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Distinguished Lecture

Reforms, Productivity, and Efficiency in Banking: The Indian Experience

RAKESH MOHAN

India embarked on a strategy of economic reforms in the wake of a serious balance-of-payments crisis in 1991. A central plank of the reforms was reform in the financial sector and, with banks being the mainstay of financial intermediation, the banking sector. The objective of the banking sector reforms 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. Beginning from 1992, Indian banks were gradually exposed to greater domestic and international competition. India's approach to banking reforms has been somewhat different from many other countries. Whereas there has not been privatisation of public sector banks, through a process of partial disinvestment a number of public sector banks have been listed in Stock Exchanges and have become subject to market discipline and greater transparency in this manner. Besides, newly opened banks from the private sector and entry and expansion of several foreign banks resulted in greater competition. Consequent to these developments, there has been a consistent decline in the share of public sector banks in total assets of commercial banks and a declining trend of Herfindahl's concentration index. Improvements in efficiency of the banking system were reflected in a number of indicators, such as, a gradual reduction in cost of intermediation (defined as the ratio of operating expense to total assets) in the post reform period across various bank groups (barring foreign banks), and decline in the non-performing loans. As a result of these changes, there has been an all-around productivity improvement in the Indian banking sector. While the cost income-ratio (i.e., the ratio of operating expenses to total income less interest expense) as well as net interest margin (i.e., the excess of interest income over interest expense, scaled by total bank assets) of Indian banks showed a declining trend during the post-reform period, the business per employee of Indian banks increased over three-fold in real terms exhibiting an annual compound growth rate of nearly 9 percent. At the same time, the profit per employee increased more than five-fold, implying a compound growth of around 17 percent. Branch productivity also recorded concomitant improvements. Such productivity improvements in the banking sector could be driven by two factors: technological improvements, which expands the range of production possibilities and a catching up effect, as peer pressure amongst banks compels them to raise productivity levels. As far as the future of Indian banking is concerned, a number of issues, such as the credit to small and medium enterprises, customers' interests and financial inclusion, reducing procedural formalities, listing of the public sector banks in the stock exchange and related market discipline are of paramount importance.

Let me at the outset congratulate the Pakistan Society of Development Economists for organising this *Conference*. Issues of productivity and efficiency have been at the centre-stage of discussions in recent years. Nowhere is this truer than the financial sector, which is perceived to be the 'brain' of the economy [Stiglitz (1998)]. Even within the financial sector, given the dominance of bank-based financial systems in most emerging markets including ours and the systemic importance of banks in the financial system, the banking sector continues to be the

Rakesh Mohan is Deputy Governor of the Reserve Bank of India, Bombay, India.

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centre of attention for academia and policy-makers alike. Not surprisingly therefore, performance of the banking sector has repercussions across the length and breadth of the economy. Judged thus, the theme of the *Conference* immediately appealed to me in view of its topicality and timeliness. As a central banker, the obvious topic for me to speak on relates to productivity and efficiency in Indian banking.

The objective of reforms in general is to accelerate the growth momentum of the economy, defined in terms of per capita income. Typically, improvements in the growth rate can be effected through three, not necessarily mutually exclusive channels: improving productivity of capital, through investments in human capital and raising total factor productivity (TFP).

The quality of functioning of the financial sector can be expected to affect the functioning and productivity of all sectors of the economy. Efficient financial intermediation should help in improving economy-wide resource allocation thereby promoting productivity growth all round. Thus discussion on economic efficiency and productivity should involve analysis of developments in the financial sector. Improvements in the financing of physical and human capital, both in terms of increasing magnitudes, and in terms of allocative efficiency, should raise efficiency and productivity across the economy. This approach justifies the choice of my topic today.

Financial intermediation is essential to the promotion of both extensive and intensive growth. The efficient intermediation of funds from savers to users enables the application of available resources to their most productive uses. The more efficient a financial system is in such resource generation and in its allocation, the greater is its contribution to productivity and economic growth. As resource allocation improves and real returns increase, savings would presumably respond and higher resource generation should result. Thus, development of the financial system is essential to the generation of higher productivity and economic growth.

I shall structure my address along the following lines. First, I shall explore in brief the impact of banking sector productivity on the rest of the economy. This is relevant in view of the fact that any discussion on productivity and efficiency issues in banking would need to be judged in conjunction with the level of financial development and other country-specific features. This will be followed by a brief review of banking sector reforms in India. The subsequent section will examine, in some detail, the trends in productivity and efficiency in Indian banking. My concluding remarks will be in the nature of the way ahead on areas germane to this sector at the present juncture.

2. HOW DOES PRODUCTIVITY IN BANKING INFLUENCE THE REST OF THE ECONOMY?

Economic history provides support for the fact that financial development makes a fundamental contribution to growth. Financial development helped in the

promotion of industrialisation in developed countries by facilitating the mobilisation of capital for large investments. Well-functioning banks or other financial intermediaries such as venture capital funds also spur technological innovation by identifying and funding entrepreneurs who are perceived to have the best chances of developing new products successfully and for implementing innovative production processes.

Recent research has provided robust evidence supporting the view that financial development contributes to economic growth.

- At the cross-country level, various measures of financial development (including measures of financial sector assets, domestic credit to private sectors and stock market capitalisation) are found to be positively related to economic growth.
- Other studies establish a positive relationship between financial development and growth at the industry level [Rajan and Zingales (1998)].
- Similarly, at the firm level, firms in countries with deeper financial development are able to obtain more external funds and thereby enabled to grow faster [Demirgüç-Kunt and Maksimovic (1998)].

A basic indicator of financial development is the contribution of finance-related activities to GDP. The share of real GDP originating from finance-related activities in India tripled from just around 2 percent during the 1970s to around 6 percent during the 1990s and further to 7 percent during the first half of this decade. Within the services sector, the share of finance rose from less than 5 percent to more than 12 percent over the same period (Table 1).

Table 1
Share of Real GDP Originating in Banking and Insurance

Period	(Percent)	
	Share of Banking and Insurance in GDP	Share of Banking and Insurance in Services
1970-71 to 1974-75	1.8	4.6
1975-76 to 1979-80	2.2	5.4
1980-81 to 1984-85	2.5	5.9
1985-86 to 1992-93	3.9	8.5
1993-94 to 1998-99	5.8	11.8
1999-2000 to 2003-04	6.7	12.3

Source: Computed from *National Accounts Statistics*, Central Statistical Organisation.

The broad-based indicators of financial development, as culled from the flow-of-funds accounts, are also testimony to gradual widening and deepening of the economy. Most of the commonly tracked ratios exhibited an upward trend during the 1970s and 1980s, while moderate fluctuations in these ratios were observed during the 1990s (Table 2). What is of interest is that the Finance Ratio, a proxy for financial deepening, witnessed remarkable improvement over this period.

Table 2

Flow of Funds-based Indicators of Financial Development

Period	FR	FIR	NIR	IR
1970-71 to 1974-75	0.2	1.4	0.8	0.8
1975-76 to 1979-80	0.3	1.8	1.0	0.7
1980-81 to 1984-85	0.3	2.4	1.4	0.7
1985-86 to 1989-90	0.4	2.4	1.4	0.7
1991-92	0.5	2.9	1.6	0.8
1994-95	0.5	2.4	1.2	0.9
1995-96	0.5	2.3	1.3	0.7

Source: Reserve Bank of India.

FR = Finance ratio = Total issues/National income (net national product at current prices).

FIR = Financial inter-relations ratio = Total issues/net domestic capital formation.

NIR = New issue ratio = Primary issues/ net domestic capital formation.

IR = Inter-relations ratio = secondary issues (i.e., issues by banks and other financial institutions)/ primary issues.¹

When we move away from these broad-based indicators to more specific liquidity- and credit-based indicators, a similar picture emerges. Illustratively, the ratio of aggregate deposits to GDP exceeded 50 percent during the first half of the current decade; M3/GDP has averaged around 50 percent since the 1990s. At a slightly more disaggregated level, while bank credit to government has witnessed some tapering off in the second half of the 1990s, credit to the commercial sector

¹By issues we mean 'sources of funds' or 'financial liability' of the sectors.

Secondary issues refer to issues by financial intermediaries (i.e. banks and other financial institutions).

Therefore, secondary issues = sources of funds of banking sector + sources of funds of other financial sector.

Primary issues refer to issues by all sectors other than financial intermediaries.

