Risk Behaviour of Commercial Banks under Reform: The Indian Experience

Khanindra Ch. Das
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Trivandrum-695011

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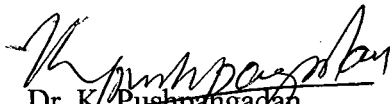**Trivandrum-695011**
May, 2009

I hereby affirm that the work for the dissertation "Risk Behaviour of Commercial Banks Under Reform: The Indian Experience" being submitted as a part of the requirements of the M. Phil Programme in Applied Economics of the Jawaharlal Nehru University was carried out entirely by myself. I also affirm that it was not part of any other programme of study and has not been submitted to any other university for the award of any degree.

May, 2009

Khanindra Ch. Das

Certified that this study is the bona fide work of Khanindra Ch. Das, carried out under our supervision at the Centre for Development Studies.

Dr. K. Pushpangadan
Professor

Dr. Hrushikesh Mallick
Lecturer

Dr. K. Narayanan Nair
(Director)
Centre for Development Studies

DEDICATED

To

My Parents

We all have to decide how we are going to fail...by not going far enough or by going too far.

Sumner Redstone

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CONTENTS

List of Tables

List of Charts

v

List of Charts in the Appendix

ABBREVIATIONS

ATM	Automatic Teller Machine
ARCs	Asset Reconstruction Companies
BFS	Board of Financial Supervision
BIS	Bank for International Settlements
BSE	Bombay Stock Exchange
CAR	Capital to Risk Weighted Asset Ratio
CB	Commercial Bank
CMIE	Center for Monitoring Indian Economy
CRR	Cash Reserve Ratio
CSO	Central Statistical Organisation
DICGC	Deposit Insurance and Credit Guarantee Corporation
GDP	Gross Domestic Product
IFR	Investment Fluctuation Reserve
IRB	Internal Rating Based
MIBID	Mumbai Interbank Bid Rate
MIBOR	Mumbai Inter-Bank Offer Rate
NDLT	Net Demand and Time Liability
NPA	Non-Performing Asset
NRI	Non Resident Indian
NSE	National Stock Exchange
NSLR	Non SLR
OBS	Off-Balance Sheet
OTC	Over the Counter
PD	Primary Dealer
PLR	Prime Lending Rate
PR	Panzar and Rosse
PSBs	Public Sector Banks
RBI	Reserve Bank of India
RBS	Risk Based Supervision
ROA	Return on Assets
RPD	Relative Profit Difference
RRB	Regional Rural Bank
SA	Standardised Approach
SARFAESI	Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest
SBI	State Bank of India
SCBs	Scheduled Commercial Banks
SCP	Structure Conduct Performance
SD	Standard Deviation
SEBI	Security Exchange Board of India
SLR	Statutory Liquidity Ratio / Government and Other Approved Securities
SPV	Special Purpose Vehicle
WOS	Wholly Owned Subsidiary
WTO	World Trade Organization

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Khanindra Ch. Das

M. Phil Programme in Applied Economics (2007-09), Jawaharlal Nehru University, New Delhi
Centre for Development Studies, Trivandrum-695011

ABSTRACT

In the context of banking sector reform, the study analyses various aspects of commercial banking industry such as changes in structure, conduct, performance and most importantly the risk behaviour for the period 1998-2007 using panel data econometric techniques among others. The slackening of different restrictions has gradually brought the much-desired dynamic and competitive forces into the system, enabling the banks to perform better by exercising flexibility in their operations. At the same time the industry has undergone diversification in many lines of business in an attempt to smoothen out or enhance its performance however tending to expose itself to many market induced vulnerabilities. In the expenditure side, there has been reduction in cost of deposit and cost of fund across all bank groups. There is also some evidence of competitive pricing of deposits particularly by the private sector banks. However, the benefit of lower cost of deposit has not been fully transferred to the borrowers particularly of the private and foreign banks as their lending rate continues to be higher in comparison to the public sector banks. In the earnings side also, there is improvement in the return on asset front. This has been facilitated by higher spread and lower burden albeit reductions in the return on advances and investments across bank groups over the years. However, there are a number of worst performers mostly in the private sector and the foreign category indicating significant disparity among the banks in the cost minimization and risk management front. On the whole, despite various enabling and strengthening measures the banking industry has experienced disparity in its conduct, performance and most importantly in the overall risk levels. It has been found that private sector banks are most risky not only in terms of the risk level but also in its trend. The foreign banks are found to be least risky for their fat capital cushion whereas the public sector banks are in the intermediate category in terms of their risk levels. On the determinants of risk, the study is indicative of the fact that higher competition tends to induce risk unless there are efficiency improvements across the banks. Further, diversification is found to have risk mitigating effect, however diversification per se is not the sufficient condition for lowering the risk rather, selective diversification coupled with buffer capital could yield the sufficient condition for banks' safety. While the banks have adapted themselves to changing environment, the fast evolving financial landscape continues to pose several challenges. Therefore, banking regulation assumes increasing significance for adequate assessment of risk and to discourage risky behaviour, leaving apart the broader issue of the desirability of diversification from socio-economic perspective. The study uses a composite index 'Z score' as the measure of risk. Further, the competition has been quantified in four ways i.e. 'n-bank' concentration ratio, adjusted Herfindahl index, Panzar and Rosse H statistic and the Relative Profit Difference. The banking market is monopolistically competitive with a few large banks, and there is further scope of improving competitive conduct of Indian banking industry.

Keywords: Commercial Bank, Reform and Regulation, Bank Performance, Monopolistic Competition, Diversification, Risk Analysis, Financial Risk, Insolvency.

Chapter 1

Introduction

1.1 Introduction

Financial development is a generic concept. There is no uniformly accepted definition of financial development.[1] The common paradigm in this regard can be classified into three broad schools i.e. the financial structuralist (e.g. Patrick, 1966), the financial repressionist (e.g. Mckinnon, 1973; Shaw, 1973) and the institutional school (Laporta et al., 1997, 1998). The first school gives importance on the quantity aspect of financial development—for instance, the number and variety of financial institutions and assets—and contends that financial deepening and composition of aggregate financial variables are relevant factors in economic growth. The second school emphasises on price variables, e.g. the interest rate, as the more relevant factor for economic growth. The third view emphasises upon institutional development including the legal system. Nonetheless, the financial health of intermediaries involved in the process is equally important in determining the level of financial development.[2] Therefore, the notion of a healthy financial system assumes critical significance.

1.2 Linkage between Finance and Economic Growth

A healthy financial system *ceteris paribus* promotes both financial and economic stability and facilitates economic growth. The significance of financial system in the economy is to undertake financial intermediation. In the absence of financial intermediaries, it would be difficult for the real economic agents to carry out transactions because of higher transaction cost and the costs of acquiring information. Financial markets and institutions may arise to ameliorate the problems created by information and transaction frictions; by mobilising savings, allocating resources, exerting corporate

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[1] Commonly used indicators of financial development are the ratio of financial assets to gross domestic product (GDP), ratio of liquid assets to GDP, ratio of broad money supply to GDP, ratio of private sector credit to GDP, market capitalization etc. Although appealing, these indicators are very aggregative in nature and therefore miss out the healthiness aspect of different micro units of the financial sector.

[2] Thus, it is important to assess the healthiness of financial intermediaries to infer about the soundness of the financial system at large.

control, facilitating risk management and trading of goods and services (Levine, 1997). This in turn spurs economic growth through the channel of capital accumulation and technological innovation *ceteris paribus*.[3] Distortions in the financial system can impede the growth process and result in dead-weight losses.

Economists disagree sharply on the role and contributions of the financial sector in economic growth. According to Levine (2004) we are far from definitive answers to the questions: whether finance cause growth, and if it does, how? Yet, the bulk of existing research suggests that countries with better functioning banks and markets grow faster, but the degree to which a country is bank-based or market-based does not matter much[4] and better functioning financial systems ease the external financing constraints that impede firm and industrial expansion, suggesting that this is one of the mechanisms through which financial development matters for growth. Given this realisation it becomes imperative to promote financial stability in financial intermediaries (and markets) for achieving higher economic growth in the long run.

The impact of financial cycles on the real economy remains the subject of debate in both academic and policy circles. One strand of research emphasises the role of the *financial accelerator* in amplifying the effects of financial cycles on the real economy through its effect on the value of collateral and thereby on the willingness of the financial system to provide credit to the economy (Bernanke and Gertler, 1995; Kiyotaki and Moore, 1997). In this view, shocks that affect the creditworthiness of borrowers tend to accentuate swings in output. The most central branch of inquiry focuses on lenders' balance sheets and the relationship between bank capital and aggregate credit, the so-

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[3] In a class of growth models (Romer, 1986; Lucas 1988; Rebelo, 1991), the functions performed by financial system affect steady state growth by influencing the rate of capital formation. The financial system affects capital accumulation either by altering savings rate or by reallocating savings among different capital producing technologies. A second class of growth models focuses on the invention of new production processes and goods (Romer, 1990; Grossman and Helpman, 1991; Aghion and Howitt, 1992, King and Levine, 1993). In these models, the functions performed by the financial system affect the steady state growth by altering the rate of technological innovation. Building on the *learning by doing* process the endogenous growth literature assigns special role to finance.

[4] There are differing views with regard to the relative importance of bank-based and market-based financial system to growth. See Stiglitz (1985), Rajan (1992), Singh (1997), Allen and Gale (2000), Levine (1997, 2002), Laporta et al. (1997, 1998), Beck and Levine (2002), Chakraborty and Ray (2006) and IMF (2006).

called *bank capital channel* (Bernanke et al., 1991; Kashyap and Stein, 1994; Peek and Rosengren, 1995; and Altunbas et al., 2007). When bank capital is eroded, banks become more reluctant to lend and may be forced to deleveraging, leading to sharper economic downturns. In this context, economic stability and growth are conditioned by well functioning (stable) banking system because of its nodal role in allocating the finance capital towards productive ventures. Well functioning banks spur technological innovation by identifying and funding those entrepreneurs with the best chances of successfully implementing innovative products and production process (Schumpeter, 1912). The stability in the banking system *ceteris paribus* determines the stability of the economic system. Long-term stability in the banking sector can improve the efficiency of financial intermediation and hence, investment and growth (Amable et al., 1998). On the other hand, if banking system is unstable, economy will tend to be unstable. Banking crises have often resulted in a prolonged period of credit crunch and a substantial loss of output (Djankov et al., 2005; IMF, 2008).

The forces that could generate instability (risk) in the banking system, and hence instability in the economy, are both endogenous and exogenous. The most important endogenous force is the self-selected risky strategies that emanate from the profitability considerations of banks or managerial decision-making. The exogenous forces that make the banks risky or prompt the banks to follow risky strategy (and hence, generate instability in the banking system), could be (de)regulation, degree of competition, turmoil in other financial markets, external shocks etc. Deregulation could impair the resilience to external shocks in the absence of prudential safeguards. Competition, on the other hand, has a dual effect. Higher competition facilitates greater access to external finance for the firms and households and thereby increases the absorption, mainly consumption and investment, in the economy, which leads to higher growth. Competition could also lower the credit standard due to the reduced screening and monitoring of investment projects leading to banking instability. At the same time, the risk mitigating techniques such as diversification, help banks to minimise risk, emanating from different sources, at a desirable level and prevents the banks and the banking system from going bust. For instance, Mohanty et al. (2006) have found that intense competition and tightening of

profit margins have shifted the focus of banks towards fee-based income to improve profitability. In this context, reform and (de)regulation play an intertwining role in increasing or mitigating risk through various channels.

The Indian growth process has, essentially been 'finance-led', whereby expansion in the financial sector played an enabling role in promoting capital accumulation, which, in turn, engendered higher growth (Reddy, 2006). Research has also supported the existence of inter-linkage between finance and growth in India (RBI, 2008). Furthermore, although crude, the correlation between bank credit and gross domestic product in India is found to be significant.[5] Chart 1.1 also shows the co-movement of growth of bank credit and economy in general and the industrial sector in particular. Therefore, other things being equal, healthiness of the banking system can significantly contribute to economic growth.

Chart 1.1: Growth of Commercial Bank-Credit and GDP (in %)

—▲— credit growth   —■— industry gdp growth   —●— gdp growth
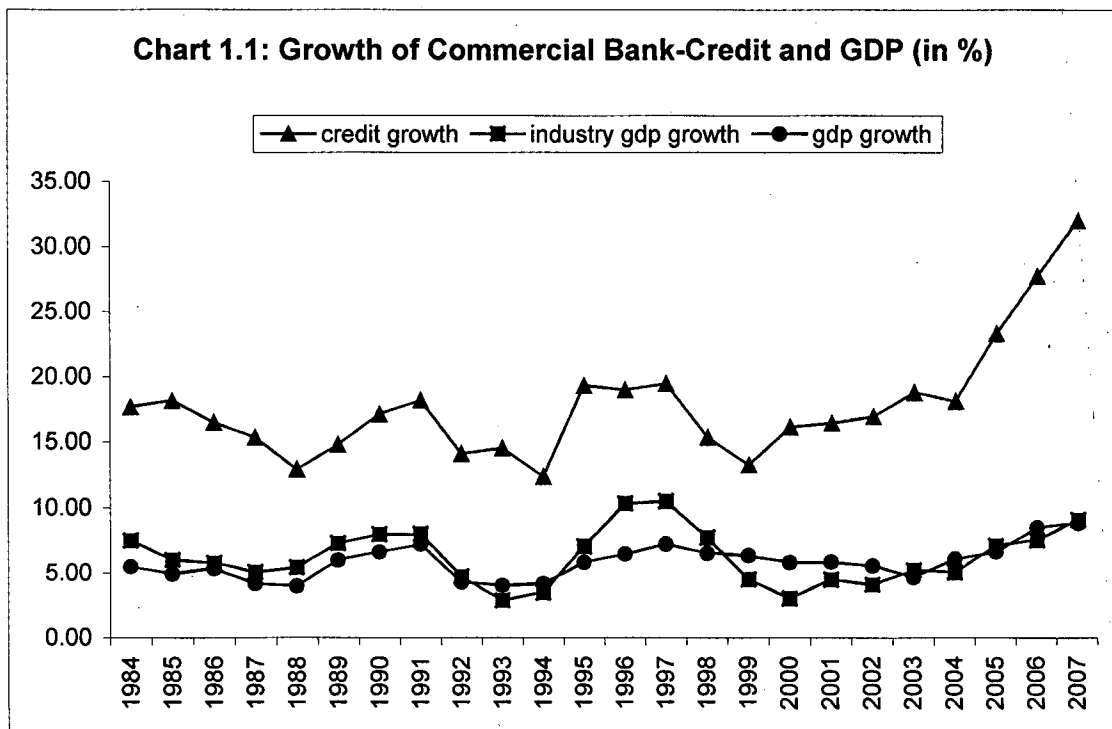
Note: Both credit and GDP growth rates are in three-year moving average term.

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[5] The correlation coefficients are 0.99 and 0.96 for the period 1980-81 to 1991-92 and 1992-93 to 2006-07 respectively. The same is 0.93 for the entire period i.e. 1980-81 to 2006-07. All coefficients are significant.

1.3 Banking Sector Reform, Issues and Statement of the Problem

Historically, Indian financial system has inherited the hegemony of banking institutions, which are mostly in the public sector in the post-independence period, with achievement in many fronts such as resource mobilisation, geographical diversification, social and development banking, and failures in some other important fronts such as competitiveness, efficiency, profitability, technological backwardness.[6] To mitigate these ill effects, a broad set of banking sector reforms[7] were initiated following the recommendation of the Narasimham Committee (GOI, 1992 and 1998). Banking sector reform essentially consisted of two-pronged approaches. While nudging the Indian banking system to better health through the introduction of international best practices in prudential regulation and supervision early in the reform cycle, the idea was to gradually increase competition in the system (Mohan, 2005a). The [reform] process has been marked by 'gradualism' with measures being undertaken after extensive consultations with experts and market participants (Mohan, 2005a). The wide-ranging changes introduced in the sector, through reform, have multiple implications.

Firstly, banking sector reform has facilitated a shift towards a new banking structure in India. It allows the entry of competitive forces into the system. New commercial banks, both private and foreign, have entered into the market.[8] The

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[6] The importance of non-banking financial intermediaries has grown in the reforms era, however, banking institutions continue to dominate the country's financial system. The relative share of (commercial) banks in total financial sector assets was nearly three-fourths in the early 1980s, and it has slowly come down over the period of time. The share was hovering around two-third mark since 1990s, and finally again stood higher, at 75.8 percent (Table 1 in the Appendix) in 2005. Notwithstanding the fact that the contribution of banking sector to GDP has remained constant, there has been deepening of the sector in terms of indicators like deposit-GDP, asset-GDP and credit-GDP ratios (See Table 2 in the Appendix). It needs to be recognised that with the establishment of the SEBI—an autonomous body for regulation and promotion of capital markets, with focus on simplification of issue procedures, establishment of disclosure standards and greater investor protection—the role of stock market has also gained prominence. For instance, the annual market capitalization (at the BSE) as percent of GDP (at factor cost) was 8.38 percent in 1990-91, which has risen to 51.1 percent in 1999-00, 123.77 percent in 2006-07.

[7] Important reform measures include: deregulation of interest rate, elimination of statutory preemptions, liberal entry of private and foreign banks, more autonomy to public sector banks, relaxing equity-holding pattern in public sector banks by allowing up to 49 percent of private equity, and most importantly a broad set of micro-prudential norms—BASEL norms such as capital adequacy norm, recognition and provisioning rules, exposure limits, asset classification, disclosure norms, accounting rules, valuation norms etc), so as to ensure safety and soundness of the banking system, and therefore a level playing field for all banks. The reform and regulations have been discussed in a detail in Chapter 2.

[8] The industry also observes the wave of consolidation (see Table 6 in the Appendix).

permission to set up new private sector banks and more liberal approach towards foreign banks has enhanced the degree of competition in the commercial banking segment. The pace of increase in the number of bank offices or branches has also been tremendous (see Table 5 in the Appendix) especially for the private sector banks. As a result, there has been a change in asset and credit concentration by ownership structure[9] demonstrating the fact that the private sector banks have started assuming greater role in financial intermediation.[10] Therefore, one needs to keep note of how well these banks perform vis-a-vis the others and what way they perform for a healthy banking system. A higher degree of competition could increase (decrease) deposit (lending) rate and thereby can affect the margin earned, destroy screening incentives and relationship lending and thereby increase the credit risk. In this context, it is worth mentioning that although (instead of reduction) returns-on-assets (ROA)/profitability of many banks have improved, the dispersion in the performance of different banks has increased quite significantly after the reforms especially in the private sector and foreign banks (Chart 1.2). Therefore, the post reform period could be characterised by more risk or instability in banks. This phenomenon is in line with the standard industrial organisation literature (Stigler, 1963), which talks about a volatile pattern of rates of return in competitive industries.

It is also observed that a number of banks are incurring losses in their balance sheet even in the post reform period (Table 3 in the Appendix). By the way, the lossmaking banks were the public sector banks (PSBs) in the early years of reform but in the later stage, mostly, the private sector and foreign category banks have come to the picture. It might be the case that the loss-making banks are those, which are not able to withstand competition. The striking feature is that there is a wide disparity across the banks in their returns on assets. Hence, there is need to analyse the implication of such disparity on banks' risk, if any.

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[9] The share of PSBs in total banking asset was about 90 percent by 1992, which eroded over the years and stood at 70 percent in March 2007 (See Table 8 in the Appendix).
[10] The three-bank asset concentration ratio fell considerably from 41.52 percent in 1991 to 33.88 percent in 2000 and 31.12 percent in 2007 (Own calculation, Chart 1 in Appendix).

Chart 1.2: Standard Deviation of ROA of Commercial Banks

◆ PSBs —■— Private —▲— Foreign ——— All CBs
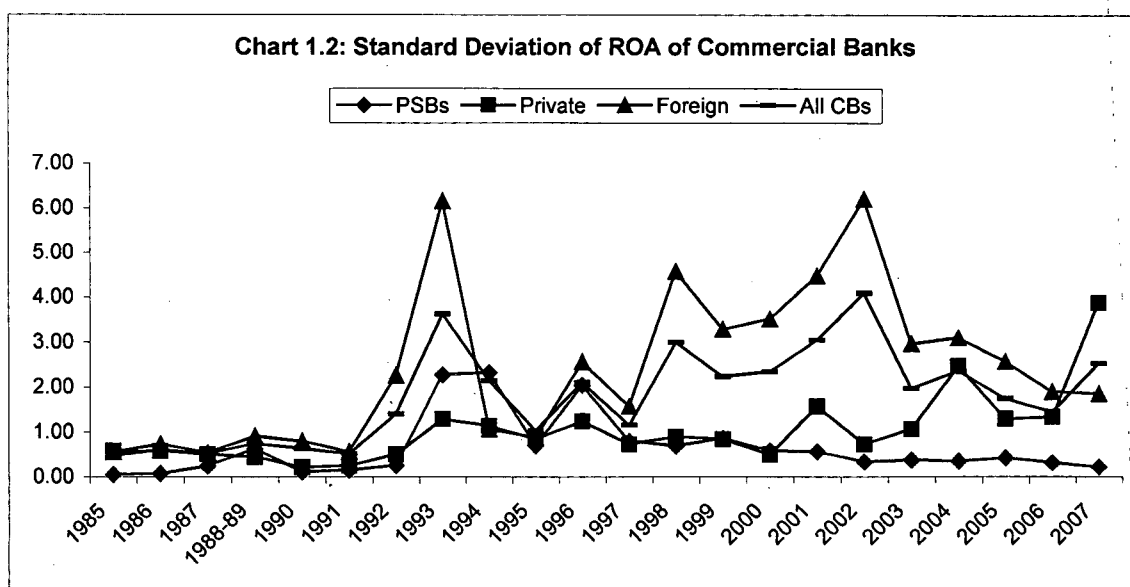
Secondly, the reform removes activity restriction for banks in many organic and inorganic lines of business and allows for diversification. Over the period of banking sector reforms, the Indian banking industry too has undergone tremendous changes in its global exposure; off-balance sheet (OBS) activities[11] such as forward exchange contract including the derivative products, guarantees given on behalf of constituents both in India and abroad, acceptances, endorsement and other obligations and other contingent liabilities and also its exposure to the sensitive sectors. While the fundamental banking business of liquidity provision is well alive, the aforementioned changes have widened the space for the banks to diversify its operations with concomitant implication on its risk exposure because at times banks might experience crisis for having taken a higher risk in OBS. It may be noted that there have been changes in the conduct in the direction facilitated by the reform. For instance, the OBS activities[12], exposure to sensitive

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[11] The term off-balance sheet activity usually refers to various fee/commission-based activities of commercial banks, which do not have any direct reflection on the commercial bank's balance sheet either on the asset or on the liability side. Hassan *et al.* (1993) defined off-balance sheet activities as the banking products and practices that are not reflected in the on-balance sheet portfolio. Over the past several years, significant policy initiatives have been undertaken by the authorities, which have provided a boost for banks to engage in OBS activities (Nachane and Ghosh, 2007). Salient policy initiatives have been undertaken over the last several years, which have provided impetus to the development of the derivatives market (see Chapter 2 for details).

[12] As evident, forward exchange contract and derivative are the dominant form of OBS activities across bank groups (Table 9a in the Appendix).

sectors[13], foreign operations[14] etc. have grown tremendously (see Chart 11, 12 and 13, in Appendix). These changes can influence the performance and risk of commercial banks.

In the context of these banking sector reforms, many other implications have come to the fore. While the removal of different statutory preemptions and deregulation of interest rate have widened the scope and flexibility of banks in the portfolio choice and enabled to earn reasonable rate of return, at the same time, these reform and regulatory measures could lead to differential performance across banks depending on their ownership, size and the level of capitalisation (Mohan, 2007; Ray, 2008). Under such a situation, steady performance of any bank becomes conditional upon its ability to select safe portfolio baskets, risk management practices and its efficiency. However, the ability to select a safe portfolio is not completely endogenous to a bank. It depends on the bank's conduct, which is of course endogenous to the bank, as well as subject to a number of extraneous conditions, economic forces and different kinds of risks e.g. credit risk, market risk etc. on which a bank has little control. Therefore, there can be situations where some banks might not perform well in the profitability front, which can further constrain their expansion in a variety of ways. There could also be a situation where a set of banks perform well while others do not, which could spur risky behaviour among the latter set of banks in an effort to retrieve their performances. Further, banks' ability to overcome regulatory constraint, the state of technology, product sophistication and business practices could produce differential conduct, performance and risk across the banks.

Overall, the reform process has tried to enhance the performance of banks nevertheless allows for a greater role of the market forces. There is an indication of change in the structure, conduct and performance of the sector, consequent upon the

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[13] Sensitive sector includes capital market, real estate and commodity sector. Exposure to capital market is inclusive of both investments and advances. Exposure to real estate sector is inclusive of both direct and indirect lending.

[14] Foreign exposures include balances with banks outside India, investment outside India such as investment in securities—private and government, subsidiaries and joint ventures etc. and advances outside India.

reform. Notwithstanding the fact that there is improvement in many parameters of banking performance e.g. non-performing asset, capital adequacy ratio, return on assets, spread and burden[15] etc. after the reform (see Chart 3-10, in the Appendix), the banking industry has experienced disparity in its conduct (e.g. OBS activity, see Chart 11 in Appendix), and performance parameters despite various enabling and strengthening measures. For example, it is observed that the mean return on assets is higher than the median especially for the private sector and the foreign banks (Chart 5 and 6, in Appendix). This means that more than 50 percent of these banks are performing below the group average. Further, there is clear disparity in the spread and burden across the bank groups. The disparity among banks is also noticeable in the technological upgradation front (for example, in terms of no of ATMs, the ratio of off-site to total ATMs etc. see Table 4 in Appendix). Despite having less number of branches, relative to the PSBs, the private sector and foreign banks are able to do more business per branch (Table 7 in the Appendix). This has been made possible by technological factors among others. Private sector, especially the new private sector banks, and foreign banks (of course, not all private and foreign banks) not only have more off-site ATMs than on-site ATMs but also have more ATMs than the number of branches. All these have implications for banks' performances and risk. Therefore, it is highly important to study the risk behaviour of commercial banks and of different bank groups, in an environment seemingly characterised by increasing competition, activity diversification that have been made conductive by the reform and regulations.

1.4 Objective of the Study

The study attempts to analyse the risk behaviour by taking into consideration the factors like the degree of competition and the levels of diversification among others. While doing so, the performance of commercial banks in selected indicators and the degree of competition in the Indian banking industry are also analysed. It is observed that, there are very few studies to assess the risk behaviour of commercial banks in India and these are not so comprehensive in terms of the quantification of risk and coverage.

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[15] Spread is defined as the interest income minus interest expended scaled by total assets whereas the burden is defined as the non-interest expenditure minus non-interest income scaled by total assets.

For instance, Das (2002) analyses the interrelationship among non-performing loans [risk], capital and productivity in an attempt to understand the interrelationship between risk taking and productivity in the PSBs and found that higher productivity leads to a decrease in credit risk; and the risk, capital and productivity changes are intertwined with each other and to a certain degree they complement with each other. Non-performing loans, as a measure of risk, do not consider risk other than credit risk at large.[16] Against this background, the study sets the following objective in an attempt to assess the healthiness of commercial banks in India.

- To analyse the performance of the commercial banks in selected parameters of cost, earning and profitability in order to judge how the banking sector has performed under reform.

- To measure the degree of competition in the commercial banking sector in India.

- To analyse the risk behaviour of commercial banks in the light of changes in the structure and conduct facilitated by the banking sector reform and the regulations. This is empirically assessed using bank level data.

The importance of studying the risk behaviour is immense in view of the nodal characteristics of commercial banks in maintaining financial stability and the economic growth process. To cite Bhide et al. (2002)...*long periods of tranquility with little or no financial disturbance, engender a sense of complacency which eventually culminate in periods of turmoil which contain several failures and the threat of many more. A constant challenge, therefore, remains for the authorities in identifying newer risks, eschewing harmful incentives and strengthening the banking sector to keep pace with changing technology.* The current study is primarily concerned with risk behaviour and factors affecting it. In other words, the idea is to see the trend and determinants of risk of different commercial banks. However, the implication of banks' risk on economic activity, if any, is not examined.

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[16] The individual types of risk associated with most off-balance-sheet business are in principle no different from those associated with on-balance-sheet business. It therefore suggests that off-balance-sheet risks cannot and should not be analysed separately from the risks arising from on-balance-sheet business, but should be regarded as an integral part of the banks' overall risk profiles (Bank for International Settlements, 1986).

The major data source of the study is the various publications of Reserve Bank of India (RBI) particularly the *Statistical Tables Relating To Banks In India* and the *Trend and Progress of Banking in India*, both are annual publications of RBI. It also uses the publications such as the *Handbook of Statistics on Indian Economy*, and the *Report on the Currency and Finance* wherever necessary. Additional sources are the Central Statistical Organisation (CSO) and the Centre for Monitoring Indian Economy (CMIE) (PROWESS) electronic database.

1.5 Chapter Scheme

Chapter 2 is devoted for (i) listing out the important reform measures having implication on structure, conduct, performance and risk of the commercial banking industry and (ii) making an assessment of performance of commercial banks in selected parameters of cost, earning and profitability in order to judge how the banking sector has performed under reform and visualise how the reform has shaped the Indian commercial banking industry. The reform measures are classified into four broad categories namely the enabling and performance enhancing measures, market structure and conduct changing measures, prudential measures and the miscellaneous. While judging the performance of commercial banks in the reform era the growth rate of credit, investment, asset and some productivity indicators e.g. business per employee etc are also considered besides the cost, earning and profitability parameters such as the cost of deposit and fund, intermediation/operating cost, net interest margin (spread), burden, return on investments, return on advances, and most importantly the return on assets. Chapter 3 reviews the literature on how risk could be generated (lessened) in banks. Three sets of factors; namely competition, diversification and institutional factors that include ownership and regulation, are reviewed in the chapter and provides an analytical framework for the study followed by the hypotheses of the study surrounding banks' risk. The methodology of the study, including measurement of variables, and data sources are explained in Chapter 4. Chapter 5 deals with the estimation of the degree of competition and the analysis of risk behaviour using both descriptive statistics and econometric tools. Summary and conclusion along with the limitation of the study and scope for further research are presented in Chapter 6.

Chapter 2

Banking Sector Reform and Performance of the Industry

2.1 Introduction

This chapter lists out important reform measures having implication on the market structure, conduct, performance and risk of the commercial banking industry. This is preceded by a brief description of the role performed by the sector in the pre-reform era especially in mobilisation and allocation of financial resources, deficiencies thereof and the context of the banking sector reform. In addition, an assessment of performance of commercial banks in selected parameters of cost, earning and profitability is also attempted in order to judge how the banking sector has performed under reform and visualise how the reform has shaped the commercial banking industry.

2.2 Banking Sector and Its Role in Planned Economic Development

Banking in India has a long history and it has evolved over the years passing through various phases. At the time of independence India inherited a banking system that was deficient in many respects. The entire banking sector was in the domain of the private sector. The banks were mostly urban-oriented and remained beyond the reach of rural population. A large proportion of the rural population had to depend on moneylender and other informal sources for credit, as banks' rural penetration was grossly inadequate. Agriculture, the so-called backbone of the Indian economy, was not considered as an economic proposition by banks. Thus, the rural economy in general and agricultural sector in particular was not supported by the banking system (Kumar, 2006). As a result the rural population was vulnerable to economic exploitation in the hands of informal sources of credit because of the interlinkage of rural markets. In addition, large industrial and business houses used to enjoy major portion of the credit, which was not desirable from the competitiveness perspective, whereas vital sectors like agriculture, small-scale industries and export sectors did not receive any attention that they deserved. Nevertheless, the situation did not turn better until the social control over banks, which was necessitated in order to allocate financial resources for achieving the objectives of

12

planned economic development. In sum, the need for bank nationalisation was felt for aligning monetary and banking activity of the country in consonance with the planning process.

The underlying philosophy of the approach of planned economic development was to encourage growth by ensuring adequate availability of credit at reasonable or concessional rate of interest, in areas where commercial considerations did not allow disbursal of credit. This strategy is well known in the literature as the '*social and development banking*'. The creation of near-monopoly control over the banking system of the country by nationalising all large banks in the private sector helped in meeting the credit needs, be it in the industry, agriculture or other priority sectors for achieving the planned targets. This was made possible by the implementation of measures like directed credit policies and administered interest rates. The system of credit planning (starting from 1967-68) became an integral part of the formulation of monetary and credit policy. The banking system not only played catalytic role in the planned allocation of credit but also made significant strides in many spheres, be it the geographical reach by extending banking facilities to areas hitherto not served by bank branches or the amount of resources mobilised by mopping up of potential savings. However, the role of non-banking financial intermediaries, in mobilising and allocating financial resources towards specific areas of the economy, is not to be overlooked. The phenomenal growth of Indian banking system in the post-nationalised era started showing signs of illness by mid-eighties. Specifically, they suffered from high level of non-performing assets, low profitability, low capital base, low operational efficiency, unhealthy balance sheet etc. threatening the viability of the banking sector (Bhasin, 2007).

2.3 Context of the Banking Sector Reform

Until the beginning of the 1990s, the state of the financial sector in India could be described as a classic example of 'financial repression' (Mohan, 2005a). Prior to the initiation of financial sector reforms in 1992, the Indian financial system essentially catered to the needs of planned economic development. The government sector had a predominant role in every spheres of economic activity. The sector was characterised,

13

inter alia, by administered interest rates, large preemption of resources by the authorities and extensive micro regulations directing major portion of the flow of funds to and from financial intermediaries. The preemption of large proportion of bank deposits in the form of reserves and an administered interest rate regime resulted in high-cost and low quality of financial intermediation (Prasad and Ghosh, 2005). The existence of a complex structure of interest rates arising from the economic and social concerns about providing concessional credit to certain sectors resulted in cross subsidisation, which implied that higher rates were charged to non-concessional borrowers. The system of administered interest rate was characterised by detailed regulatory prescriptions on lending and deposits, leading to a multiplicity of interest rates. As a result, the spread between deposit and lending rates of commercial banks increased, and administered interest rates did not factor in credit risk. The health of the financial intermediaries and most importantly the PSBs was masked by relatively opaque accounting norms and limited disclosure. The lack of transparency, accountability, and prudential norms in the operation of the banking system led also to a rising burden of non-performing assets. On the expenditure front, inflexibility in licensing of branches and management structures constrained the operational independence and functional autonomy of banks and raised overhead costs. The financial environment during this [pre-reform] period was characterised by segmented and underdeveloped financial markets (Prasad and Ghosh, 2005). This resulted in distortion of interest rates and inefficient allocation of resources. In sum, as a result of state dominion in the allocation of finance, Indian financial system in general and the banking system in particular was characterised by barriers to entry, lack of competition, low capital base, high intermediation cost, segmented markets and inefficiency. The role of technology was minimal and the quality of service was not given adequate importance. Banks did not follow appropriate risk management systems, and the prudential standards were weak (RBI, 2003). It was in this backdrop that wide-ranging financial sector reforms were introduced as an integral part of the economic reforms programme that started in 1991-1992.

