Chapter 8  
Summary and Conclusions

8.1 Introduction

Over the last twenty years, the Indian banking system has experienced a significant transformation from a financially repressed system to a sound and efficient system which has resilience to withstand the force of a financial crisis. From the early 1970s through the late 1980s, the role of market forces in the Indian banking system was almost missing, and excess regulation in terms of high liquidity requirements and state interventions in allocating credit and determining the prices of financial products resulted in serious financial repression. Realizing the presence of the signs of financial repression and to seek an escape from any potential crisis in the banking sector, the Government of India (GOI) embarked on comprehensive banking reforms plan in 1992 with the objective of creating a more diversified, profitable, efficient and resilient banking system. The reform measures were sequenced to create an enabling environment for banks to overcome the external constraints and operate with greater flexibility. The main agenda of the reform process was to focus on key areas: (i) restructuring of public sector banks (PSBs) by imparting more autonomy in decision making, and by infusing fresh capital through recapitalization and partial privatization; (ii) creating contestable markets by removing entry barriers for de novo domestic private and foreign banks; (iii) improving the regulatory and supervisory frameworks; and (iv) strengthening the banking system through consolidation. To meet this agenda, the policy makers heralded an episode of interest rates deregulation, standardized minimum capital requirements as per Basel norms, prudential norms relating to income recognition, assets classification and provisioning for bad loans, and changes in the legal and supervisory environment.

Bearing the aforementioned developments in mind, the main objective of this study is to analyze the impact of deregulation and liberalization measures introduced since 1992 on the efficiency and productivity growth of Indian banking industry. To this end, we studied the evolution of cost efficiency and total factor productivity (TFP) growth across distinct ownership groups and size classes over the period from 1992-93 until 2007-08. We used an input-output specification by incorporating a risk factor,
which is broadly consistent with popularly used intermediation approach, and employed data envelopment analysis (DEA) models to estimate the cost efficiency and its component measures for Indian banks. Moreover, DEA-based non-radial Malmquist productivity index (MPI) approach has been used to compute the yearly indices of TFP growth.

**8.2 Empirical findings of the study**

The main inferences that have been drawn from the results of our empirical study can be summarized as follows. In order to reach at the best-specification of inputs and outputs, we made a comparison of the estimates of cost, technical and allocative efficiencies with and without the non-interest income as a proxy for non-traditional activities in the output vector. Our results show that the omission of non-interest income as a proxy for non-traditional activities significantly understated the cost, technical and allocative efficiencies of Indian banking industry. Further, the exclusion of these activities in the output specification has significantly affected the ranking of the individual banks and ownership groups in each year of the study period. We note that the PSBs were more efficient than the private and foreign banks if non-interest income as a proxy for non-traditional activities was not included in the output vector. However, when this proxy was accounted for in the output specification, the foreign banks turned to be more efficient than their counterparts. Thus, the inclusion of non-traditional activities not only improved the efficiency level of foreign banks to a large extent but also changed their relative position in the groups’ ranking. Therefore, we can safely infer on the basis of empirical findings that non-traditional activities are totally relevant in an analysis of the efficiency of Indian banks, and a proxy for these activities should be included as one of the outputs in the studies on banking efficiency, particularly aiming at the comparison of the performance among distinct ownership type institutions. Overall, the results of this study reinforced the prevailing view in the extant literature that the exclusion of non-traditional activities causes misspecification of banks’ output, and may distort the efficiency estimates, and therefore, a best-specification must include a proxy for non-traditional activities.

The analysis of evolution of cost efficiency in Indian banking industry shows that Indian banks, on average, exhibit the degree of cost inefficiency in tune of 17.8%,
which is slightly lower than that of world’s average of 20% cited in the extensive survey of Berger and Humphrey (1997). Further, the main source of observed cost inefficiency was allocative in nature rather than technical, indicating that Indian banks are doing a better job technically rather than allocatively. In addition, the observed technical inefficiency in the Indian banking system was primarily due to managerial underperformance in controlling the waste of inputs in the production process rather than failure to operate at optimum scale size. Our results further suggest that the deepening of reforms process yielded a positive impact on the cost efficiency of Indian banks. The analysis of growth rates revealed that that cost efficiency of Indian banks grew at a very moderate rate of 0.127% per annum over the sample years, and its trend was positive in both the sub-periods. The moderate rate of cost efficiency was mainly due to negative growth in allocative efficiency since technical efficiency followed an uptrend. The observed negative growth of allocative efficiency may be because of high fluctuations and instability in factor prices, idle capacity and staff redundancies.