Finance Ratio (FR) captures the relationship between financial development and overall economic growth.

The relationship between financial development and the growth of physical investment is captured by the Financial Inter-relations Ratio (FIR)

The New Issue Ratio (NIR) reflects the proportion of primary claims issued by non-financial institutions.

Inter-relations Ratio (IR) captures the relative importance of financial institutions in financial transactions [Source: Rangarajan and Jadhav (1992)].

averaged over 30 percent of GDP during the first half of the current decade (Table 3). These observations are particularly relevant from the standpoint of the role of banks in the intermediation process. Juxtaposed with the financial sector reforms, this suggests that the enhanced freedom of banks since the liberalisation process has provided them with the flexibility in resource mobilisation and deployment, which has manifested itself in the uptrend in these ratios. Thus financial deepening has been taking place continuously in India and is still in progress.

Table 3

Liquidity—and Credit-based Indicators of Financial Development

(as Percent of GDP at Current Market Prices)

Period	Aggregate Deposits	M3	Bank Credit to Government	Bank Credit to Commercial Sector
1970-71 to 1974-75	16.4	25.9	13.3	15.6
1975-76 to 1979-80	24.1	33.0	14.0	21.8
1980-81 to 1984-85	30.0	39.1	18.7	26.9
1985-86 to 1989-90	36.1	45.4	22.9	30.3
1990-91 to 1994-95	39.6	49.3	23.6	29.0
1995-96 to 1999-00	43.8	53.8	21.9	28.6
2000-01 to 2004-05	54.7	65.3	24.9	33.5

Source: Reserve Bank of India.

Studies by the Reserve Bank [RBI (2000)] on the association between finance and growth for an extended time span from 1971-72 to 1999-2000 find that the causality between finance (proxied by real M3 growth) and growth (proxied by real GDP growth) is bi-directional. However, in the absence of any structural model underlying such relationships, these 'causality' estimates can only be interpreted in terms of the predictive content of each of the variables. Subsequent research on the inter-linkage between finance and growth in India has veered around to the view that the Indian growth process has essentially been 'finance-led': expansion in the financial sector played an enabling role in promoting capital accumulation, which, in turn, engendered higher growth [Bell and Rousseau (2001)]. Typically however, studies of this genre tend to be susceptible to the time period and choice of variables, so that a different period with another set of variables could possibly lead to different conclusions. What is, however, accepted is that finance did play a role in influencing the growth process in India, although such observations related to financial deepening have little to say about efficiency and productivity growth.

The aforesaid observations do not take into account the changing dynamics of the financial system. The traditional classification of the financial system as bank- or market-based often tends to be static; in contrast, financial systems evolve and

develop over time in response to changes in the institutional environment, legal set up and other country-specific features. This has been the case in India as well. Many of you would be aware that, cross-country classifications of financial system have typically classified India as a 'bank-based' system. This is not surprising, since banks have traditionally been the dominant financial intermediaries. However, the relative share of banks in total financial sector assets, which was nearly three-fourths in the early 1980s, came down gradually over a period of time and has hovered around the two-thirds mark since the 1990s [Ray and SenGupta (2004)].

More importantly however, following the rapid growth of stock markets since the 1990s, the role of 'market-based' finance has been on the rise. The most commonly employed measure of financial system orientation—the ratio of market capitalisation to bank assets—supports this observation (Table 4). This suggests that not only have financial institutions gained in terms of financial assets, but there is also considerable potential for market financing to develop. However, the magnitude of market capitalisation is obviously dependent on the vagaries of the stock market: it is not expected to exhibit a consistent increase as a ratio of GDP, whereas the growth in bank assets/GDP ratio is much more regular.

Table 4

Financial System Orientation

(as Percent of GDP at Current Market Prices)

As at End	Assets of Scheduled Commercial Banks	Market Capitalisation at BSE	Financial System Orientation
(1)	(2)	(3)	(4)=(3)/(2)x100
December 1970	17.9	3.8	21.3
December 1975	21.0	2.6	11.0
December 1980	40.0	3.8	9.3
December 1985	46.8	7.4	15.2
March 1991	56.3	16.0	28.4
March 1995	51.6	43.1	83.5
March 2000	59.1	46.8	79.3
March 2003	69.0	23.2	33.7
March 2004	71.6	43.5	60.8
March 2005	75.9	54.7	72.1

Source: Computed from Handbook of Statistics on the Indian Economy, RBI.

BSE: The National Stock Exchange, Mumbai.

Whereas financial deepening is easier to measure, analysing productivity and efficiency changes in banking is more complex and needs to be viewed in relation to the changing contours of the banking industry in India.

3. CONTOURS OF INDIAN BANKING SECTOR REFORMS²

The transformation of the banking sector in India needs to be viewed in light of the overall economic reforms process along with the rapid changes that have been taking place in the global environment within which banks operate. The global forces of change include technological innovation, the deregulation of financial services internationally, our own increasing exposure to international competition and, equally important, changes in corporate behaviour such as growing disintermediation and increasing emphasis on shareholder value. Recent banking crises in Asia, Latin America and elsewhere have accentuated these pressures.

As many of you would be aware, India embarked on a strategy of economic reforms in the wake of a serious balance-of-payments crisis in 1991; a central plank of the reforms was reform in the financial sector and, with banks being the mainstay of financial intermediation, the banking sector. The objective of the banking sector reforms 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. A summary profile of the banking industry over the last 15 years is presented in Table 5.

Table 5

Summary Profile of the Banking Industry: 1990-91 to 2004-05

Year/Bank Group	1990-91			1995-96			2004-05		
	PSB	Private	Foreign	PSB	Private	Foreign	PSB	Private	Foreign
1. No. of Banks	28	25	23	27	35(8)	29	28	29(9)	31
(a) Listed	None	None	NA	2	9(3)	NA	20	18(7)	NA
(b) Non-listed				25	26(5)	NA	8	11(2)	NA
2. Share (in Percent) of									
(a) Assets	91.4	3.7	4.9	84.5	6.5(1.5)	7.9	75.3	18.2(12.5)	6.5
(b) Deposits	92.0	4.0	4.0	85.4	6.6(1.3)	6.7	78.0	17.3(10.9)	4.7
(c) Credit	93.0	4.0	3.0	82.4	6.8(1.9)	8.9	73.2	20.0(13.9)	6.8
(d) Income	89.4	3.3	7.3	82.5	8.2	9.4	76.4	16.9	6.7
(e) Expenses	90.0	3.3	6.8	84.1	7.5	8.4	76.7	16.9	6.4
(f) Profit	68.5	4.1	27.4	-33.3	55.6	77.8	74.2	16.4	9.4
3. Memo									
Bank Asset/GDP (Percent)		56.3			50.4			80.4	

Source: Reserve Bank of India.

PSB: public sector banks; NA: Not applicable; Listed: Banks listed on recognised stock exchanges.

Figures in bracket under Private pertain to *de novo* private banks.

²I have discussed the details of financial sector reforms in India elsewhere; see Mohan (2005).

As you are aware, the financial system in India by the late 1980s was characterised by dominant government ownership of banks and financial institutions, widespread use of administered and variegated interest rates, and financial repression through forced financing of government fiscal deficits by banks and through monetisation. Thus, although a great degree of financial deepening had indeed taken place and financial savings had increased continuously, financial markets were not really functioning, and there was little price discovery in terms of the cost of money, i.e., interest rates. The efficiency and productivity enhancing function of the financial system was severely handicapped. Hence, a widespread financial sector reform effort has been underway since 1991.

Let me briefly sum up the major areas of banking sector reforms:³

- Financial repression through statutory pre-emptions has been reduced, while stepping up prudential regulations at the same time.
- Interest rates have been progressively deregulated on both the deposit and lending sides (Box I).
- Restoration of the health of the banking system has involved.
- Restoration of public sector banks' net worth achieved through recapitalisation where needed (total cost less than one percent of GDP).
- Competition increased through entry of new private sector banks and foreign banks.
- Higher levels and standards of disclosure achieved to enhance market transparency.
- Bank regulation and supervision strengthened towards international best practice.
- Micro prudential measures instituted.
- Supervision process streamlined with combination of on-site and off-site surveillance along with external auditing.
- Risk based supervision introduced.
- Process of structured and discretionary intervention introduced for problem banks through a prompt corrective action mechanism.
- Ownership of public sector banks has been broadened through disinvestment up to 49 percent, and banks have been listed (Table 6).
- Mechanism for greater regulatory coordination instituted for regulation and supervision of financial conglomerates.
- Measures taken to strengthen creditor rights (still in process).

