CHAPTER – II

INDIAN BANKING SYSTEM

The banking system of any economy is the track on which it runs. Its structure and working are integral to a country’s financial performance and economic growth. Indian banking system is unique, the like of which exists nowhere in the world. The banking system in India having gone through various stages of development now consists of central bank (RBI), public sector scheduled banks and private sector, scheduled as well as non-scheduled. Banks in India concentrate on the generation, the mobilization and effective distribution of savings. Banks have diversified their functions, entering new areas of operation. Balancing liquidity with profitability, management of reserves and creation of credit are the parameters on which their financial performance is measured. Whereas parameters like branch expansion measure their social performance. RBI exercises control on banks through its various tools. The Indian banking system has a very wide reach and deep presence. It is one of the largest banking systems in the world. In terms of liquidity and profitability it has achieved new dimensions. It is one of the strongest pillars supporting development of our economy. Indian banking system is filled with many problem areas also. NPAs, interest rates, and government control are some of the areas that duly affect the profitability of banks in India’s, CRR, interest rate slabs, prudential norms, capital adequacy norms, access to capital market, freedom of operation, recovery of debt are some of the areas where many reforms have been suggested and brought. In this chapter different periods of banking development in India is reviewed and attempt to find out the strength, weakness, opportunities, and threats of Indian banking.

Definition of Banks

A Bank is an institution which accepts deposits from the general public and extends loans to the households, the firms and the government. Banks are those
institutions which operate in money. Thus, they are money traders, with the process of development functions of banks are also increasing and diversifying now, the banks are not nearly the traders of money, they also create credit. Their activities are increasing and diversifying. Hence it is very difficult to give a universally acceptable definition of bank.

Indian Banking Regulation Act 1949 section 5 (1) (b) of the Banking Regulation act 1949 Banking is defined as. “Accepting for the purpose of the landing of investment of deposits of money from public repayable on demand or other wise and withdraw able by cheques, draft, order or otherwise.”1 In a Greek History “Bank means a bench or table for changing money.”2 According to Oxford Dictionary “Bank is an establishment for custody of money received from or on behalf of its customers. Its essential duty is to pay their drafts unit. Its profits arise from the use of the money left by them.”3 Kinley viewed "A bank is an establishment which makes to individuals such advances of money or other means of payment as may be required and safely made and to which individuals entrust money or means of payment when not required by them for use.”4 While Crowthers viewed “Bank as institutions which collects money from those who are saving it out of their income and lends out to those who required it.”

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2 Ibid.
According to English Common Law "A banker is defined as a person who carries on the business of banking, which is specified as conducting current accounts for his customers, paying cheques drawn on him, and collecting cheques for his customers".  

H. L. Hert opined “A Bankers is one who in the ordinary course of his business honors drawn upon him by person from and for whom he receives money on current account”.

Ancient Period of Banking in India

The origin of banking dates back to the Vedic period. There are repeated references in the Vedic literature to money lending which was quite common as a side business. Later, during the time of the Smritis, which followed the Vedic Period and the Epic age, banking became a full time business and got diversified with bankers performing most of the functions of the present day. The Vaish community, conducted banking business during this period. As far back as the second or third century A.D. Manu the great Hindu Jurist, devoted a section of his work to deposits and advances and laid down rules relating to rates of interest to be charged.

Still later, that is during the Buddhist period, banking business was decentralized and became a matter of volition. Consequently, Brahmins and Kshatriyas, who were earlier not permitted to take to banking as their profession except under exceptionally rare circumstances, also took to it as their business. During this period banking became more specific and systematic and bills of exchange came in wide use. “Shresthis” or bankers influential in society and very often acted as royal treasurers. From the ancient times in India, an indigenous banking system has prevailed. The businessmen called Shroffs, Seths, Sahukars, Mahajans, Chettis etc. had been carrying on the business of banking since ancient times. These indigenous

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5 United Dominions Trust Ltd. Vs Kirkwood, English Court of Appeal, 1966, 2 QB 431.
bankers included very small money lenders to shroffs with huge businesses, who carried on the large and specialized business even greater than the business.  

**Mughal Period**

Mughal dynasty started with Babur ascending the throne of Agra in 1526 A.D. During Mughal period the indigenous bankers played a very important role in lending money and financing of foreign trade and commerce. They were also engaged in the profitable business of money changing. Banking business was, however particularly during the secular and settled reign of Emperor Akbar given the much needed political stability to the country. Every city, big or small had a ‘Sheth’ also known as a ‘Shah’ or ‘Shroff’, who performed a number of banking functions. He was respected by all parts of people as an important citizen. In Principal cities, besides Shroffs, there was a ‘Nagar Sheth’ or ‘Town Banker’. They were instrumental in changing funds from place to place and doing collection business mainly through Hundis. The Hundis were accepted mode of change of money for commercial transactions. In general banking in India has evolved through five distinct phases. Each phase could be separated from the other by a landmark development in the sphere of Banking Sector.