2.4 Banking Reform and Regulations

Broadly speaking, reforms in the banking sector had two distinct phases. Considering the strategic importance of the financial sector, the government of India had set up a committee on financial system in 1991 under the chairpersonship of M. Narasimham. The Narasimham committee was asked to examine all aspects relating to the structure, organisation, functions and procedures of the Indian financial system. The first phase of the banking sector reform, following GOI (1991), focused mainly on the enabling and strengthening measures. The banking reform that started with the implementation of the recommendations of GOI (1991) facilitated a paradigm shift from a highly regulated to a market oriented system. The second phase of reform, following GOI (1998), placed greater emphasis on structural measures in aligning the Indian standard with that of best international practices. Thus, the objective of the banking sector reform was to promote a diversified, efficient and competitive financial system with the ultimate objective of improving the allocative efficiency of resources through operational flexibility, improved financial viability and institutional strengthening (Mohan, 2005b). The reform measures pertaining to both the phases, and having implication on the market structure, conduct and performance and hence, banks' risks are being briefed below.

2.4.1 Enabling and Performance Enhancing Measures

Prominent among the enabling measures include the deregulation of both deposit and lending interest rates. Prior to the reform, interest rate structure prevalent was highly complex with many slabs and ceilings. Profitability was the forbidden word in banking business. The interest rate deregulation was tried with a view to provide more flexibility to banks, enable price discovery and profitability along with the promotion of competition and operational efficiency. The details of these measures are given below.

(a) Deposit Rate Deregulation[17]

  i. 1992: Interest rates were freed between 46 days and 3 years and over, but ceiling was prescribed.

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[17] Deposit and lending interest rate deregulation are Taken from Mohan (2005c)

ii.   1995: Ceiling was removed for deposits over two years.

iii. 1996: Ceiling was removed for deposits over one year.

iv.   1997: Interest rates on term deposits were completely deregulated.

v.   2004: Minimum maturity for term deposits was reduced to seven days.

(b) Lending Rate Deregulation

i.   1992-1993: Six categories of lending rates, five slabs below two lakh and minimum lending rate above two lakh were prescribed.

ii.   1994: Lending rates were freed for loans above Rs. 2 lakh and minimum rate was abolished. Banks were required to announce prime lending rate (PLR), taking account the cost of funds and transaction cost among others, with the approval of their boards.

iii. 1996: Banks were to specify maximum spread over prime lending rate.

iv.   1997-98: Separate prime lending rate was permitted for cash credit/demand loans and term loans over three years. Floating (PLR) rate was also permitted.

v.   1998-99: Prime lending rate was made ceiling for loans upto Rs. 2 lakh.

vi.   1999: Tenor linked prime lending rate i.e. PLR for different maturities was introduced to give banks more operational flexibility.

vii. 2001-02: Prime lending rate was made the benchmark rate and sub-prime lending rate was permitted for loans above Rs. 2 lakh.

viii. 2002-03: Bank-wise prime lending rate was made transparent on Reserve Bank of India (RBI) website.

ix.   2003: Lending rate across banks tended to vary widely with banks charging higher rates over the PLRs for non-prime borrowers. Nonetheless, (despite fall in deposit rates and lowering of cost of funds over the period), the range of PLRs of PSBs remained sticky downwards. With continued stickiness of PLRs, the RBI mooted the concept of Benchmark Prime Lending Rate (BPLR). It addresses the need for transparency in banks' lending rates and also to reduce the complexity involved in pricing of loans.

x.   2003-2004: Computation of benchmark prime lending rate was rationalised and the tenor linked prime lending rates were abolished.

(c) Elimination of Statutory Preemptions

Another significant feature of the banking sector reform has been the gradual reduction in the reserve ratios. This is presented in Table 2.1.

Table 2.1: Trend in CRR and SLR

CRR (Cash Reserve Ratio)		SLR (Statutory Liquidity Ratio)	
Effective Date	Rate (in %)	Effective Date	Rate (in %)
16-09-1962	3.00	16-03-1949	20.00
13-11-1976	6.00	16-09-1964	25.00
31-07-1981	6.50	05-02-1970	26.00
27-11-1981	7.25	24-04-1970	27.00
29-07-1983	8.00	28-08-1970	28.00
04-02-1984	9.00	04-08-1972	29.00
24-10-1987	10.00	17-11-1972	30.00
30-07-1988	11.00	08-12-1973	32.00
01-07-1989	15.00	01-07-1974	33.00
08-10-1992	15.00	01-12-1978	34.00
17-04-1993	14.50	25-09-1981	34.50
15-05-1993	14.00	30-10-1981	35.00
11-06-1994	14.50	28-07-1984	35.50
09-07-1994	14.75	01-09-1984	36.00
06-08-1994	15.00	08-06-1985	36.50
09-12-1995	14.00	06-07-1985	37.00
27-04-1996	13.50	25-04-1987	37.50
11-05-1996	13.00	02-01-1988	38.00
06-07-1996	12.00	22-09-1990	38.50
09-11-1996	11.00	29-02-1992	38.50
04-01-1997	10.50	09-01-1993	38.25
22-11-1997	9.50	06-02-1993	38.00
13-03-1999	10.50	06-03-1993	37.75
22-04-2000	8.00	21-08-1993	37.50
19-05-2001	7.50	18-09-1993	37.25
16-11-2002	4.75	16-10-1993	34.75
14-06-2003	4.50	20-08-1994	34.25
02-10-2004	5.00	17-09-1994	33.75
23-12-2006	5.25	29-10-1994	31.50
03-03-2007	6.00	25-10-1997	25.00

Source: Handbook of Statistics on Indian Economy, 2007.

Salient among these measures are the reduction in the statutory preemptions i.e. Statutory Liquidity Ratio (SLR) and Cash Reserve Ratio (CRR) [18] so as to release greater funds for commercial lending. CRR, which stood at 15 percent during July 1989 and October 1992, was gradually brought down to 4.50 percent by June 2003 (Table 2.1), in pursuance of the medium term goal of 3 percent. Similarly, SLR was reduced to 25 percent in 1997, which was as high as 38.50 percent during 1990-1992. Nevertheless, banks' investment in government securities has continued to remain well above the statutory minimum but this is market driven in the liberalisation era.

(d) Legal Measures

In the Indian legal system, it was not permissible for a secured creditor to take possession of the securities (foreclosure) in the event of default and sell such securities for the purpose of recovery of loan. This power has been conferred on the secured creditor by the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002. The act provides for enforcement of security interest for realisation of dues without the intervention of the courts or tribunals. Prior to the enactment of the SARFAESI Act, the entire borrower community was used to a system where claims of the lenders were adjudicated by courts. The recovery process by attachment and sale of securities and other assets could be done only after such adjudication. Under the provision of the act, a bank serves notice on the defaulting borrower for payment of defaulted loan and in the event of non-compliance, proceeds with the action for taking possession and sale of securities. The Act also paved the way for setting up of Asset Reconstruction Companies (ARCs), which in turn helps banks and financial institutions to clean up their balance sheets.[19]

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[18] CRR obligates a bank to hold certain percentage of its net demand and time liabilities (NDTL) as reserves with the central bank. It is used by the RBI as a direct instrument of monetary control, particularly to mop up or inject liquidity from/into the economy. SLR on the other hand obligates banks to invest a predetermined portion of its net demand and time liabilities in government and other approved securities. These requirements often preempt a major chunk of the resources reducing the availability of lonable funds. As a result of these preemptions, there resulted in higher spread, as banks being able to lend only part of its deposits mobilised, charged substantially higher lending rates (on non-concessional loans) to cover cost of funds.

[19] Asset Reconstruction Company India Limited (ARCIL) was the first asset reconstruction company registered with the RBI which was jointly set up by ICICI bank, IDBI, SBI, HDFC and a few other banks and financial institutions.

2.4.2 Market Structure and Conduct Changing Measures

(a) Pro-Competitive Measure

For well over two decades after the two-stage nationalisation of banks in 1969 and 1980, no banks were being allowed to set up in the private sector. After a long gap, competition has been infused into the banking system by licensing new private banks since 1993. By the end of 2007-08, 11 new private sector banks have become operational. Foreign banks have also been given more liberal entry. Under the World Trade Organization (WTO) commitment, the foreign banks (in all) are permitted to open upto 12 branches a year with effect from 1998-99, provided the regulatory standards are satisfied. The RBI has released a roadmap for presence of foreign banks in India in February 2005. The roadmap is divided into two phases i.e. the first phase is between March 2005 and March 2009 and the second phase is April 2009 onwards. The guidelines for presence of foreign banks in India are indicative that the RBI has mostly preferred the 'one form of presence' criterion. At present, foreign banks may operate in India through three modes namely branches, a wholly owned subsidiary (WOS) or a subsidiary with an aggregate foreign investment up to a maximum of 75 percent in a private bank. During the first phase foreign banks will be permitted to establish their presence by way of setting up a WOS or conversion of existing branches into a WOS depending on the eligibility criterion such as ownership pattern, financial soundness, supervisory rating and international rating. Further, the WOS will be treated on par with the existing branches of foreign banks for branch expansion with flexibility to go beyond the existing WTO commitments of 12 branches in a year and preference for branch expansion in under-banked areas. Permission for acquisition of share holding in Indian private sector banks by eligible foreign banks would however be limited to banks identified by RBI for restructuring. Issues concerning the national treatment to WOS, dilution of stack and permitting mergers/acquisitions of any private sector banks in India by a foreign bank would be examined in second phase.

(b) Off-Balance Sheet Activities (OBS)

OBS refers to various fee/commission-based activities, which do not have any direct reflection on the commercial bank's balance sheet either on the asset or on the

liability side. These includes contingent liabilities of different forms e.g. forward exchange contract and derivatives, guarantees given on behalf of constituents both in India and abroad, acceptances, endorsement and other obligations etc. Over the past several years, significant policy initiatives have been undertaken by the authorities, which have provided a boost for banks to engage in OBS activities (Nachane and Ghosh, 2007). Salient policy initiatives that have been undertaken over the last several years and which have provided impetus to the development of the derivatives market include the following: First, the Reserve Bank of India has imparted flexibility to asset-liability managers by introducing Forward Rate Agreements (FRAs) and Interest Rate Swaps (IRS) as risk mitigation strategies. Second, following the recommendations of the L.C. Gupta Committee on Derivatives (March 1998), the government has amended the Securities Contract Regulation Act, 1956 and recognised derivatives as securities. The amended definition is broad and covers securitisation instruments also. Third, in June 2000, both the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE) introduced Stock Index Futures. Effective March 1, 2000, the government has lifted the ban on forward rate contracts and cleared the way for forward contracts in debt securities. This is the basis for index-based futures in the debt market. A major bottleneck in the development of the derivatives market had been the absence of a reliable structure of benchmark interest rates for different maturities. With a view to fill this gap, the National Stock Exchange decided to experiment with the idea of ascertaining the expectations of major market participants in arriving at indicative benchmark rates. Based on a daily poll of over 25 market participants, NSE started disseminating since 1998 its overnight money market rates called NSE Mumbai Inter-Bank Offer / Bid (MIBOR/MIBID) rates. These rates have since gained wide acceptance in the market. Subsequently, the Report of the Working Group on Rupee Derivatives recommended, *inter alia*, the introduction of exchange-traded derivatives to supplement over the counter (OTC) derivatives. It recommended four types of contracts for trading: (*a*) short-term MIBOR futures contract, (*b*) MIFOR (Mumbai Interbank Forward Offer Rate) futures contract based on 6-month LIBOR (London Interbank Offered Rate) and Rupee-Dollar 6-month forward rate, (*c*) bond futures contract, and (*d*) long-term bond index futures contract.

(c) Autonomy and Ownership

With a view to provide a level playing field, the PSBs have been given greater operational flexibility and managerial autonomy. The new framework allows PSBs to pursue new lines of business, open branches, make suitable acquisition of companies or businesses, close or merge unviable branches, open overseas offices, set up subsidiaries and exit a line of business. Further, these banks have been allowed to decide human resource issues, including staffing pattern, recruitment of specialist officers and other matters of corporate strategy, placement, transfer, training, promotions and pensions as well as visits to foreign countries to interact with depositors and other stakeholders. Given the fiscal constraint and in keeping with the evolving principle of corporate governance, the government permitted PSBs to diversify its ownership by raising fresh equity up to 49 percent from the market to meet the capital shortfall (Mohan, 2005a). Many PSBs and private sector banks have accessed the domestic equity market by now (see Table 2.3). The number of banks listed in the NSE has increased from 7 (of which 2 were PSBs and 5 private sector banks) in 1995 to 30 in 2000 (of which 10 were PSBs and 20 private sector banks) and 37 in 2007 (of which 18 were PSBs and 19 private sector banks). The reduction in the number of private sector banks listed in NSE is due to merger. PSBs have also raised capital through global depositary receipt (GDR) and American depositary receipt (ADR). Similarly, the number of banks listed in the BSE has increased from 8 (of which 2 were PSBs and 6 private sector banks) in 1995 to 30 in 2000 (of which 11 were PSBs and 19 private sector banks) and 40 in 2007 (of which 21 were PSBs and 19 private sector banks). In addition, many banks have raised subordinate debt through the private placement route. The distribution of private shareholding in PSBs for the latest three years is shown in Table 2.2. It is noteworthy that the number of PSBs having private shareholding between 40 to 49 percent has risen from 6 in 2005 to 11 in 2007.

TH-17891

21

Tables 2.2: Private Shareholding in Public Sector Banks*

(Figures Represent Number as at End March)

Category	2005	2006	2007
Up to 10 percent	4	4	3
More than 10 and up to 20 percent	Nil/Negligible	Nil/Negligible	1
More than 20 and up to 30 percent	5	3	3
More than 30 and up to 40 percent	6	3	3
More than 40 and up to 49 percent	6	11	11

Source: Trend and Progress of Banking in India, 2005 and 2007.
*Includes 19 nationalised banks, SBI and IDBI ltd.

Table 2.3: Number of Commercial Banks Listed in the BSE and NSE

Year	Bombay Stock Exchange (BSE)			National Stock Exchange (NSE)		
	All CBs	PSBs	Private	All CBs	PSBs	Private
1995	8	2	6	7	2	5
1996	11	3	8	13	3	10
1997	16	6	10	17	5	12
1998	22	9	13	23	9	14
1999	27	10	17	27	9	18
2000	30	11	19	30	10	20
2001	31	13	18	32	12	20
2002	31	14	17	32	13	19
2003	37	18	19	36	17	19
2004	37	19	18	34	16	18
2005	38	20	18	36	17	19
2006	38	20	18	36	17	19
2007	40	21	19	37	18	19
2008	40	22	18	37	19	18

Source: CMIE, PROWESS (Electronic Database).

(d) Branch Licensing

The committee on the financial system (GOI, 1991) recommended the abolition of branch licensing. Though it has not been done but greater operational freedom has been given to open certain specialised branches and also close urban, semi-urban and metro branches and conversion of rural branches into satellite offices. The matter of opening or closing of branches, other than rural branches, is left to the commercial judgment of individual banks. Banks are allowed to open (service) branches having no interface with

22

customers, and attend exclusively to data processing, verification and processing of documents, issuance of chequebooks, demand drafts etc. on requests received from other branches and other functions incidental to banking business. The guidelines for licensing of new banks in the private sector were revised (January 2001) indicating that: (i) initial minimum paid-up capital for the new bank shall be Rs.200 crore, to be raised to Rs.300 crore within 3 years of commencement of business, (ii) the promoter's contribution shall be a minimum of 40 percent of the paid-up capital of the bank at any point of time, (iii) while augmenting the capital base to Rs.300 crore, the promoters will have to bring in additional capital, which would be at least 40 percent of the fresh capital raised, (iv) NRI participation in the primary equity of a new bank shall be to a maximum extent of 40 percent, (v) the new bank should not be promoted by a large industrial house.

2.4.3 Prudential Measures

The financial deregulation and increasing market orientation of the banking system on the one hand ensures a process of price discovery, facilitates better allocation of lonable resources; on the other hand, this also implies that bank's balance sheet increasingly gets linked to the fluctuation in financial markets. The challenge before the regulator therefore, is to harness the benefit of competition, while at the same time, limit the threat to financial stability (Ray, 2008). A key element of the banking sector reforms has been the strengthening of prudential framework relating to capital adequacy, income recognition, asset classification and provisioning requirements, disclosure standards etc. and encouraging transparency and accountability. These norms were introduced in order to ensure the safety and soundness in the banking system and to strengthen financial stability.

(a) Capital Adequacy

The issue of building up adequate level of capital in banks did not receive enough attention in the pre-1990s. Government ownership of banks was considered adequate for maintaining public confidence. Banking at the international scale was very meager and therefore, there was little pressure to conform to the international norms. A sound banking system became the need of the hour with the gradual economic and financial

integration. The government accepted the recommendations of the committee on the financial system (GOI, 1991), which led to the adoption of Basel norms[20] on capital adequacy to improve the financial health of the banks and enable them to compete both at home and abroad. The RBI introduced these norms in a phased manner since April 1992 covering all the commercial banks.

Capital adequacy ratio (CAR) is the ratio of bank's capital to its risk weighted assets.[21] It is an indication of a bank's strengthness in absorbing the risk of loss of asset or asset values. In April 1992, RBI prescribed CAR for commercial banks operating in India. Accordingly it was stipulated that foreign banks operating in India should achieve CAR of eight percent by March 1993, while Indian banks with branches abroad were asked to achieve the stipulation by March 1995. All other banks were asked to achieve the same by March 1996. In October 1998, the RBI raised the minimum regulatory CAR requirement to 9 percent, and the banks were advised to achieve the same by March 2000. The notion of risk-weighted assets had also been gradually expanded from credit risk to encompass market and operational risks. In order to ensure a smooth transition, the government has recapitalised a number of nationalised banks and allowed foreign banks to bring capital from their parent banks. The improvement in the CAR can be seen from the fact that in the year 1999, as many as 27 banks were having CAR of less than 10 percent, 33 banks between 10 to 12 percent and 43 banks above the 12 percent mark whereas in the year 2007 only 3 banks were reported to have CAR of less than 10

[20] The Basel Committee on Banking Supervision (BCBS) at the Bank for International Settlements (BIS) released a framework in July 1988 (Basel-I) on 'International Convergence of Capital Measures and Capital Standards'. It provided for the implementation of credit risk measurement framework with a minimum regulatory capital of 8 percent of banks' risk weighted assets by end of 1992. In 1996, through an amendment to Basel-I, market risk was introduced in the weighing scheme in addition to the credit risk. In July 1999, the BCBS initiated a process of replacing the Basel-I with a revised version, the Basel-II. The Basel-II stands on three pillars i.e. the minimum capital requirements, supervisory review process and market discipline by developing a set of disclosure norms. Banking regulation in India has borrowed substantially from the Basel norms.

[21] Capital refers to both Tire-I (core capital) and Tire-II capital. Tire-I provides the most important and rapidly available support to the bank against unexpected losses, whereas Tire-II capital contains elements that are less permanent in nature or less rapidly available. In the Indian case tire-I capital contains paid-up capital, statutory reserves and other free reserves, if any. The Tire-II capital contains undisclosed reserves and cumulative perpetual preference shares, revaluation reserves, general provisions and loss reserves, hybrid debt capital instruments and subordinated debt. As per the RBI stipulation Tire-II capital cannot be more than 100 percent of Tire-I capital.

percent, 27 banks between 10 to 12 percent and as many as 52 banks above the 12 percent mark (see Table 2.4).

Table 2.4: Distribution of Commercial Banks according to CAR (Figures are in No.)

Bank Group/Year	CAR < 10 %		CAR 10-12 %		CAR >12 %	
	1999	2007	1999	2007	1999	2007
PSBs	5		14	11	8	17
Private	8	3	14	9	11	13
Foreign	14		5	7	24	22
All CBs	27	3	33	27	43	52

Source: Trends and Progress of Banking in India, RBI, Various Issues.

(b) Asset Classification, Provisioning and Income Recognition

In line with the international practices and as per the recommendation of the GOI (1991), the RBI has introduced the prudential norms for asset classification, provisioning for bad assets and the income recognition, with effect from the year ending on March 31st, 1993 in a phased manner. Banks need to classify their advances as: standard, substandard, doubtful and loss which are different from the earlier system of 8 health codes, introduced in 1985. Strict provisioning norm has been specified in case of various categories of Non Performing Assets (NPAs) viz., sub-standard assets (10 percent), doubtful assets (100 percent of the unsecured portion and 20-50 percent of the balance depending on the time profile) and loss assets (100 percent). In addition, a nominal 0.25 percent had to be provided for standard assets, which was increased to 0.40 percent in the October 2005. Later, the general provisioning requirement for banks on standard advances in specific sectors, i.e. personal loans, loans and advances qualifying as capital market exposures, residential housing loans beyond Rs.20 lakh and commercial real estate loans, increased to 1.0 percent from the earlier level of 0.40 percent in May 2006. Nevertheless, general provision on standard assets was allowed to be included in tier II capital. For the purpose of compliance with the capital adequacy norms, tier II capital including investment fluctuation reserve (IFR) is considered up to a maximum of 100 percent of total Tier I capital. Prior to the introduction of prudential norm relating to the income recognition, income was recognised on accrual basis rather than on actual recovery of cash. Further, the banks were not required to make sufficient provisioning for

25

non-performing loans. As per stipulation, no income should be recognised in case of NPAs. The concept of *past due* in the identification of NPAs was dispensed with effect from March 2001, and 90-day delinquency norm was adopted for the classification of NPAs with effect from March 2004.

(c) Exposure Norms

The RBI has prescribed regulatory limits on banks' exposure to individual and group borrowers in India to avoid concentration of credit. The exposure limit is fixed with respect to banks' capital funds. The applicable limit is 15 percent of capital fund in case of single borrower and 40 percent in case of a group of borrowers. However, there are exceptions in case the credit is meant for an infrastructure project. Further, boards of banks, under exceptional circumstances, are allowed to raise single or group exposure limit by 5 percent of capital funds. Similarly, investment of a bank in equity and preference shares eligible for capital status, subordinate debt instruments, hybrid debt capital instruments and other capital instruments approved in the nature of capital which are issued by another bank or financial institution should not exceed 10 percent of the investing bank's capital funds. Furthermore, banks are not allowed to acquire any fresh stake in another bank's equity share; if by such acquisition the investing bank's holdings exceeds 5 percent of the investee bank's equity capital. Similar exposure norm has been specified for real estate and other sensitive sectors[22] albeit with some exceptions e.g. for venture capital funds. Nevertheless, foreign operation has been encouraged. For instance, in April 2003, the ceiling for banks to offer credit / non-credit facilities to Indian Joint Ventures / WOS abroad was increased from 5 percent of the unimpaired Tier I capital to 10 percent of banks' unimpaired capital (Tier I and Tier II) funds. Later (November 2006), in order to facilitate the expansion of Indian corporates' business abroad, the prudential limit on credit and non-credit facilities extended by banks to Indian Joint Ventures (where the holding by the Indian company is more than 51 percent) and WOS abroad was enhanced from 10 percent to 20 percent of their unimpaired capital (Tier I and Tier II) funds.

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[22] Sensitive sectors are those sectors where asset prices are subject to unpredictable fluctuations e.g. capital market, real estate or the commodities sector.

(d) Disclosure and Accounting Rules

The stability of a financial system is enhanced when institution and markets function on the basis of informed decision. Adequate disclosure of information should act as a deterrent to excessive risk taking and minimise adverse selection problems (Bhasin, 2007). Disclosure requirement of commercial banks has gradually been broad-based. Banks are now under obligation to report on the deviations from adherence to the prudential norms prescribed by the RBI along with the key business ratios in their 'Notes on Accounts' to the balance sheet, from the year ended March 31st, 1996. The RBI can impose a penalty in case of contravention or default. In addition, the RBI has suggested a minimum framework to ensure that banks make meaningful disclosures of their risk exposure in derivative portfolios. The greater disclose of banks' balance sheet enables the RBI to regulate and supervise the banking system in a timely and effective manner.

(e) Regulation and supervision

The regulation and supervision of the banking system were entrusted to the RBI by the Banking Regulation Act, 1949. Over the years, the regulatory and supervisory policies of RBI have been transformed significantly in tandem with the global developments and the changing pace of the Indian financial system. A high-powered Board of Financial Supervision (BFS) with the governor of the RBI as the chairman was constituted in November 1994.[23] The RBI has been focusing on encouraging market discipline and ensuring good governance with an emphasis on *fit and proper* management and diversified ownership in more recent times. Banks are encouraged to diversify and offer varieties of products and services in addition to the conventional products. Apart from on-site inspection, the RBI has adopted off-site monitoring, internal control system in banks and use of external auditors. The risk based supervision (RBS) process has also been tried in which banks are differentiated on the basis of their risk profiles and the risks posed by them to the stability of the financial system. In the RBS banks with high risk, and critical areas with high risk within the banks, receive more supervisory attention. The

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[23] In view of the fact that the functions of regulation and supervision are organically linked, the GOI (1998) proposed renaming of the BFS as the Board for Financial Regulation and Supervision (BFRS) to provide an integral system of regulation and supervision over banks and financial institutions and non-banks financial intermediaries.

27

CAMEL[24], which is an internationally adopted supervisory rating model, has also been put in place for the supervision of banks. Banks have also been advised to adopt statistical risk management techniques like value-at-risk or other models appropriate to their level of business operation.

2.4.4 Miscellaneous

In September 2001, based on the recommendations of the RBI-SEBI Technical Committee, on an experimental basis it was decided to permit banks to extend finance to stockbrokers for margin trading within the overall ceiling of 5 percent prescribed for exposure of banks to capital market subject to certain conditions. Further, maintenance of minimum margin of 40 percent was prescribed on the funds lent for margin trading, etc. The margin requirement on all advances against shares, financing of initial public offerings (IPOs), issue of guarantees by banks was raised from 40 percent to 50 percent in January 2004. Further, a minimum cash margin of 25 percent (within the overall margin of 50 percent) in respect of guarantees issued for capital market operations was also prescribed. Banks (excluding RRBs) were made eligible (February 2006) to apply for primary dealership (PD) subject to the following guidelines: i) banks which do not at present have a partly or wholly owned subsidiary and fulfill the following criteria (a) minimum net owned funds of Rs.1,000 crore, (b) minimum CAR of nine percent (c) net NPAs of less than three percent, and d) a profit making record for the last three years; (ii) Indian banks which are undertaking PD business through a partly or wholly owned subsidiary and wish to undertake PD business departmentally by merging/taking over PD business from their partly/wholly owned subsidiary, subject to fulfilling the criteria as laid down above; (iii) foreign banks operating in India who wish to undertake PD business departmentally by merging the PD business being undertaken by group companies, subject to fulfillment of the above criteria. Guidelines on securitisation of standard assets were also issued to all banks, excluding RRBs. The guidelines include definitions and norms relating to true sale, criteria to be met by special purpose vehicle (SPV), special features including representations and warranties and re-purchase of assets from SPVs, policy on provision of credit enhancement, liquidity and underwriting

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[24] The CAMEL refers to Capital Adequacy, Asset quality, Management, Earnings and Liquidity.

facilities, policy on provision of services, prudential norms for investment in the securities issued by SPV and accounting treatment of the securitisation transactions.

Detailed prudential guidelines were issued to banks (February 2005) on capital adequacy for implementation of the New Capital Adequacy Framework under Basel II. In order to maintain consistency and harmony with international standards, banks were advised to adopt 'Standardised Approach' (SA) for credit risk and 'Basic Indicator Approach' for operational risk with effect from March 31, 2007. The RBI may consider allowing some banks to migrate to 'Internal Rating Based' (IRB) approach after developing adequate skills both in banks and at supervisory levels. Under the new framework, banks adopting SA would use the ratings assigned only by those credit rating agencies, which are identified by the RBI. Prudential guidelines on capital adequacy and market discipline-implementation of the New Capital Adequacy Framework finalised for implementation in April 2007.

2.5 What Can the Reform Measures Deliver?

The reform measures briefed above have direct or indirect bearing on banking market structure, bank's conduct, performance and risk exposures. This is because of the fact that the reform has been influential enough to alter the degree of competition, the level of diversification of activities in banks alongside the changes in the institutional factors such as regulation and ownership. For instance, the reform aimed at elimination of preemptions and restrictions and institutional development enables banks to perform better by exercising flexibility in their operations. At the same time, banks are also exposed to market induced vulnerabilities. It is also worth mentioning that depending upon the risk management practices, ownership, size and the level of capitalisation etc. different banks are likely to experience different risk levels in the changing environment and prudential regulation can have differential effect. Therefore, the next chapter reviews the existing literature explaining the channels through which the above-mentioned factors can affect banks' risk and develops an analytical framework for the present study. Nevertheless, the assessment of performance of commercial banks under reform in selected parameters of cost, earning and profitability is done in the following section.

2.6 An Assessment of Performance of Commercial Banks under Reform

To see how the banking sector has performed under reform and how the banking sector reform has shaped the industry and various implications thereof, the following part of the chapter attempts to provide a gist of the performance of different commercial banks in selected parameters of cost, earning and profitability. The analysis mostly spans over ten years i.e. 1997-98 to 2006-07. This is preceded by an introduction to the composition of balance sheet (in terms of) asset portfolio and liability besides the discussion on the composition of earnings (interest and non-interest income) and composition of expenditure (interest and non-interest expenditure) of commercial banks. While judging the performance of commercial banks in the reform era the growth rate of credit, investment, asset and some productivity indicators e.g. business per employee etc are also considered besides the cost, earning and profitability parameters such as the cost of deposit and fund, intermediation/operating cost, net interest margin (spread), burden, return on investments, return on advances, and most importantly the return on assets.

The Indian commercial banking industry has responded to various enabling and strengthening measures in a mixed fashion. Some of the developments are on expected lines while some others are difficult to be judged as healthy. There has been deepening of the commercial banking industry over the years as indicated by the banking sector assets to gross domestic product (GDP) ratio (Table 2, in Appendix). The trends in credit and investment deposit ratios, which prevailed in the 1990s, have also been reversed significantly (Table 2.7 and 2.8). Further, there is improvement in the non-performing assets for all the categories of banks or the banking industry as a whole (Chart 8 in Appendix), with PSBs having the highest ratio of net non-performing assets to net advances due to their larger role in social and development banking and lending to weaker sections, followed by the private sector and the foreign banks. The reasons for this improvement are quite understandable. There has been toning up of credit risk management system, loan review mechanism on an ongoing basis, changes in the definition of priority sector and of course the macro-economic environment and the

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development in the legal front.[25] Nonetheless, further analysis is needed to infer about the performance of banks under reform. Therefore, the balance sheet portfolio composition and the performance of commercial banks in selected parameters of cost, earning and profitability are discussed next.

2.6.1 Balance Sheet Portfolio Composition and Performance of Commercial Banks under Reform

Commercial banks undertake a wide variety of activities, which play a critical role in the economy. The three main interrelated functions of commercial banks are holding of deposits; creating credit through lending and investment activities; and providing a mechanism for payments and transfers of funds for various productive activities (RBI, 2008). An analysis of portfolio composition focuses entirely on the asset side of the balance sheet. The study of commercial banks' portfolio composition is important, as it is a significant explanatory factor with regard to the form of financial intermediation and the magnitudes and changes in the flow of financial resources to specific sectors of the economy. Commercial banks hold a portfolio of assets such as cash in hand and balances with the central bank; assets with the banking system; investments in government and other approved securities (together called SLR securities) and non approved or Non-SLR (NSLR) securities (comprising of commercial papers, shares bonds and debentures issued by the corporate sector); and loans and advances. Quantitatively, lending and investments are the most important earning assets of the banks. Given the characteristics and distribution of the liabilities, banks attempt to structure their portfolio of assets in such a manner so as to yield the maximum return, subject to the regulatory constraints. The present and expected levels of market interest rate, loan demand and actions of the central bank, in turn will greatly determine the quantum and composition of the loan and investment portfolios.

Banks in India have traditionally been the main source of credit for various sectors of the economy. They have also been funding the borrowing requirements of the

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[25] Banks can issue notice under the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002 for enforcement of security interest without intervention of the courts.

central and state governments by investing in their securities. Lending and investment operations of banks in India have evolved in response to the changing needs of the economy. Prior to the initiation of financial sector reforms in the early 1990s, lending by banks was tightly regulated and banks were expected to align their lending operations in consonance with the plan priorities. Bank lending was the principal focus of monetary policy under the credit planning approach adopted in 1967-68. However, in the wake of banking sector reforms, various restrictions on banks' balance sheet were withdrawn and direct credit controls largely dismantled, though in a phased manner. Directed investments were also reduced to a significant extent. The system of administered lending rates was also dismantled and various other restrictions on banks' lending were gradually removed in order to enable banks to operate in a flexible manner. This led to a structural transformation in the lending and investment operations of the banks (RBI, 2008). Diversification of portfolios and asset adjustments by banks are now made more on the basis of risk-return considerations. Banks in India followed the accommodation principle[26] in the pre-liberalisaton phase. In contrast, in the post liberalisation phase, the profit maximisation principle has been dominating the banks' portfolio behaviour (RBI, 2008).

Advances (credit) and investments are the two most important interest income-generating assets of the commercial banks in India, which constitutes 70 to 80 percent of their total assets. A look at the commercial banks' portfolio composition reveals that in the initial years of the reform (e.g. 1998), advances as a percentage of total asset was roughly around 40 percent and investment constituted around 35 percent across all the banks groups (Table 2.5). The share of credit in total asset was perceived to be low at various academic and policymaking circles. Further, the growth rate of credit was also lower in the period 1997-98 to 2002-03 compared to the later period of 2003-04 to 2006-07 (Table 2.6). The lower share of credit in total asset and most importantly the lower credit growth in the early phase was on account of several demand and supply side factors. On the supply side, introduction of prudential norms relating to income recognition, asset classification and provisioning in the early 1990s had made banks

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[26] According to the accommodation principle demand for bank loans determines banks' portfolio behaviour.

cautious. Banks' capacity to extend credit was also impaired due to little headroom available in the capital adequacy ratio. Banks found risk-adjusted returns on government securities more attractive and continued to invest in Government securities, far in excess of the stipulated requirements, notwithstanding the lower statutory pre-emption in the form of SLR. The SLR security has been continuing to dominate the investment portfolio across the bank groups (Table 2.5). On the demand side, there was slowdown in the industrial growth[27] that had affected the demand for credit by the corporate sector.