³A detailed discussion on this aspect is contained in Bhide, *et al.* (2001).

Box I
Interest Rate Deregulation

Deposit Rate Deregulation

- April 1992: (a) interest rates freed between 46 days and 3 years and over, but ceiling prescribed, (b) October 1995: Ceiling removed for deposits over 2 years
- July 1996: Ceiling removed for deposits over 1 year
- October 1997: Interest Rates on Term Deposits Completely Deregulated
- 2004: Minimum maturity for term deposits reduced to 7 days

Lending Rate Deregulation

- 1992-93: Six categories of lending rates
 - 5 slabs for below Rs 2 lakh
 - Minimum lending rate above Rs 2 lakh
- October 1994: Lending Rate freed for Loans above Rs 2 lakh and Minimum Rate Abolished
- October 1996: Banks to specify maximum spread over PLR
- 1997-98: Separate PLRs permitted for cash credit/demand loans and term loans above 3 years. Floating Rate permitted.
- 1998-99: PLR made ceiling for loans upto Rs 2 lakh
- 1999-00: Tenor linked PLR Introduced
- 2001-02: PLR made benchmark rate; sub PLR permitted for loans above Rs 2 lakh
- 2002-03: Bank-wise PLRs made transparent on RBI website
- 2003-04: Computation of Benchmark PLR rationalised tenor linked PLRs abolished

Table 6

*Private Shareholding in Public Sector Banks
(as on March 31, 2005)*

Shareholding (in Percent)	Number of Banks*
Up to 10	4
More than 10 and up to 20	–
More than 20 and up to 30	5
More than 30 and up to 40	6
More than 40 and up to 49	6

Source: Trend and Progress of Banking in India, 2004-05, RBI.

* Comprising 19 nationalised banks, State Bank of India and IDBI Ltd.

As the banking system has been liberalised and become increasingly market-oriented and financial markets have developed concurrently, the conduct of monetary policy has also been tailored to take into account the realities of the changing environment (switch from direct to indirect instruments).

This macro approach to financial monitoring has enabled policy-makers to fine-tune their regulatory stance in consonance with the changing market and institutional dynamics so as to balance growth and stability concerns. For instance, despite the gradual tightening of prudential norms, the ratio of non-performing loans (NPL) to total loans, which was at a high of 15.7 percent for scheduled commercial banks (SCBs) at end-March 1997, has declined by more than two thirds to 5.2 percent at end-March 2005 (Table 7). Net NPLs also witnessed a significant decline, driven by the improvements in loan loss provisioning and improved recovery management, which comprises over half of the total provisions and contingencies. Capital adequacy of the banking sector also recorded a marked improvement and reached 12.8 percent at end-March 2005, well above the stipulated level of 9 percent. Banks have also been sensitised to develop robust risk management systems for credit and operational risks and focus on their asset-liability maturity profile to withstand adverse movements in market risk parameters such as interest rates and take corrective measures.

Table 7

Non-performing Loans of Different Bank Groups: 1994–2005

Year (end-March)	(Percent to Total Advances)				Memo: NPL / Total Loans (Percent)—2004
	PSB	Old Private Banks	New Private Banks	Foreign Banks	
1994	24.8	NC	NC	NC	China: 15.6
1995	19.5	NC	NC	NC	Indonesia: 13.4
1996	18.0	NC	NC	NC	Korea: 1.7
1997	17.8	10.7	2.6	4.3	Malaysia: 11.6 [@]
1998	16.0	10.9	3.5	6.4	Argentina: 17.5 [@]
1999	15.9	13.1	6.2	7.6	Brazil: 3.9
2000	14.0	10.8	4.1	7.0	US: 0.8
2001	12.4	10.9	5.1	6.8	UK: 2.2
2002	11.1	11.0	8.9	5.4	Japan: 2.9
2003	9.4	8.9	6.7	5.3	
2004	7.8	7.6	5.0	4.6	
2005	5.5	6.0	3.6	2.8	Global range: [0.3 to 30.0]

Source: Computed from *Statistical Tables relating to Banks in India*, RBI (various years).

@: relates to 2005. NC: Not compiled.

Another heartening development in banks' balance sheets, driven by the twin forces of international accounting irregularities and regulatory initiatives has been the increasing focus on corporate governance. As part of their Annual Report, banks

presently disclose, under the head 'Report on corporate governance', details of their boards of directors, number of board meetings attended by members, details of the various sub-committees of the boards and provided the banks are listed, information on their stock price movements. This is complemented with the banks' philosophy on corporate governance and the enabling mechanisms undertaken by the banks to achieve their philosophy. As you would be aware, such listing is an important component of the process of 'market discipline', which complements the regulatory initiatives undertaken by the authorities. To take the governance process in banks a step further, we had some time back issued guidelines laying down transparent criteria for determining the 'fit and proper' status of owners and directors in private banks. Given our focus on a consultative approach to policy formulation, the document was posted on the RBI website for encouraging a debate on this issue. Based on the feedback received, the draft is being reviewed before final guidelines can be issued to banks.

The whole policy reform process has been designed to make the banking system more market oriented to enable efficient price discovery and to induce greater internal efficiency in the resource allocation process. Thus, whereas the efforts in the 1960s, 1970s and 1980s were essentially devoted to financial deepening, the focus of reforms in the past decade and a half has been engendering greater efficiency and productivity in the banking system in particular, and in the financial sector as a whole. How well have we succeeded?

4. EFFICIENCY AND PRODUCTIVITY ANALYSIS IN BANKING

In recent times, a significant body of literature has evolved which explores the performance of financial institutions in the wake of financial liberalisation. These studies are essentially micro-economic in nature and seek to analyse the efficiency and productivity of banking systems. Such analysis is of relevance from the policy standpoint, because as the finance-growth literature suggests, if banks become better-functioning entities, this is expected to be reflected in safety and soundness of the financial system and ultimately, lead to increases in the rate of economic growth. More importantly, such analysis is useful in enabling policy-makers to identify the success or failure of policy initiatives or, alternatively, highlight different strategies undertaken by banking firms which contribute to their successes.

A priori, deregulation is expected to unleash competitive forces. Such competition would, in turn, enable banks to alter their input and output mix, which when combined with technological developments facilitates increase in output that raises overall bank productivity and efficiency. Second, liberal entry of *de novo* private and foreign banks as a part of the deregulation process is expected to raise bank efficiency, productivity and technology levels, because *de novo* private/foreign banks are associated with superior management practices and technology, which can be fruitfully imbibed by those which are not. A third strand of thinking, borrowing

from the public choice framework, contends that different ownership structures may engender different efficiency levels. The theoretical argument is straightforward: lack of capital market discipline weakens owners' control over management, enabling the latter to pursue their own interests, and provides fewer incentives for them to be efficient. Finally, as banking in the current world is technology driven and technological progress itself is scale augmenting, the relationship between bank size and efficiency becomes important. Skeptics, on the contrary, argue that deregulation is, in general, accompanied by an increase in banks' operational cost and could induce financial fragility due to over-expansion of banking activity. Thus, productivity gains after deregulation could be temporary and not sustainable in the long run. As a result, evidence in support of a unidirectional relationship between deregulation and efficiency/productivity is not conclusive.

Besides various methods of estimation, the efficiency and productivity studies in banking are constrained by the absence of precise definitions of inputs and outputs of banks. As a result, several approaches exist and the appropriateness of each approach varies according to the circumstances (Box II).

Competition and Profitability of Indian Banks

Beginning from 1992, Indian banks were gradually exposed to the rigours of domestic and international competition. Newly opened banks from the private sector and entry and expansion of several foreign banks resulted in greater competition in both deposit and credit markets. Consequent to these developments, there has been a consistent decline in the share of public sector banks in total assets of commercial banks. The evidence of competitive pressure is well supported from the declining trend of Herfindahl's concentration index (Table 8).⁴ Notwithstanding such transformation, the public sector banks still remain the mainstay, accounting for nearly three-fourths of assets and income. It is also important to note that public sector banks have responded to the new challenges of competition, as reflected in the increase in the share of these banks in the overall profit of the banking sector. From the position of net loss in the mid-1990s, in recent years the share of public sector banks in the profit of the commercial banking system has become broadly commensurate with their share in assets, indicating a broad convergence of profitability across various bank groups. This suggests that, with operational flexibility, public sector banks are competing relatively effectively with private sector and foreign banks. The 'market discipline' imposed by the listing of most public sector banks has also probably contributed to this improved performance. Public sector bank managements are now probably more attuned to the market consequences of their activities [Mohan (2005)].