The empirical findings on the basis of cost efficiency of distinct ownership groups indicate that PSBs were more cost efficient along with the foreign banks than private banks. Further, the study points that cost efficiency of PSBs improved (though at a moderate rate) during the entire study period, and most of the observed efficiency gains have emanated after few years of launching the reforms process, i.e., from 1998-99 onwards. This improvement in cost efficiency of PSBs was mainly attributed to technical efficiency, since managers of PSBs operate relatively not efficient with respect to the optimal combination of inputs given their prices and technology. The results suggest that the PSBs have benefited more significantly from the reform process than other banks—something which might be expected given that government policy had a particular focus on the efficiency improvement of these banks. Further, among PSBs, efficiency levels of State Bank of India and its associates were noticeably higher than that of nationalized banks.

Our study also finds that cost efficiency of private banks grew at a modest rate, and intensification of reforms failed to impart to a positive impact on the cost efficiency performance of these banks. Further, new private banks outperformed old
private banks in the post-reforms years since these banks have successfully managed their business at lower operating costs, and do not carry any baggage from the past. During the post-reforms period, the cost efficiency performance of old private banks was lackadaisical, resulting in a ‘pulling down’ of the overall performance of private banking segment below the level that has been observed by public and foreign banks. Regarding the foreign banks, the study finds that cost efficiency exhibited a negative trend during the entire study period and distinct sub-periods. The empirical results also reveal that (i) in the majority of years, foreign banks were dominating in defining the grand technological frontier of the Indian banking system, and (ii) foreign banks were more cost efficient than their domestic counterparts. This finding indicates that foreign banks in the Indian banking system have succeeded in using their superior technology and managerial expertise and experience, and this in turn has offsetted potential cross-border disadvantages, e.g., lack of knowledge about the local market, barriers of culture and regulations, etc. Thus, the empirical evidence is in favour of the prevalence of the *global advantage hypothesis* in Indian banking industry.

The analysis of returns-to-scale finds that most of Indian banks are facing substantial scale problems, especially due to increasing returns-to-scale, suggesting that substantial efficiency gains could be obtained from altering the scale via either internal growth or consolidation in the sector. An examination of relationship between bank size and efficiency exhibits that medium banks were more cost efficient than small, followed by large and micro banks. This indicates that recent advances in technology, increased competition and deregulation have reduced the minimum efficient scale of technology, thereby making medium-sized banks more efficient.

The empirical analysis carried out in this thesis also investigates the main determinants of Indian banking efficiency because this could provide important insights for the potential improvement of bank management and regulatory policies. In particular, we examine the impact of environmental factors like ownership status, size, profitability and asset quality on the cost efficiency levels of banks. Our results show that private banks were less cost efficient than public and foreign banks. In addition, the relationship between efficiency and profitability has been observed to be positive. Another important result is that the bad luck or bad management hypothesis instead of
the skimping hypothesis is prevalent in the Indian banking industry. Moreover, we find that larger banks were more cost efficient, indicating the existence of significant economies of scale in Indian banking industry. Furthermore, the banks with extensive exposure to off-balance sheet activities were more efficient.