The portfolio composition has changed considerably in recent years particularly since 2003-04. As shown in Table 2.5, the relative share of credit in the balance sheet asset has increased from around 40 percent during 1998-2002 to around 50 to 60 percent in the following years (especially since 2005), which is even higher than what it was in 1991, across all the banks groups except for the foreign banks. The relative share of investment has also increased for all the bank groups in the early years, from 34.98 percent in 1998 to 42.52 percent in 2004 for PSBs, 32.80 percent in 1998 to 36.89 percent in 2004 for private sector banks and 28.15 percent in 1998 to 35.05 percent in 2003 for foreign banks, which fell in the later years. Interestingly, the relative share of investment fell below the 1998 level in the latest years under consideration across the bank groups. Another noticeable feature of portfolio composition is that the relative share of investment is highest for PSBs, except for 2006 and 2007, and lowest for foreign banks (since 1998). Nonetheless, the intra-investment composition shows that SLR investment, which is relatively less risky than the NSLR investment, is the dominant form of investment across bank groups though at different levels. Since 1998, the PSBs are having the highest share of SLR investment in total investments whereas the private sector banks are having the lowest, except in 2000 and 2002. In the year 2000 and 2002, foreign banks are having the lowest share of SLR investment in total investments i.e. 63.77 and 38.66 percent respectively. Concomitantly, the NSLR portion of investment (where risk is supposed to be more) is highest for the private sector and the foreign banks. Thus, diversification of balance sheet portfolio is not uniform across banks. It can

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[27] The average annual growth rate of industrial production was 5.2 percent during 1996-97 to 2001-02 as compared with 9.4 percent in the preceding three years (RBI, 2008).

be mentioned that there is a strong tendency of diversification towards OBS activities (details in Chapter 5). These activities generate fee/commission and other non-interest income. However, the pace of diversification towards OBS activities is not uniform across banks. This is evident from the median values presented in Appendix Table 9, which are lower than the bank group-wise figures presented in Appendix Chart 11.

Table 2.5: Balance Sheet Portfolio Composition of Commercial Banks (in %)

	Description	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	Advance / Asset	44.58	40.04	38.60	39.52	40.26	41.59	42.74	43.00	48.18	54.91	59.02
	Investment/ Asset	24.13	34.98	35.93	37.42	38.27	39.28	42.46	42.52	38.66	31.44	27.24
	SLR* Investment/ Investment	85.34	79.69	77.49	77.63	79.14	79.70	81.96	83.84	84.55	83.58	82.34
	NSLR** Investment/ Investment	14.66	20.31	22.51	22.37	20.86	20.30	18.04	16.16	15.45	16.42	17.66
Foreign	Advance / Asset	32.64	44.86	38.51	42.99	42.23	43.38	44.83	44.39	48.87	48.94	45.44
	Investment/ Asset	19.96	28.15	34.37	35.80	35.12	31.31	35.05	30.51	27.59	26.28	25.71
	SLR* Investment/ Investment	71.32	77.40	65.21	63.77	65.77	38.66	75.89	78.92	80.54	78.20	78.80
	NSLR** Investment/ Investment	28.68	22.60	34.79	36.23	34.23	61.34	24.11	21.08	19.46	21.80	21.20
Private	Advance / Asset	41.48	43.73	41.23	40.82	41.66	43.50	46.66	46.39	51.75	54.75	55.64
	Investment/ Asset	26.29	32.80	35.09	37.19	37.97	36.97	36.13	36.89	32.64	31.59	28.80
	SLR* Investment/ investment	97.34	69.51	64.88	65.07	62.79	57.20	69.04	71.54	69.67	71.96	74.49
	NSLR** Investment/ Investment	2.66	30.49	35.12	34.93	37.21	42.80	30.96	28.46	30.33	28.04	25.51
All CBs	Advance / Asset	43.88	40.81	38.88	39.94	40.59	42.05	43.57	43.73	48.87	54.45	57.20
	Investment/ Asset	24.01	34.20	35.72	37.27	37.99	38.30	40.85	40.65	36.84	31.10	27.45
	SLR* Investment/ investment	85.27	78.54	75.19	75.09	76.11	73.47	79.62	81.51	81.97	80.83	80.30
	NSLR** Investment/ Investment	14.73	21.46	24.81	24.91	23.89	26.53	20.38	18.49	18.03	19.17	19.70

Source: Statistical Tables Relating to Banks in India, Various Years.

Note: Balance sheet assets are cash in hand, balances with the central bank, assets with the banking system in various forms such as money at call and short notice and balances with banks both in India and abroad, investments (both SLR and NSLR), loans and advances, fixed assets and other assets.

*SLR security is the aggregate of government securities and other approved securities. **NSLR security comprises of shares, bonds and debentures issued by the corporate sector, subsidiaries and joint ventures both in India and abroad, security issued by the foreign government and others both in India and abroad.

Table 2.6: Growth Rate of Credit, Investment (including SLR and NSLR) and Asset

Bank Group	Items (Growth rates in %)	1997-98 to 2001-02	2003-04 to 2006-07	1997-98 to 2006-07
PSBs	Advances	15	24	18
	Investment	17	4	13
	SLR investment	17	4	13
	Non SLR investment	17	4	9
	Asset	14	16	14
Foreign	Advances	14	22	16
	Investment	16	14	12
	SLR investment	2	14	14
	Non SLR investment	36	11	6
	Asset	14	21	14
Private	Advances	28	28	28
	Investment	32	17	23
	SLR investment	27	18	24
	Non SLR investment	39	13	20
	Asset	28	23	24
All CBs	Advances	17	25	19
	Investment	19	7	14
	SLR investment	18	7	15
	Non SLR investment	23	7	11
	Asset	16	17	16

Source: Statistical Tables Relating to Banks in India (Various Years), Own Calculation

Table 2.7: Bank Group-wise Credit Deposit Ratio (in %)

Bank Group	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
SBI Group	75.03	56.20	49.45	50.35	48.18	46.88	48.39	50.94	56.31	68.5	76.2
Nationalised	56.84	45.33	45.24	46.38	48.28	51.17	52.32	51.92	61.27	68.0	70.4
Private	52.49	50.99	49.38	49.04	49.80	68.71	66.55	63.64	70.48	73.0	75.1
Foreign	59.90	68.32	62.18	72.21	72.64	75.39	75.27	75.87	87.07	85.8	83.8
All CBs*	62.16	50.07	47.65	48.89	49.45	53.19	54.53	54.86	62.69	70.1	73.5

Source: Statistical Tables Relating to Banks in India, Various Years. *Including RRBs

Table 2.8: Bank Group-wise Investment Deposit Ratio (in %)

Bank Group	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
SBI Group	34.43	41.88	43.40	47.26	50.26	52.86	57.12	57.24	51.56	41.4	33.4
Nationalised	33.59	43.11	43.50	44.13	43.29	43.46	46.82	47.60	45.69	37.9	33.3
Private	33.27	38.25	42.03	44.69	45.39	58.40	51.53	50.20	44.45	42.1	38.9
Foreign	36.63	42.87	55.50	60.14	60.42	54.40	58.86	52.14	49.15	46.1	47.4
All CBs*	33.32	41.63	43.39	45.22	45.79	47.91	51.13	50.92	47.26	40.0	35.3

Source: Statistical Tables Relating to Banks in India, Various Years. *Including RRBs

The major head of banks' expenditure is the interest expenditure (Table 2.9). This is because every commercial bank mobilises resources in the form of deposit and borrowing at certain costs for running their business. The interest expended on such deposits and borrowings depends on a variety of factors such as the structure of the financial system—bank based or market based, banking market structure, availability of alternative saving instruments in the hands of savers other than bank deposits etc. Between deposits and borrowings, the former is the major source of funds of the commercial banks except for the foreign banks to some extent (see Table 2.12). For example, for PSBs, more than 80 percent of liabilities are in the form of deposits since 1998, for private sector banks the same is more than 70 percent and for foreign banks the figure lies somewhere in the range of 55-60 percent. The share of borrowings in total liability is meager for PSBs (less than 5 percent after 1998) whereas for the private sector (around 10 percent) and foreign banks (15-27 percent) the same is in significant proportion. Thus, the deregulation of interest rates on deposits has facilitated the reduction in cost of deposits and cost of fund respectively (Table 2.10 and 2.11).

Table 2.9: Interest and Non-Interest Expenditure of Commercial Banks (in %)

Bank Group	Items of Expenditure	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Public	Interest Expenditure	71.32	69.93	70.05	71.14	68.77	72.35	70.74	67.02	65.30	66.09	70.52
	Operating Expenses	28.68	30.07	29.95	28.86	31.23	27.65	29.26	32.98	34.70	33.91	29.48
	Total Expenses*	100	100	100	100	100	100	100	100	100	100	100
Private	Interest Expenditure	63.39	77.36	78.58	77.98	77.77	76.03	85.14	82.37	65.29	64.11	68.22
	Operating Expenses	36.61	22.64	21.42	22.02	22.23	23.97	14.86	17.63	34.71	35.89	31.78
	Total Expenses*	100	100	100	100	100	100	100	100	100	100	100
Foreign	Interest Expenditure	63.86	68.62	66.84	65.83	64.96	64.08	46.36	36.56	47.88	46.80	49.59
	Operating Expenses	36.14	31.38	33.16	34.17	35.04	35.92	53.64	63.44	52.12	53.20	50.41
	Total Expenses*	100	100	100	100	100	100	100	100	100	100	100

Source: Statistical Tables Relating to Banks in India, Various Years.
*Excluding provisions and contingencies.

The noticeable point in Table 2.10 is that the cost of deposit is lowest for foreign banks (except for 1998 and 1999). The private sector and the PSBs have the higher cost of deposits compared to their foreign counterpart. Nonetheless, between private sector and PSBs, the former has higher cost of deposits than the latter (since 1998) except for the years 2002 to 2006. Moreover, Table 2.11 shows that the (median) private sector banks' cost of fund is always higher than that of the PSBs. This reflects the competitive pricing of deposits (since deposit is the major source of funds) by private sector banks so as to compete mainly with the PSBs that are well established in the market with extensive branch network and most importantly to compensate the depositors for the higher risk of depositing money in private sector banks which do not assure sovereign guarantees. The competitive pricing of deposit is not true for foreign banks because of their relatively less

reliance on deposits and more on borrowings vis-a-vis the other bank groups (Table 2.10). Similar pattern is observed in the cost of fund as well (Table 2.11).

Table 2.10: Cost of Deposit of Commercial Banks (in %)

Bank Group	1995	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	6.43	7.13	7.16	7.13	6.79	6.77	6.17	5.07	4.36	4.32	4.47
Private	5.98	7.93	8.40	7.14	7.14	6.63	6.02	4.65	3.84	3.87	4.77
Foreign	5.79	7.78	8.57	7.09	6.18	5.83	5.12	3.61	3.00	2.79	3.16
All CBs	6.36	7.26	7.38	7.13	6.80	6.70	6.09	4.93	4.21	4.15	4.46

Source: Statistical Tables Relating to Banks in India, Various Years.
Note: Cost of deposit is the interest expended on deposits.

Table 2.11 Cost of Fund of Commercial Banks (in %)

Bank Group	Statistic	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	Median	7.86	7.95	7.49	7.30	6.46	5.43	4.65	4.61	5.02
	Minimum	7.04	5.35	6.56	6.04	5.41	3.82	0.62	1.58	2.68
	Maximum	9.16	9.88	9.98	8.00	6.98	6.07	5.06	5.01	5.74
Private	Median	9.21	8.54	8.52	8.00	6.99	5.73	4.81	4.81	5.33
	Minimum	7.02	5.31	5.46	2.91	3.25	1.48	1.15	3.55	4.21
	Maximum	12.72	10.08	9.83	9.25	8.72	8.02	7.02	5.98	6.77
Foreign	Median	9.30	8.47	8.02	6.64	5.58	3.91	3.20	4.01	4.32
	Minimum	0.20	1.17	1.36	1.50	0.26	1.04	0.99	1.70	1.11
	Maximum	15.09	12.99	17.96	14.96	9.67	8.98	10.27	12.68	7.63
All CBs	Median	8.63	8.11	7.80	7.36	6.38	5.27	4.52	4.61	5.00
	Minimum	0.20	1.17	1.36	1.50	0.26	1.04	0.62	1.58	1.11
	Maximum	15.09	12.99	17.96	14.96	9.67	8.98	10.27	12.68	7.63

Source: Statistical Tables Relating to Banks in India, Various Years
Note: Cost of fund is the interest expended on deposits and borrowings.

Table 2.12: Composition of Liability of Commercial Banks (in %)

Bank Group	Items of Liability	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	Deposit	71.27	81.91	82.67	82.76	83.45	83.82	83.98	83.38	80.94	80.53	81.73
	Borrowing	8.11	2.14	2.38	2.19	1.95	1.78	1.75	2.09	5.24	5.72	4.99
	Capital, Reserves & surplus, Others	20.62	15.95	14.94	15.06	14.60	14.40	14.27	14.53	13.82	13.75	13.28
	Total Liability	100	100	100	100	100	100	100	100	100	100	100
Private	Deposit	79.02	85.76	83.50	83.23	83.65	63.30	70.11	73.12	73.07	74.95	74.05
	Borrowing	3.83	2.57	5.33	5.16	5.21	21.24	13.96	10.99	10.39	8.66	9.41
	Capital, Reserves & surplus, Others	17.15	11.67	11.17	11.61	11.14	15.46	15.93	15.89	16.55	16.39	16.54
	Total Liability	100	100	100	100	100	100	100	100	100	100	100
Foreign	Deposit	54.50	65.67	61.93	59.53	58.13	57.55	59.55	58.79	56.30	56.92	54.24
	Borrowing	14.85	15.09	21.35	22.74	26.34	26.54	19.68	18.34	20.17	19.27	18.33
	Capital, Reserves & surplus, Others	30.65	19.24	16.72	17.73	15.53	15.91	20.77	22.87	23.52	23.81	27.43
	Total Liability	100	100	100	100	100	100	100	100	100	100	100

Source: Statistical Tables Relating to Banks in India, Various Years.

Operating/intermediation cost, which includes all the non-interest expenditures including payment and provision for employees, is the other component of banks' expenditure. The composition of expenditure i.e. interest and non-interest expenditure varies across bank groups. Interest expenditure as percentage of total expenditure, excluding provisions and contingencies, is highest (since 1998) for private sector banks— constituting 77.36 percent in 1998 and 85.14 percent in 2003—except for the year 2006

(64.11 percent) and 2007 (68.22 percent) (see Table 2.9). This reflects their greater reliance on deposits and borrowings rather than own funds on the one hand, and higher deposit rate on the other. Public sector banks' interest expenditure as percentage of total expenditure has been around 70 percent throughout the period under consideration. The differences in the composition of expenditure across bank groups represent differences in wage, marketing publicity and advertising activities, technology intensity among others. However, for foreign banks the interest expenditure is relatively less among the bank groups, instead their operating expenditure[28] is highest. Further, the latter constitutes the dominant head of expenditure for foreign banks in the recent years i.e. more than half of the total expenditure since 2003 (Table 2.9). This is because of higher payment and provision for employees, expenditure on publicity and advertising and higher technology intensity among others. Operating/intermediation cost as percentage of total asset is also higher for foreign banks followed by the PSBs and the same is lowest for the private sector banks since 1998, except for the last two years (2006 and 2007). In 2006 and 2007 operating cost as percentage of asset has been minimum for the public sector bank group (Table 2.13). The lower operating cost, as percentage of total asset is indicative of the fact that the private sector banks are able to generate more assets with less operating cost and hence, relatively efficient in use of physical inputs and resources, irrespective of their interest expenses and the cost of funds.

Table 2.13: Operating Cost of Commercial Banks (% of Asset)

Bank Group	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	2.31	2.66	2.65	2.52	2.72	2.29	2.25	2.20	2.06	2.05	1.77
Private	3.06	2.13	2.06	1.85	1.87	1.45	1.10	1.02	2.01	2.11	2.06
Foreign	3.23	2.96	3.37	3.12	3.06	3.03	5.04	5.44	2.86	2.94	2.78
All CBs	2.38	2.63	2.65	2.48	2.64	2.19	2.24	2.20	2.10	2.12	1.91

Source: Statistical Tables Relating to Banks in India, Various Years

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[28] Operating expenditure includes all non-interest expenditure (e.g. payments and provisions for employees, advertising and publicity, printing and stationary and so on) excluding provisions and contingencies.

However, the question could be put forth is that whether the reductions in cost of deposits and cost of funds are accompanied by a lower lending rate?[29] Firstly, foreign banks have been mobilising deposits at lower cost. The cost of funds (in terms of median) of the foreign banks is also lowest. Nonetheless, the lower cost of deposits or funds has not been reflected in the lending rate and these banks are continuing to charge higher rate. This is evident from the higher net interest margin or spread, (Table 2.14) and the interest earned from lending activities (defined as interest earned on advances and discount of bills as percentage of advances and bills purchased and discounted) of foreign banks (Table 2.15). The spread of the foreign banks continues to be well above 3 percent (2.45 percent in 1991). One of the reasons for this is that these banks are charging higher rates to compensate for the higher operating cost that they are incurring. In the case of private sector bank group, though the net interest margin is lowest (since 1998), it does not mean that there is transfer of benefits to the borrowers. The lower interest margin has been primarily due to relatively higher cost of funds and cost of deposits. However, lending rate continues to be higher (Table 2.15) in relation to PSBs (and also the foreign banks in 2004 and 2005). Lower net interest margin of the private sector group could also be the result of deploying funds for non-interest earning ventures. Incidentally, for the period 2002-2006, the cost of deposit of the private sector group was lower than the PSBs (Table 2.10). However, the interest earned from lending was well above the PSBs. Furthermore, the spread was consistently on the rise for the same period (1.58 percent in 2002 to 2.40 percent in 2006) and thereafter (2.45 percent in 2007). Therefore, it could be inferred that the private sector banks preferred to have a higher spread to catch up with the industry standard rather than transferring benefits to the borrowers.

The PSBs are mostly intermediate group in terms of cost of fund. The net interest margin is also stable which implies that these banks have reduced the lending rate by (almost) the same proportion as the reduction in deposit rate since there is pressure from the major owner, the government, to reduce the lending interest rate in view of different macroeconomic developments by providing cheaper credit to various sectors of the

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[29] Since different interest rates are charged on loans of different maturities, therefore, lending rate has been approximated by interest earned from lending i.e. interest earned on advances as percent of total advances.

economy and also for fulfilling the growth and social objectives. While across the bank groups, the costs of deposits and funds have come down but the same is unevenly reflected in the lending rate particularly in the case of private and foreign banks for a variety of reasons e.g. mobilising deposits at higher rates, higher operating/intermediation cost. These banks also try to maintain a higher interest spread to earn surplus resources in order to meet the regulatory requirements by generating more reserve funds. Further, unlike the PSBs, there is no compulsion on the part of the other banks groups to transfer the benefits of lower cost of funds to the borrower in the form of lower lending rate even in extreme macroeconomic developments, so long as the lending rates conforms to the guidelines of the RBI. Thus, despite lower cost of funds, private and foreign banks have not been offering (relatively) lower lending rates to the borrowers since the lending rates are completely left to the individual judgment of the concerned banks.

Table 2.14: Net Interest Margin or Spread of Commercial Banks (% of total Asset)

Bank Group	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	1.68	2.91	2.81	2.70	2.84	2.73	2.91	2.97	2.91	2.85	2.65
Private	2.50	2.44	2.09	2.13	2.33	1.58	1.96	2.18	2.32	2.40	2.45
Foreign	2.45	3.92	3.47	3.85	3.64	3.25	3.36	3.46	3.34	3.58	3.74
All CBs	1.75	2.95	2.78	2.72	2.84	2.57	2.77	2.86	2.83	2.81	2.69

Source: Statistical Tables Relating to Banks in India, Various Years
Note: Net interest margin or spread is equal to interest earned minus interest expended.

Table 2.15: Interest Earned from Lending Activities of Commercial Banks (in %)

Bank Group	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	16.65	11.39	11.12	10.57	10.37	9.56	8.96	7.89	6.93	7.10	7.68
Private	18.79	13.07	12.41	10.82	10.62	6.93	10.08	8.85	7.53	7.44	8.38
Foreign	25.01	14.55	14.92	11.96	11.99	10.96	10.34	8.34	7.35	7.56	8.66
All CBs	17.03	11.86	11.57	10.72	10.54	9.19	9.26	8.11	7.07	7.20	7.89

Source: Statistical Tables Relating to Banks in India, Various Years

Next parameter to look at is the sources of income of the banks. There are two major sources of commercial banks' income namely interest income and non-interest income. Interest income includes interest on advances (and discount on bills),

investments, balances with RBI and other inter-bank funds and others. Non-interest income includes income accruing from OBS, commission, exchange and brokerage; net-profit or loss on sale of investments, revaluation of investments; net profit or loss on sells of assets e.g. land and other assets; net profit or loss on exchange transactions and the miscellaneous. The composition of income reveals an interesting pattern (Table 2.16). Interest is the major source of income for the PSBs (88.25 percent in 1998 and 88.96 percent in 2007) in comparison to the private sector (83.42 percent in 1998 and 82.14 percent in 2007) and particularly the foreign banks (77.99 percent in 1998 and 72.20 percent in 2007). The non-interest income source is well exploited by the foreign and to some extent by the private sector banks. This is also evident from Chart 10 (in Appendix), which shows the burden i.e. how the non-interest expenditure is met through non-interest income. Foreign and private sector bank groups are having the lowest burden. This means that these two bank groups have been earning higher non-interest income, which meets almost all the non-interest expenditure. In fact, in 2002, 2003 and 2004 non-interest income was more than their non-interest expenditure for private sector bank group. The same was the case for foreign banks in 2004. The PSBs are yet to develop their competence in these lines so as to explore the other (non-interest) sources of income. The immediate problem before the PSBs is the non-availability of buffer capital to play with the risk of undertaking non-interest earning activities.

Table 2.16: Interest and Non-Interest Income of Commercial Banks (in %)

Bank Group	Interest Income										
	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	90.45	87.25	88.09	87.41	87.91	85.90	83.44	79.57	83.38	86.29	88.96
Private	89.85	83.42	87.34	83.85	87.35	79.49	77.12	77.04	80.49	81.32	82.14
Foreign	82.85	77.99	80.84	79.16	79.03	74.85	74.50	69.10	70.36	69.59	72.20
All CBs	89.98	85.89	87.30	86.24	87.03	84.07	81.66	78.38	81.99	83.98	85.91
Bank Group	Non-interest Income										
	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	9.55	12.75	11.91	12.59	12.09	14.10	16.56	20.43	16.62	13.71	11.04
Private	10.15	16.58	12.66	16.15	12.65	20.51	22.88	22.96	19.51	18.68	17.86
Foreign	17.42	22.01	19.16	20.84	20.97	25.15	25.50	30.90	29.64	30.41	27.80
All CBs	10.02	14.11	12.70	13.76	12.97	15.93	18.34	21.62	18.01	16.02	14.09

Source: Statistical Tables Relating to Banks in India, Various Years

Banks' performance in any particular line of business is judged by the returns they get from that particular business. Therefore, one can look at the returns on advances and investments in general for judging the performances of different bank groups in these lines—since advances and investments are the major assets of banks, (see Table 2.5)—and the returns on assets in particular. Returns on advances and investments are measured in terms of percentage returns on advances and investments respectively. On the other hand, return on asset measures the percentage return on total assets after meeting all the expenses including provisions and contingencies.

The return on advances measured in terms of interest earned was traditionally higher than return on investments. This is because banks were having little choice of investing in high yield securities, as there were large statutory preemptions and the rate offered by the government was artificially low. However, the divergence between the two started narrowing down in the early 1990s, when interest rates on government securities were freed. By now, the rate of return on investments has almost converged with that of advances (Table 2.17 and 2.18) as a result of allowing greater flexibility in the advances and investment portfolio since the mid-1990s. Banks use this flexibility to maximise returns.

The median banks' returns on advances and investments have been on the downward trend (Table 2.17 and 2.18). The trend in the return on advances is indicative of increased competition in the pricing of loans on the one hand and the reflection of the reduction in the cost of funds on the other. However, the return on advances of private sector banks (and foreign banks except some years) continues to be higher than the PSBs reiterating the fact that these banks are charging higher rates to their borrowers. On the other hand, the trend in the return on investment is mostly an outcome of the market forces. The reduction in the cost of fund has also enabled banks to invest at a lower return or on low yielding instruments. The noteworthy development is the downward trend in the cost of funds, facilitated partly by deposit rate deregulation, across all the bank groups. The median cost of funds for public sector bank group was 7.86 percent in 1998-1999, which gradually came down to 4.61 percent in 2005-06 before slightly rising to

5.02 percent in 2006-07. For the private sector bank, the median cost of funds was 9.21 percent in 1998-99, continuously on the downward direction to touch 4.81 percent in 2005-06, which rose slightly to 5.33 percent in 2006-07. Similar trend can be observed for the foreign bank group too. The point to be underscored here is that there are considerable differences in the cost of funds across the bank groups. As presented in the Table 2.11, throughout the period, the cost of funds of the public, private and foreign bank groups have been at different levels i.e. cost of funds of the median private sector bank is higher than that of the median public sector and the foreign bank. The explanation for the phenomenon lies in the fact that there has been new entry of banks entirely in the private sector (and also some in the foreign category). These new banks, particularly the private sector banks, while mobilising funds have been following the strategy of paying higher deposit rates for attracting depositors and to compensate for the fact that (i) they are new in the market and (ii) they have limited branch network unlike the PSBs, which already have an extensive branch network. The reductions in return on advances and investments are an industry level phenomenon and not the case of a particular bank or bank group. It is rather an outcome of market forces and the competitive environment facilitated by various reform measures.

The most comprehensive measure of the overall bank performance is the return on assets. The median banks' ROA for the PSBs was below 0.75 percent before 2001-02 (0.16 percent in 1991), which improved (a little) over one percent mark in 2002-03 (1.01 percent) and 2003-04 (1.20 percent) and in later period, the same remained below one percent (Table 2.19). For the private sector banks the median banks' ROA is somewhat erratic, 0.34 percent in 1991, at close to one percent except the last couple of years. For foreign banks the median ROA was close to one percent prior to 2002-03, which improved over one percent in the subsequent years.

However, there are serious reservations in the return on asset front. A careful look at the minimum values of the ROA (Table 2.19) across the bank groups reveals that for all the years under consideration, the minimum return on asset of both private sector and foreign banks are negative. This means that there are loss-making banks in each year

under consideration in both private and foreign categories. This is a phenomenon having serious implication for the simple reason that to cover such losses these banks might have to deplete capital or issue new debt, thereby posing the threat of instability in the banking system at large. In the PSBs, the situation has improved considerably. There were a few loss-making PSBs prior to 2001-02 and henceforth no loss-making PSBs except for the year 2004-05.

The median, minimum and maximum values of the ROA across the bank group convince that there exists considerable disparity among banks in the cost minimisation and risk management front. A comparison of mean return on asset of a bank group with that of median, particularly the private and the foreign banks, also tells the same story (Chart 4-7 in Appendix). The mean ROA has improved over one percent in the post 2003 scenario, nevertheless, the median ROA has actually remained lower than mean implying that well performers are only a few, and majority of banks are not able to improve their ROA significantly, though the spread[30] is positive at close to two to three percent level (Table 2.14). Thus, there is considerable disparity among banks in the cost minimisation and risk management fronts. There has been decline in the (equity) capital asset ratio over the years (Chart 2, in Appendix). However, as seen above, there is significant improvement in the capital adequacy ratio well above the regulatory minimum of nine percent (Chart 3, in Appendix).[31] The former development needs to be addressed in a concerted way in order to maintain long-term health of the banking system because capital has a dampening effect on risk-taking behaviour and moral hazard.

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[30] The spread has improved across all the bank groups in comparison to what it was in 1991 except for the private sector banks (Table 2.14). High spread is attributed to the deregulation of interest rate among others, which has enabled banks to set their prime-lending rate taking into account their cost of funds and also the competitive strategies.

[31] Equity capital is the major component of *Tire I* capital. There regulatory stipulation is such that *Tire II* capital must not exceed hundred percent of *Tire I* capital.

Table 2.17: Return on Investment of Commercial Banks (in %)

Bank Group	Statistic	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	Median	11.81	11.87	11.54	11.06	10.19	9.30	8.39	8.05	8.03
	Minimum	10.55	6.52	10.22	9.52	8.59	7.24	1.58	3.35	3.91
	Maximum	14.01	15.74	13.64	11.96	11.25	10.35	9.70	9.49	9.03
Private	Median	12.52	12.23	11.88	11.00	9.87	8.38	7.35	7.24	7.17
	Minimum	10.33	9.59	8.82	5.60	6.26	2.50	1.58	5.40	6.04
	Maximum	14.30	14.64	14.88	13.82	12.34	13.22	10.59	9.91	9.38
Foreign	Median	11.65	11.45	10.68	10.39	8.79	7.51	6.82	6.98	6.98
	Minimum	0.15	7.39	2.58	5.16	1.38	0.60	3.59	4.34	4.53
	Maximum	22.77	18.25	21.30	18.72	14.76	13.64	11.43	15.93	14.23
All CBs	Median	11.89	11.77	11.50	10.89	9.84	8.58	7.75	7.66	7.49
	Minimum	0.15	6.52	2.58	5.16	1.38	0.60	1.58	3.35	3.91
	Maximum	22.77	18.25	21.30	18.72	14.76	13.64	11.43	15.93	14.23

Source: Statistical Tables Relating to Banks in India, Various Years

Table 2.18: Return on Advances of Commercial Banks (in %)

Bank Group	Statistic	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	Median	12.36	11.85	11.44	10.73	10.03	8.82	8.08	8.06	8.77
	Minimum	10.87	8.40	10.53	9.39	8.69	7.48	4.81	7.31	8.20
	Maximum	14.42	14.99	12.52	11.99	11.54	10.28	9.81	8.98	9.90
Private	Median	13.68	12.80	12.29	11.28	10.64	9.73	8.87	8.74	9.86
	Minimum	11.03	10.16	9.41	2.85	7.72	7.52	3.04	6.92	6.33
	Maximum	19.30	16.18	15.14	14.01	14.43	14.11	14.30	13.28	11.62
Foreign	Median	14.59	12.78	12.90	10.88	9.56	8.03	7.25	7.18	9.20
	Minimum	1.74	5.16	8.01	1.50	3.66	4.88	0.09	0.03	5.82
	Maximum	28.44	22.63	18.89	103.83	23.80	21.79	23.62	19.77	34.66
All CBs	Median	13.38	12.40	11.93	10.86	10.14	8.84	8.04	8.15	9.17
	Minimum	1.74	5.16	8.01	1.50	3.66	4.88	0.09	0.03	5.82
	Maximum	28.44	22.63	18.89	23.25	23.80	21.79	23.62	19.77	34.66

Source: Statistical Tables Relating to Banks in India, Various Years

Table 2.19: Return on Assets of Commercial Banks (in %)

Bank Group	Statistic	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	Median	0.16	0.83	0.54	0.59	0.43	0.75	1.01	1.20	0.90	0.75	0.80
	Minimum	0.00	-1.55	-3.63	-1.81	-1.49	0.06	0.03	0.06	-0.45	0.16	0.42
	Maximum	0.67	2.44	1.28	1.39	1.33	1.34	1.76	1.73	1.59	1.32	1.35
Private	Median	0.34	1.00	0.77	0.84	0.72	0.87	0.98	1.07	0.43	0.57	0.85
	Minimum	0.00	-2.58	-2.32	-0.54	-6.50	-2.27	-3.56	-11.28	-3.50	-4.80	-18.87
	Maximum	0.94	2.23	1.89	1.90	1.70	2.12	2.02	3.68	1.47	1.66	1.49
Foreign	Median	1.15	1.10	0.81	0.92	0.80	0.86	0.75	1.32	1.11	1.04	1.52
	Minimum	0.34	-25.41	-14.41	-11.37	-24.38	-33.38	-12.93	-13.71	-7.69	-1.72	-1.73
	Maximum	2.73	5.90	6.69	4.87	7.57	4.08	3.95	6.96	4.53	6.49	9.36
All CBs	Median	0.25	0.98	0.73	0.75	0.66	0.81	0.99	1.20	0.86	0.86	0.94
	Minimum	0.00	-25.41	-14.41	-11.37	-24.38	-33.38	-12.93	-13.71	-7.69	-4.80	-18.87
	Maximum	2.73	5.90	6.69	4.87	7.57	4.08	3.95	6.96	4.53	6.49	9.36

Source: Statistical Tables Relating to Banks in India, Various Years

Note: Return on asset is the net profit after meeting all expenses including the provisions and contingencies scaled by total assets.

Table 2.20: Business per Employee of Commercial Banks (Rs. Crore)

Bank Group	1998	1999	2000	2001	2003	2004	2005	2006	2007
PSBs	1.01	1.07	1.26	1.62	2.16	2.56	3.06	3.67	4.71
Private	1.68	2.06	2.69	3.28	4.85	5.69	5.75	6.71	6.94
Foreign	5.45	4.96	5.82	7.72	10.31	12.73	9.88	9.54	9.95
All CBs	1.12	1.20	1.43	1.84	2.51	2.99	3.48	4.20	5.22

Source: Statistical Tables Relating to Banks in India, Various Years
Note: Business is equal to deposit plus advances.

The disparity among bank groups is also reflected in the indicators of productivity such as business per-employee. The business per employee is lowest for the PSBs and highest for the foreign banks whereas the private sector banks are the intermediate group in this measure (Table 2.20). The point to be kept in mind in making such a comparison is that the measure can be influenced by the transaction size. The transaction size of the

PSBs is lower because of accepting small deposits and also offering small borrower accounts, whereas most of the foreign and also the private sector banks deal relatively largely with premium corporate and high net worth individuals, therefore their business per employee is higher. It is necessary to ensure that the private and foreign banks also deal with small customers. However, the lower business per employee of PSBs is despite the lower number of employees per office (Table 2.21). On the contrary, higher business per employee of the foreign banks is despite the higher number of employees per office. Therefore, it is misleading to say that lower number of foreign bank branches is unimportant in the system. These banks with lower number of branches are able to do more business by employing more people per offices along with the application of modern banking technologies. As we have seen earlier, the technology intensiveness is evident from the number of ATMs per bank branch and the ratio of off-site ATMs to on-site ATMs (Table 4, in Appendix).