⁴Defined as the sum of squares of the market shares of individual banks. Decreases in the index generally indicate a loss of pricing power and an increase in competition.

Box II**Inputs and Outputs of Commercial Banks**

Banks are typically multi-input and multi-output firms. As a result, defining what constitutes 'input' and 'output' is fraught with difficulties, since many of the financial services are jointly produced and prices are typically assigned to a bundle of financial services. Additionally, banks may not be homogeneous with respect to the types of outputs actually produced. In view of these complexities, four approaches have come to dominate the literature on banking output: the *production approach*, the *intermediation approach*, the *operating (income-based) approach* and more recently, the *modern 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 or information systems) and the outputs represent the services provided to customers and are best measured by the number of deposit and loan accounts.

Under the *intermediation approach*, financial institutions are viewed as intermediating funds 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 count as outputs. In principle, there are three variants of the intermediation approach, viz., the *asset approach*, the *user cost approach* and the *value-added approach*. The *asset approach* is a reduced form modelling of the banking activity, focusing exclusively on the role of banks as financial intermediaries between depositors and final uses of bank assets. Deposits and other liabilities, together with real resources (labour and physical capital) are defined as inputs, whereas the output set includes earning assets such as loans and investments. The *user cost approach* determines whether a financial product is an input or an output on the basis of its net contribution to bank revenue. If the financial returns on an asset exceed the opportunity cost of the funds or alternately, if the financial costs of a liability are less than the opportunity cost, they are considered as outputs; otherwise, they are considered as inputs. The *value-added approach* identifies major categories of produced deposits and loans as outputs because they form a significant proportion of value added.

The *operating approach (or income-based approach)* views banks as business units with the final objective of generating revenue from the total cost incurred for running the business. Accordingly, it defines banks' output as the total revenue (interest and non-interest) and inputs as the total expenses (interest and operating expenses).

Finally, the *modern approach* seeks to integrate some measure for risk, agency costs and quality of bank services. In this approach, the individual components of CAMEL⁵ are derived from the financial tables of the banks and are used as variables in the performance analysis.

Source: Adapted from Berger and Humphrey (1992) and Frexias and Rochet (1997).

⁵CAMEL is the acronym for Capital adequacy, Asset quality, Management, Earnings and Liquidity.

Table 8

*Herfindahl's Index of Concentration on Deposits and Credit of
Scheduled Commercial Banks: 1992-2004*

Year (end-March)	Deposit	Credit
1992	8.1	10.4
1993	7.6	10.1
1994	7.4	8.6
1995	7.0	7.9
1996	6.9	7.8
1997	6.7	7.3
1998	6.6	7.4
1999	7.1	7.2
2000	6.9	6.9
2001	7.3	6.7
2002	7.1	6.0
2003	6.9	6.0
2004	6.3	5.8

Source: Author's calculations.

Since the late 1990s, in line with the benign interest rate regime, both interest income and interest expenditure of banks as proportions of total assets have declined. However, interest expenditure declined faster than interest income, resulting in an increase in net interest income. However, non-interest income, which emanates mostly from fee-based activities, has been increasing consistently in the post-reform period. For example, non-interest income as a proportion of total assets of the banking sector increased from 1.2 percent in 1993 to more than 2 percent in 2004 (Table 9). In this context, it is also appropriate to mention that Indian banks, in particular the public sector banks, are yet to catch-up fully with their foreign counterparts.

Efficiency of Indian Banks

Improvements in efficiency of the banking system are expected to be reflected, *inter alia*, in a reduction in operating expenditure, interest spread and cost of intermediation in general. Several indicators have been employed in the literature to compare banking production costs across time. Illustratively, intermediation cost, defined as the ratio of operating expense to total assets, witnessed a gradual reduction in the post reform period across various bank groups barring foreign banks (Table 10). This decline in intermediation cost needs to be weighed against the large expenditures incurred in upgradation of information technology and institution of 'core banking' solutions. Admittedly, intermediation costs of banks in India still tend to be higher than those in developed banking markets.

Table 9

Non-interest Income of Scheduled Commercial Banks: 1992-2004

(as Percentage to Total Asset)

Year (end-March)	Public Sector Banks	Indian Private Banks	Foreign Banks	All Scheduled Commercial Banks
1992	1.22	1.03	3.40	1.38
1993	1.19	1.13	0.99	1.17
1994	1.26	1.34	2.22	1.34
1995	1.26	1.43	2.46	1.36
1996	1.39	1.68	2.35	1.49
1997	1.32	1.64	2.54	1.45
1998	1.33	1.94	2.96	1.52
1999	1.22	1.36	2.46	1.33
2000	1.28	1.67	2.60	1.43
2001	1.22	1.28	2.47	1.32
2002	1.43	1.59	2.91	1.57
2003	1.66	2.45	2.64	1.86
2004	1.91	2.08	2.98	2.01

Source: Computed from *Statistical Tables relating to Banks in India*, RBI (various years).

Table 10

Intermediation Cost of Scheduled Commercial Banks: 1992-2004*

(as Percentage to Total Asset)

Year (end-March)	Public Sector Banks	Indian Private Banks	Foreign Banks	All Scheduled Commercial Banks
1992	2.60	2.97	2.26	2.59
1993	2.64	2.71	2.70	2.65
1994	2.65	2.49	2.65	2.64
1995	2.83	2.35	2.73	2.79
1996	2.99	2.47	2.78	2.94
1997	2.88	2.36	3.04	2.85
1998	2.66	2.14	2.99	2.63
1999	2.65	2.04	3.40	2.65
2000	2.52	1.85	3.12	2.48
2001	2.72	1.87	3.05	2.64
2002	2.29	1.45	3.03	2.19
2003	2.25	1.99	2.79	2.24
2004	2.20	2.01	2.76	2.20

Source: Computed from *Statistical Tables relating to Banks in India*, RBI (various years).

* Intermediation cost = operating expenses.

At a more disaggregated level, it is evident that⁶ Indian banks have improved their efficiency in the post reform period as evidenced from the declining trend in per unit cost of output, irrespective of the choice of outputs (Table 11). The operating cost per unit of earning assets declined from 2.1 percent in 1992 to 1.8 percent in 2004; similarly, operating cost per unit of total volume of business declined from 3.4 percent to 2.6 percent during the same period. Among the components of operating expenses, employee cost per unit of output witnessed a noticeable decline in the post-reform period. This decline is discernible across all bank groups, and especially for public sector banks in the post 2001 period consequent to the voluntary retirement scheme across several nationalised banks. On the other hand, the change in physical capital cost per unit of output has been marginal, reflecting the fact that Indian banks maintained a steady flow of investments towards physical capital formation, especially on automation and information technology.

Table 11

*Operating Expense and Its Components of Scheduled
Commercial Banks: 1992-2004*

Year (end-March)	(Percent)					
	Operating Expense/ Earning Assets [@]	Labour Cost/ Earning Assets [@]	Non-labour Cost/ Earning Assets [@]	Operating Expense/ Total Business [*]	Labour Cost/ Total Business [*]	Non-labour Cost/Total Business [*]
1992	2.08	1.40	0.68	3.42	2.30	1.12
1993	2.14	1.43	0.72	3.51	2.34	1.17
1994	2.22	1.44	0.78	3.56	2.31	1.25
1995	2.32	1.54	0.78	3.74	2.48	1.26
1996	2.48	1.73	0.75	4.01	2.80	1.22
1997	2.36	1.60	0.76	3.84	2.60	1.24
1998	2.16	1.46	0.70	3.51	2.37	1.14
1999	2.21	1.47	0.74	3.55	2.35	1.20
2000	2.05	1.37	0.68	3.22	2.15	1.06
2001	2.16	1.47	0.69	3.36	2.28	1.07
2002	1.82	1.18	0.64	2.73	1.77	0.96
2003	1.81	1.13	0.69	2.65	1.65	1.00
2004	1.78	1.08	0.71	2.61	1.58	1.03

Source: Computed from *Statistical Tables relating to Banks in India*, RBI (various years).

[@] Earning assets = credit + investment.

^{*} Total business = deposit + credit.

