

Rakesh Mohan: Reforms, productivity and efficiency in banking: the Indian experience

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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 centre of attention for academia and policymakers 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 will structure my address along the following lines. First, I will 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 capitalization) 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 per cent during the 1970s to around 6 per cent during the 1990s and further to 7 per cent during the first half of this decade. Within the services sector, the share of finance rose from less than 5 per cent to more than 12 per cent over the same period.

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. What is of interest is that the Finance Ratio, a proxy for financial deepening, witnessed remarkable improvement over this period.

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 per cent during the first half of the current decade; M3/GDP has averaged around 50 per cent 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 averaged over 30 per cent of GDP during the first half of the current decade. 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.

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 & 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. 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.

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 Reforms¹

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.

As you are aware, the financial system in India by the late 1980s was characterized 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 reforms²:

- 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 per cent 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.

¹ I have discussed the details of financial sector reforms in India elsewhere; see Mohan (2005).

² A detailed discussion on this aspect is contained in Bhide *et al.* (2001).

- 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 per cent, and banks have been listed.
- Mechanism for greater regulatory coordination instituted for regulation and supervision of financial conglomerates.
- Measures taken to strengthen creditor rights (still in process).

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 & 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 rationalized tenor linked PLRs abolished

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 per cent for scheduled commercial banks (SCBs) at end-March 1997, has declined by more than two thirds to 5.2 per cent at end-March 2005. 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 per cent at end-March 2005, well above the stipulated level of 9 per cent. 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.

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 policymakers 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).

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 (labor 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 CAMEL³ 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)

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.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,

³ CAMEL is the acronym for Capital adequacy, Asset quality, Management, Earnings and Liquidity.

⁴ Defined 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.

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).

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 per cent in 1993 to more than 2 per cent 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. 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.

At a more disaggregated level, it is evident that⁵ 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. The operating cost per unit of earning assets declined from 2.1 per cent in 1992 to 1.8 per cent in 2004; similarly, operating cost per unit of total volume of business declined from 3.4 per cent to 2.6 per cent 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.

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 per cent. 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 per cent in 1992 to 0.2 per cent 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.

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 per cent of their net income towards managing labour and physical capital in 2004 as against nearly 72 per cent in 1993. In other words, Indian banks recorded a net cost saving of nearly 27 per cent 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 varied markedly from a low of 48 per

⁵ Total operating cost can be broken down into labor 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.

cent to a high of 116 percent and the ratio around 60 per cent 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. Thereafter, it recorded a relatively modest decline to around 3 per cent 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 1997.⁶ 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 per cent. 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 per cent. 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 per cent. 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

⁶ Definitions 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.

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 bottomline is clear: Indian banks witnessed significant productivity improvements, post-reforms.

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. 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.

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.⁷ 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 per cent in public sector banks compared with 100 per cent in new private and around 90 per cent in foreign banks (Reserve Bank of India, 2002). Data reported by the RBI suggests that nearly 71 per cent of branches of public sector banks are fully computerized. However, computerization 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

⁷ The reported figure for Pakistan was 4.21 in 2001.

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. 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 specialized SME branches in identified clusters/centers 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, 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 under-privileged. 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 per cent to around 8 per cent 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 per cent of GDP, but supports nearly 60 per cent 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.