Table 2.21: Number of Employees, Offices and Employees per Office of Commercial Banks

Description	Bank Group	1998	1999	2000	2001	2003	2004	2005	2006	2007
No of Employees	PSBs	785826	872052	861954	785826	752860	727817	748710	744333	729172
	Private	62438	62844	63069	62438	71071	77099	92618	110505	139285
	Foreign	13232	15505	14602	13232	11785	11053	16386	22117	27850
	All CBs	861496	950401	939625	861496	835716	815969	857714	876955	896307
No of Offices	PSBs	46523	47032	47447	47643	47923	48242	48974	49817	51392
	Private	4911	5103	5207	5381	5589	5943	6321	6813	7363
	Foreign	196	192	193	205	212	224	245	263	276
	All CBs	51630	52327	52847	53229	53724	54409	55540	56893	59031
Employees Per Office (Branch)	PSBs	17	19	18	16	16	15	15	15	14
	Private	13	12	12	12	13	13	15	16	19
	Foreign	68	81	76	65	56	49	67	84	101
	All CBs	17	18	18	16	16	15	15	15	15

Source: Statistical Tables Relating to Banks in India, Various Years

2.7 Conclusion

It is observed that the reform measures have direct or indirect bearing on banking market structure, bank's conduct, performance and risk exposures because of the fact that the reform has been influential enough to alter the degree of competition, the level of diversification of activities in banks alongside the changes in the institutional factors such as regulation and ownership. While the elimination of preemptions and restrictions and institutional development enables banks to perform better by exercising flexibility in their operations, the policy changes also exposes the industry to market induced vulnerabilities. In addition, depending upon the risk management practices, ownership, size and the level of capitalisation etc. different banks are likely to experience different risk levels in the changing environment and prudential regulation can have differential effect.

Nevertheless, there have been mixed responses to various enabling and strengthening measures in the banking sector. There has been increasing dynamism and deepening of the banking sector with improvements in capital adequacy ratio, better management of non-performing assets, rising credit-deposit ratio and also a higher profitability at the industry level. However, at the same time, the industry has experienced disparity in its conduct and performance parameters of cost, earnings and profitability. For instance, it is observed that diversification (a form of conduct) is not uniform across banks. The cost, earning, and profitability parameters also show similar disparities. The deregulation of interest rates has facilitated reduction in cost of deposits and cost of funds respectively. However, cost of deposits and cost of funds are higher in the case of private sector banks vis-a-vis the remaining two categories of banks, which is indicative of competitive pricing of deposits by the private sector banks. The competitive pricing is not observed in case of foreign banks because of their less reliance on deposits. Nevertheless, operating cost (as percentage of total assets) is less for private sector banks indicating higher asset generation capacity per unit of such costs. While the cost of deposits and funds has come down, the same is unevenly translated in the form of lower lending rates particularly in the case of private sector and foreign banks. The difference in banks' conduct is reflected in the sources of income as well. The foreign and the

private sector banks have explored the non-interest sources of income to a greater extent, albeit not (to an equal extent) by all banks in these two groups.

As a result of the reform, the divergence between return on advances and return on investments has (narrowed down) almost converged. The downward trend in return on advances is also indicative of increased competition in the pricing of loans among others. In addition, although the average ROA of different bank groups has improved, there exists considerable disparity among banks in the same parameter particularly in the case of private sector and foreign banks. This is indicative of the fact that there is significant disparity among banks in the cost minimisation and risk management front. Therefore, the study of risk behaviour of commercial assumes greater significance in the changing environment, which is expected to identify the risk-inducing and risk-mitigating factors. It is also observed that lesser number of foreign bank branches in India is not unimportant in the system as these banks are showing better performance in indicators like the business per employee among other aspects. Finally, it could be indicated that the disparities observed in the cost, earning and profitability indicators should not increase over time for maintaining the structure and healthiness of the banking system.

As the reform has been influential enough to alter the degree of competition, the level of diversification of activities in banks alongside the changes in the institutional factors such as regulation and ownership, the next chapter reviews the existing literature that explains the channels through which these factors can affect banks' risk and formulates some testable hypotheses.

Chapter 3
Review of Literature

3.1 Introduction

Historically, understanding the role performed by the commercial banks in the economy has had its roots in macroeconomic theory. Commercial banks are central to a macro economy as they act as financial intermediaries between savers and investors (Keynes, 1930). Banks provide financial services necessary for consumers and enterprises to undertake their business. Among other things, they provide a means to hold and exchange financial assets. They intermediate savings to productive investments through the supply of credit to business and consumers, and they enable risk sharing. In other words, commercial banks undertake a wide variety of activities, which play a critical role in an economy. They pool and absorb risks for depositors and provide a stable source of investment and working capital funds to various sectors of the economy. In addition, they provide a smooth functioning payment system that allows financial and real resources to flow, relatively freely, to their highest return uses (RBI, 2008).

When a banking system does not work well, there is potential for financial instability. Banks differ from other industries in that its balance sheet consists of short-term deposits on the liability side and long-term assets that can be difficult to liquidate quickly. This leaves the bank vulnerable to runs—a situation in which the bank's depositors attempt to withdraw their funds simultaneously—and hence give rise to liquidity risk, in the absence of deposit insurance or maturity-matching technologies (Northcott, 2004; Bikker and Bos, 2008). In addition, the banking industry also serves as a major conduit through which instability may be transmitted to other sectors in the economy by disrupting the inter-bank lending market and payments mechanism [contagion effect], by reducing credit availability and by freezing deposits (Berger et al., 2008). There are numerous factors to induce risky behaviour among the banks and hence, instability into the banking industry.[32] These factors could be the degree of competition in

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[32] Instability and risk are highly related. The term 'Risk' refers to an event whose occurrence is uncertain and its occurrence has harmful or negative consequences. Financial risk does not have a unique definition

the industry, ownership structure of banks, regulatory practices etc. In order to confront the challenges of risk, different banks could adopt different strategies. For instance, a bank may diversify its portfolio and mitigate shocks when the earning streams are not perfectly correlated to one another.

3.2 Competition and Risk

Competition can be infused into the banking system in a variety of ways. One way is to permit new banks either from inside the country or the alien to operate in the domestic market. The other way of infusing competition is to strengthen the market and institutions under which the banks operate. The latter can mostly be viewed as the facilitating factor and complementary to the former that helps maintaining contestability in the system. Effective competition depends on the contestability and not on the number of banks *per se* (Claessens and Laeven, 2004). Nonetheless, maintaining contestability requires allowing (foreign as well as domestic) bank's entry into the banking industry and reducing activity restriction on banks. However, there are costs and benefits of new bank entry, especially the entry of foreign banks. The benefits include increased competition, efficiency or productivity as these banks are expected to bring better technology and expertise of different kinds. There could also be several downside risks associated with the entry of foreign banks such as cream-skimming, increase in concentration, regulatory and supervisory challenges and the threat of instability in the banking sector among others. The cross-country evidence with regard to the effect of foreign bank's entry on competition, and its costs and benefits is at best mixed (Claessens et al., 1998; Detragiache et al., 2008; Uiboupin, 2004). Apart from the new bank entry, mergers and acquisitions also have bearing on the degree of competition. The Indian banking sector has not remained insulated from the global forces driving mergers and acquisitions across

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and does mean different things to different agents. Risk for banking firm mostly refers to that uncertain event wherein return on the deployment of money in the hands of both financial and real economic agents (or instruments) is uncertain and there is chance of loosing money. In the case of financial firms especially banks the term 'risk' has immense implications because it basically deploys deposit and borrowed money in income generating assets. As banks have to be solvent and maintain the trust of depositors; any loss arising out of risky deployment of funds lowers earnings and profits. Such an event could induce banks to take either action i.e. to deploy funds in ventures where return is high but with high risk so as to satisfy the shareholder or to lower the business, which again reduces earnings. In the process the bank might face the insolvency. Such an outcome is likely to create instability in the whole financial system because of the (contagion effect) interlinkage of banks among themselves and with other financial institutions.

the countries. Mergers and amalgamation of banks in the pre 1999 period were primarily triggered by weak financial conditions of the banks. However, in the post 1999 period, mergers occurred between healthy banks, driven by business and commercial considerations (RBI, 2008).

It has theoretically and empirically been shown that the degree of competition in the banking sector can matter for the access of firms and households to financial services and external financing (Claessens and Laeven, 2005). Traditional industrial organisation (IO) approach treats banks like any other firm and views that competition ensures both allocative and cost efficiency. Thus, a competitive banking industry is characterised by a large number of small banks and the potential benefits are similar to those of competition in other industries. Banks are profit-maximising price-takers such that costs and prices are minimised. The greatest quantity of credit will be supplied at the lowest price. In contrast, market power exists where a bank can profitably charge a price above marginal cost. In this case, a bank may decrease the quantity of credit supplied and charge higher rates. Increased competition is likely to make depositors and borrowers better off as loan rates decrease and deposit rates increase. This will also facilitate the channeling of saving to the real sector, thereby increasing investment and output in the economy. Illustration of the benefits of a competitive banking system such as higher levels of economic activity, capital stock or growth via the medium of interest rate, credit rationing etc. has been provided in Smith (1998), Guzman (2000) etc.

As a first order effect, one would expect increased competition in the banking sector to lead to a lower cost and enhanced efficiency, even allowing for the fact that financial products are heterogeneous (Claessens and Laeven, 2004). However, the view that competition is unambiguously good in banking is more naive than in other industries for market power could moderate risk taking incentives (Vives, 2001) but the important thing to note here is that the relationship between competition and risk behaviour among banks is often ambiguous in the empirical works because of the unobserved effects. The banking industry has undergone significant deregulation worldwide in the last two-

decades or so, giving the leeway for researchers to study the impact of increased competition on a variety of aspects including the risk behaviour.

Under the traditional 'competition-fragility' view, competition among the banks erodes market power, decreases profit margin, and reduces franchise value that encourages banks to take more risk. It has been shown that increased competition induces risk behaviour among the banks for the former reduces banks' franchise value[33] (Keeley, 1990; Hellman et al., 2000; Salas and Saurina, 2003; Jiménez et al., 2007), lowers relationship lending[34] (Petersen and Rajan, 1995), reduces screening and monitoring incentives (Cetorelli and Peretto, 2000; Marquez, 2002; Cordella and Yeyati, 2002) and increases portfolio risk (Shaffer, 1998). Increased competition can also erode the surplus, which the banks can earn either from deposit (Allen and Gale, 2000; Hellman et al., 2000) or loan market (Bolt and Tieman, 2004).

In contrast, under the 'competition-stability' view, banks' market power in the loan market may result in greater risk as higher interest rate charged on borrowers make it more difficult to repay loans and exacerbate moral hazard and adverse selection problems. This stream of literature has emerged recently, which postulates that the risk averting incentives attributed to franchise value may be constrained or even reversed under certain situations (Boyd and Nicoló, 2005). Their model transforms the bank portfolio problem into a contracting problem with moral hazard. As competition declines banks can earn more rents in their loan market by charging higher loan rates. However, the borrowers when confronted with increased funding cost will optimally choose higher risk investment projects and thereby higher bankruptcy risk in their investment projects for the borrowers. This effect is further reinforced by moral hazard on the part of the

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[33] Franchise value is the economic worth of banks' intangible assets and it represents the opportunity cost of going bankrupt. The underlying source of franchise value is assumed to be the market power, accumulation of proprietary information (Besanko and Thakor, 1993) etc. The franchise value theory predicts negative relationship between franchise value and bank risk taking.

[34] Relationship lending is that kind of bank lending where banks lend to borrowers having long tie with the bank in borrowing and repayment transactions. It reduces information asymmetry and overcomes the problem of screening.

borrowers, when they confront with higher interest costs.[35] In sum, borrowers optimally increase their own risk of failure when they confront with higher interest cost in a concentrated banking market. This would lead to more problem loans and defaults and a higher bankruptcy risk for banks. Using a cross sectional sample of the US banks in 2003 and a panel data set of about 2600 banks in 134 non-industrialised countries for 1993-2004, Boyd et al. (2006) have found empirical support for Boyd and De Nicoló (2005) (competition-stability) model and have shown that banks' probability of failure is positively and significantly related to concentration. In another cross-country study of 38 countries for the period 1980-2003, using *H Statistic* measure of competition, Schaeck et al. (2006) also reports that higher degrees of competition in banking systems are associated with increased survival time of banking systems and go hand in hand with a decrease in the probability of systematic banking crises. De Nicoló and Loukoianova (2007) have also provided empirical evidence of a positive relationship between banking market concentration and bank's risk of failure. In fact, the relationship is stronger than the earlier study (Boyd et al., 2006) when ownership is taken into account and it is strongest when state-owned banks have sizeable market shares. In their study, covering 133 non-industrialised countries during the 1993-2004 period, the private domestic banks are found to take on more risk as a result of larger market shares of state-owned (and foreign) banks.

These two sets of findings are not however directly comparable as the sample of banks and countries, period of analysis, econometric methods and risk measures differ in these studies. The study by Keeley (1990), Salas and Saurina (2003) uses Tobin's *Q* (which is low for risky banks and *vice versa*) as the proxy for franchise value, Boyd et al. (2006) uses *Z score*[36] as the measure of risk whereas Schaeck et al. (2006) employs duration analysis and logit model to study the impact of competition on banks' riskiness. Nevertheless, the possibility of two opposite results cannot be ruled out. In addition, it is argued that the correspondence between competition and bank risk is not one to one.

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[35] Stiglitz and Weiss (1981) have also shown that higher interest rate under less competition might raise credit risk of borrower as a result of moral hazard.

[36] *Z score* is an inverse measure of bank risk, which was proposed by Hannan and Hanweck (1988). Z=[Return on Assets +Equity-Asset Ratio]/Standard Deviation of Return on Asset.

Even if market power in the loan market results in riskier loan portfolios, the overall risks of banks need not increase if banks protect their franchise value by increasing their equity capital or adopt other risk mitigating techniques, e.g. sale of loans (Berger et al., 2008). Further, if banking institutions believe that they are too big to fail, or implicitly/explicitly protected by government safety net, it is likely that these institutions engage in more risk taking.

In testing the opposite hypotheses—namely 'competition-fragility' and 'competition-stability'—many of the studies have simply used the Herfindahl index or 'n-bank' concentration ratios as the measure of competition (e.g. Boyd et al., 2006). Nevertheless, keeping in mind the heterogeneity of financial services that a bank offers which may differ from its competitors, it seems reasonable to use pragmatic measures of competition in banking market to determine whether risk behaviour emanates from competition *per se*. The current study employs four alternative measures of competition (in examining the impact of competition on risk behaviour) and therefore tries to be comprehensive so as to avoid generalisation of specific findings and to check for consistency of results.

3.3. Diversification and Risk

Diversification of portfolio has been the strategy of financial firms to lower different kinds of risk. This works when the returns from different portfolios are not perfectly or highly correlated to one another. In case of banks one can think of two distinct kinds of diversification i.e. diversification of banking activities and geographical diversification both are related to its performance and risk (Choi and Kotrozo, 2006).[37] There are however costs and benefits of both kinds of diversification, therefore, the relative strength of the two forces will determine whether diversification really helps in improving financial performance of a bank.

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[37] In practice, two distinct forms of geographical diversification can be observed, for instance, diversification across the domestic locations or across countries by expanding branches or subsidiaries. Geographical diversification can appropriate some or all of the value clients place on location, thereby mitigate or avoid price competition and also produce pro-competitive effects in a concentrated market.

The benefits of diversification include the ability to leverage managerial efficiency across products and geography, economies of scale and scope, maintaining or increasing market share/power and franchise value, lower cost of capital (Choi and Kotrozo, 2006; Baele et al., 2007) etc. The potential for more efficient internal capital markets is another often-cited benefit of diversification. A well-diversified bank—either geographically or activity-wise or both—has an advantage over less diversified banks by possessing the ability to transfer internal cash flows from less efficient operations to areas where its use will be most beneficial to the organisation. Since internal funds are less costly than external capital, those banks that are able to most effectively use such cash flows possess an advantage over those without such an opportunity (Stulz and Shin, 1998). Another benefit associated with activity diversification is the ability to gain economies of scope for the organisation. For instance, a bank that collects credit information on borrowers can use the same information to offer insurance products to these clients at a lower cost because much of the information needed have already been collected when evaluating the loan application (Deng and Elyasiani, 2005). Additional benefits could also accrue in the form of reduced earnings volatility because of spreading operations across areas with different economic environments (Boot and Schmeits, 2000).

On the cost side, it includes the agency cost and increased organisational complexity. The costs associated with a firm's increased complexity may overshadow the benefits of diversification. Managers may pursue diversification to enhance their ability to extract private benefits, even when diversification would lower the market value (Jensen and Meckling, 1976). Further, in more diversified firms, there are more divisional or product managers than would exist in a more focused firm. Each of these managers may have agendas that do not correspond to the objectives of top management or even the stakeholders of the organisation. Even if the organisation's top management team is not subject to such agency risks, it is more difficult for them to monitor divisional or product managers.

There is no clear consensus on the effects of diversification on performance and risk. Banks diversifying into other areas, such as financial services, would reduce

unsystematic risk, but there may not be any effect on systematic risk (Templeton and Serveriens, 1992). In a cross-country study of 43 countries, using Tobin's Q, Laeven and Levine (2007) find a diversification discount in financial conglomerates. The results are consistent with theories that stresses intensified agency problems in financial conglomerates that engage in multiple activities and indicate that economies of scope are not sufficiently large to produce a diversification premium. Number of studies (in the US context) shows that increased reliance on non-interest income raises the volatility of accounting profits without raising average profits (Stiroh and Rumble, 2005; Stiroh, 2006). The ability to diversify portfolio could also differ across banks of different sizes. Demsetz and Strahan (1997) document a positive relation between size and diversification. More importantly, small banks can perform better in some of the areas without having to follow the diversification strategy at large due to better handling of informationally difficult credit (Berger et al., 2005) for its localised operations, therefore risk behaviour of large and small banks might also vary. It is difficult to determine which benefits a bank expects to achieve and which costs might be incurred as a result of diversification. What is possible, however, is to look at the overall impact of diversification. With this background, as there could be threat of instability from multiple sources, the study also looks into the (activity) diversification that banks in India has undertaken in the recent past and its impact on their risk.

3.4 Institutional Factors and Risk

3.4.1 Ownership and Risk
Risk behaviour emanating from ownership structure of a financial firm is well established. Highly leveraged firms have an incentive to engage in risky behaviour. If the gamble works, shareholders benefit; if it does not work, the lenders bear the cost (Jensen and Meckling, 1976). This agency problem is particularly strong for banks. Banks tend to be very highly leveraged; a large share of the debt-holders are depositors who have small claims, are widely dispersed, and may not be well-informed of banks' activities and potential risks; and, the existence of deposit insurance[38] further lessens depositors'

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[38] India is one among those countries to have deposit insurance. The Deposit Insurance and Credit Guarantee Corporation of India (DICGC), a wholly owned subsidiary of Reserve Bank of India, provide this facility.

incentives to monitor, and intensifies the ability and incentives of the shareholders to increase risk (Keeley, 1990). The extent of risk, however, depends on different intermediate factors such as managerial incentives, regulatory restrictions etc. Agency theory has long identified divergence in risk preference between owners and managers as possible source of agency costs. Managers with bank specific human capital skills and private benefits will tend to advocate for less risk taking than shareholders (Jensen and Meckling, 1976; Demsetz and Lehn, 1985). Managers, as agents of the stockholders, may have an incentive to reduce the risk of bank's insolvency below the level desired by the shareholders, since managers, who have the firm and industry specific human capital, have a great deal to lose personally in the event of bank's insolvency (Saunders et al., 1990). As regard to the regulatory interaction, the same regulation can produce dissimilar risk behaviour among banks depending on the comparative power of shareholder in banks' governance structure (Laeven and Levine, 2008). The current study is however limited to the broad classification of public, private and foreign ownership only and do not consider individual bank specific ownership structure. The reason behind doing so is that state owned banks have control over seventy percent of the country's banking assets, which signify the presence of sovereign guarantee in case of any eventuality. The majority shareholder (the government) can also influence decision-making process of PSBs. However, the study does not consider bank specific ownership structure of the remaining banks—whether owned by a few major shareholders or disbursed ones—for maintaining uniformity.

3.4.2 Regulation and Risk

There have been frequent banking crises in the past—more so in the neo-liberal regime—in different countries although with different intensities. To avoid such crises and to ensure financial stability (by safeguarding the financial soundness of banks), banking regulation has been designed throughout.[39] Prominent among the banking

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[39] The so-called most modern regulatory practices so far (Basel norms) have been designed by the Bank for International Settlements (BIS).

regulation includes the capital regulation[40] in the form of minimum capital requirement.[41] The goal of capital regulation is to reduce the risk taking incentives of [bank] owners by forcing them to place more of their own money, in the form of capital, at risk in the bank (Kim and Santomero, 1988). However, capital regulation might not always work because of a countervailing effect. More stringent capital requirement reduces shareholder value, and hence the utility of owners, and to compensate for the same, they might select a riskier investment portfolio (Kohen and Santomero, 1980). The relationship can exist in either of the two ways depending on the banks' ownership structure among others. Thus, it has been an empirical question to explore. Nonetheless, in practice, some banks may have ulterior motive for setting capital targets independently from supervisory rules. Many banks choose a capital level that is substantially higher than the regulatory minimum for purely commercial reasons, e.g. in order to obtain a higher rating as this makes capital market funding cheaper or to avoid downgrading for reputational reasons (Bikker and Bos, 2008). Further, some banks may wish to hold capital buffer that enables them to exploit unexpected investment opportunities (Berger et al., 1999). The positive association between risk exposure and capital levels, even in banks which are not constrained by regulatory capital requirement (i.e. capital in excess of regulatory minimum) reflects the view that risk-taking behaviour tends to be constrained by bank owners' and/or managers' private incentives rather than the regulation *per se* (Shrieves and Dahl, 1992).

3.5 Analytical Framework of the Study

It is observed that the literature on banks' risk is diverse; nevertheless, the context of these studies is different. However, in Indian context, there is dearth of study with regards to the risk behaviour of commercial banks in the context of the banking sector reform, although there are studies on the interrelationship between banks' risk and productivity (Das, 2002) with partial coverage and narrow quantification of risk. Hence,

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[40] The use of simple capital ratios in banking regulation is an ineffective means to bound the insolvency risk of banks. As a solution to this problem the risk based capital ratio has been designed under the Basel Capital Accord.

[41] The other forms of regulation which the banking regulator of a country can impose include: 1) restriction on the number of activities that the banks can undertake, 2) entry restrictions so as to ensure the stability of the banking system, by allowing quasi-monopoly rent to the existing banks 3) and various prudential norms e.g. disclosure of the balance sheets, exposure limits and accounting transparency, etc.

given the interplay of variety of factors in determining risk, the study is expected to identify the determinants of risk behaviour and provide insights into the risk dynamics of commercial banks operating in India. The factors that are reviewed above are put in the following analytical framework to analyse the risk behaviour of commercial banks operating in India. In a way, these are the factors that seem to have changed after the reform.

Analytical Framework		
1. Competition	→	
2. Diversification	→	Banks' Risk

3. Institutional Factors
   a) Ownership
   b) Regulation
	→
	→	
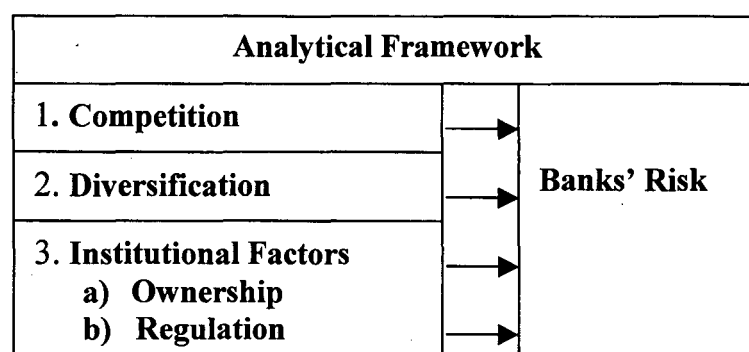
In other words, the study is concerned with the following functional relationship.

Risk = f (Competition, Diversification, Ownership, Regulation)

3.6 Hypotheses and the Study

The study makes the following hypotheses to study the phenomenon.

Hypothesis 1: The degree of competition does not impart risk in banks.

Alternative Hypothesis 1: Competition has a risk inducing effect.

Hypothesis 2: Diversification of banking activities does not reduce banks' risk.

Alternative Hypothesis 2: Diversification has a risk reducing effect.

Hypothesis 3: Ownership, whether public or private, does not affect banks' risk.

Alternative Hypothesis 3: Risk varies across banks, depending on their ownership structures. It can also be hypothesised that private commercial banks (Indian or Foreign) are more risky.

Hypothesis 4: Banking regulation has no effect on banks' risk level.

Alternative Hypothesis 4: Regulation is effective in controlling banks' risk.

Chapter 4

Methodology and Data Sources

4.1 Introduction

This chapter is concerned with the methodology for the analysis of risk behaviour of scheduled commercial banks that are operational in India and documentation of the data sources.[42] Commercial banks are the joint stock companies dealing with money and credit. The scheduled banks in India are those that are entered in the second schedule of the RBI Act, 1934 whereas non-scheduled banks are those that are not entered in the same. At present, the importance of non-scheduled commercial banks has reduced to its minimum. The scheduled banks are classified into two categories i.e. scheduled commercial banks and scheduled co-operative banks. Scheduled commercial bank includes PSBs, private sector banks, foreign banks and the regional rural banks (RRBs). In view of the functional difference between the first three groups and the RRBs we exclude the latter from our analysis. These first three categories of banks are also having the dominant share in all the scheduled commercial banks' asset (constituting around 97 percent) whereas the RRBs have the rest.

The chapter is organised as follows. The variables used in the risk analysis are measured in section 4.2 followed by the documentation of data sources, coverage and period of study in section 4.3. In the section 4.2, firstly, it deals with quantification of commercial banks' risk, which is the key variable of the study. It then proceeds, following the analytical framework, to quantification of variables that are used as covariate in the risk model. These variables are competition, diversification, ownership and regulation besides size as the control variable. As indicated earlier, the study uses four alternative methods for measuring competition. It then constructs the risk function to be estimated using panel data econometric techniques.

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[42] The performance of commercial banks in selected parameters of cost, earning and profitability is already presented in Chapter 2.

4.2 Measurement of Variables

4.2.1 Quantification of Risk

In the literature one finds various measures of bank risk e.g. the magnitude of non-performing loans, volatility of stock returns, risk-weighted assets as percentage of total assets etc. These measures have their own merits as well as demerits. Studies by Jiménez et al. (2007) and Das (2002) have used non-performing loans as the measure of bank risk. Non-performing loans are a good measure of credit risk but fail to capture the overall risk. Most importantly the need for a risk measure to cover the latter arises from the fact that even for the banks that are incorporated in India, credit constitutes only a little above half of the individual banks' balance sheet assets, which is even lower for foreign banks that are operating in India. Under that scenario non-performing loans would miss out the risk emanating from rest of the operations. There are several studies—in all areas of finance including banking—mostly in the advanced countries' context which uses volatility of stock returns as the measure of banks' risk (Laeven and Levine, 2008) under the assumption that volatility of stock returns is expected to reflect the performance and hence, riskiness of concerned banks. However, such a measure is of limited use in countries where majority of bank stocks are not traded in the secondary market. The third measure which is much comprehensive in nature namely the 'risk weighted asset' is of interest in the regulatory sphere under the Basel requirements. But there has been criticism as regards the way of assigning weights to different assets, mostly one has to rely excessively on market ratings.

The risk measure used in this study is the '*Z score*' drawn from Hannan and Hanweck (1988) and Boyd et al. (1993). It measures risk of insolvency[43], which occurs if losses exhaust banks' capital. The measure has widely been used to evaluate the riskiness of banks and other financial firms (e.g. Laeven and Levine, 2008; De Nicoló and Loukoianova, 2007; Boyd et al., 2006; Nash and Sinkey, 1997). The empirical measure of the risk index (used in the current study) is written as follows:

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[43] Insolvency and bankruptcy are being used interchangeably in the current study though the two are not exactly the same. The latter is a determination of insolvency by a court of law with legal orders intended to resolve the insolvency.

$$Z_{it} = \frac{ROA_{it} + CA_{it}}{\sigma_{it}(ROA)} \qquad \dots\dots\dots\dots\dots(1)$$

Where,

ROA$_{it}$ = return on assets (ROA) of bank 'i' at time period t after meeting all expenses including provisions and contingencies,

CA$_{it}$ = equity capital to asset ratio of bank i, at time t, and

σ_{it} (ROA) is the standard deviations of ROA of bank i over the period of study.[44]

The index is appealing because it includes ROA—the most widely accepted accounting measure of overall bank performance, the variability of ROA—a standard measure of risk in financial economics, and book [bank] capital adequacy—an industry standard of bank safety and soundness (Nash and Sinkey, 1997). It may be noted that the *Z score* measures the distance from insolvency. Insolvency is presumed to occur when current losses exhaust the capital.

The *Z score* is a measure, expressed in units of standard deviations of ROA, of how much a bank's ROA (and hence, accounting earnings) can decline until equity capital is exhausted. In other words, it indicates the number of standard deviations that a bank's ROA would have to drop below its mean[45] before the equity capital is exhausted.[46] Intuitively *Z score* gauges the thickness of capital cushion to absorb the accounting losses, therefore a higher *Z score* implies a safer bank while a lower *Z score* implies a riskier bank.

The *Z score* measure applied in this study (based on accounting data) has a number of additional advantages over the remaining measures because, it is possible to

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[44] A cross sectional σ (ROA) has also been used (separately for each particular year) to calculate Z_i by taking standard deviation of return of assets of all the banks. This is denoted as Zc. A potential weakness of cross sectional method is that the σ (ROA) across commercial banks may reflect product differentiation.

[45] In practice, for each bank, observed value of the ROA is used in calculating the *Z Score*. In other words, insolvency is gauged from observed value of the ROA.

[46] Hannan and Hanweck (1988) also derive the probability insolvency (p), which is given by $p \leq \frac{1}{2} \frac{\sigma^2}{[E(ROA) + CA]^2}$ or in other words, $p = \frac{1}{2Z^2}$ corresponding to each Z. This follows the assumption that the probability distribution of ROA is symmetric.

cover most of the banks to analyse riskiness of their entire operations and reflect the true insolvency risk based on their actual performances. The disadvantage could be that it does not decompose various risk components of a bank. The study considers two versions of the risk index, as the dependent variable.[47] (i) the *Z score,* which is constructed for each of the banks using standard deviation (over time) of ROA of the respective banks, and (ii) *Zc score,* which is constructed for each bank in each year using the standard deviation of ROA of all the banks. The former is essentially a time series approach and the latter is a cross-section approach. For instance, consider 80 banks for a period of 5 years. In the time series approach, the first task would be to calculate standard deviation of ROA for the 80 banks using the respective five-year data points. The *Z score* would be obtained for each bank and for each year by dividing the sum of ROA and CA by the respective banks' standard deviation of ROA. In the cross section approach, standard deviation of 80 banks' ROA would be calculated for each of the five years. The *Zc Score* would then be obtained, for each year and for each bank, by dividing the sum of ROA and CA of each particular year by the standard deviation of ROA of the respective year. This index (both formations) is the dependent variable in the risk analysis that uses panel data econometric techniques.

Given the framework of analysis—the independent variables are competition, diversification, ownership and regulation. In addition, bank-size is used as the control variable for testing whether large and small banks are different in terms of their riskiness. The measurement of the independent variables is described below.

4.2.2 Measurement of Competition

Competition has been quantified in four ways. The first is the 'n-bank' concentration ratio. In this study, three-bank asset concentration ratio (i.e. the ratio of sum of top three banks' asset irrespective of ownership to total commercial banking asset) is used. The second is the adjusted Herfindahl index (Ah), adjusted for the number

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[47] Here *Z score has* been constructed using the standard deviation of ROA over time for two sub-periods, i.e. 1998-2002 and 2003-2007 besides the entire period i.e. 1998-2007, on a bank-by-bank basis under the assumption that risk of a bank is reflected in the standard deviation of ROA over time. *Zc score* on the other hand uses the cross sectional standard deviation of all banks' ROA in each particular year.

of banks in each year as their number can change in any period. The Herfindahl index is given by $h = \sum_{i=1}^{N} s^2{}_i$ where, s_i is the asset share of ith bank in the total commercial banking asset in a particular year, and N is the number of banks. Note that, $\frac{1}{N} \leq h \leq 1$, higher the value of Herfindahl index lower is the competition and *vice versa*. The Herfindahl is adjusted for the number of banks, as there can be merger or entry/exit of banks, in each year in the following manner. $Ah = h - \frac{1}{N} / 1 - \frac{1}{N}$ Where, Ah is the adjusted Herfindahl index. The need for additional measures of competition arises because of the fact that banking is a multi-service business, further, products/services are heterogeneous albeit substitutable, and thus simply comparing asset concentration might not be enough to gauge the true nature of competition.

The third measure of competition used in the study is drawn from Panzar and Rosse (1987). The Panzar-Rosse (PR) methodology is as follows. The model examines the relationship between change in input prices and revenue earned by a bank. Banks adopt different pricing strategies in response to changes in input costs depending on the market structure in which they operate. The PR '*H*' statistic (measure of competition) is calculated from the bank's reduced form revenue equation. For bank i in the time period t, the reduced form revenue equation is given by the following specification:

$$R_{it} = f(W_{it}, Z_{it}, T_{it}) \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Where, R_{it} is the vector of bank's revenues W_{it} is the vector of input prices (viz. funds, labour, capital etc.) that are exogenous to the banks, Z_{it} denotes the vector of exogenous variables that shift the bank's (structural) revenue function e.g. activity or geographical diversification and T_{it} is the vector of exogenous variables that shift the bank's (structural) cost function e.g. new technology, capital requirement. The H statistics measures the sum of the elasticities of the reduced form revenue of the bank with respect to bank's input prices. [48]

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[48] This is derived, using the profit equation, from the structural form revenue and cost equations (Panzar and Rosse, 1987).

$$H = \sum \frac{\partial R_{it}}{\partial W_{it}} * \frac{W_{it}}{R_{it}} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

It represents the percentage variation in the equilibrium revenue resulting from a unit percentage change in the price of all inputs used by the bank. Under perfect competition, an increase in input prices will result in increase in the marginal cost and marginal revenue by the same amount.[49] Under imperfect competition, it is assumed that an increase in input prices will increase marginal cost and decrease equilibrium output and revenues. Panzar and Rosse (1987) demonstrated that when $H \le 0$ the market structure is a monopoly one, $H = 1$ is perfect competition and $0 < H < 1$ indicates monopolistic competition. Thus, first of all, one has to estimate the reduced form revenue function of banks. Based on it, one can compute the H measure of competition. H statistic is considered superior to previously used proxies for the degree of competition since it describes competitive behavior of financial institutions using comparative static properties of reduced-form revenue equations based on cross-sectional data (Schaeck et al., 2006). The methodology is widely used to test the degree of competition in banking, which relies on bank specific data, as evident from many studies at the individual and cross-country cases (Claessens and Laeven, 2004; Doshit et al., 2005; Mkrtchyan, 2005; Schaeck et al., 2006; Bikker and Spierdijk, 2009).