**Phase I –Pre-independence Phase (up to 1947)**

The English traders that came to India in the 17th century could not make much use of the indigenous bankers, owing to their ignorance of the latter’s language as well the latter’s inexperience of the former’s trade. Therefore, the English agency houses in Calcutta and Bombay began to conduct banking business, besides their commercial business, on the basis of unlimited liability.

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8 URL: http://www.gatewayforIndia.com/History/Muslim-history.htm, 21 June 2010.
These agency houses were organized by the Europeans with aptitude of commercial pursuit, who resigned from civil and military services in India and organized agency houses. The primary concern of these agency houses was trade, but they branched out into banking as a sideline to facilitate the operations of their main business. The English agency houses, that began to serve as bankers to the East India Company had no capital of their own, and depended on deposits for their funds. They financed movements of crops, issued paper money and established joint stock banks.9

The first Joint Stock Bank established in the country was the Bank of Hindustan founded in 1770 by the famous English agency house of M/s. Alexander and Company. The Bengal Bank and The Central Bank of India were established in 1785.

The Bank of Bengal, the first of the three Presidency Banks was established in Calcutta in 1806 under the name of Bank of Calcutta. It was renamed in 1809 on the grant of the charter as a Bank of Bengal. The two other presidency banks, namely the bank of Bombay and the Bank of Madras, were established in 1840 and 1843 respectively. After the Paper Currency Act of 1862, however the right of the note issue was taken away from them. The Presidency Banks had branches in important towns of the country. The banking crisis of 1913 to 1917 however brought out the serious deficiencies in the existing banking system in the country showing the need for effective co-ordination through the establishment of the Central Bank. After repeated efforts, the three presidency bank was fused into a single bank under the name of the Imperial Bank of India in 1921.

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9 Bhanu Murthy, K.V. & Taru Deb, Ashis, *Concept of Deregulation -Lessons from Banking History in India* (Delhi: Delhi University), 2010, pp. 11-12.
The bank was authorized to hold Government balances and manage public debt. It was not, however, given power to issue notes. The issuing of the currency continued to be close preserving of the Government of India. The branches of the bank were to work as clearing houses. It was mainly a commercial bank competing with other banks. The Imperial Bank of India was nationalized in 1955 by the SBI act. In the wake of the Swadeshi Movement, a number of banks with Indian management were established in the country. The Punjab National Bank Ltd. was founded in 1895, The Bank of India Ltd. in 1906, The Canara Bank Ltd. in 1906. The Indian Bank Ltd. in 1907, the Bank of Baroda Ltd. in 1908, and the Central Bank of India Ltd. in 1911. There have been a number of checks to progress to the Banking Industry in the form of bank failures during the last over 100 years. The series of bank crisis particularly during the time 1913–17, 1939–45 and 1948–53 wiped out many weak units. Loss in trade or industry affected their credit and solvency. It may however, be stated that one of the important reasons for the last banking crisis of 1948–53 was the partition of the country into India and Pakistan. Most of the depositors who were Hindus migrated from Pakistan to India while a major portion of the assets of the banks, which failed remained in Pakistan.

Although suggestions have been made from time to time that India ought to have a Central Bank. The Royal Commission on Indian currency and finance recommended that a Central Bank should be started in India so as to perfect her credit and currency organization. From 1927 to 1933, there was a proposal and constitutional reforms law process has been made. It was enacted in due course and became law on the 6th March 1934 and the Reserve Bank of India started functioning with effect from 1st April 1935. The Reserve Bank of India (RBI) was established with a view to manage the currency and credit of the country by.

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acting as a banker to Commercial Banks and Government. Failure of Banks was a regular feature during the pre-independence period and to a lesser extent during post-independence period. Serious shortcomings in the functioning was witnessed during the period of war 1935-45, which lead to the realization that close inspection by the Central Banking Authority was necessary to ensure the soundness of the Banking Organizations. During this period from 1913 to 1918, at least 94 Banks in India failed. Reserve Bank of India was constituted as an apex Bank without major government ownership. This period saw turbulent time due to the outbreak of the Second World War and later national freedom movement, which disrupted the economic development.

Phase II-Pre-nationalization Phase (1947-1969)

At the time of independence, there were 648 Banks in the Indian Union with a total of 4820 Branch Offices. In January 1949, the Reserve Bank of India was nationalized. Reserve Bank of India assumed extensive regulatory and supervisory powers under the Banking Companies Act 1949, later renamed as Banking Regulation Act. Thus, change in the outlook of Bank management started emerging, leading towards the end of traditional Banking. The Rural Banking Enquiry Committee in 1950 recommended in the larger context to meet rural credit requirements. This Committee recommended that the Imperial Bank should be persuaded to set up a network of branches in the rural areas as well. The advent of newer services and mobilization resulted into the formation of State Bank of India in 1955, which extended the Banking facilities on a large scale. With the purpose of diversification reorganization of seven Banks that became the Associate Banks belonged to the princely states (State Bank of India and its seven associate Banks called as the State Bank group), during 1956-59. The State Bank

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12 War Time Central Banking Operations, "Reserve Bank of India History", Chapter 11, 1, pp. 310-344.
of India and its subsidiaries increased their rural base substantially during the
decade 1960's but these were still unable to meet the requirement of the country.