The analysis of total factor productivity (TFP) growth in Indian banking industry reveals that the productivity performance of Indian banks recorded a moderate improvement after the introduction of deregulatory policies, whereas their technical efficiency has not improved as expected. In general, the productivity growth in Indian banking industry was mainly attributable to the technological progress rather than the improvement in efficiency. Our results suggest that innovation in banking technology made a greater contribution in achieving the productivity growth rate of 1.3% per annum during the post-deregulation period. Thus, technical progress was the key driver of productivity growth in Indian banking industry. Further, deepening of the reforms process yielded positive results in terms of productivity growth. After productivity regress in the first phase of liberalization and deregulation, a striking rebound has taken place in the second sub-period, when productivity grew at the rate of 2.7% per annum in the second phase. Further, the observed U-turn in the productivity behaviour of Indian banks during the latter phase of deregulation was due to a strong ‘frontier-shift’ effect. The most depressing development that has emerged in this phase was that the gains from technical change were reduced by adverse technical efficiency change. In fact, the installed technology in the Indian banks was not utilized fully by their customers to the extent necessary to start the process of catching-up among banks.

Another significant finding of our analysis is that the PSBs made steadier progress in productivity relative to domestic private and foreign banks. In particular, productivity growth within PSBs was the fastest (2.7% per annum), followed by private banks (0.8% per annum), and foreign banks (0.5% per annum). Further, the nature of observed productivity surge across these ownership groups was technology-driven, supporting the hypothesis that a diversity of market participants playing on a level field could act as a stimulant to innovation in response to greater competition. Further, PSBs had a significantly higher average productivity growth in the first phase
of reforms, but foreign banks were ranked the best in the second phase. The reshuffle of ranking between public and foreign banks can be explained as the result of increased competition to create a niche in the market place. Moreover, in the second phase of reforms, the group of PSBs was the only one that succeeded in enhancing efficiency but all categories of banks experienced technological progress. There were sweeping technological advances in foreign banks.

This study also finds that domestic banks outperformed the foreign banks in terms of productivity growth during the entire study period. However, there was reshuffling in the ranking between domestic and foreign banks during the second phase. Foreign banks emerged as the better performer in terms of productivity growth due to their exceptionally outstanding performance in introducing technical innovations. In addition, foreign banks emerged as the leading innovators in the Indian banking industry. This reflects the enormous relevance of foreign ownership in Indian banking industry.

Regarding the temporal behaviour of TFP growth across size classes, it has been observed that the productivity growth in medium and large banks was the speediest throughout the entire period. Small and micro banks also had productivity gains during the sample period, but those gains were too meager. Further, in both medium and large banks, TFP growth was largely contributed by technological progress, suggesting that these banks are the leaders in adopting more sophisticated and advanced banking technology.

The panel data regression analysis provides that the exposure of banks to off-balance sheet activities was the most significant factor explaining the inter-bank variations in productivity growth and its sources. This suggests that the banks having more involvement in non-traditional activities experience larger productivity gains. Further, profitability of banks had a direct relationship with the productivity growth, and larger banks were not necessarily those experienced the larger productivity gains. Furthermore, ownership per se did not exert any significant influence on the productivity growth of Indian banks.
8.3 Policy implications

The empirical findings of the present study shed light on the potential direction of future banking reforms in India, and also on the issue of how banks might go about increasing the cost efficiency of their operations. The following significant policy implications can be gleaned from the aforementioned empirical results.

First, given the evidence that public sector banks are more cost efficient and experienced higher TFP growth than domestic private banks, we can say with a great confidence that private ownership by itself may not be sufficient to ensure that Indian banks operate efficiently. This is also a pointer towards the fact that dominance of public ownership of banks is not a hindrance for the future growth of banking industry, in particular, and the economy, in general. Moreover, we find that (i) foreign banks are more efficient than (private) domestic banks, (ii) foreign banks are dominating in defining the grand efficient frontier of the Indian banking system, and (iii) foreign banks are leading technological innovators of the industry. This indicates the relevance of foreign bank entry in the Indian banking system, and suggests that the relaxations in the entry of foreign banks would make an important contribution towards improving overall banking efficiency. All in all, our study thus favours the existing policy of opening-up the Indian banking sector, with liberalization of foreign entry by way of setting up a wholly-owned banking subsidiary (WOS) or conversion of the existing branches into a WOS. We expect that this will really push the domestic banks closer to the global best-practices, and would improve their performance and service quality.