In the Indian context, Prasad and Ghosh (2005) have made use of this methodology. In a study covering the period 1996-2004, they found monopolistic competition attributes of the banking system. The current study, however, makes a slight (but significant) deviation in the use of the same methodology. It considers the level of activity diversification, specifically the OBS activity, as another covariate.[50] The obvious justification for this deviation is the growing volume of banks' OBS exposure and thus

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[49] This happens only when the banks are in long run equilibrium. Thus, we also need to test whether banks are in long-run equilibrium. In fact, in our empirical estimation, the long run equilibrium test is satisfied in all the years, as the ROA is not affected by the input prices.

[50] Prasad and Ghosh (2005) used panel data techniques for measuring the degree of competition. The application of panel data regression gives a single measure of competition for the entire period of study. Since the purpose of the current study is to trace the effect of competition on risk behaviour, therefore instead of panel data technique, the study makes use of simple cross sectional ordinary least square technique. This gives different measures of competition for different years, which is later used, as a covariate in the risk function.

the non-interest income of banks in India in recent years. To measure competition the following reduced form revenue function is estimated. This is the empirical simplification of equation (2).

$$\ln (EA)_i = a + b \ln (F)_i + c \ln (L)_i + d \ln (K)_i + e \ln(A)_i + f \ln (CAR)_i + g \ln (OFFON)_i + h \ln(BRS)_i + U_i \quad ......(4)$$

Where,

ln   is the natural logarithm operator,

i   is the subscript for bank i^{th} bank,

EA   is the ratio of total earnings to total assets, a measure for bank revenues

F   is the unit cost of fund[51], input price measure,

L   is the unit cost of labour[52] input price measure,

K   is the unit cost of capital[53], input price measure,

A   is the total assets, control variable for bank size,

CAR   is the capital adequacy ratio,

        proxy for exogenous variables that shift the bank's (structural) cost function,

OFFON is the ratio of OBS activities to the on-balance sheet activities (i.e. total assets),

        proxy for the variables that shift the bank's revenue function,

BRS   is share of ith banks' branches in total bank branches,

        also a proxy for the variables that shift the bank's revenue function,

U   is the random disturbance term.

The resultant H statistics is the sum of three input elasticity coefficients i.e. $H = b+c+d$

Since the H statistics is valid only when market is in equilibrium, therefore, equilibrium test is an essential part of the PR methodology.[54] For that purpose, we estimate the equation 4(a). As the literature suggests, the independent variables are the same as those used in the estimation of reduced form revenue function (Claessens and

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[51] Unit cost of fund is the ratio of interest expended on deposits and borrowings to the total deposits and borrowings on annual basis.

[52] Ratio of payment and provisions for employees to the total number of employees on annual basis.

[53] Ratio of operating expenditure (see footnote 28, page 40) to fixed assets on annual basis.

[54] *...the results for the models of perfect and monopolistic competition depend quite critically on the assumption that the firms in question are observed in long-run equilibrium (Panzar and Rosse, 1987).*

Laeven, 2004). The idea behind this test is that, in equilibrium, ROA should not be significantly affected by input prices.

ln (ROA)$_i$ = a + b ln (F)$_i$ + c ln (L)$_i$ + d ln (K)$_i$ + e ln(A)$_i$ + f ln (CAR)$_i$ + g ln (OFFON)$_i$ + h ln(BRS)$_i$ +U$_i$ ...4(a)

Where, ROA is the return on asset and rest of the variables are as described above. *F* test is used to test the null hypothesis that sum of coefficients of the three inputs are equal to zero.

The fourth measure of competition is a recent introduction into the literature called the relative profit difference (RPD) (Boone, 2008). The basic idea behind the RPD measure is that competition improves the profitability of efficient (least cost) firm, and firms are punished more harshly for being inefficient. Thus, it counters the price-cost margin measure in which one expects that competition lowers the profitability. Thus the RPD (of efficient firm) increases under competition. The RPD is measured as follows:

$$RPD = \frac{\pi(n^{**}) - \pi(n)}{\pi(n^*) - \pi(n)} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(5)$$

Where, π is the profit operator, n and n* are the least and second least efficient firms, n** are the relatively efficient firms (n** = 1, 2,..........., n-2).

Banks are typically multi-input and multi-output firms. Since many of the financial services are jointly produced, as a result, defining what constitutes input and output is fraught with difficulties. In view of these complexities, two major approaches have come into being in the banking literature in determining the input or output of a bank. They are the 'production approach' and the 'intermediation approach'. Under the production approach, banks are primarily viewed as providers of services to customers. The input set under this approach includes physical variables e.g. labour, material, space and information systems and output represents the services provided to customers and best measured by the number of deposits and loan accounts. Under the intermediation approach, financial institutions are viewed as intermediary between savers and investors. Banks produce intermediation services through the collection of deposits and other liabilities and their application in interest-earning assets, such as loans, securities and

other investments. This approach includes both operating and interest expenses as inputs, whereas loans and other major assets are counted as outputs. The fundamental difference in the two lies in that the former approach views deposit as output and therefore interest payments are not regarded as banking cost whereas in the latter approach interest payment is considered as a cost of intermediating deposits into income earning assets.

In this study, efficiency is judged on the basis of cost of funds. A bank having highest cost of fund, which is more in the nature of variable cost, has been taken as the least efficient firm.[55] This follows from the intermediation approach. Thereafter, RPD is calculated following the substitution of π by ROA, hence, it measures the relative ROA difference.[56] A priori, the effect of these competition variables on risk is ambiguous.

4.2.3. Measurement of Diversification

A fundamental implication of modern portfolio theory is that diversification reduces the return variances of a portfolio of financial assets. Applied to banking, portfolio theory suggests that diversification can potentially reduce the probability of failure (Demsetz and Strahan, 1997). In the literature, diversification has been captured in different ways depending on the purpose of the study. Assuming that diversification reduces bank specific risk, Demsetz and Strahan (1997) have used a market-based measure of diversification index by scaling systematic risk by stock return variance of individual bank. Chio and Kotrozo (2006) have used Herfindahl Index as a measure of activity diversification. In a recent study, Laeven and Levine (2007) focuses on the distinction between interest generating activities and fee generating activities. As a caricature, specialised – or "pure" – commercial banks would convert deposits into loans. The activity measures gauge where each bank falls along the spectrum from a pure lending bank to a fee-generating bank. Data availability, however, restricts their ability to measure the diversity of bank activities, as a result, they consider asset-based and

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[55] See footnote 51 for cost of fund. Nevertheless, Date Envelopment Analysis (DEA) and stochastic frontier production function are the two often used sophisticated ways to determine the efficiency of banks.

[56] While calculating 'relative return on asset difference', for a couple of years, it has been found that return on asset of least efficient bank is higher than its immediate follower. In such cases absolute difference in ROA of the two least efficient banks is used in the denominator so as to maintain monotonicity and comparability of the results. If this is not done, banks having higher ROA than the least efficient one would be assigned a negative value of 'relative ROA difference' and *vice versa*.

income-based measures as proxies for measuring the extent to which banks engage in loan making activities or fee/trading-based activities. Since the current study is primarily concerned with the (activity) diversification towards off balance sheet (OBS) activities and its impact on risk and since the data on off balance sheet is available, the ratio of the value of OBS activity to balance sheet assets is used as a measure of diversification. The OBS activity covers different form of contingent liabilities e.g. forward exchange contract including the derivative activities; guarantees given on behalf of constituents both in India and abroad; acceptances, endorsement and other obligations. For each bank, the diversification variable is constructed by taking the ratio of OBS activities for the major heads (excluding others) to total assets.

4.2.4. Quantification of Institutional Factors

The institutional factors considered here are (a) ownership and (b) regulation.

(a) Ownership

For capturing the effect of ownership on risk dummy variables have been used for private sector (*Dummy*=1 for private banks, 0 otherwise) and foreign banks (*Dummy*=1 for foreign banks, 0 otherwise) by taking PSBs as the control group.

(b) Regulation

The last but not the least factor in determining the risk behaviour includes the regulation. There have been a number of regulations for banks in the reform era. The effect of all these regulations are not explicitly addressed in this study but the study includes one of the most important regulations i.e. capital adequacy ratio and its impact on banks' risk.[57] A priori the sign of capital adequacy ratio is ambiguous. The control variable is the bank size. The share of each banks' asset in the total banking assets[58] has been used to control for the bank size in the empirical model. The risk function to be estimated using panel data econometric technique assumes the following form.

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[57] The fact that the variable CAR is included in (4) is taken care of when *H statistic* is used as covariate in the risk equation to be estimated.

[58] Total banking asset refers to sum of public, private and foreign banks' asset. It does not include the asset of co-operative and RRBs for the simple reason that the co-operatives and RRBs do not account for even 5% of all bank's assets.

$$Z_{it} = a + b \, (C_{it}) + c \, (OFFON_{it}) + d \, (AS_{it}) + e \, (Dpvt) + f \, (Df) + g \, (CAR_{it}) + U_{it} \quad \ldots\ldots (6)$$

Where,

Z_{it} is the risk measure (*Z score* or *Zc score*) of bank i at time t.

C_{it} is the measure of competition. The four measures are $3B_t$, Ah_t, H_t and RPD_{it}

     $3B_t$ is the three-bank (asset) concentration ratio at time t,

     Ah_t is the adjusted Herfindahl index at time t,

     H_t is the Panzar and Rosse *H statistic* at time t,

     RPD_{it} is the relative profit (ROA) difference of bank i at time t,

$OFFON_{it}$ is the ratio of OBS to on-balance sheet activities, a measure of diversification.

AS_{it} is the asset share of bank i at time t,

$Dpvt$ is the dummy variable for private sector banks,

Df is the dummy variable for foreign banks,

CAR_{it} is the capital adequacy ratio of bank i at time t,

U_{it} is the random disturbance term.

4.3 Data Sources, Coverage and the Period of Study

The major data source is various publications of the RBI. The required data on variables for measuring both competition and risk has been obtained from the *Statistical Tables Relating to Banks in India* and *Trend and Progress of Banking in India;* both are annual publications of the Reserve Bank of India. The study also uses the publications such as the *Handbook of Statistics on Indian Economy,* and the *Report on the Currency and Finance* wherever necessary. Additional sources are the CSO and the CMIE, PROWESS electronic database. The study spans over ten years i.e. 1997-98 to 2006-07. The metamorphosis of the second-generation reforms, higher dispersion of return on assets across banks (Chart 1.2), uniform application of prudential norms across banks, entry of new banks in the private and foreign category are the reasons for considering the starting period in 1997-98. The major deregulation of interest rates also took place by that time. These developments coupled with the other reforms and regulations set a uniform operating environment for the commercial banks and to keep coherence with the policy developments, the above-mentioned study period is chosen.

Data permits us to carry out all the analyses for all the years except for the fact that the analysis of risk behaviour and competition using all the approaches could not be done for the initial five years. This is because of the non-availability of bank-wise data on number of employees, which is very much essential for the application of Panzar-Rosse (1987) methodology.[59] The *Statistical Tables Relating to Banks in India* provides the same data from only 2002-03 onwards, though the bank-group-wise figures were available. The RBI data, used in this study, pertains to end March for all the years.

Competition has been measured for each year separately taking all the commercial banks having observation on required variables. While measuring the risk index (in time series approach) it has been found that except for a few small private sector and foreign banks, data on the required variables for all the remaining banks are available for all the years. The risk index is therefore constructed for all those banks having observations on ROA for at least three consecutive years. This is because ROA plays the vital role in calculating *Z score*. Further, the filtering does not lead to much loss of data since missing cases are only a few. For the *Zc score*, a priory, such exclusion is avoided. *Z score* is computed for two sub-periods namely 1998-2002 and 2003-2007 besides the entire study period (1998-2007) for checking whether trends observed in the two sub-periods are different from one another and from the entire period of study. For identifying the determinants of risk, panel regression analyses have been carried out. It is found that there are cases of missing observations for one or the other covariate. Therefore, a balanced panel has been constructed for the period 1998-2007. The panel regression analysis (using both the constructions) for the period 2003-2007 considers both balanced and unbalanced panel. However, the banks that are not having observations on all the covariates for two consecutive years have been excluded from the risk analysis even in the latter case. In addition, it needs to be mentioned that while analysing competition and risk, merged banks are considered as two separate entities until the year of merger. The results are discussed in the next chapter.

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[59] The *Performance Highlights of Banks* published by the Indian Banks' Association also provides the same. Nonetheless, the data could not be obtained. Thanks are due to the library officials of the institute for their efforts.

Chapter 5

Competition and An Analysis of Risk Behaviour

5.1 Introduction

The chapter presents major empirical findings of the study. In order to study the risk behaviour, it is necessary to understand the degree of competition and diversification in the commercial banking industry of India. Thus, the degree of competition (and activity diversification) in the commercial banking industry of India is also measured in the chapter along with the risk analysis using both descriptive and econometric tools.

5.2 Degree of Competition in the Indian Banking Industry

a) Herfindahl Index and Three-Bank Concentration Ratios: The Herfindahl as well as adjusted Herfindahl index shown in Table 5.1 indicates that the banking sector asset concentration is lessening over the years. An adjusted Herfindahl index value less than 0.1 is said to reflect no concentration. Since the banks are said to operate in different sub-markets the overall asset concentration index could be misleading. Therefore, the study calculates the same index for two most important sub-markets of banking namely the deposit and the loans/advances. The index for deposit and loan market also shows the same trend of decreasing concentration. It is also observed from Table 5.2 that there is reduction in the three-bank concentration ratios. However, from the three bank asset, deposit and loan concentration ratios, it can be said that there are a few large banks, which are dominant in major banking markets. Therefore, these banks might be able to influence the market rates of many products and services as the number of small players are the majority.

The Herfindahl index has certain limitations such as it assumes market is properly defined both in terms of products and geography. Notwithstanding these limitations, the analysis is carried out under the assumption that many of the banking products and also the products provided by different banks have their substitutes. In addition, the advancement in information and communication technology has facilitated banks to

compete in different local markets without having a brick and mortar presence, thereby making the geography less important. However, it needs to be recognised that higher competition in the sector could be a threat to banking stability (as competitive forces put pressure on margin, performance and profitability) thus, competition or concentration *per se* is not the sole question to stress upon. Therefore, the study uses a couple of competition measures in which banks' efficiency in the provision of financial services is also addressed to some extent. Two such measures are applied here. Those are the *H statistics* (Panzar and Rosse, 1987) and relative profit difference (Boone, 2008).

Table 5.1: Herfindahl and Adjusted Herfindahl Index of Asset, Loan and Deposit

Year	Herfindahl Index			Adjusted Herfindahl Index			No of Banks
	Asset	Loan	Deposit	Asset	Loan	Deposit	
1998	0.07	0.07	0.07	0.06	0.06	0.06	102
1999	0.07	0.07	0.07	0.07	0.06	0.06	104
2000	0.07	0.07	0.07	0.07	0.06	0.06	101
2001	0.08	0.07	0.07	0.07	0.06	0.06	100
2002	0.07	0.06	0.07	0.06	0.05	0.06	97
2003	0.07	0.06	0.07	0.06	0.05	0.06	92
2004	0.06	0.06	0.06	0.05	0.05	0.05	90
2005	0.06	0.06	0.06	0.05	0.05	0.05	87
2006	0.06	0.06	0.06	0.05	0.05	0.04	85
2007	0.05	0.06	0.05	0.04	0.04	0.04	82

Source: Statistical Tables Relating to Banks in India, Own Calculation.

Table 5.2: Three Bank Concentration Ratios of Asset, Deposit and Advances/Loans

Year	3bank_asset (%)	3bank_deposit (%)	3bank_advances/loans (%)
1991	41.52	36.31	43.16
1998	34.34	32.71	35.75
1999	34.58	33.66	34.57
2000	33.88	32.89	33.31
2001	34.41	33.93	32.99
2002	34.21	33.16	31.92
2003	33.53	32.99	32.09
2004	32.17	31.28	30.99
2005	32.02	31.06	30.79
2006	31.97	30.71	32.13
2007	31.12	29.97	31.88

Source: Statistical Tables Relating to Banks in India, Own Calculation

b) *H Statistics:* In line with the existing Indian literature (Doshit et al., 2005; Prasad and Ghosh, 2005), the banking market is found to be monopolistically competitive. This is clearly reflected in the *H* statistics presented in Chart 5.1. In the chart, the resulting *H* *statistic* is showing smaller values for a couple of years in the beginning and at the end (Chart 5.1). One of the reasons for this is the operating cost difference across the banks that have not been fully reflected in their earnings. Notwithstanding the monopolistic banking structure, one needs caution in interpreting these findings. While the number of banks is reasonably large, the dominance of a few large banks in the industry continues as evident from the three-bank concentration ratios. Such banks, accounting for large share of deposits and advances (as market leaders), are able to influence decisions about liquidity and rate variables (e.g. deposit and lending rates) in the system. The noteworthy development in recent years has been the emergence of a couple of private sector banks in the top list of banks. The gradual up-gradation of skills and technologies in these competing banks and the restructuring and re-engineering processes being attempted by both private sector and foreign banks is expected to reduce such influences in the near future.

Chart 5.1: Panzar-Rosse *H statistic*

—◆— Panzar Rosse H Statistics#   —■— Panzar Rosse H Statistics$

	2003	2004	2005	2006	2007
—◆— Panzar Rosse H Statistics#	0.16	0.29	0.5	0.4	0.1
—■— Panzar Rosse H Statistics$	0.1	0.41	0.47	0.38	0.22
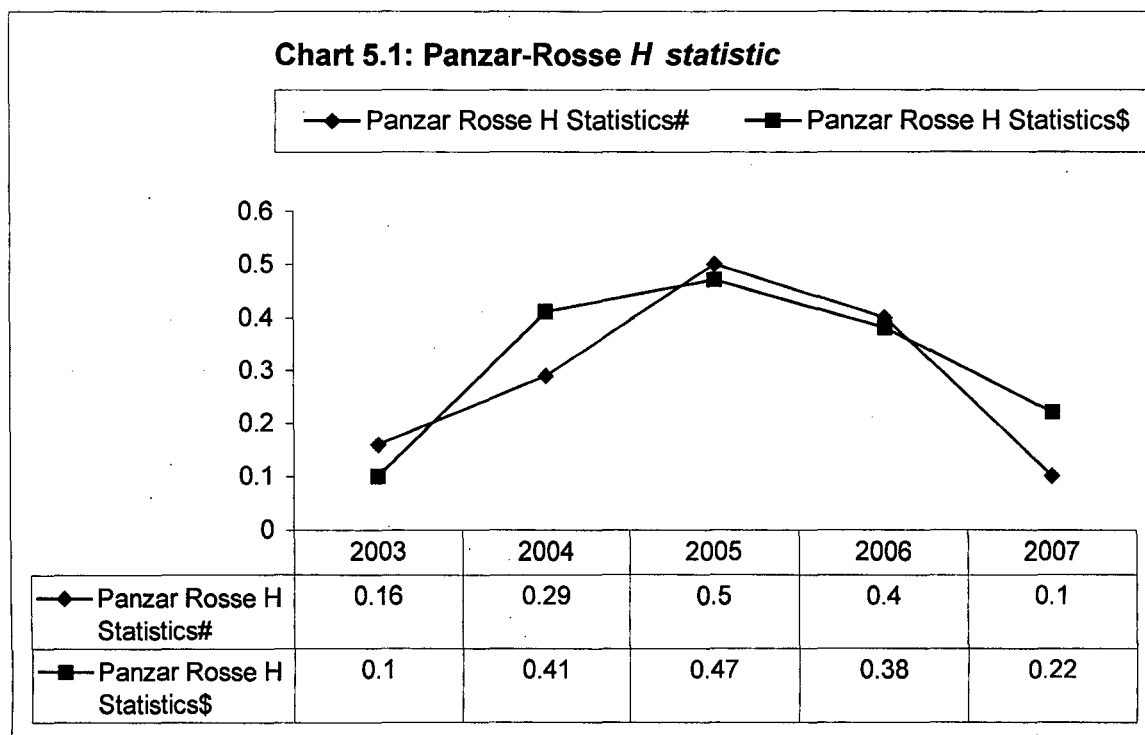
Note: #Estimated using own specification. $ Estimated using Prasad and Ghosh (2005) specification.

77

c) **Relative Profit/ROA Difference (RPD):** The second efficiency based measure of competition is the RPD. It measures how different is the profitability of an efficient bank in comparison to the inefficient ones. The theoretical underpinning of the measure is that in a competitive market, efficiency is rewarded with increased profit and the firms are panelised harshly for being inefficient. The calculation of RPD has already been elaborated in the fourth chapter. Table 5.3 presents the results. It shows that median (and also the minimum) RPD for some of the years are negative. This is because efficient (in weak sense) banks are not able to outperform the inefficient ones mainly because of product differentiation and operating in in-competing lines of business. The latter phenomenon is true especially for some of the foreign banks. Therefore, there is lot more scope for improvement in the competitive conducts in the Indian commercial banking system both in organic and inorganic lines as well as across geography. Selective diversification with proper risk assessment mechanism in place could be one of the ways to achieve this objective.

Table 5.3: Relative Profit Differences among Banks

Statistic	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Median	-2.41	0.93	1.16	1.17	1.19	0.86	-0.54	-0.13	-0.95	0.72
Minimum	-15.35	0.00	-1.80	0.00	-7.46	0.00	-14.45	-4.52	-2.53	-8.54
Maximum	0.00	1.30	2.17	1.49	2.02	1.04	4.85	1.76	0.63	4.67
Standard Deviation	1.47	0.14	0.57	0.14	1.03	0.12	2.21	0.90	0.41	1.19
No of Banks	102	104	101	100	97	92	90	87	85	82
Skewness	-6.52	-2.87	-3.16	-5.31	-6.19	-4.31	-3.99	-1.57	0.47	-5.39

Source: Statistical Tables Relating to Banks in India, Own calculation
Note: RPD is calculated for all the commercial banks irrespective of ownership.

In sum, static measures of competition such as Herfindahl index and three bank concentration ratios show an increase in the degree of competition in the commercial banking industry. However, non-static or efficiency based measure such as *H statistic* or RPD shows that there is lot more scope for improving the competitive conduct of the Indian banking industry.

5.3 A Glance at Diversification Pattern

The current study is primarily concerned with the activity diversification pattern towards off balance sheet (OBS) activities that generates non-interest income for banks. By definition, OBS activities refer to various fee/commission-based activities, which do not have any direct reflection on the commercial bank's balance sheet. A number of studies have examined the key motivations underpinning OBS activities of banks. Studies have investigated whether banks engage in OBS activities in order to overcome binding capital requirements (Jagtiani et al., 1995). Nevertheless, in the Indian context, the study by Nachane and Ghosh (2007) found that not only regulation, but also market forces, captured by bank-specific characteristics and macro-economic conditions are at work in the diffusion pattern of OBS activities in India. Even though literature on OBS activities is extensive, empirical research with respect to Indian banks is scarce (Nachane and Ghosh, 2002 and 2007) and no specific study could be found which has investigated the linkage between bank's OBS activities and risk in the Indian context.

In line with Laeven and Levine (2007), the present study focuses on the distinction between interest (income) generating activities and fee (income) generating activities. The focus of the study on activity diversification (towards OBS) permits the use of the ratio of the value of OBS to balance sheet assets as a measure of diversification. The data on OBS activities of Indian banks show the following realities. Firstly, the OBS activity has grown at a steady pace (Chart 5.2) indicating greater levels of diversification. Secondly, the tendency of diversification is not uniform across banks. The mean figures are higher than the median figures. This means that well diversified banks are a few in number and not all banks have accelerated the pace of diversification. Thirdly, the composition of OBS shows that forward exchange contract and derivatives are the dominant activities (Table 5.4). These activities promises fee based income and other non-interest income but with some risk. Nonetheless, it is clear that there is a tendency towards diversification across banks but there are differences in intensity.

Chart 5.2: Ratio of OBS Activities to Total Assets (All Commercial Banks)

☐ Mean ☐ Median

Year	Mean	Median
2000	0.53	0.29
2001	0.58	0.33
2002	0.58	0.29
2003	0.69	0.32
2004	0.89	0.32
2005	1.20	0.33
2006	1.53	0.37
2007	2.15	0.37
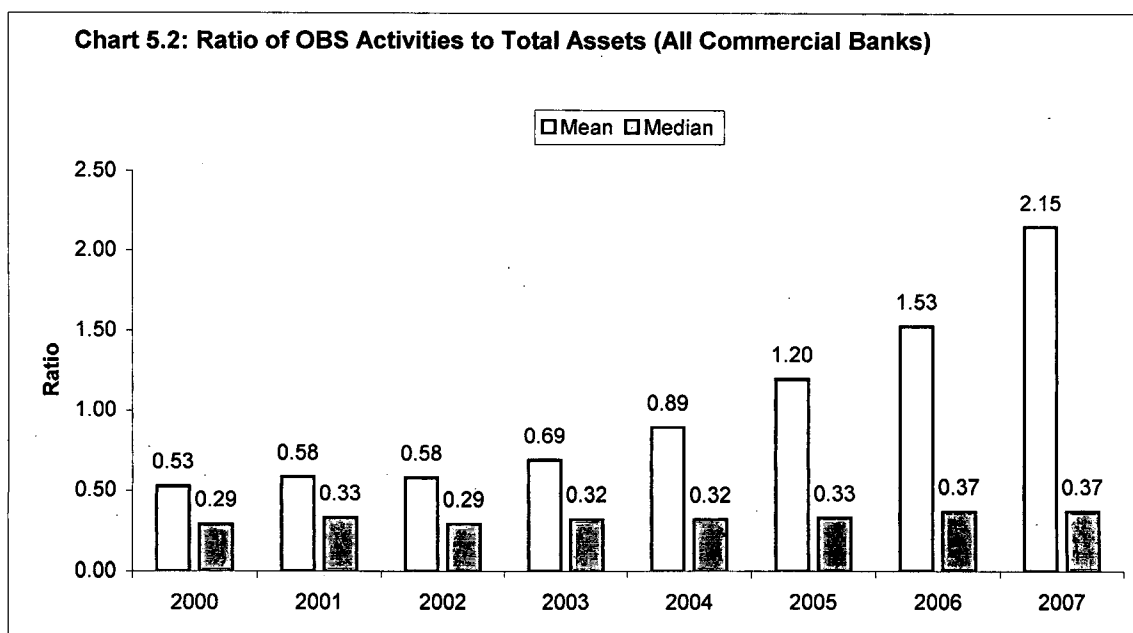
Note: Bank group-wise figures are presented in Chart 11 and Table 9 in the Appendix.

Table 5.4: Composition of OBS Activities, All Commercial Banks (Rs. lakh)

Year	1	2	3	4	5
1999	33442044	6279995	4343282	1782053	45846832
	(72.94)	(13.70)	(9.47)	(3.89)	(100)
2000	43804098	6736621	4894244	3100240	58535206
	(74.83)	(11.51)	(8.36)	(5.30)	(100)
2001	58536484	7144937	4991557	4624622	75297612
	(77.74)	(9.49)	(6.63)	(6.14)	(100)
2002	64079183	8425498	5134164	10896227	88535071
	(72.38)	(9.52)	(5.80)	(12.31)	(100)
2003	77383942	8997316	6807092	23207376	116395723
	(66.48)	(7.73)	(5.85)	(19.94)	(100)
2004	116279592	10184831	9708407	40132844	176305677
	(65.95)	(5.78)	(5.51)	(22.76)	(100)
2005	179411683	12314368	13887996	75878453	281492501
	(63.74)	(4.37)	(4.93)	(26.96)	(100)
2006	315929050	16122873	16997957	75884357	424934237
	(74.35)	(3.79)	(4.00)	(17.86)	(100)
2007	558525610	21961722	21690072	140994006	743171410
	(75.15)	(2.96)	(2.92)	(18.97)	(100)

Source: Statistical Tables Relating to Banks in India, Various Years.

Note: Column: (1) liability on account of outstanding forward exchange contracts (includes derivative contracts) (2) guarantees given on behalf of constituents both in India and outside India (3) acceptances, endorsements and other obligations (4) others (Including (a) claims against the bank not acknowledged as debts and (b) liability for partly paid investments) and (5) total. Figures in the parenthesis represent percentage of the total. Bank group-wise figures are presented in Table 9a in the Appendix.

5.4 Risk Analysis

5.4.1 Trends in Risk Behaviour of Commercial Banks

This section, analyses the risk profile of commercial banks using descriptive and econometric tools. The trend in the risk index (Z score and Zc Score) is presented in the Chart 5.3, 5.4, 5.5 and 5.6. Z score reported in Chart 5.3, 5.4 and 5.5 is calculated using bank-wise (time series) standard deviation of ROA for the period 1998-2007 and two sub-periods i.e. 1998-2002 and 2003-2007 respectively. The sub-periodisation has been done to see whether the trend obtained for the entire period (Chart 5.3) is a statistical artifact. This is because the periods considered are not structurally same and there have been changes in many parameters such as structure, conduct, reforms and regulations, and also the macroeconomic environment. The Zc score reported in Chart 5.6 is calculated using the cross section standard deviation of ROA (for all banks). In both time series and the cross section approaches we obtain median values for all the bank groups in order to throw light on the middle of the distribution.