At the end of 1961, 2944 Banking Offices were located in 222 towns
having a population of less than 50,000 and above, and 2,024 offices in 1,060
places having a population of less than 50,000. In 1962, the Reserve Bank of
India issued a circular to all Scheduled Banks mentioning Banks to submit details
about their expansion programmes for the next three years. Reserve Bank of India
regulated branch licensing policy for new offices of Banks in a manner to assert
the sound development of the Banking system and to cater the expanding
requirements of India.\footnote{14}

Nationalization of the Imperial Banks signified the entry of Public Sector
Banks into Commercial Banking in India. It was made clear by Union Minister of
Finance that nationalization of the Imperial Bank was not based on ideological
grounds but it was intended to acquire control over a strategic section of
Commercial Banking with a view to develop and serve. During this period, Banks
went into compulsory or voluntary liquidation. This resulted into 204 weaker or
non-viable Banking companies amalgamated and merged with other sound
Banking Organizations. This brought down the number of functioning Banks to
93 by the end of 1967.\footnote{15} In July 1969, the Government of India Nationalized the
14 biggest Commercial Banks with deposit base of not less than Rs. 500 million.\footnote{16}
The idea behind nationalization of the Banks was to allow the Banking system
reach out to rural and semi-urban areas. The Nationalization of Banks was also
done to meet the needs of diverse kinds of borrowers, in particular farmers, small-
scale industries, and self-employed professionals. In addition to serve to the need

\footnote{14}{Introduction, Reserve Bank of India History, Section 2, pp.1-8.}
\footnote{15}{From Imperial Bank to State Bank, Reserve Bank of India History, Chapter 9, 2,
pp. 318-354.}
\footnote{16}{The Defining Event, Reserve Bank of India History, Chapter 1, 3, pp. 13-53.}
of these kinds of diverse borrowers, Banks changed their methods of operations. A special attention was paid towards the growth and development of the economy. Thus, to achieve these goals it was necessary to align Banks credit flow with the broader goals of planned economic development. With this view, the social control was introduced in 1968 with the main objective to achieve the wide spread of Bank credit, rectifying regional and sector imbalances and to direct credit flows to priority sectors. Social control ensured purposeful and even distribution of Bank credit and flow of credit to be attuned to serve the socio-economic objectives of development. Therefore, by the end of this phase the nationalization of Banks marked the beginning of the expansion phase of the Indian Banking Industry.

**Phase III—Expansion Phase (1969-84)**

Before 1969, Banking facilities were mostly operated in the urban and semi-urban areas. Particularly during this period, a strong-minded effort was made to take Banks to the interior of villages to rural people. The percentage of credit towards the socially desirable sectors of the economy was impressive and the targets of credit for the different sectors of the economy, which were in terrible need of the funds was implemented. During this period, Banks provided extensive publicity about various services provided by them especially to the customers in the rural areas. Banks made much more intensified efforts, through a coordinated branch expansion programme for mobilization of deposits from all sections of the society and lending to the weaker sectors of the society.

A new Banking policy with a view to geographical diversification of banking facilities under the name of Lead Bank Scheme was announced in 1969. According to this scheme, entire country was divided into districts and each Nationalized Bank was allotted a district where it was supposed to play a leading role in extending branches. Banks were also required to conduct surveys of
districts allotted to them to identify the unbanked areas for branch opening. Under Lead Bank Scheme, Banks were asked to recruit and train staff for offering advice to small borrowers and framers. The easy availability of credit spirited entrepreneurship among the masses leading towards the phenomenal growth of retail trade, small businesses, self-employment, transport operators, and small scale industries throughout the country. This step taken by Banking Sector created huge employment opportunities for the unemployed people and increased the national income of the country as well.