Second, the empirical evidence highlights that the key driver of the observed productivity growth in Indian banking industry is technological progress. In the post-deregulation years, increased application of technology played an important role in improving cost efficiency and productivity of banks. This justifies the RBI’s focus on the use of information technology in the banking sector on the large scale. Beginning with the Magnetic Ink Character Recognition (MICR) cheque clearing system, the Indian retail payment system got a major boost during the post-reforms period with the introduction of technologically advanced and secured systems such as the electronic fund transfer, electronic clearing system, the special National Electronics
Funds Transfer System (NEFT) and card based systems that greatly enhanced efficiency levels in banking operations. The introduction of Real Time Gross Settlement (RTGS) improved the cash management by banks. Another technology induced cost-effective initiative was the introduction of virtual banking services through the establishment of ATMs and shared ATM networks, smart cards, stored-value cards, phone banking and ultimately the internet and intranet banking. The RBI also operationalised the Very Small Aperture Terminal (VSAT) network to provide reliable communication backbone to the financial sector. To facilitate connectivity within the banking sector, the RBI, public sector banks, and Institute for Development and Research in Banking Technology (IDRBT) collectively set up the Indian Financial Network (INFINET) based on satellite communication. Such technological initiatives promoted by the RBI produced a strong frontier-shift effect in the Indian banking industry during the post-deregulation period.

Third, our empirical findings indicate that (i) medium and large banks exhibited the higher efficiency than the small and micro banks, and (ii) most of the banks were operating in the zone of increasing returns-to-scale. These findings suggest that in general, Indian banks could improve their cost efficiency by growing in size; perhaps by using mergers and acquisitions (M&As). Simply, substantial cost efficiency gains may perhaps be obtained from altering the scale of operations via either internal growth or consolidation in the sector.

Finally, the future reforms in the banking sector should be directed towards strengthening competitive and market-oriented policies. In particular, the government should continually introduce reform measures to improve risk management, transparency and corporate governance in Indian banks. This is because the empirical findings of the present study are in favour of conventional wisdom that financial deregulation exerts a positive influence on the efficiency and productivity of banks. Our findings suggest that banking reforms programme initiated in 1992 provided the anticipated banking efficiency gains, especially across public sector banks. This reflects that the banking reforms process in India has achieved the desired results to a large extent, and thus, offers a success story that may be emulated by other developing economies that are undergoing banking reforms not only because an ascent in the
efficiency has been observed in the majority of banks, but also significant technological progress has taken place over time. The empirical results implicitly signal the effective working of monetary policy in India since the early nineties. During the post-reforms period, the policy makers gradually reduced the level of statutory pre-emptions (by lowering CRR and SLR) which in turn increased the banks’ lending capacity. Increase in the banks’ credit creating capacity not only wiped out the signs of repression in the banking system but also enhanced the interest income of the banks. The increase in interest income contributed positively to the banks’ output and was well mirrored in the improvement of cost efficiency of banks.

8.4 Limitations and directions for future research

Our study has some limitations, and these suggest potential directions for future work. The first shortcoming of the present study is that we only investigated the cost efficiency of Indian banks. Cost efficiency gives a measure of how close a bank’s costs are to those of the best banking practice after controlling for comparative output levels. However, a measure of profit efficiency which assesses how close a bank comes to generate the maximum possible profit given the levels of input and output prices (quantities) and other exogenous conditions could capture inefficiencies on the output side as well as those on the input side. Thus, further research into investigating the profit efficiency of Indian banks would be a valuable addition to the extant literature. The second shortcoming of this study is that it employs the only data envelopment analysis (DEA) methodology for computing cost, allocative, technical, pure technical and scale efficiency scores for individual banks. An interesting direction for further research would be to employ stochastic frontier approach (SFA) along with DEA to estimate the relative efficiency of Indian banks. This would lead to methodological cross-checking and help to assess the robustness of empirically estimated efficiency levels. Another potential direction for future research is that one could also investigate the impact of inclusion or exclusion of a proxy for non-traditional activities in the output specification on the total factor productivity (TFP) growth and its components in Indian banking industry.

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