The charts show that the level of risk differs across the banks depending on their ownership structure. The private sector banks clearly show more risky behaviour followed by public sector and foreign banks. The result is in line with De Nicoló and Loukoianova (2007) in which private domestic banks are found to take on more risk as a result of larger market shares of state-owned banks. One of the reasons for more riskiness of private sector banks is that many of these banks have lower (equity) capital base (median is below one percent, see Chart 1 in the Appendix). Most importantly, the standard deviation of ROA of these banks stands higher (Table 5.5) at least in comparison to the PSBs, because of experiencing cycles in their profits and losses. It is to be kept in mind that Z score reflects the effect of any of the three factors i.e. ROA, capital-asset ratio and standard deviation of ROA or a combinations thereof. It is observed that there are one or the other foreign banks that are incurring losses in each year under consideration. Therefore, one would have expected the foreign banks also showing risk behaviour at least higher than the PSBs for the entire period and also in both the sub-periods. This did not materialise (except for the first sub-period) because of its

stronger capital cushion, (see Chart 2 in the Appendix). The capital cushion of foreign banks is far higher than the remaining two categories of banks although these banks have the highest standard deviation of ROA (Table 5.5) in both the periods under consideration. In other words, capital cushion of foreign banks offset the risk emanating from the volatility of ROA thereby lessening their overall risk levels. Further, the ROA of foreign banks is also higher due to the non-interest income from OBS activities. Otherwise, PSBs seem to be less risky in nature with low but stable ROA. In fact, PSBs were having the highest median Z Score for the first sub-period (Chart 5.4) in comparison to the other two bank groups except for the year 2002. However, the cause of concern for the PSBs is that their capital asset ratio is at a very low level (the median being lower than one percent) and declining over the years (see Chart 2 in the Appendix).
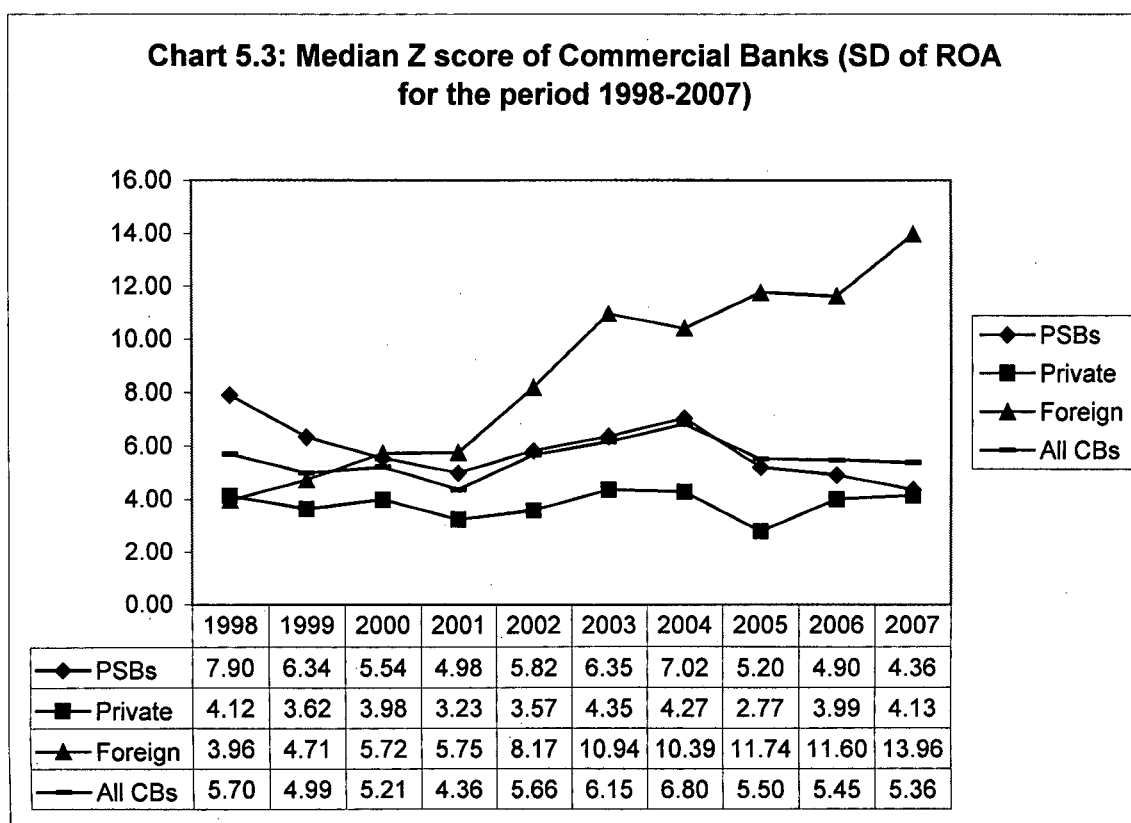
Chart 5.3: Median Z score of Commercial Banks (SD of ROA for the period 1998-2007)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
──◆── PSBs	7.90	6.34	5.54	4.98	5.82	6.35	7.02	5.20	4.90	4.36
──■── Private	4.12	3.62	3.98	3.23	3.57	4.35	4.27	2.77	3.99	4.13
──▲── Foreign	3.96	4.71	5.72	5.75	8.17	10.94	10.39	11.74	11.60	13.96
──── All CBs	5.70	4.99	5.21	4.36	5.66	6.15	6.80	5.50	5.45	5.36

Source: Statistical Tables Relating to Banks in India, Various Years, Own calculation

Chart 5.4: Median Z Score of Commercial Banks (SD of ROA for the Period 1998-2002)
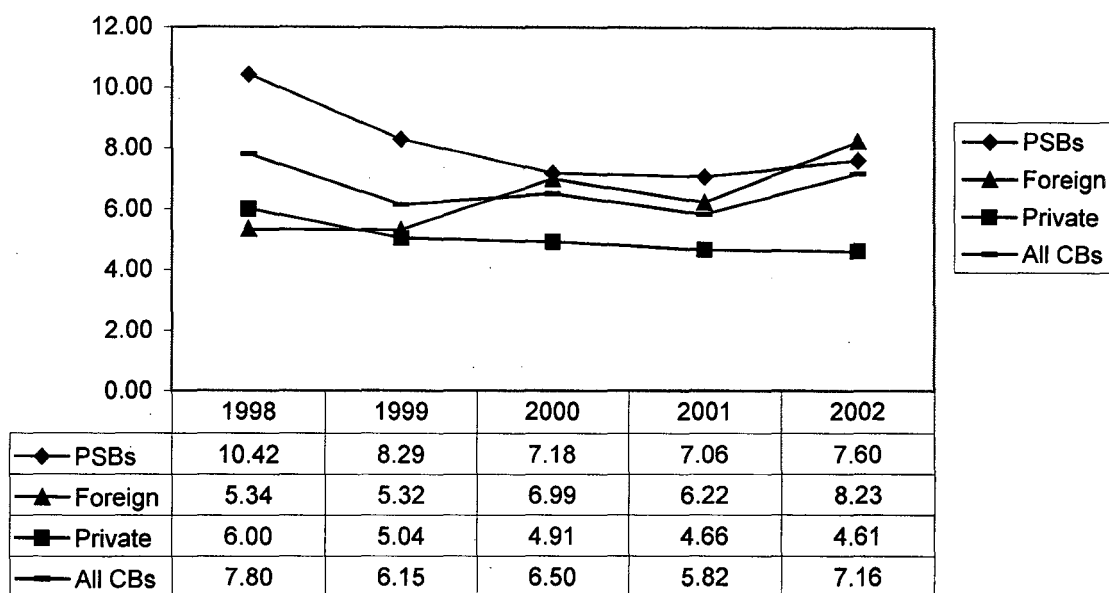
	1998	1999	2000	2001	2002
—◆—PSBs	10.42	8.29	7.18	7.06	7.60
—▲—Foreign	5.34	5.32	6.99	6.22	8.23
—■—Private	6.00	5.04	4.91	4.66	4.61
——All CBs	7.80	6.15	6.50	5.82	7.16

Source: Statistical Tables Relating to Banks in India, Various Years, Own calculation

Chart 5.5: Median Z score of Commercial Banks (SD of ROA for the Period 2003-2007)
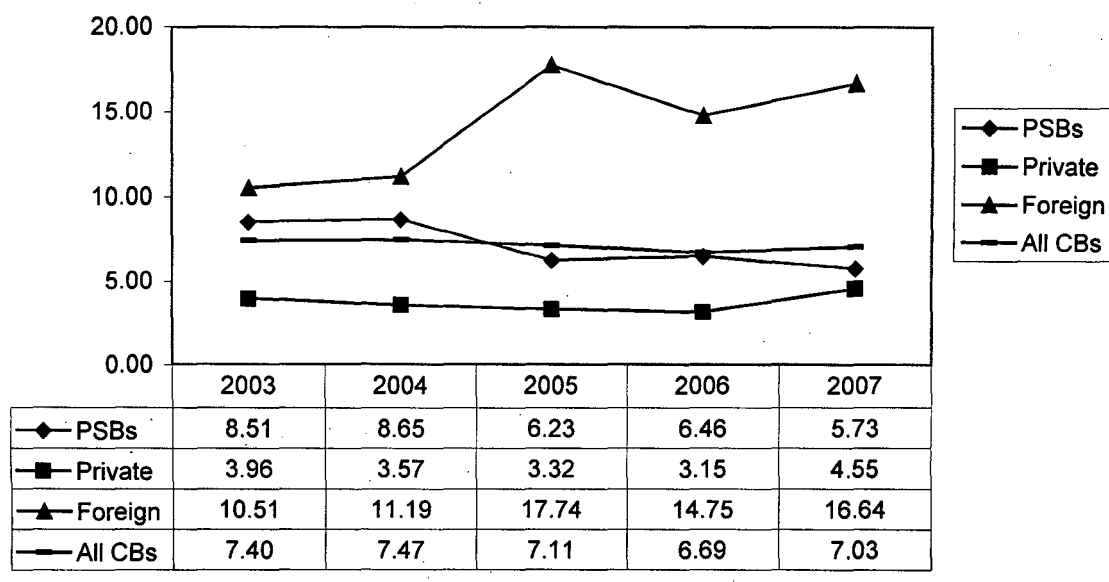
	2003	2004	2005	2006	2007
—◆—PSBs	8.51	8.65	6.23	6.46	5.73
—■—Private	3.96	3.57	3.32	3.15	4.55
—▲—Foreign	10.51	11.19	17.74	14.75	16.64
——All CBs	7.40	7.47	7.11	6.69	7.03

Source: Statistical Tables Relating to Banks in India, Various Years, Own calculation

83

Chart 5.6 also tells the similar kind of story except two major differences. First, since the *Zc score* is computed using the cross sectional standard deviation of ROA of all banks in each particular year, therefore, the index values are lower than the index in time series approach.[60] Second, clear trends have arisen in index values especially since 2000, which shows that given the standard deviation of ROA of all the banks, the public sector and foreign banks have become less riskier whereas the Indian private sector banks have become more riskier. As indicated earlier the foreign banks are scoring higher index values due to their very fat capital cushion.

In addition, not only there are differences but also a widening gap among bank groups in terms of risk levels as shown by the above descriptive risk analysis.

Chart 5.6: Median Zc Score of Commercial Banks

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	3.75	2.48	2.79	2.69	5.21	5.15	5.71	3.66	4.48	6.11
Private	2.23	1.88	3.37	1.12	2.27	1.97	0.76	1.17	1.14	0.41
Foreign	2.60	3.29	4.21	2.76	1.93	5.66	5.12	6.40	9.08	9.14
All CBs	1.04	1.42	1.15	0.79	0.56	1.19	1.06	1.24	1.35	0.74
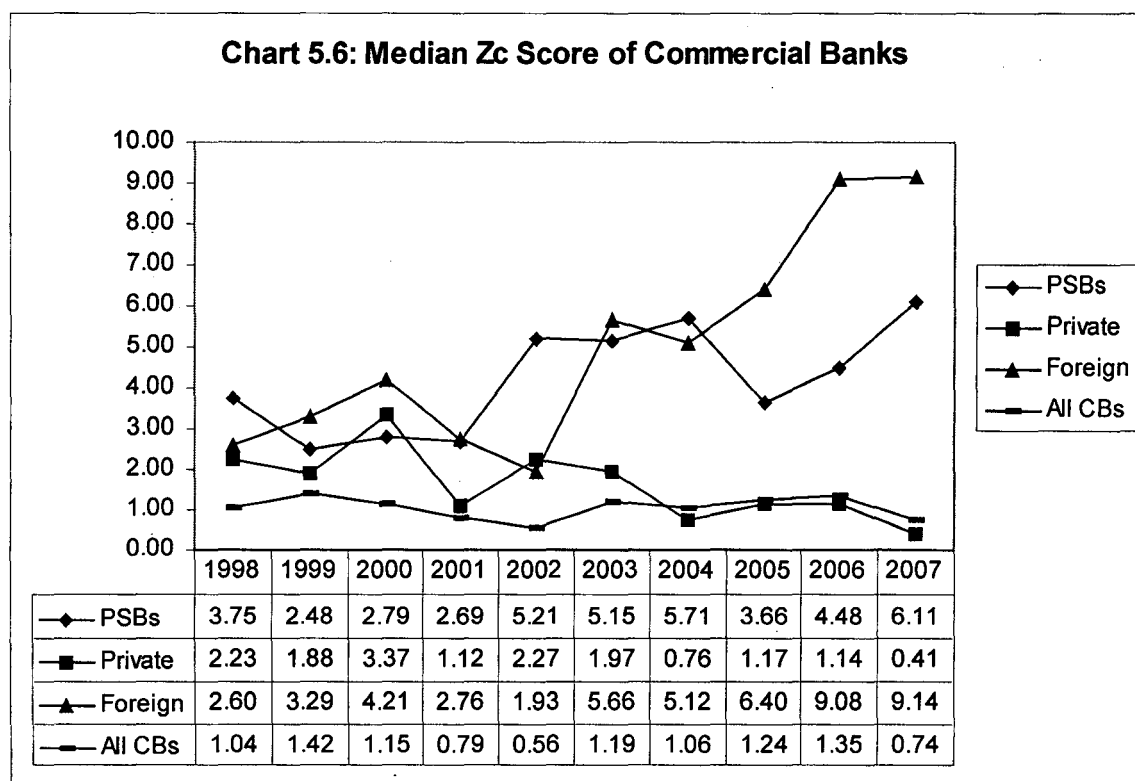
Source: Statistical Tables Relating to Banks in India, Various Years, Own calculation

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[60] *Zc score* values are lower because, in the cross-section approach the standard deviation obtained from the ROA of all banks is usually higher than the standard deviations that are obtained for each bank in the time series approach (not reported).

Table 5.5: Bank Group-wise Standard Deviation of ROA

SD of ROA for the period 1998-2007				
Statistic	**PSBs**	**Private**	**Foreign**	**All CBs**
Median	0.33	0.47	1.36	0.69
Maximum	1.64	6.40	15.84	15.84
Minimum	0.16	0.11	0.31	0.11
SD of ROA for the period 1998-2002				
Statistic	**PSBs**	**Private**	**Foreign**	**All CBs**
Median	0.22	0.35	1.55	0.47
Maximum	1.36	3.64	15.84	15.84
Minimum	0.08	0.10	0.07	0.07
SD of ROA for the period 2003-2007				
Statistic	**PSBs**	**Private**	**Foreign**	**All CBs**
Median	0.28	0.51	1.09	0.49
Maximum	0.56	9.47	6.55	9.47
Minimum	0.06	0.05	0.22	0.05

Source: Statistical Tables Relating to Banks in India, Various Years, Own calculation

5.4.2 What Determines the Risk Behaviour of Banks? A Panel Regression Approach

To identify the determinants of risk behaviour of banks, equation (6) (see Chapter 4 on Methodology and Data Sources) has been estimated using panel data regression approach. The descriptive statistics of the variables used in the regression model has been reported in the Appendix (Table 10a and Table 10b). One of these variables namely the H *statistic* is obtained from another regression estimation specified by the equation (4) (see Chapter 4). The results are reported in Table 13 in the Appendix, followed by the equilibrium test in Table 13a. To verify whether the competition parameter obtained from the regression is by chance or due to any specification bias, another regression specified

by Prasad and Ghosh (2005) has been performed (Table 14 in the Appendix). Both the models yield the same trend in the *H statistic,* the competition parameter. The results indicate an increase in competition during 2003 to 2005 and a decline for the year 2006 and 2007. Nevertheless, the Indian banking market is monopolistically competitive as evident from the *H statistic.*

Before discussing the regression results, it is better to have a glance at the nature of correlation among the variables of interest and the possible direction.[61] These figures are presented in the Appendix (Table 11 and Table 12). The correlation coefficient of the risk index with the competition variable(s) is not significant, however, the sign of these coefficients indicate that higher competition leads to higher risk, but when the efficiency is adjusted for, higher competition reduces the risk.[62] The diversification variable i.e. OFFON has significant positive correlation with the risk index indicating that diversification might be lowering risk. The size variable (AS), measured by asset share of banks in total commercial banking assets, has a negative correlation with the risk index. The correlation table also reveals that private sector banks have lower risk index implying higher risk (the correlation coefficient is significant) whereas the foreign banks are having higher risk index implying lower risk, confirming to the previous descriptive results presented in the Charts 5.3 to 5.6. Finally, the capital adequacy ratio has significant positive association with the risk indicator possibly implying that safer banks are also maintaining higher capital adequacy ratio.

The panel data regression results are presented in the Table 5.6 and Table 5.7. The *Hausman test* has been performed under the null hypothesis that random effect estimators are consistent and efficient against the alternative of inconsistency in random effect estimators. *Hausman* test results are indicative of fixed effect model for the period 1998-2007. Nevertheless, in the models for the period 2003-2007, the *Hausman* (χ^2) *test* does not reject the null hypothesis (Table 5.7) therefore the random effect (GLS) model is

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[61] The correlations table for the period 1998-2007 is not reported.

[62] Both *H statistic* and RPD are efficiency-based measure of competition. Interpreting insignificant coefficients does not make sense; hence, we look at whether these coefficients are significant in the regression.

86

selected to interpret the results. The Wald (χ^2) test jointly tests the zero null hypotheses of regression coefficients. The null hypothesis has been rejected in all the models. The fit is also moderate as overall R^2 is about 25 to 30 percent in the regression of Z score and seventy percent in the regression of Zc score.

On the determinants of risk behaviour, the results indicate that competition has risk inducing effect—as the coefficients of the static measures of competition namely the three-bank concentration ratio and the adjusted Herfindahl index are positive and significant in both the periods and specifications.[63] The effects of other competition measures are also significant except for the Z score regression for the period 2003-2007.[64] Higher competition as per the PR methodology (the third measure of competition) leads to higher (Z score) Zc score and hence, less risk. The finding is in line with Schaeck et al. (2006) in which higher degrees of competition in banking systems are associated with increased survival time of banking systems. The result indicates that the competition has an efficiency component. This implies that the efficient banks, having lower input costs vis-a-vis the other banks, will be able to reflect the rising input cost in its earnings. This can happen either because of their ability to minimise the rising cost at a lower level in comparison to the inefficient ones or because of their ability to produce more output (revenue) using less of the input whose cost has risen. The fourth measure of competition namely the RPD has no significant effect in the Z score regression for the period 2003-2007 but significant in the Zc score regression as well as the regression covering the entire period, but a negative sign. Two explanations can be given for the negative sign of the coefficient. Firstly and most importantly, since the banking market is not homogenous in terms of its products and services, efficient firms may not be able to outperform inefficient ones because of the product differentiation and operating in heterogeneous banking services. Secondly, it could be due to the incomprehensiveness in the measurement of efficiency. Hence, there is scope for verifying the results with comprehensive measures of efficiency in future study. Further, in all the above cases, one

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[63] These two measures of competition produce similar results, as their correlation is high and significant.

[64] In the Z Score model, the standard deviation of the dependent variable is higher than that of the Zc Score model that makes the R^2 lower and therefore the residual variance is higher vis-à-vis the second model. Higher standard errors (due to higher residual variance) tend to make the resulting coefficients insignificant.

must not miss out the fact that *Z score* has three components i.e. ROA, capital-asset ratio and standard deviation of ROA or a combination thereof. Interestingly, the use of alternative measures of competition gives broader picture as regards the effect of competition on banks' risk. Thus, from the above, it seems that competition, in the static sense, induces risky behaviour unless there is large number of efficient banks in the system. In addition, even in a competitive environment, risk levels of efficient banks could be higher (indicative from the RPD measure of competition) compared to the less efficient ones, once the banks operate in heterogeneous banking services with product differentiation. Higher risk of an efficient bank could be the result of non-availability of extra returns (among others) because of operating mostly in the competing lines of business.

The diversification variable (OFFON) has positive and significant impact on the risk index in all the selected fixed and random effect models. This amounts to saying that to some extent, if not in all cases, diversification has risk mitigating effect because it smoothens out the earnings volatility on the one hand, assures reasonable rate of return and increases the value of the banking firm on the other. However, it needs to be stressed that diversification is a necessary but not the sufficient condition for the banks' risk reduction strategy for the simple reason that there are possibilities of systematic risk which is difficult to hedge against. The three dimensional composite index of risk also highlights that capital has everything to do with risk reduction rather than the diversification *per se*.

In conformity with the correlation table (Table 11 and 12 in the Appendix), the regression result also shows that the private banks' dummy has negative sign and the foreign banks' dummy has a positive sign. However, the private banks' dummy is not significant and only foreign banks' dummy is significant in the *Zc score* regression for the period 2003-2007 with positive sign. This is expected as it is seen that the foreign banks have significantly higher risk index (implying lower risk) mostly due to their higher capital cushion. The capital adequacy ratio, which is a ratio of tire-one and tire-two capital to the risk-weighted assets, is having positive and significant effect on the risk

88

index. This implies that to be less risky banks also (need to) maintain higher capital adequacy ratio, even higher than the regulatory minimum. It is to note that the capital to asset ratio in the numerator of the risk index is only a small component of the capital adequacy ratio.

Finally, the control variable for size (*AS*) is significant with a negative sign for the regression covering the period 1998-2007 but not significant to influence the risk index in the regression covering the period 2003-2007.[65] This could be indicative of insignificant efficiency gains for large banks. Further, the benefits of economies of scope could occur even for small banks when they engage themselves in multiple activities.

Table 5.6: Panel Regression Estimates for the Period 1998-2007

Covariates	Fixed Effect Dependent Variable *Z score*			Random Effect Dependent Variable *Z score*		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
3B	0.44*			0.45*		
Ah		32.99**			34.69**	
RPD			-0.29*			-0.28*
OFFON	0.11*	0.10*	0.10*	0.11*	0.10*	0.10*
AS	-75.20*	-76.28*	-78.12*	-52.29**	-52.79**	-53.12**
Dpvt				-3.39	-3.40	-3.41
Df				0.15	0.18	0.28
CAR	0.11*	0.11*	0.11*	0.12*	0.12*	0.12*
Constant	-7.78**	4.96*	7.03*	-7.69	5.27*	7.37*
N	770	770	770	770	770	770
Banks	77	77	77	77	77	77
R^2 Overall	0.25	0.24	0.23	0.31	0.30	0.30
F/Wald χ^2 Test	40.31*	37.59*	38.42*	195.13*	184.25*	187.16*
Hausman χ^2 (4)				16.19*	16.34*	19.56*

Note: *Significant at 1 percent, **Significant at 5 percent.
Statistical software *STATA (Version 10)* has been used to perform the regression. In the fixed effect model *STATA* drops the two dummy variables because they do not vary over time.

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[65] The existence of a large number of small banks, both private and foreign, could also be one of the reasons for the insignificance of the size variable.

Table 5.7: Panel Regression Estimates for the Period 2003-2007

Covariates	Random Effect Dependent Variable Z score				Random Effect Dependent Variable Zc score			
	Model re1	Model re2	Model re3	Model re4	Model re5	Model re6	Model re7	Model re8
3B	1.06*				0.58*			
Ah		125.57*				99.17*		
H			0.30				4.58*	
RPD				0.03				-0.06*
OFFON	0.14*	0.13*	0.12*	0.12*	0.12*	0.12*	0.11*	0.11*
AS	20.61	21.27	26.33	23.58	-10.12	-10.18	-8.96	-8.87
Dpvt	-1.55	-1.55	-1.44	-1.48	-0.07	-0.07	-0.10	-0.07
Df	3.55	3.57	3.75	3.75	2.76**	2.75**	2.76**	2.72**
CAR	0.32*	0.32*	0.32*	0.32*	0.22*	0.22*	0.22*	0.22*
Constant	-29.53	-1.54	4.53	4.86	-20.25*	-6.41*	-2.78	-1.8**
N	386	386	386	386	386	386	386	386
Banks	83	83	83	83	83	83	83	83
R^2 Overall	0.31	0.30	0.30	0.30	0.70	0.71	0.71	0.71
Wald χ^2 Test	139.26*	138.5*	126.9*	127.8*	392.81*	402.1*	409.4*	401.1*
Hausman χ^2 (4)	1.60	1.55	1.14	1.35	0.76	0.73	0.68	0.63

Note: *Significant at 1 percent, **Significant at 5 percent.

Result of the fixed effect models are not reported as the *Hausman* test do not reject the null hypothesis that random effect estimators will be consistent and efficient. The balanced panel regression results are also not reported, as the sign and significance of the coefficients are same as the unbalanced ones. The results of regression that drop the dummies for private and foreign banks are also not reported as the sign and significance of the coefficients are same as the regression model with ownership dummies. Furthermore, when the variable CAR is dropped from the models re3 and re7, which uses *H* statistic as a covariate, the sign and significance of other variables remain unchanged.

Statistical software *STATA (Version 10)* has been used to perform the regression.

5.4.3 Testing for Serial Correlation in Linear Panel-Data Models

Because serial correlation in linear panel-data models biases the standard errors and causes the results to be less efficient, researchers need to identify serial correlation in the idiosyncratic error term in a panel data model (Drukker, 2003). Wooldridge (2002) derives a simple test for serial correlation in panel-data models. The test is attractive because it requires relatively few assumptions and is easy to implement. Wooldridge's method uses the residuals from the regression of a linear panel data model in first differences. Central to this procedure is Wooldridge's observation that, if the idiosyncratic errors (U_{it}) in the linear model are uncorrelated then its first difference $(\Delta Uit = e_{it})$ will be serially correlated i.e. Corr $(e_{it}, e_{it-1}) = -0.5$. Given this observation, the procedure regresses the first differenced residuals (obtained from the regression of linear model) on its lag (first lag) and tests that the coefficient on the lagged residual equals to -0.5. A significant test statistic indicates the presence of serial correlation (in U_{it}). Drukker (2003) provides simulation results showing that the test has good size and power properties in reasonably sized samples. The null hypothesis is that there is no first-order autocorrelation in U_{it} (i.e. there is first order autocorrelation in e_{it}). Application of this test shows that the regression models, used in the present study, are free from serial correlation, as the test statistics are not significant (Table 5.8).[66]

Table 5.8: Wooldridge Test for Autocorrelation in Panel Data (period 2003-2007)

Model	F (1, 79)	P value
Model: **re1**	2.275	0.1354
Model: **re2**	2.299	0.1334
Model: **re3**	2.371	0.1276
Model: **re4**	2.343	0.1298
Model: **re5**	0.234	0.6302
Model: **re6**	0.176	0.6762
Model: **re7**	0.708	0.4027
Model: **re8**	1.820	0.1811

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[66] Autocorrelation test result for the models presented in table 5.6 is not reported.

5.5 Conclusion

It is observed that there is an increase in the degree of competition albeit in static sense in the reform era. However, the efficiency-based measures of competition show that there is lot more scope for improving the competitive conduct of the Indian banking industry. It is also evident that there is a clear tendency towards (activity) diversification but the tendency of diversification is not uniform across banks and not all banks have accelerated the pace of diversification. From the risk analysis it can be inferred that the level of risk differs across banks depending on their ownership. The private sector banks show more risky behaviour followed by the PSBs and foreign banks. Therefore, increasing the role of private sector banks in the process of financial intermediation and furthering the level playing field have to go hand in hand with putting in place appropriate risk assessment mechanism and risk based supervision of these banks, besides the standard prudential norms.[67] The overall risk of the foreign bank group is found to be less because of their fat capital cushion. The PSBs are intermediate in terms of overall risk with relatively stable profitability. However, it is also observed that the capital cushion of public (and private sector) sector banks is at a lower level.

The use of alternative measures of competition gives broader picture as regards the effect of competition on banks' risk. It seems that competition, in the static sense, induces risky behaviour. However, the competition that enhances efficiency would be desirable for maintaining the health of the banking system in terms of less risk. At the same time, diversification strategy could be beneficial for mitigating risk. Simultaneously, banks also need to maintain higher capital adequacy ratio, even higher than the regulatory minimum. In this context, banking regulation assumes increasing significance in encouraging prudent practices among all commercial banks.

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[67] In this context it is worth mentioning that the Committee on Financial Sector Reforms (GOI, 2008) advocates for making the institutions ownership neutral where institutional form does not affect the costs of undertaking an activity other than for purely economic reasons, nonetheless, the committee is particular about allowing greater role of the private sector in order to improve the efficiency in the allocation of resources through increasing competition. There skepticism remains with regard to the implication of such a move on stability of the banking system given the inherent risky behaviour of private sector banks.

Chapter 6
Summary and Conclusion

The study has attempted to analyse various aspects of commercial banking industry such as changes in structure, conduct, performance of banks and most importantly the risk behaviour against the backdrop of banking sector reform and regulations that have been undertaken to improve the safety and soundness of the banking industry and to make it competitive both at home and abroad. The sector has improved itself to newer heights. Prudential norms have been adopted at par with international best practices. The capital adequacy ratio has also recorded considerable improvement. The analysis suggests that the industry has been witnessing considerable changes subsequent to the reforms especially in its structure and conduct. The policy changes have brought dynamism into the industry. New banks in the private sector are being introduced and foreign banks have been given liberal entry. As a result, the private sector banks have started assuming increasingly important role in the process of financial intermediation in an environment, which is made conductive by the introduction of various reforms and regulations. Banks have responded to the change in the market structure by diversifying and expanding through organic and inorganic lines of businesses, triggered by both endogenous and exogenous factors, technological advancement as well as the global developments. However, the tendency towards diversification has been marked by disparity across bank groups and also within the same groups. The within group disparity is observed to be more especially in case of the private sector banks and foreign banks.

There is an increase in the degree of competition, albeit in static sense, in the reform era. The asset, deposit and loan concentrations are lessening over the years. Although the banking market is monopolistically competitive, as reflected in *H Statistic*, the dominance of a few large banks continues. These banks might be able to influence the market rates of many banking products and services. Nevertheless, the efficiency-based measures of competition show that there is lot more scope for improving the competitive conduct of the Indian banking industry.

The descriptive (risk) analysis shows that the private sector banks are the most risky whereas the foreign banks are the least. The PSBs are the intermediate category in terms of risk exposure in their operation. Further, not only there are differences but also a widening gap among bank groups in terms of the observed risk levels as shown in the descriptive analysis. In the econometric analysis, it has been found that higher competition tends to induce risk unless there is improvement in the efficiency of the banking system. The use of alternative measures of competition gives broader picture as regards the effect of competition on banks' risk. Competition that enhances efficiency would be desirable for maintaining the health of the banking system in terms of less risk. Diversification to newer activities also found to have risk mitigating effects. However, diversification *per se* is not the sufficient condition for lowering risk rather selective diversification along with buffer capital stock could ensure bank's safety and keep the banking system healthy. In sum, while the banks have adapted themselves to changing environments, the fast evolving financial landscape continues to pose several challenges for them in the era of liberalisation of the financial system.

The portfolio composition has also shown a change in response to the regulatory measures and the changing macroeconomic environment. The credit portfolio has picked up in response to various supply and demand side related factors though it was less in the initial phase of reforms. As always, the SLR investment continues to dominate the NSLR investments, nevertheless the private sector banks have tended to invest relatively more in the latter (NSLR) variety. On the whole, deposits remain the major source of liability. However, for the foreign banks the relative importance of borrowings and capital is higher. The costs of deposits and funds have come down significantly which has been facilitated partly by the interest rate deregulation and partly by the market forces. Further, the deposits are priced competitively, as evident from relatively higher cost of deposits specifically for the private sector banks. In addition, the lower deposit and the cost of funds have not benefited the entire borrower community as the private sector and foreign banks continue to (charge) earn higher rates from the borrowers albeit within the regulatory stipulations. One of the reasons for this is the higher operating expense (on

payment and provision for employees, publicity and advertising activities and introduction of advanced technologies among others) of these banks.

The existence of disparity in banks' conduct is also reflected in the performance parameters such as the non-interest source of income. Overall, there has been improvement in the profitability and the return on assets (ROA) despite reduction in the return on advances and the return on investments. The reduction in return on advances and investments is observed to be an industry level phenomenon and is not the case of any particular bank or bank group *per se* that has been facilitated partly by the reduction of cost of deposits due to the measures like interest rate deregulation and various other reform measures. However, there is considerable disparity among banks in the profitability or ROA front as there are number of loss-making banks particularly in the private and the foreign categories. This also indicates that there is significant disparity among banks in the cost minimisation and risk management front.

Towards conclusion, there have been mixed responses to various enabling and strengthening measures in the banking sector. There has been increasing dynamism and deepening of the banking sector with improvements in capital adequacy ratio, better management of non-performing assets, rising credit-deposit ratio and also higher profitability at the industry level. However, at the same time, the industry has continued to experience disparity in its conduct and performance and most importantly in the risk levels despite various enabling and strengthening measures. From the measures of risk, the private sector banks are found to be most risky, whereas the foreign banks are found to be least risky but mostly because of obese capital cushion of the latter. The PSBs are found to be the intermediate group, among the three types of banks, in terms of riskiness in its operations, because of their stable profitability.

Investigating on the determinants of risk, it has been found that higher competition tends to induce risk unless there is wider improvement in the efficiency of the banking system. Diversification to newer activities is found to have risk mitigating effects, however, diversification *per se* is not the sufficient condition for lower risk levels

rather selective diversification along with buffer capital stock could ensure bank safety. However, one could question large-scale diversification from a socio-economic perspective, in which banks are expected to meet the financial needs of credit-worthy individuals and economic units by engaging in relationship banking. Financial innovations would increase the overall complexity and the risks, which the banking sector could be exposed to in the future. This would need to be addressed by enhanced safety and soundness of the system, so that benefits of changing structure is maximised. Any complacency may not be desirable. Regulators need to be alert as there could be other sources of risks that were never observed earlier rather than ensuring mere compliance with prudential stipulations. Nonetheless, in an increasingly deregulated environment, the banking regulation has got to adequately assess the banks' risk and equip itself to meet the growing challenges of discouraging lucrative risky innovations in order to create a healthy banking system and maintain financial stability. In the immediate future, (high) operating cost and (selective) diversification of activities would be some of the aspects, which banks need to focus on to remain competitive and profitable. The regulator also needs to ensure that the benefit of low cost is transferred to the borrowers. Last but not the least, is to ensure undiminished flow of funds to the creditworthy individuals and firms so as to maintain the tandem of economic growth.

Limitation of the Study and Scope for Further Research

The study has tried to deal with a limited set of objectives especially the analysis of risk behaviour of commercial banks in an environment characterised by reform and regulations covering all the commercial banks operating in India irrespective of the ownership category because of the fact that the portfolio exposures of different banks have tended to move towards the same direction. While doing so, the study has applied a reasonable methodology. However, it has not been possible to test the alternative methodologies to examine the consistency of results, within the constraint of time. Further, the risk model employed in the study exclusively focuses on the supply side variables (i.e. from the bank or banking systems' perspective) thus the study can be criticised from the point of view of ignoring demand side or real variables e.g. GDP

growth rate or real interest rate which can have effect on banks' risk. The efficiency indicator that is used to construct the 'relative profit difference' measure of competition also needs improvement. In addition, technology variables (both tangible e.g. ATM and intangible e.g. internet banking etc.) have not been given adequate attention in the analysis of banks' risk because of various constraints though these are emerging features. The effect of bank specific ownership structure and bank mergers on risk (if any) has also not been looked at separately and comprehensively. In the present study, despite having higher off-balance sheet (OBS) exposures, the foreign banks in India are found to be less risky. It could be due to better risk management in these banks even though the risk is said to be higher in the OBS activities. Nonetheless, a separate study can be undertaken to analyse the risk of OBS activities for all the categories of banks. Furthermore, the implication of banks' risk on economic activity, if any, and the channels thereof need to be studied in the Indian context. Therefore, there is ample scope for future research in these lines and also to address the relevance of analysing risk in the structure-conduct and performance (SCP) framework.

Notwithstanding the limitations, a few issues emerge from the study. Firstly, there is a need to augment (equity) capital in both PSBs and private sector banks. Secondly, the disparity observed in the conduct, performance and risk parameters needs to be harmonised across banks in order to arrive at a healthy banking system, which will be conductive for equitable economic growth. In particular, the disparity in cost, earning and profitability indicators should not increase over time for maintaining the structure and healthiness of the banking system. Finally, banking regulation needs to assume greater role for adequate assessment of risk and encourage prudent practices among banks, so as to maximise the benefits of changing structure, overcome the challenges of fast evolving financial landscape and avoid financial instabilities.

Appendix

Table 1: Financial Assets of Banks and Financial Institutions
(At the end-March: Amount in Rs. Crore)

Description	1990-91	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05P
I. All Banks (3+4)	2,32,786	7,61,326	8,88,781	10,50,276	12,69,034	14,50,854	16,96,574	20,46,643
1. All Scheduled Commercial banks*	2,22,613	7,26,129	8,51,100	10,09,150	12,23,008	14,01,682	16,43,447	19,87,456
2.non-scheduled commercial banks**	77	0	0	0	0	0	0	0
3.Total Commercial banks (1+2)	2,22,690	7,26,129	8,51,100	10,09,150	12,23,008	14,01,682	16,43,447	19,87,456
4. State Co-operative Banks+	10,096	35,197	37,681	41,126	46,026	49,172	53,127	59,187
II. Financial Institutions (5to8)++	1,27,975	4,64,328	5,22,466	5,89,741	5,69,253	5,77,877	7,00,340	6,51,840
5.Term-lending Institutions# (All-India)	57,372	2,09,388	2,29,109	2,42,062	1,71,215	1,80,740	1,95,247	1,39,153
6.State Level Institutions@	10,049	21,629	24,518	31,993	38,904	53,044	60,942	60,942 >>
7.Investment Institutions@@	58,566	2,27,023	2,61,885	3,07,732	3,50,538	3,34,570	4,33,178	4,39,409
8.Other Institutions ##	1,988	6,289	6,954	7,954	8,596	9,523	10,973	12,336
III. Aggregate (I+II)	3,60,761	12,25,654	14,11,247	16,40,017	18,38,287	20,28,731	23,96,914	26,98,483
IV. Percentage Share:								
a. I in III	64.5	62.1	63	64	69	71.5	70.8	75.8
b. II in III	35.5	37.9	37	36	31	28.5	29.2	24.2

Source: Trend and Progress of Banking in India, 2005.

Note: P: provisional, >>figures repeated.

* As per returns under Section 42 of the RBI Act, 1934 and since 1991 relate to the reporting Friday of March, except the ICICI Bank Ltd., for which the data relate to end-March 2002.