In the first decade after nationalization of the 14 Commercial Banks, 21,000 new Bank Offices were opened raising the total number of functioning offices from 8,262 in June 1969 to 30,202 by the end of June 1979. Out of these new offices nearly half numbers of offices were opened where there was no Commercial Bank previously. The average population per Bank Office declined from 65,000 in June 1969 to about 27,000 in 1975 and further to 18,000 in 1979. Among the Scheduled Commercial Banks, the Public Sector Banks opened the largest number of branches. Regional Rural Banks were set up in September 1975, as third component of the multi-agency credit system for agriculture and rural development. The establishment of new Regional Rural Banks and the expansion of the branches of existing banks were encouraged. Another important development during the year 1978-79 was the formulation of a new branch licensing policy for the three year period (1979-81). The size and influence of Public Sector Banks in the economy continued to increase with unrestrained branch expansion along with nationalization of six more Private Banks in April 1980. Government controlled around 91 percent of banking business of India. By the end of March 1984, the Public Sector Banks together with Regional Rural

Banks accounted for 90 percent of the 44,520 Bank Offices functioning in the country of which nearly seven-tenths network was created during 1969-84.\textsuperscript{18}

The overall objective of the expansion phase was to expand the Banking facilities in deficit areas and to reduce the inter-state and inter-district disparities in order to support development activities. It was this phase in which Indian Banks worked in over protective environment with little competition among the Nationalized Banks themselves along with a few Private and Foreign Banks. During this period, Nationalized Banks worked more or less like the Government Departments having a bureaucratic attitude towards customers as customers had very few options available. The expansion phase was marked by geographical and numerical increase of Bank branches. This phase developed some weaknesses in the areas like poor customer services, low profitability, overstaffing and growing non-performing assets. During this period, viewing these shortfalls Reserve Bank of India took decisions to slow down the pace of expansion, to place emphasis on strengthening of the existing structure and consolidation.

**Phase IV-Consolidation Phase (1985-91)**

In 1985, a series of policy measures were introduced by Reserve Bank of India to strengthen Public Sector Banks. Emphasis was made to pay special attention to internal control, customer services, credit management, staff productivity, and profitability of the Banks. Unfortunately, Banks were not prepared enough to implement the challenging changes, as suggested by Reserve Bank of India. To counter inefficiencies in 1985, there was a steady increase in the interest rates on Government bonds to better reflect supply and demand. From early 1990's Public Sector Banks stopped rural expansion and concentrated on

In the 1990's, structural problems created by India's economic policies in previous decades, such as its inward-looking nature and its distrust on foreign direct investment. This resulted into India's inability to receive capital from the international market to cover its deficit accounts. The balance of payment crisis also showed that the economic policies were out of line with the changing environment. In fact, the crisis of 1990's facilitated major changes. In 1990's, Narasimha Rao Government embarked on a policy of liberalization and licensing of a small number of Private Sector Banks. The Private Sector Banks were also known as New Generation Tech-savvy Banks. The new generation Banks included- Global Trust Bank (the first of such new generation Bank that later amalgamated with Oriental Bank of Commerce), Axis Bank (earlier as Unit Trust of India), Industrial Credit and Investment Corporation of India Bank (commonly called as ICICI Bank) and Housing Development Finance Corporation Limited Bank (HDFC). The next stage for Indian Banking Sector proposed relaxation in the norms related to the Foreign Direct Investment, in which foreign investors in Banks were given voting rights with some restrictions. Particularly this phase witnessed the liberal entry of Private and Foreign Banks, operational freedom, deregulation of the interest rates, reduction in the statutory reserve requirements of Statutory Liquidity Ratio (SLR) and Cash Reserve Ratio (CRR). These changes brought competitiveness in the Indian Banking Industry and even helped in improving the profitability. Apart from development of positive implications of liberalization, deregulation, and globalization increased risk also existed. Banks, being well aware of the risk factors for their business started proactively devising internal mechanisms for identification and management of the risks. Another significant instance of this phase was the entry of mass computerization to handle, the increased volumes of business effectively and to improve customer services. Computerization in the
Banks resulted into surplus manpower in the Banking Industry, which led to the introduction of voluntary retirement in the Nationalized Banks with a view to contemplating the manpower.

Thus, the rapid growth in the economy of India was revitalized with the help of Banking Sector, with strong contribution of three sectors of Banks, namely Government Banks, Private Banks, and Foreign Banks. A modern outlook emerged during this period along with the tech-savvy methods of working. Customers demanded more from their Banks resulting into the requirements of restructuring of Indian Banking Industry.

Phase V-Restructuring Phase (1992 onwards) or Economic Reforms Period

The banking sector reforms were a part of the new economic policy adopted by the government of India in July, 1991. The government appointed a Committee on the financial system under the Chairmanship of Mr. M. Narasimham in August 1991. The Committee submitted its report within three months and made the following recommendations.

1. Prudential Regulation and Supervision. Both supervision and regulation are required for the sound and healthy growth of the banking system. The Narasimham Committee had recommended that banking supervision must be strengthened and prudential regulation should be introduced. The government accepted this recommendation and the RBI issued guidelines in April 1992 for income recognition, asset classification and provisioning and adopted the Basle capital adequacy standards. Non-performing loans have been defined as credit facility in respect of which interest has not been received for 180 days. These loans are classified as sub-standard, doubtful and lost depending on how long they have been non-performing. Provisioning has to be made at 10 per cent for sub-standard loans, 20-50 percent for doubtful loans and 100 per cent for lost loans.
2. Rehabilitation of Public Sector Banks. By the year 1991, the banking system had become weak due to the accumulation of non-performing assets. NPAs accounted for 24 per cent of the total lending. Half of the public sector banks made huge losses and the net profit to assets ratio was in the range of minus 6.8 to plus 0.5 per cent. In order to restore the net worth of the banks, the government decided to recapitalize them. Recapitalization required direct infusion of capital to the banks from the Union budget and the NPAs were left in the books of the banks, the recommendation of the government. Instead special recovery tribunals were set up by the government, by March 1997, the cost of recapitalization operation was about Rs.14000 crore. As a result, the capital adequacy ratio of all the banks improved.