⁶Total operating cost can be broken down into labour cost and cost of physical capital. To create per unit cost measure, we deflate the operating cost and its two components by either (i) the total earning assets (deposits plus investments), which is justified by the asset approach in measuring banking outputs, or (ii) the aggregate of advances and deposits, which can be justified by the value-added approach in measuring banking outputs.

From the efficiency standpoint, the intermediation cost needs to be viewed in conjunction with non-interest income. Till 2001, the burden (the excess of non-interest expenditure over non-interest income as a percentage to total assets) of commercial banks hovered around 1 to 1.5 percent (Table 12). This gap between intermediation cost and income from fee-based activities has narrowed considerably in recent years. For example, the burden of Indian commercial banks declined from 1.2 percent in 1992 to 0.2 percent in 2004. Moreover, there has been a lowering of the burden across bank groups in recent years. The improvement in respect of Indian private banks has been remarkable; their non-interest income in recent years has surpassed their intermediation cost and has resulted in a negative burden.

Table 12

Burden of Scheduled Commercial Banks: 1992–2004*

(as Percentage to Total Asset)

Year (end-March)	Public Sector Banks	Indian Private Banks	Foreign Banks	All Scheduled Commercial Banks
1992	1.37	1.94	-1.14	1.21
1993	1.45	1.57	1.70	1.48
1994	1.39	1.16	0.42	1.30
1995	1.57	0.92	0.27	1.43
1996	1.60	0.78	0.43	1.44
1997	1.56	0.72	0.50	1.40
1998	1.33	0.19	0.03	1.11
1999	1.44	0.69	0.94	1.32
2000	1.24	0.18	0.53	1.05
2001	1.51	0.59	0.59	1.32
2002	0.86	-0.14	0.12	0.63
2003	0.59	-0.46	0.15	0.38
2004	0.29	-0.07	-0.22	0.19

Source: Computed from *Statistical Tables relating to Banks in India*, RBI (various years).

*Burden=non-interest expense less non-interest income. It reflects the extent to which non-interest expenses are recovered through non-interest income.

The cost income-ratio (defined as the ratio of operating expenses to total income less interest expense) of Indian banks showed a declining trend during the post reform period. For example, Indian banks paid roughly 45 percent of their net income towards managing labour and physical capital in 2004 as against nearly 72 percent in 1993 (Table 13). In other words, Indian banks recorded a net cost saving of nearly 27 percent of their net income during the post reform period. According to the data reported in *The Banker 2004*, the cost-income ratio of world's largest banks

Table 13

Cost-income Ratio of Scheduled Commercial Banks: 1992–2004

Year (end-March)	(Percent)			
	Public Sector Banks	Indian Private Banks	Foreign Banks	All Scheduled Commercial Banks
1992	58.4	58.9	30.9	55.3
1993	73.7	66.8	59.2	71.9
1994	73.1	57.3	41.2	68.1
1995	67.6	52.2	40.6	63.5
1996	66.7	51.5	45.6	63.3
1997	64.3	51.3	45.6	61.0
1998	62.7	48.5	43.1	58.9
1999	65.9	58.9	56.9	64.3
2000	63.2	48.6	48.5	59.9
2001	67.0	51.8	50.0	63.4
2002	54.9	45.6	49.1	53.1
2003	47.8	45.1	46.5	47.2
2004	45.1	46.6	42.8	45.1

Source: Computed from *Statistical Tables relating to Banks in India*, RBI (various years).

Cost-income ratio = ratio of operating expenses to total income less interest expense. It measures the extent to which non-interest expense devours net total income.

varied markedly from a low of 48 percent to a high of 116 percent and the ratio around 60 percent is an indicative benchmark [RBI (2005)]. In that respect, the cost-income ratio of Indian banks is now comparable internationally. Among various ownership patterns, public sector banks have tended to have relatively higher cost-income ratio as against private banks and foreign banks.

This explanation needs to be viewed in conjunction with the differential ownership profile of banks. Early studies [Sarkar, *et al.* (1998)] found somewhat weak evidence to suggest that ownership was an important determinant of performance. More recent studies exhibit mixed evidence: while certain studies [Keova (2003)] suggest ownership to have some effect on bank performance, others [e.g., Bhaumik and Dimova (2004)] veer around the view that competition induced public sector banks to eliminate the performance gap that existed between them and both domestic and foreign and private sector banks. More recent research reported differences in the efficiency of Indian commercial banks with different ownership status, level of non-performing loans, size and asset quality [Das and Ghosh (2006)]. More importantly, their study uncovered evidence that public sector banks (PSBs) recorded higher efficiency gains in the post-reform period. Clearly, the evidence here is not conclusive, because comparisons are beset with several difficulties. Given the

size and variety of PSBs, it is possible to find banks that could equal the good private sector banks as well as bad ones. In addition, PSBs have to reckon with 'legacy' problems, such as many of the non-performing assets that they have been saddled with. Some PSBs operate in relatively backward areas with limited discretion to pull out from such areas. The question still remains: whether there is a better payoff in enabling PSBs to improve their performance while promoting private sector banks, as compared with an alternative policy that provides for transfer of ownership and control from the public to the private sector. Will greater scope for mergers and acquisitions within and between public and private sector add to greater efficiency?

Another important indicator of efficiency of banks is net interest margin (NIM), defined as the excess of interest income over interest expense, scaled by total bank assets. Broadly speaking, this ratio reflects the allocative efficiency of financial intermediation, a lower ratio being indicative of higher efficiency. It is quite reasonable to believe that the decline in deposit rates ushered by the deregulation process will be manifested in the lending behaviour of banks. In practice, however, lending rates have tended to be sticky downwards and seem to operate with a time lag. Historically the NIM of Indian banks is rather high. Around the onset of the reform process in 1992, the NIM of Indian banks was about 3.3 percent (Table 14).

Table 14

Spread[@] of Scheduled Commercial Banks: 1992–2004

(as Percentage to Total Asset)

Year (end-March)	Public Sector Banks	Indian Private Banks	Foreign Banks	All Scheduled Commercial Banks
1992	3.22	4.01	3.90	3.30
1993	2.39	2.92	3.57	2.51
1994	2.36	3.01	4.20	2.54
1995	2.92	3.07	4.27	3.03
1996	3.10	3.10	3.76	3.15
1997	3.16	2.95	4.13	3.22
1998	2.91	2.46	3.97	2.95
1999	2.81	2.11	3.51	2.79
2000	2.70	2.13	3.85	2.72
2001	2.84	2.33	3.64	2.84
2002	2.73	1.58	3.25	2.57
2003	2.52	1.96	3.36	2.48
2004	2.97	2.24	3.47	2.87

Source: Report on Trend and Progress of Banking in India, RBI (various years).

[@]Spread = interest earned – interest paid.

Thereafter, it recorded a relatively modest decline to around 3 percent in recent years. And traditionally, it is the foreign banks, which by virtue of their ability to mobilise low-cost deposits, have the highest NIMs, whereas those for private banks have been the lowest in recent years. These comparisons are not watertight: typically, small and medium banks had high NIM until 1997.⁷ Thereafter, NIM for big banks recorded a rise. Contextually, it may be mentioned that banks in most developed countries and several emerging economies have NIM (as a percentage to total assets) of around 2 percent. This provides some indication that competition in banking still has some way to go in India.

Productivity

Studies on productivity in Indian banking have only begun to emanate of late. A recent study found that total factor productivity growth has improved marginally in the post deregulation period, but there was little evidence of narrowing of productivity differentials across ownership categories following deregulation [Kumbhakar and Sarkar (2003)]. Among various productivity indicators, labour productivity indicators like business per employee and profit per employee are most commonly used. In addition, business per branch is also used to judge branch-level productivity. The business per employee of Indian banks increased over three-fold in real terms from Rs 5.4 million in 1992 to Rs 16.3 million in 2004, exhibiting an annual compound growth rate of nearly 9 percent (Table 15). At the same time, the profit per employee increased more than five-fold: from Rs 20,000 to Rs 150,000 over the same period, implying a compound growth of around 17 percent. Branch productivity also recorded concomitant improvements. Overall, the balance of evidence suggests distinctive productivity improvements in the banking sector over the reform period. The extant literature suggests that such improvements could be driven by two factors: *technological improvement*, which expands the range of production possibilities and a *catching up effect*, as peer pressure amongst banks compels them to raise productivity levels. In the context of gradual deregulation of financial sector, several factors could have been at work: a significant shift of the best-practice frontier, driven by a combination of technological advances, financial innovation and different strategies pursued by banks suited to their business philosophy and risk-return profile, changing composition of banks' input-output, and reduction in total cost due to improvements in overall efficiency. While it is difficult to pinpoint the relative mix of these factors in raising productivity, the bottom-line is clear: Indian banks witnessed significant productivity improvements, post-reforms.