** As per returns under Section 27 of the Banking Regulation Act, 1949. Data relate to the last Friday of March.

+ The data since 1990 are in respect of last Reporting Friday of March.

++ Figures pertain to the accounting year of the respective financial institution.

Term-lending institutions include IDBI, NABARD, ICICI, IFCI, EXIM BANK, IIBI, NHB and IDFC. Data exclude ICICI from 2001-02 as it was merged with ICICI Bank Ltd. since May 2002 and IDBI from 2004-05 which was converted into a bank since October 2004.

@ State level institutions include SFCs and SIDCs.

@@ Investment institutions include UTI (till 2002 since its conversion into a mutual fund), LIC and GIC and its former subsidiaries.

Other institutions include DICGC and ECGC.

Note: 2. Data of financial assets of banks include: (i) Cash in hand and balances with the Reserve Bank, (ii) Asset with the Banking System (iii) Investments, (iv) Bank Credit (total loans, cash credits, overdrafts and bills purchased and discounted) and (v) Dues from banks.

Table 2: Macro Indicators Relating to the Banking Sector of India

Year	% Share of Banking* in GDP	Growth rate of Banking* GDP (%)	Share of Banking (%) in Service	Deposit % of GDP	CB Asset % of GDP	CB Credit % of GDP	Average Population Per bank branch@ (in '000)
1991	4.4	17.6	11.04	48.63	67.78	29.75	11
2001	5.5	0.10	10.88	54.82	67.27	27.33	15
2003	6.4	15.80	12.16	59.95	75.03	32.70	16
2004	6.4	11.90	12.09	62.07	77.81	34.05	16
2005	5.8	3.60	11.08	63.77	81.85	39.99	16
2006	5.5	7.60	10.51	66.08	85.05	46.31	16
2007	5.6	18.20	10.75	71.16	91.38	52.27	16

Source: *Statistical Tables Relating to Banks in India* (Various Years), *Trend and Progress of Banking in India* (Various Years) *and National Accounts Statistics, CSO (2008)*, Own Calculation.

Note: GDP is at current price. * Including insurance.

@ 136 thousand in 1951, 64 thousand in 1969, 19 thousand in 1981, 17.5 thousand in 1982, 16 thousand in 1983, 15 thousand in 1984, 14 thousand in 1993.

Table 3: Number of Commercial Banks and Loss-making Commercial Banks

Year	No. of Commercial Banks				No. of Loss-making Commercial Banks			
	PSBs	Private	Foreign	All CBs	PSBs	Private	Foreign	All CBs
1992	27	25	21	73	1	1	1	3
1993	27	24	22	73	12	2	1	15
1994	27	24	23	74	12	3	0	15
1995	27	24	21	72	8	2	0	10
1996	27	33	31	91	8	3	4	15
1997	27	34	32	93	3	0	4	7
1998	27	33	42	102	2	1	7	10
1999	27	33	44	104	2	2	15	19
2000	27	32	42	101	1	1	10	12
2001	27	31	42	100	2	3	10	15
2002	27	30	40	97	0	1	11	12
2003	27	29	36	92	0	2	7	9
2004	27	30	33	90	0	2	6	8
2005	28	28	31	87	1	9	8	18
2006	28	28	29	85	0	4	4	8
2007	28	25	29	82	0	2	2	4

Source: Counted from Statistical Tables Relating to Banks in India, Various Years.

Table 4: Number of ATMs of Commercial Banks in 2006 (end March)

Bank Group	On-site ATMs	Off-site ATMs	Total ATMs	Percentage of off-site to total ATMs	No of Branches	Ratio of the No of ATMs to no of Branches
Nationalised Banks	4812	2353	7165	32.84	35621	0.20
State Bank Group	1775	3668	5443	67.39	14196	0.38
PSBs	6587	6021	12608	47.76	49817	0.25
Private	3309	4350	7659	56.80	6780	1.13
Old Private	1054	493	1547	31.87	4862	0.32
New Private Sector Banks*	2255	3857	6112	63.11	1918	3.19
Foreign Banks	232	648	880	73.64	263	3.35

Source: Taken from the *Indiastat* site: http://www.indiastat.com/ (cited source RBI).

Note: *New private sector banks are Axis Bank Ltd., Centurion Bank of Punjab Ltd., HDFC Bank Ltd., ICICI Bank Ltd., Indusind Bank Ltd., Kotak Mahindra Ltd., and Yes Bank Ltd.

Table 5: Number of Bank Branches/Offices of Scheduled Commercial Banks

Bank Group	1991	2000	2001	2002	2003	2004	2005	2006	2007
Public	41730	47447	47643	47676	47923	48242	48974	49817	51392
Private	3800	5207	5381	5578	5589	5943	6321	6813	7363
Foreign	141	193	205	206	212	224	245	263	276
All CBs	45671	52847	53229	53460	53724	54409	55540	56893	59031
RRBs	14518	14685	14694	14716	14755	14733	14762	14764	14773
SCBs	61089	67532	67923	68176	68479	69142	70302	71657	73804

Source: Statistical Tables Relating to Banks in India, Various Years.

Table 6: Mergers / Amalgamations in the Indian Banking Sector: 1990 Onwards

Year	Bank	Merged/Amalgamated With
1990	Bank of Tamil Nadu Ltd.	Indian Overseas Bank
1990	Bank of Thanjavur Ltd.	Indian Bank
1990	Purur Central Bank ltd.	Bank of India
1990	Purbanchal Bank Ltd.	Central Bank of India
1993	New Bank of India	Punjab National Bank
1996	Kashi Nath Seth Bank Ltd.	State Bank of India
1997	Bari Doab Bank Ltd.	Oriental Bank of commerce
1997	Punjab Cooperative Bank Ltd.	Oriental Bank of commerce
1999	Bareilly Corp. Bank Ltd	Bank of Baroda
1999	The Sikkim Bank Ltd.	Union Bank of India
2000	Times Bank ltd.	The HDFC Bank Ltd.
2001	Bank of Madura Ltd.	ICICI Bank Ltd.
2002	ICICI Ltd.	ICICI Bank Ltd.
2002	Benares State Bank Ltd.	Bank of Baroda
2003	Nedungadi Bank Ltd.	Punjab National Banks
2004	South Gujarat local area bank	Bank of Baroda
2004	Global Trust Bank Ltd.	Oriental Bank of commerce
2005	IDBI Ltd.	IDBI Bank Ltd.
2005	Bank of Punjab ltd.	Centurion Bank Ltd.
2006	Ganesh Bank of Kurundwad Ltd.	Federal Bank Ltd.
2006	United Western Bank Ltd.	IDBI Ltd.
2007	Bharat Overseas Bank Ltd.	Indian Overseas Bank
2007	Sangli Bank Ltd.	ICICI Bank Ltd.
2007	Lord Krishna Bank Ltd.	Centurion Bank of Punjab Ltd
2008	Centurion Bank of Punjab Ltd	HDFC Bank Ltd.

Source: Report on Currency and Finance (RBI, 2008).

Table 7: Business per Office/Branch of Commercial Banks (Rs. Crore)

Bank Group	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
PSBs	17.02	19.86	22.96	26.74	30.40	33.99	38.55	46.77	54.78	66.83
Private	21.37	25.32	32.54	38.05	51.25	61.66	73.86	84.32	108.82	131.30
Foreign	368.18	400.83	440.11	498.47	549.24	573.03	627.91	660.50	802.43	1004.10
All CBs	18.76	21.79	25.43	29.70	34.58	38.99	44.83	53.75	64.70	79.25

Source: Statistical Tables Relating to Banks in India, Various Years
Note: Business is equal to deposit plus advances

Table 8: Asset and Credit Concentration by Ownership Structure

Year	Asset Share (in %)			Credit Share (in %)		
	PSBs	Private	Foreign	PSBs	Private	Foreign
1990	91.88	3.52	4.61	92.65	3.56	3.79
1991	91.44	3.73	4.84	92.88	3.52	3.60
1992	88.85	4.23	6.93	90.59	4.02	5.40
1993	88.68	4.74	6.58	90.37	4.69	4.95
1994	87.11	5.23	7.66	87.30	5.83	6.86
1995	86.60	6.70	6.70	86.08	7.53	6.39
1996	84.46	7.60	7.94	82.37	8.70	8.93
1997	83.01	8.77	8.22	80.14	10.21	9.65
1998	81.60	10.19	8.21	80.06	10.92	9.02
1999	81.04	10.90	8.06	80.46	11.56	7.98
2000	80.24	12.3	7.46	79.40	12.57	8.03
2001	79.52	12.62	7.86	78.87	12.95	8.18
2002	75.27	17.43	7.30	74.44	18.03	7.53
2003	75.75	17.39	6.68	74.31	18.63	7.06
2004	74.5	18.6	6.9	73.22	19.78	7.00
2005	75.31	18.17	6.52	74.30	19.15	6.55
2006	72.33	20.52	7.16	72.94	20.63	6.43
2007	70.45	21.52	8.03	72.69	20.93	6.38

Source: Statistical Tables Relating to Banks in India, Various Years.

Table 9: Median and Standard Deviation of the Ratio of Off-Balance Sheet Activities to Asset

Bank Group	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007
Median										
PSBs	0.19	0.18	0.20	0.24	0.18	0.25	0.25	0.29	0.29	0.32
Private	0.21	0.16	0.19	0.22	0.22	0.19	0.27	0.19	0.21	0.21
Foreign	2.05	1.22	2.08	1.61	1.00	1.25	1.45	1.68	2.13	2.22
All CBs	0.30	0.28	0.29	0.33	0.29	0.32	0.32	0.33	0.37	0.37
Standard deviation										
PSBs	0.11	0.11	0.15	0.30	0.30	0.28	0.14	0.16	0.17	0.16
Private	0.50	0.41	0.34	0.35	0.23	0.23	0.33	0.96	0.96	1.20
Foreign	9.09	4.45	6.00	6.98	5.67	5.81	11.11	23.83	33.48	40.10
All CBs	6.04	3.12	4.23	4.93	3.92	3.94	7.13	14.97	20.57	25.17

Source: Statistical Tables Relating to Banks in India, Various Years, Own Calculation
*Taken from CMIE-PROWESS Electronic Database.

Table 9a: Bank Group-wise Composition of Off-Balance Sheet Activities (Rs lakh)

Year	Bank Group	1	2	3	4	5
1999	PSBs	10718041	4199154	2883361	1144167	18944722
	Percentage	56.58	22.17	15.22	6.04	100
	Private	3448867	663791	500317	173679	4786653
	Percentage	72.05	13.87	10.45	3.63	100
	Foreign	19275136	1417050	959604	464207	22115457
	Percentage	87.16	6.41	4.34	2.10	100
2000	PSBs	14183850	4283760	3412323	1544499	23424433
	Percentage	60.55	18.29	14.57	6.59	100
	Private	4970878	865663	616298	234587	6687427
	Percentage	74.33	12.94	9.22	3.51	100
	Foreign	24649370	1587198	865623	1321154	28423346
	Percentage	86.72	5.58	3.05	4.65	100
2001	PSBs	19956534	4399324	3510501	2007157	29873523
	Percentage	66.80	14.73	11.75	6.72	100
	Private	6229201	1004141	737659	272427	8243431
	Percentage	75.57	12.18	8.95	3.30	100
	Foreign	32350749	1741472	743397	2345038	37180658
	Percentage	87.01	4.68	2.00	6.31	100
2002	PSBs	20948461	4815068	3687735	3476554	32927817
	Percentage	63.62	14.62	11.20	10.56	100
	Private	7039101	1780617	734646	1462630	11016993
	Percentage	63.89	16.16	6.67	13.28	100
	Foreign	36091621	1829813	711783	5957043	44590261
	Percentage	80.94	4.10	1.60	13.36	100

		(1)	(2)	(3)	(4)	(5)
2003	PSBs	26418660	5355573	4713083	4142698	40630014
	Percentage	65.02	13.18	11.60	10.20	100
	Private	9247905	1906961	1144852	7281270	19580989
	Percentage	47.23	9.74	5.85	37.19	100
	Foreign	41717377	1734782	949157	11783408	56184720
	Percentage	74.25	3.09	1.69	20.97	100
2004	PSBs	31318497	6284531	7046256	3990406	48639692
	Percentage	64.39	12.92	14.49	8.20	100
	Private	16331608	2142839	1713489	18461603	38649539
	Percentage	42.26	5.54	4.43	47.77	100
	Foreign	68629487	1757461	948662	17680835	89016446
	Percentage	77.10	1.97	1.07	19.86	100
2005	PSBs	41515817	7893060	9762883	9210103	68381863
	Percentage	60.71	11.54	14.28	13.47	100
	Private	21705543	2501802	2739488	27100202	54047035
	Percentage	40.16	4.63	5.07	50.14	100
	Foreign	116190323	1919506	1385625	39568148	159063603
	Percentage	73.05	1.21	0.87	24.88	100
2006	PSBs	50531530	10361454	11453268	11852531	84198783
	Percentage	60.01	12.31	13.60	14.08	100
	Private	46995495	3280160	3443079	31598547	85317281
	Percentage	55.08	3.84	4.04	37.04	100
	Foreign	218402025	2481259	2101610	32433279	255418173
	Percentage	85.51	0.97	0.82	12.70	100
2007	PSBs	61293573	13771520	14192529	15870127	105127750
	Percentage	58.30	13.10	13.50	15.10	100
	Private	75079283	4862275	4419303	48648415	133009275
	Percentage	56.45	3.66	3.32	36.58	100
	Foreign	422152754	3327927	3078240	76475464	505034385
	Percentage	83.59	0.66	0.61	15.14	100

Source: Statistical Tables Relating to Banks in India, Various Years.

Note: Column: (1) liability on account of outstanding forward exchange contracts (includes derivative contracts) (2) guarantees given on behalf of constituents both in India and outside India (3) acceptances, endorsements and other obligations (4) others (Including (a) claims against the bank not acknowledged as debts and (b) liability for partly paid investments) and (5) total.

Table 10a: Descriptive Statistics of Variables in the Risk Function (1998-2007)

Variables	Median	Standard Deviation	Minimum	Maximum	No of Observations	Skewness
Z Score	5.51	10.10	-2.68	85.09	770	3.98
3B	33.71	1.21	31.12	34.58	770	-0.42
Ah	0.06	0.01	0.04	0.07	770	-0.23
RPD	0.81	1.39	-15.35	4.85	770	-2.60
OFFON	0.31	11.60	0	184.74	770	10.78
AS	0.01	0.03	0.00001	0.24	770	5.91
CAR %	12.35	27.65	0	347.22	770	5.14

Table 10b: Descriptive Statistics of Variables in the Risk Function (2003-2007)

Variables	Median	Standard Deviation	Minimum	Maximum	No of Observations	Skewness
Z Score	7.12	15.83	-1.11	96.58	386	2.66
Zc Score	1.12	8.09	-1.20	46.65	386	2.91
3B	32.02	0.75	31.12	33.53	386	0.69
Ah	0.05	0.006	0.04	0.06	386	0.02
H	0.29	0.15	0.10	0.50	386	-0.08
RPD	-0.19	8.68	-38.30	13.30	386	-1.71
OFFON	0.32	17.05	0	184.74	386	6.87
AS	0.005	0.03	0.00001	0.26	386	5.34
CAR %	12.77	24.02	0.99	141.24	386	3.11

Table 11:Correlation of the Panel Variables I (2003-07, No of observations 386)

	Z Score	3B	Ah	H	RPD	OFF-ON	AS	Dpvt	Df	CAR
Z Score	1									
3B	0.02	1								
Ah	0.02	0.98*	1							
H	-0.02	0.05	.23*	1						
RPD	0.09	0.06	-0.06	-0.36*	1					
OFF ON	0.13**	-.11**	-.11**	-0.01	0.11**	1				
AS	-0.04	0.03	0.02	-0.02	0.005	-0.09	1			
Dpvt	-0.24*	0.03	0.03	0.02	-0.04	-0.15*	0.002	1		
Df	0.42	-0.06	-0.06	0.004	0.05	0.33*	-0.27*	-0.47*	1	
CAR	0.51*	-0.03	-0.03	-0.005	0.08	-0.03	-0.19*	-0.25*	0.54*	1

Note: * Implies significant at 1 %, and ** implies significant at 5 % level of significance.

Table 12: Correlation of the Panel Variables II (2003-07, No of observations 386)

	Zc Score	3B	Ah	H	RPD	OFF-ON	AS	Dpvt	Df	CAR
Zc Score	1									
3B	0.03	1								
Ah	0.02	0.98**	1							
H	0.08	0.05	0.23*	1						
RPD	0.006	0.06	-0.06	-0.36*	1					
OFF ON	0.28*	-.11**	-.11**	-0.01	0.11**	1				
AS	-0.22*	0.03	0.02	-0.02	0.01	-0.09	1			
Dpvt	-0.28*	0.03	0.03	0.02	-0.04	-0.15*	-0.16*	1		
Df	0.61*	-0.06	-0.06	0.004	0.05	0.33*	-0.27*	-0.47*	1	
CAR	0.77*	-0.03	-0.06	-0.005	0.08	-0.23	-0.19	-0.25*	0.54*	1

Note: * Implies significant at 1 %, and ** implies significant at 5 % level of significance.
Correlation between Z Score and Zc Score is 0.64 and significant at conventional level of significance.

Table 13: PR Methodology and the Resultant H Statistic[#]: Dependent Variable ln(EA)

Covariates	2003	2004	2005	2006	2007
ln F	0.085***	0.193*	0.352*	0.238*	0.04
ln L	-0.020	-0.016	-0.039	0.042	-0.01
ln K	0.094*	0.110*	0.182*	0.115*	0.07*
ln A	-0.002	-0.012	-0.003	-0.084***	-0.09*
ln CAR	-0.17*	-0.169*	-0.02	0.035	0.03
ln OFFON	0.007	-0.001	0.02	0.054***	0.08*
ln BRS	-0.02	-0.016	0.005	0.077***	0.09*
Constant	-1.7*	-1.31	-1.35	-0.361	-0.67
Adjusted R^2	0.37	0.29	0.51	0.40	0.25
N	66	78	81	81	79
F	6.55*	5.5*	12.67*	8.69*	4.77*
H	0.16	0.29	0.5	0.4	0.10

Own specification,
*Significant at 1 percent, **Significant at 5 percent, ***Significant at 10 percent.

Table 13a: Equilibrium Test under the PR Methodology

Year	Degrees of freedom	F	P value
2003	1, 51	0.09	0.76
2004	1, 64	0.11	0.74
2005	1, 57	0.46	0.50
2006	1, 67	0.37	0.55
2007	1, 68	0.25	0.62

Note: The equilibrium test is performed after regressing the model 4(a) described in the fourth chapter. The null hypothesis is that sum of coefficients of factor inputs (ln F, ln L and ln K) is equal to zero. The above table (Table 13a) shows that the null hypothesis is not rejected in all the years. This means that banks are in long-run equilibrium. Hence, the *H Statistic* is valid.

Table 14: PR Methodology and the Resultant H Statistic$^\$$: Dependent Variable, ln (EA)

Covariates	2003	2004	2005	2006	2007
ln F	0.035	0.309*	0.406*	0.333*	0.139*
ln L	-0.012	0.016	-0.017	0.018	0.049
ln K	0.073*	0.087*	0.089*	0.031	0.026***
ln A	-0.015	-0.034	-0.044	-0.056**	-0.068*
ln CAR	-0.174*	0.002	-0.008	-0.011	-0.001
ln AA	-0.001	0.086*	0.049***	0.002	0.045***
ln BRS	0.005	0.021	0.039***	0.061**	0.07*
ln INI	-0.152*	-0.216*	-0.197*	-0.236*	-0.223*
D5	0.04	0.052	-0.017	-0.054	-0.02
Constant	-1.327	-0.577	-0.031	0.071	0.361
Adjusted R^2	0.58	0.67	0.69	0.70	0.62
N	67	76	79	79	78
F	11.52*	17.62*	21.03*	21.55*	14.98*
H	0.096	0.41	0.47	0.38	0.22

Note: $ using the model specified by Prasad and Ghosh (2005). The additional variables in Prasad and Ghosh (2005) are as below. AA is the advance (loan) asset ratio, INI is the ratio of interest income to non-interest income, D5 is the dummy variable for five largest banks. *Significant at 1 percent, **Significant at 5 percent, ***Significant at 10 percent.

Chart 1: Three-Bank Concentration Ratio of Commercial Banks

	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
—◆—3bank_asset	41.5	34.3	34.6	33.9	34.4	34.2	33.5	32.2	32	32	31.1
▬3bank_deposit	36.3	32.71	33.66	32.89	33.93	33.16	32.99	31.28	31.06	30.71	29.97
—▲—3bank_advances	43.2	35.75	34.57	33.31	32.99	31.92	32.09	30.99	30.79	32.13	31.88

109

Chart 2: Median Capital-Asset Ratio of Commercial Banks

◆— PSBs ■— Private ▲— Foreign —— All CBs

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
◆— PSBs	1.47	1.28	1.17	1.10	0.90	0.96	0.86	0.70	0.69	0.54
■— Private	0.92	0.77	0.80	0.83	0.79	0.91	0.77	0.75	0.95	0.82
▲— Foreign	10.57	12.21	15.32	11.95	14.72	19.02	16.06	14.39	16.44	15.68
—— All CBs	2.75	2.33	1.98	1.70	1.56	1.65	1.49	1.41	1.23	1.05
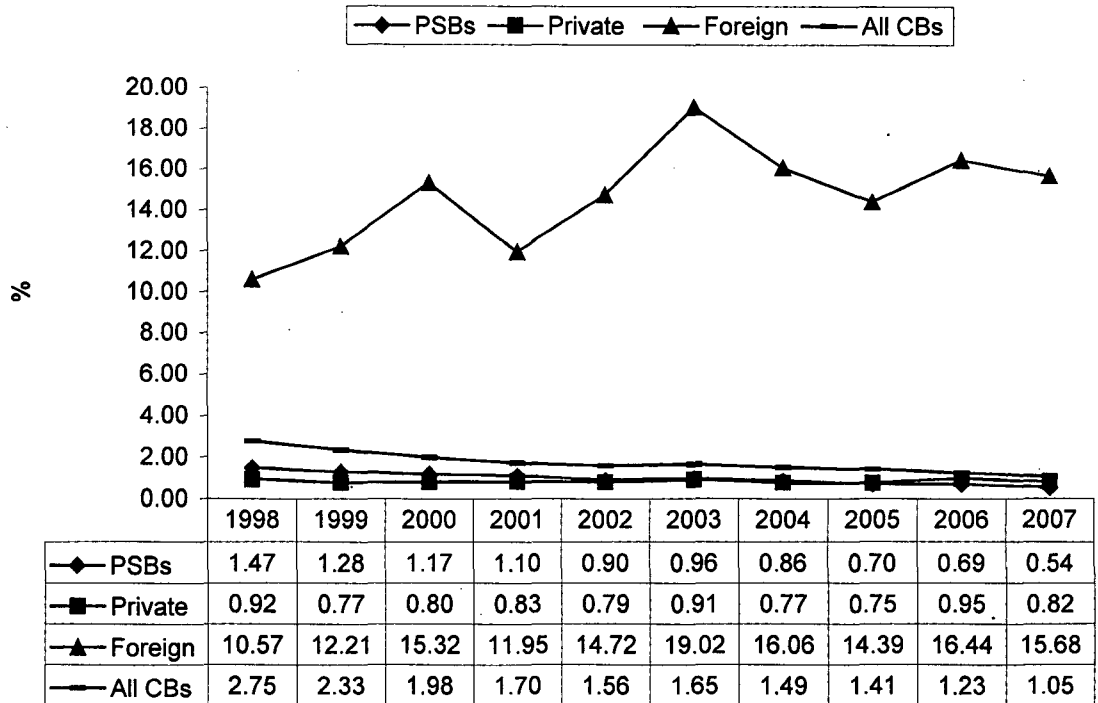
Chart 3: Median CAR of Commercial Banks (in percentage)

◆— PSBs ■— Private ▲— Foreign —— All CBs

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
◆— PSBs	8.8	10.4	10.85	10.87	11.47	11.61	11.57	12.23	12.74	12.3	11.95	12.32
■— Private	11.79	11.97	11.39	11.61	11.56	11.23	11.64	11.32	13.03	12.03	11.26	12.43
▲— Foreign	9.83	11.31	13.21	12.9	17.95	15.72	19.7	25.74	34.83	30.07	31.33	23.26
—— All CBs	9.5	10.8	11.48	11.58	11.82	12.14	12.54	13.54	13.85	12.72	12.08	12.67

110
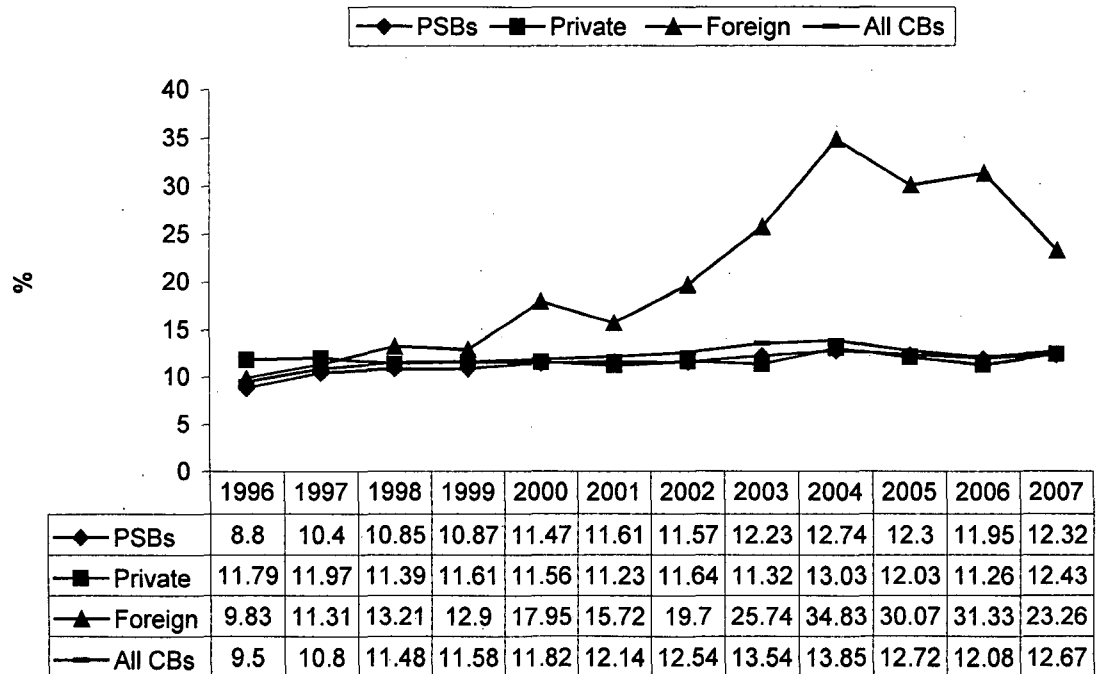
Chart 4: Mean and Median ROA (Return-on-Assets) of PSBs

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
—◆—mean	0.77	0.42	0.57	0.42	0.72	0.96	1.12	0.87	0.82	0.83
—■—median	0.83	0.54	0.59	0.43	0.75	1.01	1.20	0.90	0.75	0.80
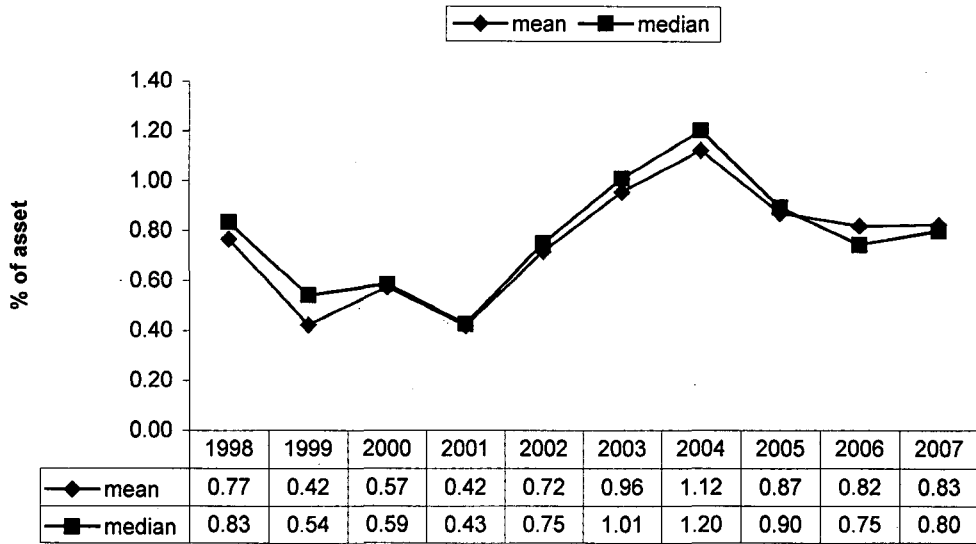
Chart 5: Mean and Median ROA of Private Sector Banks

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
—◆—mean	1.04	0.68	1.02	0.77	0.83	1.04	1.16	1.06	1.07	1.02
—■—median	1.00	0.77	0.84	0.72	0.87	0.98	1.07	0.43	0.57	0.85

111
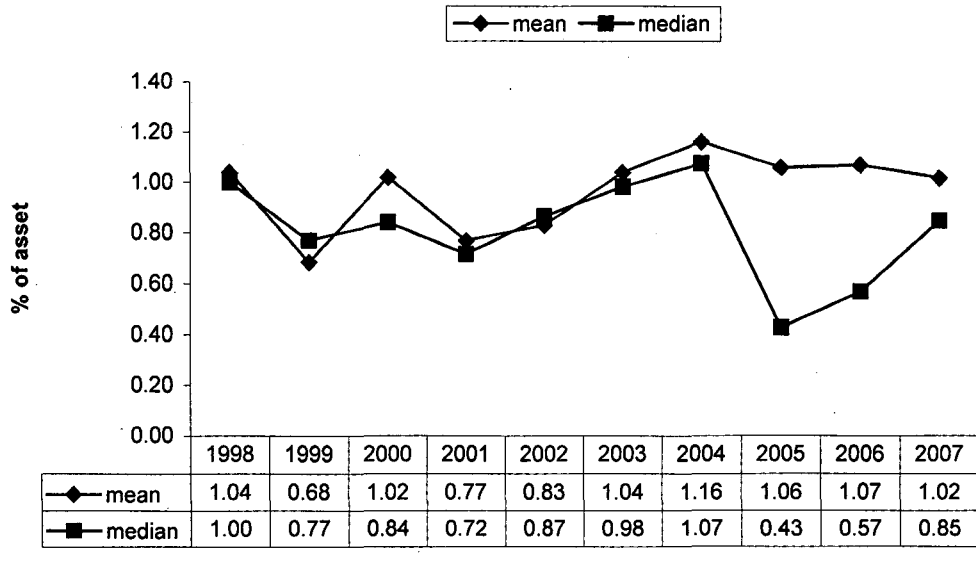
Chart 6: Mean and Median ROA of the Foreign Banks

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
mean	0.96	0.91	1.3	1.1	1.4	1.59	1.88	1.61	2.08	2.27
median	1.10	0.81	0.92	0.80	0.86	0.75	1.32	1.11	1.04	1.52
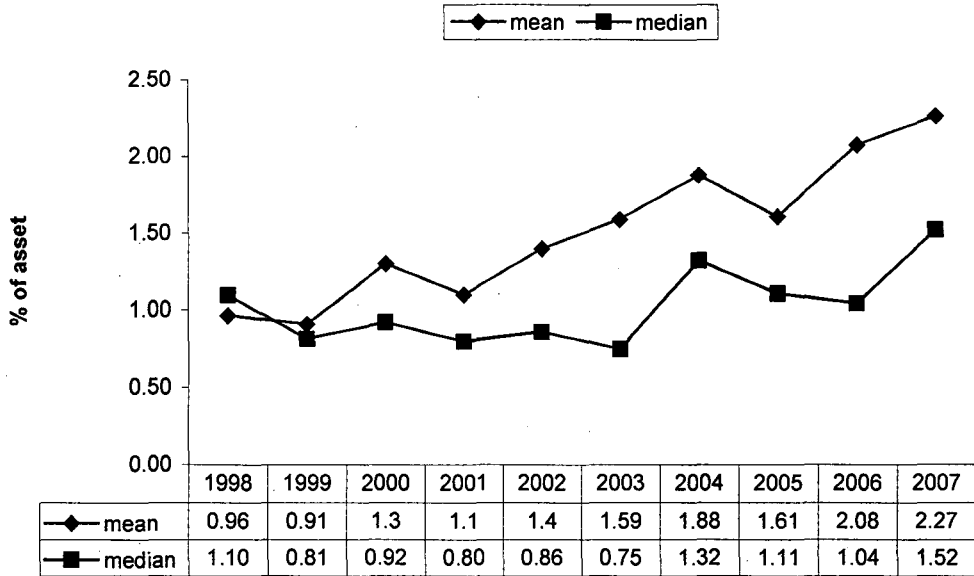
Chart 7: Mean and Median ROA of all Commercial Banks

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
mean	0.81	0.49	0.73	0.57	0.83	1.08	1.23	1.01	1.01	1.05
median	0.98	0.73	0.75	0.66	0.81	0.99	1.20	0.86	0.86	0.94

112
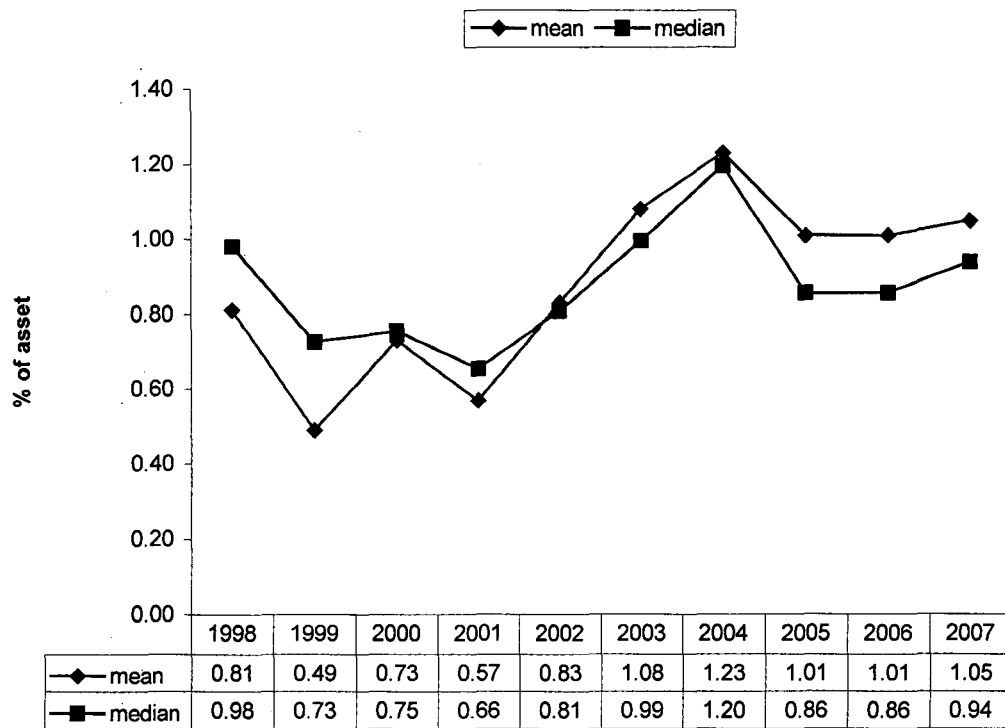
Chart 8: Net NPA of Commercial Banks as percentage of Net Advances