3. Reduction in the SLR and the CRR. The Statutory Liquidity Ratio and the Cash Reserve Ratio were very high in the pre reform period. High SLR and CRR reduced the profitability of banks in India. The Narasimham Committee recommended a reduction in the SLR to 25 per cent by 1996 and an unspecified reduction in the CRR. The government accepted this recommendation and brought down the SLR on total net demand and time liabilities to 25 per cent in 1996 from a high of 38.5 per cent in 1991. However, investment in government securities by commercial banks was 41.4 per cent of their net demand and time liabilities in December 2003 whereas the statutory requirement was only 25 per cent. The CRR being an instrument of monetary policy was reduced in a phased manner. The CRR was reduced to 13 per cent in May 1996 and by early 1997 it
was reduced to 10 per cent. It was further reduced to 9.5 per cent in November 1997. Since there was excess liquidity in the banking system, the CRR was raised to 11 per cent in August 1998. After reviewing the monetary and credit situation, the RBI reduced the CRR to 10.5 per cent in March 1999; 10 per cent in May 1999, nine per cent in November 1999 and in June 2003; the CRR was lowered to 4.5 per cent.

4. **Deregulation of Interest Rates.** Interest rates in India before the reforms were administered by the Central Bank i.e. they were not market determined. The administered interest rate system in India had become complex due to the multiplicity of interest rates. The policy of giving concession loans to the different disadvantaged sections of the society at a variety of interest rates reduced the profitability of commercial banks in India. The Narasimham Committee recommended phasing out of the system of concession interest rates. It argued that “interest rates should increasingly be allowed to perform their main function of a locating scarce loanable funds among alternative users. For them to do so, rates will have to be allowed broadly to be determined by market forces”. The government accepted the recommendation and adopted measures to deregulate them. From April 1992, the interest rates were liberalized and banks were allowed to determine interest rates on all term deposits of maturity of above 30 days and were free to determine the prime term lending rate for term loans of three years and above.

5. **Phasing out of Directed Credit.** Directed credit was introduced in India on the grounds of equity and efficiency. However, they reduced the profitability of commercial banks and also failed to promote both equity and efficiency. According to Hans Binswanger and SR Khandekar, directed credit had marginal effect on output had neutral effect on employment in the agricultural sector. In the agricultural sector, large and medium farmers took away large part of the
concession credit and subsidies. Further, the small scale industries were given subsidized credit on the grounds of market failure for more than 25 years. However, they could not come out of their cocoon. Concession credit therefore lost its argument of equity and efficiency. The Narasimham Committee recommended phasing out of the directed credit program. The government accepted the recommendation but is yet to take measures of phasing out the directed credit program.

6. Competition. In order to make the banking industry more competitive, it was made open to the private sector. As a result, ten new private sector banks came into existence. However, the RBI had imposed restrictions on these new private sector banks to open branches.

Narasimham Committee Report (1998) on Banking Sector

The Government of India appointed a Committee on Banking Sector reforms under the chairmanship of Mr. M Narasimham in the year 1998. The committee submitted its report in 1998. Important recommendations of the committee were as follows:

1. Strong banks should be merged and relatively weak and unviable banks should be closed. Mergers between banks and development financial institutions may be considered if it makes economic and commercial sense.

2. The country should have two or three banks with international orientation, eight to ten national banks and a large number of local banks. The third tier banks should remain limited to smaller regions. The first and second tier banks should take care of the needs of the corporate sector.
3. The Committee recommended new and higher norms for capital adequacy. It suggested that the minimum capital to risk assets ratio be increased to 10 percent from the earlier level of 8 percent.

4. Budgetary support for recapitalization should be stopped and Legal framework for credit recovery should be strengthened.

5. Net NPAs for all banks be brought down to below 5 percent by the year 2000 and 3 percent by 2002.

6. There should be rationalization of branches and staff.

7. Bank Boards should be depoliticized under the RBI supervision.

8. The policy of licensing new private banks may be continued.

9. Foreign banks may be allowed to set up subsidiaries or joint ventures in India and treated on par with other private banks and subject to the same conditions with regard to branches and directed credit as the private banks.

10. There has to be an integrated system of regulation and supervision to regulate and supervise the activities of banks, financial institutions and non-bank finance companies. The agency for this purpose to be renamed as the Board for Financial Regulation and Supervision (BFRS).