⁷Definitions of small, medium and big banks are as follows: small banks are those with asset upto Rs 50 billion; medium banks are those with asset exceeding Rs 50 billion and upto Rs 100 billion; big banks are those with asset exceeding Rs 100 billion but and upto Rs 200 billion; and large banks are those with asset exceeding Rs 200 billion.

Table 15

Select Productivity Indicators of Scheduled Commercial Banks

(Rs Million at 1993-94 Prices)

Year	Business per Employee	Profit per Employee	Business per Branch
1992	5.4	0.02	109.9
1993	5.4	-0.05	110.4
1994	5.4	-0.04	109.2
1995	5.6	0.02	113.0
1996	6.0	0.01	119.6
1997	6.6	0.04	129.0
1998	7.5	0.05	144.9
1999	8.4	0.03	158.7
2000	9.7	0.05	179.4
2001	11.5	0.05	196.2
2002	13.7	0.09	214.9
2003	15.0	0.12	234.8
2004	16.3	0.15	254.5

Source: Statistical Tables relating to Banks in India.

In a wider framework, cross-country studies of deregulation and productivity growth of banks report divergent views. Typically, cross-country comparisons are often fraught with difficulties, not only because of the different regulatory and economic regimes encountered by financial entities, but also owing to the differential quality of services associated with deposits and loans in different countries. Maudos and Pastor (2001) analysed the cost and profit efficiency across 14 EU economies, as well as Japan and the USA. The results uncovered the evidence that, since the start of the 1990s increasing competition has led to gains in profit efficiency in the USA and Europe but not so in the Japanese banking system. Their results also show that the variance in of profitability between countries would be considerably reduced if inefficiencies were eliminated, efficiency gains thus being a very important source of improvement in profitability. A recent study in the Asian context analysed various efficiency measures of South-East Asian (Indonesia, Korea, Malaysia, Philippines and Thailand) banks in the context of corporate governance [Williams and Nguyen (2005)]. Although the motivation of the study was different, their empirical results found economic justification for the policy of bank privatisation.

Let me encapsulate this section by making some general comments on the efficiency and productivity growth of Indian banks *vis-à-vis* leading Asian nations like China and Korea. As far as real growth (adjusted for price movement and exchange rate fluctuations) in banking business is concerned, Indian banks are

favourably placed. In recent years, the real growth of deposits and of loans of Indian banks were noticeably higher than those of other Asian countries such as China and Korea. At the same time, profitability of Indian banks, as determined by the return on assets, is also much higher (Tables 16, 17, 18 and 19). The intermediation cost of Indian banks seems to be relatively higher than that of Korea and China. Nonetheless, higher operating cost in India is well compensated by the higher non-interest income, as compared to other Asian countries. Finally, the labour productivity of the top 4 banks in India (which includes one *de novo* private bank) and the four state-owned Chinese banks indicates that except the private bank, the top three public sector banks in India recorded much lower employee productivity. However, in the absence of data on employment for banks in other countries, it is difficult to ascertain the degree of labour productivity differentials across countries.

Table 16

Spread (Net Interest Margin) of Banks of Major Asian Countries⁸

(as Percentage to Total Asset)

Year	China	Indonesia	Korea	Malaysia	Philippines	Thailand	India
1996	1.86	2.92	1.70	2.91	4.07	2.57	3.07
1997	2.27	2.76	1.80	2.94	4.21	3.00	2.83
1998	2.16	-9.38	1.69	3.32	4.52	0.74	2.66
1999	1.83	-3.11	2.03	2.67	3.16	0.69	2.56
2000	1.76	2.21	2.06	3.02	2.54	1.43	2.74
2001	1.78	3.16	2.12	2.83	2.60	1.69	2.54
2002	1.78	3.61	2.33	2.70	2.29	1.84	2.74
2003	1.87	4.22	2.50	2.61	2.30	1.99	2.84

Source: BankScope.

Table 17

Intermediation Cost (Operating Expense) of Banks of Major Asian Countries

(as Percentage to Total Asset)

Year	China	Indonesia	Korea	Malaysia	Philippines	Thailand	India
1996	1.23	2.39	2.24	1.42	3.52	1.50	2.77
1997	1.24	4.50	2.55	1.49	3.28	2.05	2.60
1998	1.40	4.04	2.53	1.68	3.67	2.54	2.58
1999	1.18	2.83	1.53	1.50	3.38	2.20	2.41
2000	1.12	2.72	1.46	1.70	3.32	1.98	2.57
2001	1.10	2.36	1.42	1.80	3.30	2.01	2.21
2002	1.05	2.73	1.39	1.73	3.16	1.78	2.22
2003	1.01	2.94	1.38	1.61	3.00	1.71	2.19

Source: BankScope.

⁸The figures reported in Tables 16-19 for India are not strictly comparable with earlier tables because of different data sources.

Table 18

Non-interest Income of Banks of Major Asian Countries

(as Percentage to Total Asset)

Year	China	Indonesia	Korea	Malaysia	Philippines	Thailand	India
1996	0.26	0.99	1.06	0.98	2.12	0.68	1.44
1997	0.24	2.97	0.93	1.10	1.73	1.00	1.49
1998	0.13	1.31	0.20	1.16	1.96	1.03	1.38
1999	0.17	1.96	0.99	1.00	1.95	0.97	1.47
2000	0.22	1.51	0.74	1.01	1.59	0.62	1.33
2001	0.22	1.08	1.28	1.15	1.73	0.73	1.49
2002	0.25	1.30	0.91	1.11	2.11	0.93	1.83
2003	0.25	1.46	0.80	0.94	2.16	0.95	1.97

Source: BankScope.

Table 19

Net Profit of Banks of Major Asian Countries

(as Percentage to Total Asset)

Year	China	Indonesia	Korea	Malaysia	Philippines	Thailand	India
1996	0.29	1.01	0.17	1.40	2.06	-0.56	0.71
1997	0.30	-0.39	-0.84	1.03	1.63	-1.17	0.90
1998	0.20	-46.92	-3.10	0.04	0.85	-5.57	0.54
1999	0.17	-9.20	-1.40	0.96	0.10	-5.88	0.70
2000	0.21	0.46	-0.37	1.29	-0.03	-0.15	0.48
2001	0.20	0.87	0.76	0.68	0.48	1.46	0.69
2002	0.20	1.30	0.60	1.03	0.60	0.21	0.97
2003	0.12	1.61	0.15	1.08	1.08	0.63	1.14

Source: BankScope.

A clear message emanating from these findings is the role of technology in driving productivity and efficiency improvements. In today's world of banking, technology is considered as the basic tool of the "process engineers" of the organisation. It is crucial for the design, control, and execution of service delivery in banks. Therefore, a key driver of efficiency and productivity in the banking industry today is the effective use of technology. This is a crucial pre-requisite for capitalising on future opportunities for the banking sector. In effect, it has become the key to servicing all customer segments—offering convenience to retail customer, corporates and government clients. The increasing sophistication, flexibility and complexity of products and servicing offerings makes the effective use of technology critical for managing the risks associated with banking business. However, the 'technological penetration' in India has been quite modest. According to data reported in the *World Development Indicators* database, as of 2002, the number of computers per 1000

persons was about 7 in India compared to anywhere between 70-500 in most emerging markets and even higher in most developed economies.⁹ Wide disparities exist within the banking sector as far as technological capabilities are concerned: the percentage of 'computer literate' employees as percentage of total staff in 2000 was around 20 percent in public sector banks compared with 100 percent in new private and around 90 percent in foreign banks [Reserve Bank of India (2002)]. Data reported by the RBI suggests that nearly 71 percent of branches of public sector banks are fully computerised. However, computerisation needs to go beyond the mere 'arithmetics', to borrow a term from the Report of the Committee on Banking Sector Reforms [Government of India (1998)], and instead, needs to be leveraged optimally to achieve and maintain high service and efficiency standards. In fact, recent research on the role of technology in driving productivity improvements in banking demonstrates that computer employees and IT capital exhibit higher productivities than their respective non-computer employees and non-IT capital, respectively [Huang (2005)]. The challenge, therefore, remains three fold: acquiring the 'right' technology, deploying it optimally and remaining cost-effective whilst delivering sustainable returns to shareholders. In effect, 'managing' technology so as to reap the maximum benefits remains a key challenge for the Indian banks.

