisian Banking Sector", *Journal of Finance and Investment Analysis*, 1(3), 2012, 239-254.
- Banerjee, S. (2012), "Basel I and Basel II Compliance Issues for Banks in India", *Macroeconomics and Finance in Emerging Market Economies*, DOI 10.1080/17520843.2012. 688754.
- Bhattacharyya, A., Lovell, C.A.K. and Sahay, P. (1997), "The Impact of Liberalization on the Productive Efficiency of Indian Commercial Banks", *European Journal of Operations Research*, 98.
- Bhaumik, S.K. and Dimova, R. (2004), "How Important is Ownership in a Market with Level Playing Field? The Indian Banking Sector Revisited", *Journal of Comparative Economics*, 32(1), 165-180.
- Bonin, J.P., I. Hasan and P. Wachtel (2005), "Bank Performance, Efficiency and Ownership in Transition Countries", *Journal of Banking and Finance*, 29, 31-53.
- Cameron, C. and P. K. Trivedi (2010), *Microeconometrics Using Stata*, Stata Press, College Station, TX, USA.
- Catarineu-Rabell, E., P. Jackson and D. Tsomocos (2005), "Procyclicality and the New Basel Accord-Bank's Choice of Loan Rating System", *Economic Theory*, 26, 537-557.
- Christine, C., J. Moffit and L. A. Suberly (2008), "Fundamental Analysis for Evaluating Bank Performance: What Variables Provide the Greatest Insight into Future Earnings?", *Journal of Bank Accounting Finance*, 22, 17-24.
- Claessens, S., D. Klingebiel and L. Laeven (2001), "Financial Restructuring in Banking and Corporate Sector Crises: What Policies to Pursue?", *NBER Working Papers 8386*, National Bureau of Economic Research, Inc.

- Das, A., A. Nag and S.C. Ray (2005), "Liberalization, Ownership, and Efficiency in Indian Banking: A Nonparametric Analysis", *Economic and Political Weekly*, 40(12), 1190-1197.
- Easterly, W., R. Islam and J.E. Stiglitz (2000), "Shaken and Stirred: Explaining Growth Volatility", Annual World Bank Conference on Development Economics, World Bank.
- European Central Bank (2010), "How to Measure Bank Performance", Appendix to *The Report On EU Banking Structures*, 8 September.
- Fries, S. and A. Taci (2005), "Cost Efficiency of Banks in Transition: Evidence from 289 Banks in 15 Post-communist Countries", *Journal of Banking and Finance*, 29, 55-81.
- Ghosh, S.N., D.M. Narain and S. Sahoo (2003), "Capital Requirements and Bank Behaviour: An Empirical Analysis of Indian Public Sector Banks", *Journal of International Development*, 15, 145-156.
- Giannone, D., M. Lenza and L. Reichlin (2011), "Market Freedom and the Global Recession", *IMF Economic Review*, 59(1), pp.111-135.
- Gilbert, R.A. and D.C. Wheelcock (2007), "Measuring Commercial Bank Profitability: Proceed with Caution", *Federal Reserve Bank of St.Louis*, 22, 515-532.
- Gordy, M. B., and B. Howells (2006), "Procyclicality in Basel II: Can We Treat the Disease without Killing the Patient?", *Journal of Financial Intermediation* 15, 395-417.
- Gynedi, R. (2014), "India's Nonperforming Assets: A Lurking Crisis, Center for Strategic and International Studies Paper", http://csis.org/files/publication/140401_Gynedi_IndiaNonperformingAssets_Web.pdf.
- Hasan, I. and K. Marton (2003), "Development and Efficiency of the Banking Ssector in a Transitional Economy: Hungarian Experience", *Journal of Banking and Finance*, 27, 2249-2271.