In response to the recommendations, the RBI announced a number of measures in October 1998. These measures related to phased introduction of risk weight for government approved securities, risk weight for government guaranteed advances, general provision for standard assets and higher capital to risk assets ratio for banks. In 2002, Securitization, Reconstruction of Financial Assets and Enforcement of Security Act was passed to provide a satisfactory legal
framework for the recovery of bank credit.\textsuperscript{21} Thus, Indian Banking Industry was categorized into Non-Scheduled Banks and Scheduled Banks. Scheduled Banks constituted of Commercial Banks and Co-operative Banks.

Year 1998, onwards Banks were free to offer differential rates of interest based on their size of deposits. The emphasis shifted from process based administration to risk-based management. During this period, Banks started developing new delivery channels like- automated teller machine (ATM), phone banking, internet banking, any branch banking, and auto sweep products. Automated Teller Machines were established initially to offer cash withdrawal functions later also included offering facilities like account management and bill facilities. Banks used Automated Teller Machines for product promotions. Internet Banking became popular and Banks offered facilities like- account enquiry, money transfer, requests, mail alerts, railway ticketing and bill payment. Internet Banking made Banking anywhere anytime on 24x365 basis. With the progress of alternate delivery channels, the need for centralized database was felt. There arises a need to update the database instantly, irrespective of the branch or the alternate channel that the customer used. Apprehending the need for centralized data center architecture, Banks started consolidating their database into a single large database through networking. Core Banking Solutions (CBS) created an environment where the entire Bank’s operations could be controlled from a centralized hub and created a centralized customer database that could be accessed from anywhere. Initially Private Sector Banks took a lead in Core Banking Solutions and viewing the success of Private Sector Banks even Public Sector Banks started switching to it. Core Banking Solutions helped Banks to provide faster and efficient customer services at reduced operational costs as it helped to save manpower costs. Apart from delivery channels development, during this phase emphasis was made to have international accounting standards.

To be introduced in phased manner with a view to make the Indian Banks internationally competitive with sound capital base. Banks experienced the pressure of competition in the form of changing customer requirements and customer retention. To manage these pressures, Banks became more customer-friendly. As a part of financial sector reforms State Banks were given operational flexibility and functional autonomy by diluting the stake of the Indian Government to 51 percent. Government further proposed, in 2000-01 in the Union Budget to reduce Government holding on Nationalized Banks to a minimum of 33 percent. Implementation of Banking Sector reforms helped Indian Bank's net profit to grow by 52.3 percent in the year 2002-03. The reforms in monetary and credit policy in 2004 were introduced in the view to increase the openness of the economy along with the integration of financial markets and rapid changes taking place in the global economic scenario. During this period, Reserve Bank of India stressed on objectives like strengthening of prudential and supervisory norms for Banks, improving credit delivery system, developing technological and institutional infrastructure for efficient financial sector, ensuring stability, and modernizing the payment system. Guidelines issued in February 2005, provided greater managerial autonomy and operational flexibility to support Public Sector Banks so that, they could respond to the new environmental changes and sustain competition with respect to the Private and Foreign Banks. Banks were permitted to invest a greater percentage of their assets and were given more freedom in their lending policies. State Bank of India has already established 62 offices overseas, across 35 countries and has further planned to set new overseas offices in the

coming years. In 2006 it was seen that Banks realized that better efficiency gains, stronger risk-based pricing and closer alignment with the international best practices need to be strengthened. Other aspects, which emerged due to the global economic downturn, were- pressure to reduce cost to maintain global competition, adaption to the global culture, and potential of outsourcing was identified. Banks adopted outsourcing practices as it mainly helped to reduce cost, improvement in quality of services, higher efficiency, productivity, better utilization of Human Resource Management, and transfer of risk to the outsourcer. However, at same time there existed threat of transfer of vital information or loss of customer data. The payment system vision document 2008 adopted by the Reserve Bank of India to encourage a safe and secure payment system.

The progress of Commercial Banks was summarized in Table 2.1 to develop understanding with regard to the various remarkable developments that took place in Indian Banking Industry. In the last 39 years since 1969, it has been seen that, impressive changes had taken place in the Banking Industry. The number of Scheduled Commercial Banks almost doubled from 73 in 1969 to 170 in 2008 and the number of Branch Offices increased from 8262 in 1969 to 78666 in 2008. The expansion of the branch network helped to lower the population per office reduced from 64 in 1969 to 15 in 2008. Today, Public Sector Banks account for more than 78 percent of the total Banking Industry assets and the total assets of all Scheduled Commercial Banks has reached Rs. 40,90,000 crores by end of March 2010. Thus, the profit pool of the Indian Banking Industry has increased at a fast pace.