5. THE WAY AHEAD

How do we see the future? In this context, I would like to share with you some of the issues that need to be kept in view while discussing productivity and efficiency in banks. Needless to state, these issues remain relevant, in varying degrees, in economies that share similar features in the banking sector, as ours.

First, many of you would be aware that small and medium enterprises (SMEs) constitute an important segment of the industrial and services sectors in India in view of their significant contributions to employment generation as also exports. With the emergence of new activities in the rural segment such as agri-clinics, contract farming and rural housing with forward and backward linkages to SMEs, lending to SMEs has become a viable revenue proposition for banks. The Reserve Bank has also initiated several measures to streamline the flow of credit and address structural bottlenecks in credit delivery to this segment. Salient among these include fixing of self-set targets for financing, rationalisation of cost of loans, expanding the outreach of formal credit, and formulation of comprehensive and more liberal policies for credit extension. Public sector banks have also been advised to constitute specialised SME branches in identified clusters/centres with preponderance of small and medium enterprises. A noteworthy development in this context has been the passage of the Credit Information Companies (Regulation) Act, 2005 in the Parliament. The Act is expected to encourage setting up of credit information companies and thereby,

⁹The reported figure for Pakistan was 4.21 in 2001.

improve exchange of information on credit histories of borrowers. Coupled with appropriate risk assessment models and mechanisms, this is expected to lower transactions costs of banks. The overall effect of this process is likely to be reflected in a lowering of the risk premium embedded in interest rates charged to SMEs with positive spillovers for bank lending to the SME sector.

Although liberalisation of financial services and competition has improved customer services, experience shows that customers' interests are not always accorded priority. More importantly, concerns have been raised with regard to banking practices that tend to exclude vast segments of the population. In this context, the Reserve Bank has announced its intention to implement policies to incentivise banks to provide extensive services responsive to the needs of the underprivileged. As part of the process, the Reserve Bank has recently advised all banks to make available a basic banking 'no frills' account either with 'nil' or very low minimum balances as well as charges that would make such accounts accessible to vast sections of population. The nature and number of transactions in such accounts could be restricted, but made known to the customer in advance in a transparent manner. Banks have been urged to give wide publicity to this facility so as to ensure greater financial inclusion.

The growth performance of the Indian economy during the last few years indicates a possible ratcheting up of the trend rate of growth from around 6 percent to around 8 percent per year. Yet, there is a need to undertake significant efforts to achieve higher rates of growth in a sustained manner. The current levels of investment might not be adequate to achieve such growth rates, even after accounting for reductions in the existing incremental capital-output ratios. Looking beyond the aspect of fiscal consolidation, action on several fronts needs to be pursued vigorously to step up growth rates. First is the issue of investment in agriculture and allied activities, a sector that produces 21 percent of GDP, but supports nearly 60 percent of the population. There is often substantial loss of output owing to inadequate storage and transport facilities and paucity of adequate food processing capacities. This necessitates greater public and private investment on these post-harvest facilities to not only increase value addition, but also to improve the agriculture-industry linkage. The second issue of import is the simplification of procedures. Cumbersome procedural formalities introduce delays and results in significant output losses. Added to these, the de-reservation of items from exclusive production under SSI units is likely to permit the sector reap economies of scale and scope and enhance competitiveness. The third is the issue of finances. The incipient investment boom in infrastructure, industry and services will yield best results only if enormous resource flows are successfully intermediated at a low cost. This will depend on the ability of the financial sector to process information properly and to intermediate the extant savings into optimal investment by specific firms and sectors. The fourth aspect of stepping up investment is to address the deficiencies in

infrastructure. The decline in public spending on infrastructure has not been adequately compensated by the private sector, possibly owing to difficulties in the regulatory environment. Therefore, nurturing an appropriate policy framework, with a conducive environment for public-private participation, remains the key to accelerating investment in infrastructure. The final aspect is the need to complement domestic investment with higher foreign investment, primarily in the form of FDI. Such investment is likely to trigger technology spillovers, assist human capital formation and more generally, improve the efficiency of resource use.

Over the reform period, more and more banks have begun to get listed on the stock exchange, which, in its wake, has led to greater market discipline and concomitantly, to an improvement in their governance aspects as well. This has led to a broadbasing of the ownership of PSBs. Such diversification of ownership has also led to a qualitative difference in their functioning, since there is induction of private shareholding as well as attendant issues of shareholder's value, as reflected by the market capitalisation, board representation and interests of minority shareholders [Reddy (2002)]. The issue of mixed ownership as an institutional structure where government has controlling interest is a salient feature of bank governance in India. Such aspects of corporate governance in PSBs is important, not only because PSBs dominate the banking industry, but also because, it is likely that they would continue to remain in banking business. To the extent there is public ownership of PSBs, the multiple objectives of the government as owner and the complex principal-agent relationships needs to be taken on board. Given the increased technical complexity of most business activities including banking and the rapid pace of change in financial markets and practices, PSBs would need to devise imaginative ways of responding to the evolving challenges within the context of mixed ownership. All in all, this is an exciting phase for PSBs to grow and prosper, and it is up to these banks to respond to the challenges.

Let me conclude: the address has have traversed a modest terrain, focusing on the efficiency and productivity changes in Indian banking. The patterns of efficiency and technological change witnessed in Indian banking can be viewed as consistent with expectations in an industry undergoing rapid change in response to the forces of deregulation. In reaction to evolving market prospects, a few pioneering banks might adjust quickly to seize the emerging opportunities, while others respond cautiously. As deregulation gathers momentum, commercial banks would need to devise imaginative ways of augmenting their incomes and more importantly their fee-incomes so as to raise efficiency and productivity levels.

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*Comments**

1.

Deputy Governor Rakesh Mohan has given us an excellent overview of the impressive financial sector reforms undertaken by the Indian authorities, and their positive impact on the Indian economy. What he says is instructive for Pakistan, where the State Bank of Pakistan (SBP) and the government have pursued an ambitious financial sector reform programme.

India and Pakistan, and, of course, many other countries undertaking financial sector reforms have had to examine closely the fact that the efficiency of a financial system relates to the way it performs its intrinsic functions. These include the intertemporal and geographic transfer of resources between deficit and surplus units, the management of risk, the pooling of resources (subdivision of ownership), clearing and settlement of payments, and dealing with incentives problems.

Banking sector reforms in India were started in the early 1990s, in the aftermath of an external crisis. The main objective was to promote financial development and make the system more market-oriented, with the aim of improving the allocative efficiency of resources and ultimately generate higher growth. To that end, intermediation was improved (financial repression was reduced and the interest rates progressively deregulated), prudential regulations were stepped up (promoting confidence and reducing systemic risk), and the banking system's health restored. Market-orientation was fostered by exposing domestic state-owned banks gradually to domestic and international competition, and listing state-owned banks on the stock exchanges (although not privatising them). These measures have worked, and India's banking system today seems generally healthy, dynamic, and profitable. Good use of technology has been one factor explaining the banking system's improvements. And while Dr Mohan acknowledges that further reforms and improvements by banks are needed to meet future challenges, the Reserve Bank of India (RBI) can take much pride in its achievements so far.

I will limit myself to two main comments on this paper. I will then use Dr Mohan's paper to draw parallels with Pakistan. My first comment relates to the observation that financial markets tend to evolve (i.e. mature) in sequence, starting with money markets, followed by security markets, and then equity and derivatives markets. Given the initial dominance of banks in the Indian financial system, it would have been useful if the paper had also covered the initiatives or limitations

Author's Note: The views expressed here are my sole responsibility and do not reflect those of the International Monetary Fund.

relating to potential and speed of growth in the other financial markets. For example, while the benchmarks quoted show that efficiency and profitability in the Indian banking system compare favourably with that of many other developed and emerging market economies, others don't. Market capitalisation and domestic credit to GDP ratios, for example, are well below those of Malaysia and China. While it is true that this paper concentrates on the banking system, some discussion of the other markets would have provided useful background.