- Hellman, T., K.C. Murdock and J.E. Stiglitz (2000), "Liberalization, Moral Hazard in Banking, and Prudential Regulation: Are Capital Requirements Enough?", *American Economic Review*, 90(1), pp.147-165.
- Hess, K. and G. Francis (2004), "Cost Income Ratio Benchmarking in Banking: A Case Study", *Benchmarking: An International Journal*, 11(3), 303-319.
- International Monetary Fund (2009), *Global Financial Stability Report Responding to the Financial Crisis and Measuring Systemic Risks* April.
- Jemric, I. and B. Vujcic (2002), "Efficiency of Banks in Croatia: A DEA Approach", *Comparative Economic Studies*, 44(2-3), 169-193.
- Kraft, E. and D. Tirtiroglu (1998), "Banking Efficiency in Croatia: A Stochastic-Frontier Analysis", *Journal of Comparative Economics*, 26(2), June, 282-300.
- Lartey, V. C., S. Antwi and E. K. Boadi (2013), "The Relationship between Liquidity and Profitability of Listed Banks in Ghana", *International Journal of Business and Social Science*, 4(3), March 2013, 48-56.
- Mathuva, D.M. (2009), "Capital Adequacy, Cost Income Ratio and the Performance of Commercial Banks: The Kenyan Scenario", *International Journal of Applied Economics and Finance*, 3(2), 35-47.
- Misra, B.M. and S. Dhal (2010), "Procyclical Management of Non-Performing Loans by the Indian Public Sector Banks", *BIS Asian Research Papers*.
- Mohan, Rakesh (2003), "Transforming Indian Banking: In Search of a Better Tomorrow", *Reserve Bank of India Bulletin*, January.
- Mohan, Rakesh (2006), "Reforms, Productivity and Efficiency in Banking: The Indian Experience", *RBI Bulletin*, March.

- Nakane, M.I. and D.B. Weintraub (2005), "Bank Privatization and Productivity: Evidence for Brazil", *Journal of Banking and Finance*, 29, 2259-2289.
- Price Waterhouse Coopers (2005), "International Financial Reporting Standards IAS 39 – Achieving Hedge Accounting in Practice", December, www.pwc.com/ifrs
- Pattibiram, S. (2008), "Operational Efficiency of Banks", *Business Line* Nov 14, Hindu Business Line Publication.
- Rajan Raghuram, G. (2009), "A Hundred Small Steps", *Report of the Committee on Financial Sector Reforms*, Government of India Publications SAGE Publications.
- Rajaraman, I., S. Bhaumik and N. Bhatia (1999), "NPA Variations across Indian Commercial Banks: Some Findings", *Economic and Political Weekly*, 34(3/4).
- Reserve Bank of India (2005), "Report on Trend and Progress of Banking in India 2004-2005", RBI: Mumbai.
- Sathye, M. (2003), "Efficiency of Banks in a Developing Economy: The Case of India", *European Journal of Operational Research*, 148(3), 662-671.
- Shanmugam, K. R. and A. Das (2004), "Efficiency of Indian Commercial Banks During The Reform Period", *Applied Financial Economics*, Taylor and Francis Journals, 14(9), 681-686.
- Tripe, D.W. (1998), "Cost to Income Ratios in Australasian Banking", Seminar paper, *21st Australasian Finance and Banking Conference*, Centre for Banking Studies, Sydney.
- Villalonga, B. (2000), "Privatization and Efficiency: Differentiating Ownership Effects from Political, Organizational, and Dynamic Effects", *Journal of Economic Behavior and Organization*, 42(1), 43-74.

- Yang Li, Jin-Li Hu, and Yung-Ho Chiu (2004), "Ownership and Production Efficiency: Evidence from Taiwanese Banks", *The Service Industries Journal*, Taylor and Francis, 24(4),129-148.
- Yildirim, H.S. and G.C. Philippatos (2003), "Efficiency of Banks: Recent Evidence from the Transition Economies of Europe -1993-2000", *Working Paper*, University of Saskatchewan.

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