Legend: ◆ PSBs ■ Private ▲ Foreign

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
◆ PSBs	8.15	8.13	7.42	6.74	5.82	4.53	2.99	2.06	1.32	1.05
■ Private	5.26	7.41	5.41	5.44	5.73	4.95	2.84	1.85	1.01	0.97
▲ Foreign	2.25	2.94	2.41	1.86	1.89	1.76	1.48	0.86	0.83	0.73
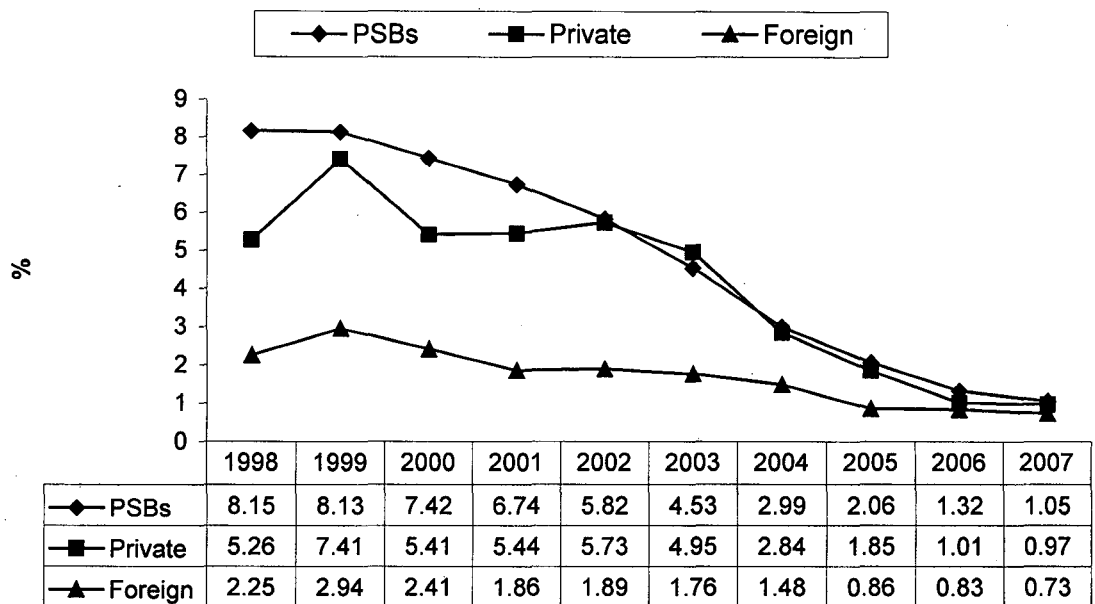
Chart 9: Spread of Commercial Banks as percentage of Assets

Legend: ◆ PSBs ■ Private ▲ Foreign — All CBs

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
◆ PSBs	2.91	2.81	2.70	2.84	2.73	2.91	2.97	2.91	2.85	2.65
■ Private	2.44	2.09	2.13	2.33	1.58	1.96	2.18	2.32	2.40	2.45
▲ Foreign	3.92	3.47	3.85	3.64	3.25	3.36	3.46	3.34	3.58	3.74
— All CBs	2.95	2.78	2.72	2.84	2.57	2.77	2.86	2.83	2.81	2.69
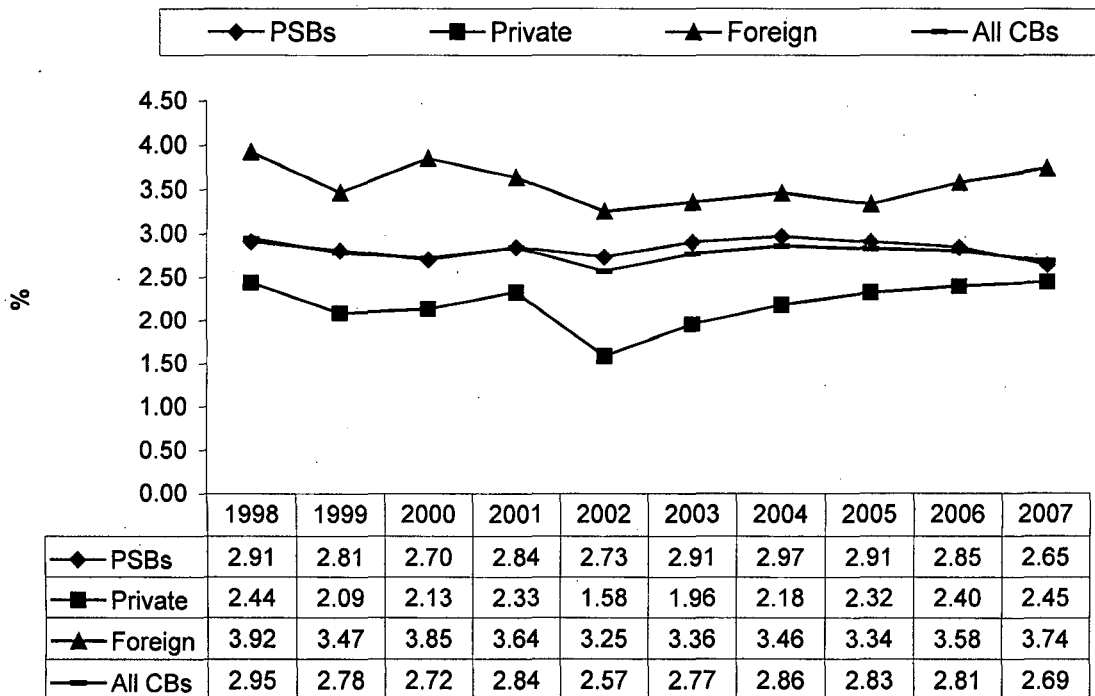
Chart 10: Burden of Commercial Banks as percentage of Assets

—◆—PSBs —■—Private —▲—Foreign ———All CBs

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
—◆—PSBs	1.33	1.44	1.24	1.51	0.86	0.59	0.29	0.71	0.96	0.92
—■—Private	0.20	0.66	0.18	0.59	-0.14	-0.46	-0.05	0.53	0.69	0.56
—▲—Foreign	0.03	0.94	0.53	0.59	0.12	0.15	-0.20	0.35	0.24	0.29
———All CBs	1.11	1.31	1.05	1.32	0.63	0.38	0.19	0.65	0.86	0.79

Note: burden is equal to non-interest expenditure minus non-interest income.

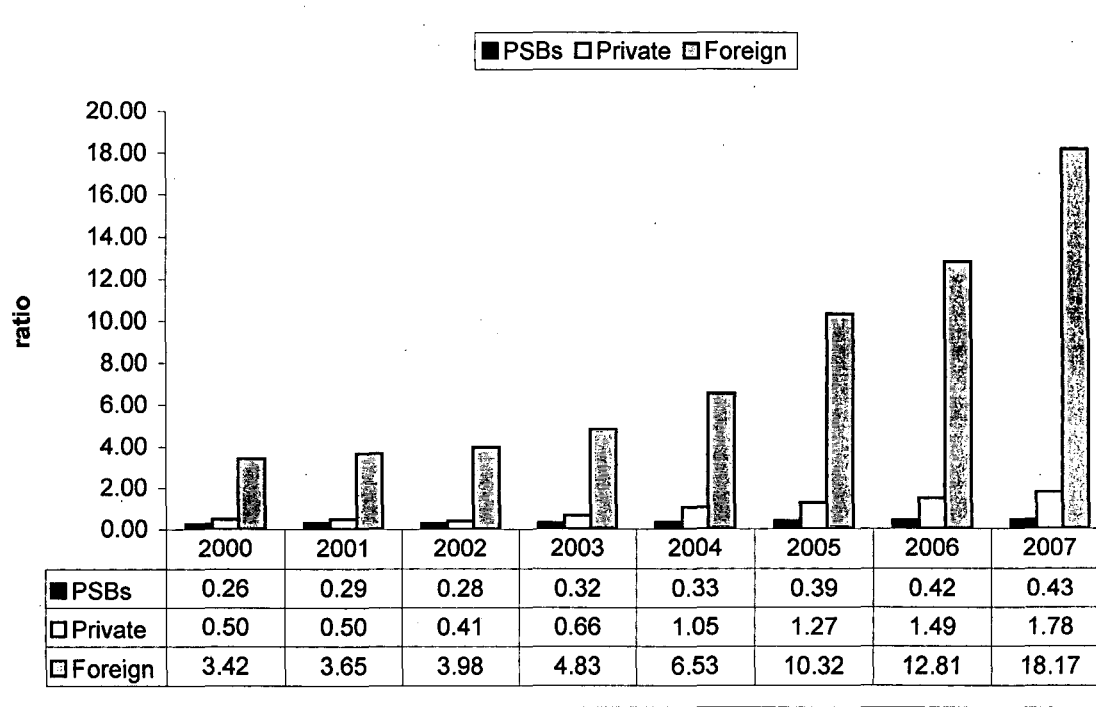## Chart 11: Ratio of Off-Balance Sheet Activities to Total Assets

■PSBs □Private ▣Foreign

	2000	2001	2002	2003	2004	2005	2006	2007
■PSBs	0.26	0.29	0.28	0.32	0.33	0.39	0.42	0.43
□Private	0.50	0.50	0.41	0.66	1.05	1.27	1.49	1.78
▣Foreign	3.42	3.65	3.98	4.83	6.53	10.32	12.81	18.17

Chart 12: Lending to Sensitive Sector as Percentage of Total Advances

◆ PSBs   ■ Private   ▲ Foreign   — All CBs

	2000	2001	2002	2003	2004	2005	2006	2007
◆ PSBs	3.07	3.52	3.20	2.85	2.76	2.77	15.61	16.58
■ Private	11.18	9.74	4.97	5.39	5.50	6.36	27.33	30.98
▲ Foreign	7.26	4.21	4.21	2.93	3.37	4.57	28.17	28.71
— All CBs	4.40	4.38	3.60	3.33	3.34	3.58	18.84	20.37
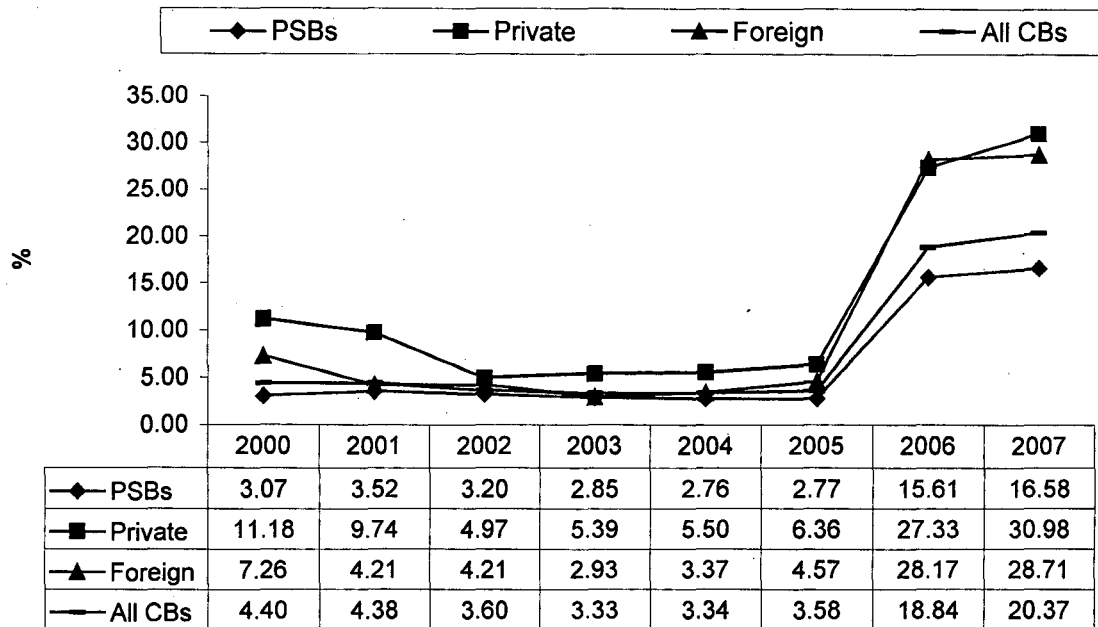
Chart 13: Foreign Operations of Commercial Banks

◆ PSBs   ■ Private   ▲ Foreign

	2003	2004	2005	2006	2007
◆ PSBs	5.05	5.07	4.88	5.60	6.47
■ Private	0.70	1.33	2.97	4.66	7.22
▲ Foreign	2.55	2.52	2.09	4.88	4.28
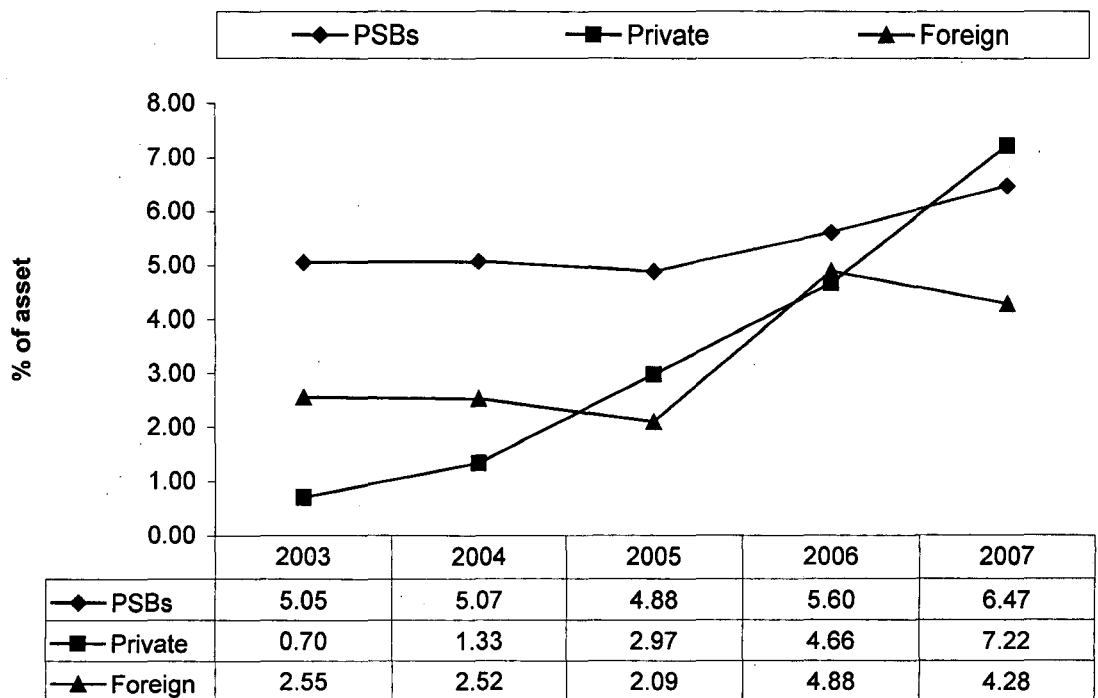
Note: The figures for foreign banks include only deposit and exclude investment and advances.

References

Allen, F. and D. Gale, 2000. *"Comparing Financial Systems."* MIT press, Cambridge, Massachusetts.

Aghion, P. and P. Howitt, 1992. "A model of Growth with Creative Destruction." *Econometrica,* 60 (2): 323-51.

Altunbas, Y., L. Gambacorta, and D. Marqués, 2007. "Securitisation and Bank Lending Channel." Working Paper No. 838, *European Central Bank.*

Amable, B., J. B. Chatelain, and O. D. Bandt, 1998. "Stability versus efficiency of the banking sector and economic growth." Paper provided by *CEPREMAP* in its series *CPEREMAP* working Papers (Couverture Orange) with number 9811.
URL: http://www.cepremap.cnrs.fr/couv_orange/co9811.pdf

Baele, L., O. D. Jonghe, and R. V. Vannet, 2007. "Does the Stock Market Value Bank Diversification?" *Journal of Banking and Finance,* 31(7): 1999-2023.

Bank for International Settlements, 1986. "The Management of Banks' Off Balance Sheet Exposures: A supervisory Perspective."
URL: http://www.bis.org/publ/bcbsc134.pdf

Beck, T. and R. Levine, 2002. "Stock Markets, Banks and Growth: Panel Evidence." Working Paper No. 9082, *National Bureau of Economic Research,* Massachusetts Avenue, Cambridge.

Berger, A. N., R. J. Herring, and G. P. Szego, 1999. "The Role of Capital in Financial Institutions." in Valentine, T. and G. Ford (eds). *"Readings in Financial Institution Management: Modern Techniques for a Global Industry."* Allen & Unwin, 83 Alexander Street, Crows Nest NSW 2065, Australia.

Berger, A. N., N. H. Miller, M. A. Petersen, R. G. Rajan and J. C. Stein, 2005. "Does Function Follow Organisational Form? Evidence from Lending Practices of Large and Small Banks." *Journal of Financial Economics,* 76 (2): 237-269.

Berger, A. N., L. F. Klapper, and R. Turk-Ariss, 2008. "Bank Competition and Financial Stability." *The World Bank* Policy Research Working Paper 4696.

Bernanke, B., C. Lown, and B. Friedman, 1991. "The Credit Crunch." *Brookings Paper on Economic Activity,* 1991 (2): 205-47.

Bernanke, B. and M. Gertler, 1995. "Inside the Black Box: The Credit Channel of Monetary Policy Transmission." *Journal of Economic Perspectives,* 9 (4): 27-48.

Besanko, D. and A. V. Thakor, 1993. "Relationship Banking, Deposit Insurance and Bank Portfolio Choice." Paper provided by *EconWPA* in its series Finance with number 0411046. URL: *http://129.3.20.41/eps/fin/papers/0411/0411046.pdf*

Bhasin, N., 2007. *"Banking and Financial Markets in India: 1947-2007."* New Century Publications, New Delhi.

Bhide, M. G., A. Prasad, and S. Ghosh, 2002. "Banking Sector Reforms: A Critical Overview." *Economic and Political Weekly*, 37 (5): 399-408.

Bikker, J. A. and J. W. B. Bos, 2008. *"Bank Performance: A Theoretical and Empirical Framework for the Analysis of Profitability, Competition and Efficiency."* Routledge, New York.

Bikker, J. A. and L. Spierdijk, 2009. "Measuring and Explaining Competition in the Financial Sector." Discussion Paper Series No. 09-01, *Tjalling C. Koopmans Research Institute*.

Bolt, W. and A. F. Tieman, 2004. "Banking Competition, Risk and Regulation." Working Paper No WP/04/11, *International Monetary Fund*.

Boone, J., 2008. "A New Way to Measure Competition." *The Economic Journal*, 118 (531): 1245-1261.

Boot, A.W. and A. Schmeits, 2000. "Market Discipline and Incentive Problems in Conglomerate Firms with Applications to Banking." *Journal of Financial Intermediation*, 9 (3): 240-273.

Boyd, J. H., S. L. Graham, and R. S. Hewitt, 1993. "Bank Holding Company Mergers with Non-bank Financial Firms." *Journal of Banking and Finance*, 17 (1): 43-63.

Boyd, J. H. and G. De Nicoló, 2005. "The Theory of Bank Risk Taking and Competition Revisited." *Journal of Finance*, 60 (3): 1329-1343.

Boyd, J. H., G. De Nicoló, and A. M. Jalan, 2006. "Bank Risk-Taking and Competition Revisited: New Theory and New Evidence." Working Paper No WP/06/297, *International Monetary Fund*.

Cetorelli, N. and P. Peretto, 2000. "Oligopoly Banking and Capital Accumulation." Working Paper No 12, *Federal Reserve Bank of Chicago*.

Chakraborty, S. and T. Ray, 2006. "Bank Based versus Market Based Financial System: A Growth Theoretic Analysis." *Journal of Monetary Economics*, 53(2): 329-350. URL: http://economics.uoregon.edu/papers/UO-2003-6_Chakraborty_Bank_Market_Based.pdf

Choi, S. and J. Kotrozo, 2006. "Diversification, Bank Risk and Performance: A Cross-Country Comparison." *Social Science Research Network.*
URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1013430

Claessens, S., A. Demirguc-Kunt., and H. Huizinga, 1998. "How Does Foreign Entry Affect Domestic Banking Markets?" *World Bank* Policy Research Working Paper No 1918.

Claessens, S. and L. Laeven, 2004. "What Drives Bank Competition? Some International Evidence." *Journal of Money, Credit and Banking,* 36 (3/ Part 2): 563-583.

————, 2005. "Financial Dependence, Banking Sector Competition and Economic Growth." *World Bank* Policy Research Working Paper No 3481.

Cordella, T. and E. L. Yeyati, 2002. "Financial Opening, Deposit Insurance and Risk in a Model of Banking Competition." *European Economic Review,* 46(3): 471-85.

CSO., 2008. *"National Accounts Statistics."* Central Statistical Organisation, Government of India, New Delhi.

Das, A., 2002. "Risk and Productivity Change of Public Sector Banks." *Economic and Political Weekly'* 37 (5): 437-445.

Demsetz, H. and K. Lehn, 1985. "The Structure of Corporate Ownership: Causes and Consequences." *Journal of Political Economy,* 93(6): 1155-77.

Demsetz, R. S. and P. E. Stranhan, 1997. "Diversification, Size and Risk at Bank Holding Companies." *Journal of Money, Credit, and Banking,* 29 (3): 300-313.

Deng, E. and E. Elyasiani, 2005. "Geographic Diversification and BHC Return and Risk Performance." *Temple University* Working Paper, 1-35.

De Nicoló G. and E. Loukoianova, 2007. "Bank Ownership, Market Structure and Risk." Working Paper 07/215, *International Monetary Fund.*

Djankov, S., C. McLiesh, and A. Shleifer, 2005. "Private credit in 129 countries." Working Paper No. 11078, *National Bureau of Economic Research,* Massachusetts Avenue, Cambridge.

Doshit, Y., R. Dhokai, and N. Lodhia, 2005. "Market Structure of the Indian Banking Sector." *The ICFAI Journal of Bank Management,* 4(2): 45-53.

Detragiache, E., T. Tressel, and P. Gupta, 2008. "Foreign Banks in Poor Countries: Theory and Evidence." *Journal of Finance,* 63 (5): 2123-2160.

118

Drukker, D. M., 2003. "Testing for Serial Correlation in Linear Panel Data Models." *The Stata Journal*, 3(2): 168-177.

GOI., 1991. "Report of the Committee on the Financial System." (Chairman: Shri M. Narasimham), New Delhi.

———, 1998. "Report of the Committee on Banking Sector Reforms." (Chairman: Shri M. Narasimham), New Delhi.

———, 2008. "Draft Report of the Committee on Financial Sector Reforms." (Chairman: Shri Raghuram G. Rajan) Planning Commission, New Delhi.

Grossman, G. M. and E. Helpman, 1991. "Quality Ladders in the Theory of Growth." *Review of Economic Studies*, 58(1): 43-61.

Guzman, M. A., 2000. "Bank Structure, Capital Accumulation and Growth: A Simple Macroeconomic Model." *Economic Theory*, 16 (2) 421-455.

Hannan, T. H. and G. A. Hanweck, 1988. "Bank Insolvency Risk and the Market for Large Certificates of Deposit." *Journal of Money Credit and Banking*, 20 (2): 203-11.

Hassan, M. K., G. V. Karels, and M. O. Peterson, 1993. "Off-Balance Sheet Activities and Bank Default-Risk Premia: A Comparison of Risk Measures." *Journal of Economics and Finance*, 17(3): 69-83.

Hellman, T. F., K. Murdock, and J. Stiglitz, 2000. "Liberalization, Moral Hazard in Banking and Prudential Regulation: Are Capital Requirements Enough?" *American Economic Review*, 90(1): 147–165.

IMF., 2006. "World economic outlook." *International Monetary Fund*, Washington, DC, September.

———, 2008. "World economic outlook." *International Monetary Fund*, Washington, DC, October.

Jagtiani, J., A. Saunders, and G. Udell, 1995. "The Effect of Bank Capital Requirements on Bank Off-balance Sheet Financial Innovations." *Journal of Banking and Finance*, 19 (3-4): 647–58.

Jensen, M. C. and W. H. Meckling, 1976. "Theory of Firm: Managerial Behaviour, Agency Costs and Ownership Structure." *Journal of Financial Economics*, 3(4): 305-360.

Jiménez, G., J. A. Lopez, and J. Saurina, 2007. "How Does Competition Impact Bank Risk-Taking?" Working paper 2007-23, *Federal Reserve Bank of San Francisco*. URL: *http://www.frbsf.org/publications/economics/papers/2007/wp07-23bk.pdf*

Kashyap, A. and J. Stein, 1994. "The Impact of Monetary Policy on Bank Balance Sheets." Working Paper No. 4821, *National Bureau of Economic Research*, Massachusetts Avenue, Cambridge.

Keeley, M.C., 1990. "Deposit Insurance, Risk and Market Power in Banking." *American Economic Review*, 80 (5): 1183-1200

Keynes, J.M., 1930. "*Treatise on Money.*" Macmillan, London.

Kim, D. and A. M. Santomero, 1988. "Risk in Banking and Capital Regulation." *Journal of Finance,* 43(5): 1219-1233.

King, R. G. and R. Levine, 1993. "Finance Entrepreneurship and Growth: Theory and Evidence." *Journal of Monetary Economics,* 32(3): 513-542.

Kiyotaki, N. and J. Moore, 1997. "Credit Cycles." *Journal of Political Economy,* 105 (2): 211-48.

Kohen, M. and A. M. Santomero, 1980. "Regulation of Bank Capital and Portfolio Risk." *Journal of Finance,* 35(5): 1235-44.

Kumar, P., 2006. "*Banking Sector Efficiency in Globalised Economy.*" Deep and Deep Publications Pvt. Ltd., New Delhi.

Laeven, L. and R. Levine, 2007. "Is There A Diversification Discount in Financial Conglomerates." *Journal of Financial Economics,* 85 (2): 331-367.

———, 2008. "Bank Governance, Regulation, and Risk Taking." Working Paper No-14113, *National Bureau of Economic Research*, Massachusetts Avenue, Cambridge.

Laporta, R., F. Lopez-de-Silanes, A. Shleifer, and R.W. Vishny, 1997. "Legal Determinant of External Finance." *Journal of Finance* 52(3): 1131-50.

———, 1998. "Law and Finance." *Journal of Political Economy,* 106 (6): 1113-55.

Levine, R., 1997. "Financial Development and Economic Growth: Views and Agendas." *Journal of Economic Literature,* 35 (2): 688-726.

———, 2002. "Bank-based or Market-based Financial Systems: Which is Better?" *Journal of Financial Intermediation,* 11(4): 398-428.

———, 2004. "Finance and Growth: Theory and Evidence." in Aghion, P. and S. N. Durlauf (eds) *Handbook of Economic Growth,* Vol 1A, North Holland.

Lucas, R. E. Jr., 1998. "On the Mechanics of Economic Development." *Journal of Monetary Economy,* 22 (1): 3-42

Marquez, R., 2002. "Competition Adverse Selection and Information Dispersion in the Banking Industry." *Review of Financial Studies*, 15 (3): 901-926.

Mckinnon, R. I., 1973. "*Money and Capital in Economic Development.*" Brookings Institution, Washington.

Mkrtchyan, A. 2005. "The Evolution of Competition in Banking in a Transition Economy: An Application of the Panzar-Rosse Model to Armenia." *The European Journal of Comperative Economics*, 2 (1): 67-82.

Mohan, R., 2005a. "Financial Sector Reforms in India: Policies and Performance Analysis." *Economic and Political Weekly*, 40 (12): 1106-1119.

———, 2005b. "Indian Economy in the Global Setting." *RBI Bulletin*, October.

———, 2005c. "Reforms Productivity and Efficiency in Banking: the Indian Experience." address delivered at the 21st annual general meeting of the conference of the Pakistan society of development economists at Islamabad in December 2005.

———, 2007. "Monetary Transmission in India." *RBI Bulletin*, April

Mohanty, M. S., G. Schnabel, and P. Garcia-Luna, 2006. "Banks and aggregate credit: what is new?" in Bank for International Settlements (ed.) *The banking system in emerging economies: how much progress has been made?* Pages 11-39.

Nachane, D. M. and S. Ghosh, 2002. "Determinants of Off-Balance Sheet Activities: An Empirical Analysis of Public Sector Banks.' *Economic and Political Weekly*, 37(5) 421-425.

———, 2007. "An Empirical Analysis of the Off-Balance Sheet Activities of Indian Banks." *Journal of Emerging Market Finance*, 6 (1): 39-59.

Nash, R. C. and J. F. Sinkey Jr., 1997. "On Competition, Risk, and Hidden Assets in the Market for Bank Credit Cards." *Journal of Banking and Finance*, 21 (1): 89-112.

Northcott, C. A., 2004. "Competition in Banking: A Review of the Literature." Working Paper 2004/24, *Bank of Canada,* June 2004.

Panzar, J. C. and J. N. Rosse, 1987. "Testing for Monopoly Equilibrium." *Journal of Industrial Economics*, 35 (4): 443-456.

Patrick, H. T., 1966. "Financial Development and Economic Growth in Underdeveloped Countries." *Economic Development and Cultural Change,* 14 (2): 174-89.

Peek, J. and E. Rosengren, 1995. "The Capital Crunch: Neither a Borrower nor a Lender Be." *Journal of Money, Credit and Banking,* 27 (3): 625-38.

Petersen, M. A. and R. G. Rajan, 1995. "The effect of Credit Market Competition on Lending Relationships." *Quarterly Journal of Economics,* 110 (2): 407-43.

Prasad, A. and S. Ghosh, 2005. "Competition in Indian Banking." Working Paper 05/141, *International Monetary Fund.*

Rajan, R. G., 1992. "Insiders and Outsiders: The Choice Between Informed and Arms-Length Debt." *Journal of Finance,* 47 (4): 1367-1400.

Ray, P., 2008. *"Commercial Banks and Monetary Policy in India."* Academic Foundation.

RBI., 2003. "Report on the Currency and Finance 2001-2002." *Reserve Bank of India,* Mumbai.

——, 2008. "Report on the Currency and Finance 2006-08 Vol. II." *Reserve Bank of India,* Mumbai.

Rebelo, S. T., 1991. "Long-run Policy Analysis and Long-run Growth." *Journal of Monetary Economy,* 99 (3): 500-21.

Reddy, Y. V., 2006. "Reforming India's Financial Sector: Changing Dimensions and Emerging Issues." *RBI Bulletin,* June.

Romer, P. M., 1986. "Increasing Returns and Long-run Growth." *Journal of Political economy'* 94 (5): 1002-37.

——, 1990. "Endogenous Technological Change." *Journal of Monetary Economy,* 98 (5/Part 2): S71-102.

Schaeck, K., M. Cihak, and S. Wolfe, 2006. "Are More Competitive Banking Systems More Stable?" Working Paper No. 143, *International Monetary Fund.*

Salas, V. and J. Saurina, 2003. "Deregulation, Market Power and Risk Behaviour in Spanish Banks." *European Economic Review,* 47 (6): 1061-75

Saunders, A., E. Strock, and N. G. Travlos, 1990. "Ownership Structure, Deregulation and Bank Risk Taking." *Journal of Finance,* 45 (2): 643-54.

Schumpeter, J. A., 1912. *"Theorie der Wirtschaftlichen Entwicklung."* [*The Theory of Economic Development*] Leipzig, Dunker and Humblot; translated by Redvers Opie, Cambridge, MA: Harvard University Press, 1934.

Shaffer, S., 1998. "The Winner's Course Curse in Banking." *Journal of Financial Intermediation*, 7(4): 359-392.

Shaw, E. S., 1973. *"Financial Deepening in Economic Development."* Oxford University Press, New York.

Shrieves, R. E. and D. Dahl, 1992. "The Relationship Between Risk and Capital in Commercial Banks." *Journal of Banking and Finance,* 16 (2): 439-457.

Singh, A., 1997. "Financial Liberalisation, Stock Markets and Economic Development." *Economic Journal,* 107 (442): 771-782.

Smith, R. T., 1998. "Banking Competition and Macroeconomic Performance." *Journal of Money Credit and Banking,* 30(4): 793-815.

Stigler, G., 1963. *"Capital and Rates of Return in Manufacturing Industries."* Princeton University Press, Princeton.

Stiglitz, J. E. and A. Weiss, 1981. "Credit Rationing in Markets with Imperfect Information." *American Economic Review,* 71 (3): 393-410.

Stiglitz, J. E., 1985. "Credit Markets and the Control of Capital." *Journal of Money, Credit, and Banking,* 17(1), 133-152.

Stiroh, K. J., 2006. "A Portfolio View of Banking With Interest and Non-Interest Activities." *Journal of Money Credit and Banking,* 38 (5): 1351-1361.

Stiroh, K. J. and A. Rumble, 2005. "The Dark Side of Diversification: The case of US. Financial Holding Companies." *Journal of Banking of Finance,* 30 (8): 2131-2161.

Stultz, R. and H. Shin, 1998. "Are Internal Capital Markets Efficient?" *Quarterly Journal of Economics,* 113 (2): 531-552.

Templeton, W. K. and J. T. Severiens, 1992. "The Effects of Non-bank Diversification on Bank Holding Company Risk." *Quarterly Journal of Business and Economics,* 31 (4): 3-17.

Uiboupin, J., 2004. "Implications of Foreign Bank Entry on Central and East European Banking Market." *Kroon & Economy,* No.1: 25-35.

Vives, X., 2001. "Competition in the Changing World of Banking." *Oxford Review of Economic Policy,* 17 (4): 535-547.

Wooldridge, J. M., 2002. *"Econometric Analysis of Cross Section and Panel Data."* Cambridge, MA: MIT Press.