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Table 2.1
Progress of Commercial Banking (1969 – 2012) Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Bank Offices in India</th>
<th>Number of Scheduled Commercial Banks</th>
<th>Population per Office (in thousands)</th>
<th>Distribution of Employees of Scheduled Commercial Banks Category-wise</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Officers   Clerks  Subordinates</td>
</tr>
<tr>
<td>1959</td>
<td>73</td>
<td>8262</td>
<td>64</td>
<td>55218     166651  75364</td>
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<td>1972</td>
<td>74</td>
<td>13622</td>
<td>41</td>
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<td>74</td>
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<td>37</td>
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<td>74</td>
<td>16936</td>
<td>35</td>
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<td>74</td>
<td>18730</td>
<td>32</td>
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<td>149254    336213  135184</td>
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<td>148</td>
<td>32419</td>
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<td>155549    339278  132856</td>
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<td>183</td>
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<td>179029    371621  145659</td>
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<td>272</td>
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<td>1987</td>
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<td>253991    484233  198120</td>
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<td>1988</td>
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<td>1991</td>
<td>276</td>
<td>60220</td>
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<td>262282    499506  215143</td>
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<td>1992</td>
<td>276</td>
<td>60570</td>
<td>14</td>
<td>267077    500296  217840</td>
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<td>1993</td>
<td>276</td>
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<td>268905    502193  223361</td>
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<td>270533    505728  221340</td>
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<td>284</td>
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<td>281326    509693  228006</td>
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<td>283380    509971  227672</td>
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<tr>
<td>1997</td>
<td>299</td>
<td>64218</td>
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<td>300</td>
<td>64939</td>
<td>15</td>
<td>290817    501474  225199</td>
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<td>291389    494081  221161</td>
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<td>2001</td>
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<td>276368    425788  199132</td>
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<td>2002</td>
<td>297</td>
<td>68195*</td>
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<td>286880    419675  194594</td>
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2004 286  69170*   16  289356  401087  191279
2005 284  70373*   16  313863  396812  189758
2006 218  71685*   16  330093  384821  185210
2007 179  74346*   15  347662  366700  185045
2008 170  78666*   15  334884  333414  170471
2009 166  82794   15  351841  342930  174641
2010 163  87768   14  401060  349360  175608
2011 163  94019   13  470144  402521  178220
2012 169  101261  13  502938  481421  196790

*Number of Bank Offices includes Administrative Offices
Source: Reserve Bank of India, Trend, and Progress of Banks in India (Various Issues from 1998 to 2012). 29

Bank Mergers that has taken place since 1969 has been presented (Table 2.2).

<table>
<thead>
<tr>
<th>Year of Merger</th>
<th>Name of Bank</th>
<th>Merged With</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>Bank of Bihar Ltd.</td>
<td>State Bank of India</td>
</tr>
<tr>
<td>1970</td>
<td>National Bank of Lahore Ltd.</td>
<td>State Bank of India</td>
</tr>
<tr>
<td>1985</td>
<td>Miraj State Bank Ltd.</td>
<td>Union Bank of India</td>
</tr>
<tr>
<td>1985</td>
<td>Lakshmi Commercial Bank</td>
<td>Canara Bank</td>
</tr>
<tr>
<td>1985</td>
<td>Bank of Cochin</td>
<td>State Bank of India</td>
</tr>
<tr>
<td>1986</td>
<td>Hindustan Commercial</td>
<td>Punjab National Bank</td>
</tr>
<tr>
<td>1988</td>
<td>Trader Bank</td>
<td>Bank of Baroda</td>
</tr>
<tr>
<td>1989</td>
<td>United Industrial Bank</td>
<td>Allahabad Bank</td>
</tr>
<tr>
<td>1990</td>
<td>Bank of Tamilnadu Ltd.</td>
<td>Indian Overseas Bank</td>
</tr>
<tr>
<td>1990</td>
<td>Bank of Thanjavur Ltd.</td>
<td>Indian Bank</td>
</tr>
<tr>
<td>1990</td>
<td>Parur Central Bank Ltd.</td>
<td>Bank of India</td>
</tr>
<tr>
<td>1990</td>
<td>Purvanchal Bank Ltd.</td>
<td>Central Bank of India</td>
</tr>
<tr>
<td>1993</td>
<td>New Bank of India</td>
<td>Punjab National Bank</td>
</tr>
<tr>
<td>1993</td>
<td>BCCI (Mumbai)</td>
<td>State Bank of India</td>
</tr>
<tr>
<td>1994</td>
<td>Bank of Karad Ltd.</td>
<td>Bank of India</td>
</tr>
<tr>
<td>1996</td>
<td>Kashi Nath Seth Bank Ltd.</td>
<td>State Bank of India</td>
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<td>1997</td>
<td>Bari Daob Bank Ltd.</td>
<td>Oriental Bank of Commerce</td>
</tr>
<tr>
<td>1999</td>
<td>Bareilly Co op Bank Ltd.</td>
<td>Bank of Baroda</td>
</tr>
<tr>
<td>1999</td>
<td>Sikkim Bank Ltd.</td>
<td>Union Bank of India</td>
</tr>
<tr>
<td>2000</td>
<td>Times Bank Ltd.</td>
<td>HDFC Bank Ltd.</td>
</tr>
<tr>
<td>2001</td>
<td>Bank of Madura</td>
<td>ICICI Bank Ltd.</td>
</tr>
<tr>
<td>2002</td>
<td>Benares State Bank Ltd.</td>
<td>Bank of Baroda</td>
</tr>
<tr>
<td>2003</td>
<td>Nedungadi Bank Ltd.</td>
<td>Punjab National Bank</td>
</tr>
<tr>
<td>2003</td>
<td>Bank Muscat</td>
<td>Centurion Bank of Punjab</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Bank of Origin</th>
<th>Bank of Destination</th>
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<tbody>
<tr>
<td>2004</td>
<td>South Gujarat LAB Ltd.</td>
<td>Bank of Baroda</td>
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<tr>
<td>2004</td>
<td>Global Trust Bank Ltd.</td>
<td>Oriental Bank of Commerce</td>
</tr>
<tr>
<td>2005</td>
<td>IDBI Ltd.</td>
<td>IDBI Bank Ltd.</td>
</tr>
<tr>
<td>2005</td>
<td>United Western Bank</td>
<td>IDBI Bank Ltd.</td>
</tr>
<tr>
<td>2006</td>
<td>Lord Krishna Bank</td>
<td>Centurion Bank of Punjab</td>
</tr>
<tr>
<td>2007</td>
<td>Sangli Bank</td>
<td>ICICI Bank Ltd</td>
</tr>
<tr>
<td>2008</td>
<td>State Bank of Saurashtra</td>
<td>State Bank of India</td>
</tr>
<tr>
<td>2008</td>
<td>Centurion Bank of Punjab</td>
<td>HDFC Bank Ltd.</td>
</tr>
<tr>
<td>2009</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>2010</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>2011</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>2012</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Source: Various Bank's websites