My second main comment relates to the changes in the relative importance of intermediaries with the improvement in the functioning of financial systems—the focus of central banking operations change (e.g., to indirect instruments), other financial intermediaries become more important in the provision of direct and indirect financing of investment, and equity markets get larger and more liquid. Dr. Mohan is well placed to tell us about conducting monetary policy during stages of an evolving financial landscape, as the RBI seems to have managed quite well in this context.

Now let me turn to comparisons of India and Pakistan. A snapshot of the Indian and Pakistani banking systems' financial soundness indicators (FSIs) at end-March 2005 reveals some interesting differences (Table 1). The Indian banking system is dominated by state-owned banks which have a 75 percent market share in assets, while in Pakistan, state-owned banks account for only 20 percent of assets (as result of the authorities' privatisation programme). However, the Indian banking sector has a capital adequacy ratio (capital to risk weighted assets) of 13, slightly higher than of 11 for the Pakistani banking sector, though both comfortably exceed internationally accepted minimum thresholds. And, Pakistan's banking sector still suffers more from a legacy of high non-performing loans (NPLs) which—while having been reduced substantially in recent years—are still twice the Indian gross NPL to gross loans ratio of 5 percent. Notwithstanding this, when it comes to the bottom line, the largely private banking system in Pakistan outperforms the largely state-owned banking system in India. As an indication of this, the return on assets (before tax) in Pakistan is 2 percent while it is 1 percent in India.

We know that financial sector reforms are not an end in itself. Enhancing financial intermediation reduces the spread between deposit and lending rates, and allows for a more efficient resource allocation, thus raising the growth potential of an economy, and benefiting the population at large. Several studies have documented this positive influence of financial development on economic growth.

In Pakistan, financial sector reforms were initiated in 1997 and pursued forcefully after 1999 when the government of President Musharraf came to power. The reforms focused on: restructuring and privatisation of problem banks; strengthening the prudential regulations and the institutional infrastructure; deregulating and liberalising credit extension; and liberalising the foreign exchange regime.

Prior to reforms, Pakistan's banking system was dominated by chronically loss-making public sector commercial banks weighed down by substantial nonperforming loans (NPLs). Credit allocation was far from efficient, and credit extension insufficiently low. Today, the core of the system is made up of dynamic and profitable local private banks. Credit expansion has picked up substantially across the board, and has facilitated investment and consumer demand. In short, the privatisation, restructuring, and deregulation have invigorated the banking system.

Restructuring and privatisation have allowed banks to rationalise their operations. In particular, retrenchment of staff and closing of unprofitable branches have laid the basis for banks' improved performance. In addition, improving the nonperforming to total loan ratio has been a crucial factor of the banking system's turnaround. As a result, banks' balance sheets have been cleaned up, allowing banks to concentrate their energies on acquiring new business, building on their remaining branch network and experience. Under private sector management, banks have realised strong asset growth, which is closely tracked by deposit growth. As a result, bank profitability is high.

Mention can be made here of a recent interesting paper in *The Pakistan Development Review* (by Atsushi Iimi, "Efficiency in the Pakistani Banking Industry: Empirical Evidence after the Structural Reform in the Late 1990s," Spring 2003), which provides empirical evidence of technical efficiency in Pakistan's banking system following the reforms that started in the late 1990s. This study applied stochastic frontier analysis to a panel of major banks during 1997–2001. It finds evidence of an increase in the productivity of employees and branches following the reforms. The efficiency gains were highest in HBL and NBP, and less so for UBL and NDFC. Clearly, public-private ownership did not matter in terms of increases in technical efficiency, but introducing private sector management structures likely played a role.

Capital markets have grown rapidly, but remain shallow relative to regional comparators, and the domestic investor base is narrow. Capital market regulation has a high compliance with international good practices. The Karachi Stock Exchange was able to weather a substantial correction earlier this year, and has recovered since then, showing an impressive growth performance on the year. Replacing *badla* financing by a less risky continuous funding facility that addresses most of *badla*'s shortcomings should make the stock market less prone to speculative exuberance. The gradual introduction of more sophisticated derivative and related instruments will further market development.

The foreign exchange regime has been liberalised. Foreign investors can bring in and take out capital, profits, dividends, remittances without any restrictions. Setting up and regularising foreign exchange companies has stabilised the market and contributed to a unified exchange rate. Very recently, mutual funds have been allowed to invest outside of Pakistan, which is a welcome precedent in the region.

In conclusion, substantial financial sector reforms have been implemented in India and Pakistan that will make their respective domestic financial sectors more efficient. In addition, India and Pakistan have recently agreed to allow each other's banks to set up foreign branches in the other country. This is not only an important step for liberalising trade in financial services, it is also another encouraging sign of the strengthening ties between Pakistan and India. I think both countries can learn about developing the financial system from each other. Dr. Mohan's paper should be read, and I am sure will be read, in Pakistan by those interested in financial development.

Table

Key Financial Soundness Indicators in Pakistan and India, end-March 2005

	India 1/			
	All banks	State Banks	Domestic Private Banks	Foreign Banks
Market share (in assets)	100.0	74.8	18.4	6.8
Capital to risk weighted assets	12.8	12.8	12.2	14.1
Tier 1 capital to risk weighted assets	8.4	8.0	8.5	11.2
Gross NPLs to gross loan	5.1	5.6	4.0	3.1
Net NPLs to capital	11.7	13.6	9.5	4.5
Return on assets (before tax)	0.9	0.9	0.8	1.3
	Pakistan 2/			
	All banks 3/	Public Sector Commercial Banks	Local Private Bank	Foreign Banks
Market share (in assets)	100.0	20.1	66.4	10.3
Capital to risk weighted assets	10.7	14.4	10.4	17.2
Tier 1 capital to risk weighted assets	7.7	9.2	7.8	16.8
Gross NPLs to gross loan	10.6	13.2	8.1	1.4
Net NPLs to capital	23.0	17.5	20.1	-0.8
Return on assets (before tax)	2.1	2.4	2.4	2.7

1/ Source: 2005 Article IV Consultation Staff Report; and Global Financial Stability Report.

2/ Source: http://www.sbp.org.pk/publications/q_reviews/q_review_June_05.pdf

3/ Includes Specialized Banks which are not listed otherwise in this table.

Mohsin S. Khan

International Monetary Fund,
Washington, D. C.

2.

In the context of financial sector reforms and restructuring in India during the last fifteen year this paper on “Reforms, Productivity, and Efficiency in Banking: The Indian Experience”, is a significant contribution to assess the impact of reform process at the present stage of developments. The paper is helpful not only in assessing the success and failures of the policies till now but also provides the future direction for the financial sector agenda.

While mentioning the objective of financial sector reforms to accelerate economic growth momentum the author has rightly explained that quality of the financial sector can affect all the channels through which growth rate can be improved.

The author has given a detailed analysis of trends in productivity and efficiency in Indian banking.

By looking at the title of the paper one expects that the focus of the paper would remain on banking sector but in most of the discussion the author has used financial sector and banking sector interchangeably. One can agree that the Indian financial sector is largely bank-based and one can use these terms interchangeably but there is comprehensive discussion on stock market developments on page 6.

While discussing the structure of the paper on page 2, author shows his intention first to ‘explore in brief the *impact* of banking sector productivity on the rest of economy’. The heading of the Section 2 ‘*How does* productivity in banking influence the rest of the economy’ is different from that intention. Interestingly, the discussion under Section 2 is different from both the ‘*impact*’ analysis and ‘*how does*’. Rather, along with some relevant review of literature (cross country as well as Indian studies), it just gives description of the changes in the financial sector during different time spans: for some measures from 1970 to 2004 and for some measures from early 1990s to 2004. If before 1990s it was era of financial repression then I think it is better to restrict discussion from early 1990s to the most recent. On the whole of Section 2 the author neither talks about the *impact* of banking sector productivity nor about how does productivity influence the economy. The author states this at the end of Section 2.

If we read Section 3 carefully it has very well explained the process of financial sector reforms in India during the last 15 year along with some measures of banking sector performance. But there are contradictory views on page 7 (financial system in India by the late 1980s was characterised byand financial repression

through forced financing of the government fiscal deficits by bank and through monetisation) and page 11 (whereas the efforts in the 1960s, 1970s, and 1980s were essentially devoted to the financial deepening).

Section 4 is the best managed part of the paper which discusses trends in wide range of indicators related to Indian banking sector productivity and efficiency. In the end author rightly concludes the paper in giving the future outlook of Indian banking industry.

M. Ashraf Janjua

College of Business Management,
Karachi.