The current scenario is of consolidation within Public Sector Banks, within Private Sector Banks and between Private Sector Banks and Public Sector Banks has emerged. Apart from this, Foreign Banks have become active in merger and acquisitions, buying out some old Private Banks and new Private Banks. The motive mentioned by experts for the major Indian Banks to adopt this was to gain advantages of economy in size and scope of operations, and the competence to operate in global market place. The merger and acquisition in the Banking Industry has brought a new life to the style of doing business in today's world. Strategic mergers, acquisitions, and shutting down has triggered the consolidation of Indian Banking Industry and helped Banks to survive. It has been seen that Indian Banking Industry had played a tremendous role in reinforcing the economy of India, by servicing the needs of three sectors of the economy: agriculture, manufacture, and service. The Banking system of India was not hassle-free but was able to meet new challenges posed by the external and internal factors. Majorly the past three decades had a several outstanding achievements to its credit. The most striking was its extensive reach. Banking today is no longer confined to only metropolitan cities. In fact, it has reached to the remotest corner of the country. Presently, Banks in India are undertaking non-traditional areas of generating income through diversified activities other than the Core Banking
activities. Today, Banking has become more or less paperless Banking. Banks has emphasized more on automation and outsourcing of different services so that they could handle the increased volumes of business efficiently and effectively. Banks are also providing tailor made products as suited to the requirements of the individual customers. Currently the Banking Sector is on the threshold of an exciting phase.

Indian Banking Structure

Currently the Indian banking industry has a diverse structure. The present structure of the Indian banking industry has been analyzed on the basis of its organized status, business as well as product segmentation.

The entire organized banking system comprises of scheduled and non-scheduled banks. Largely, this segment comprises of the scheduled banks, with the unscheduled ones forming a very small component. Banking needs of the financially excluded population is catered to by other unorganized entities distinct from banks, such as, moneylenders, pawnbrokers and indigenous bankers. Indian banking structure in mainly divided as Scheduled Banks and Unscheduled Banks.

Scheduled Banks expressed as Scheduled Commercial Banks (SCBs) which can be further grouped as State Banks Group and other Nationalized Banks, Foreign Banks, Regional Rural Banks and other Scheduled Commercial Banks. SBI Group consists of the State Bank of India (SBI) and Associate Banks of SBI. The Reserve Bank of India (RBI) owns the majority share of SBI and some Associate Banks of SBI. SBI has 13 head offices governed each by a board of directors under the supervision of a central board. The boards of directors and their committees hold monthly meetings while the executive committee of each central board meets every week.
In 1969, the Government arranged the nationalization of 14 scheduled commercial banks in order to expand the branch network, followed by six more in 1980. A merger reduced the number from 20 to 19. Nationalized banks are wholly owned by the Government, although some of them have made public issues. In contrast to the state bank group, nationalized banks are centrally governed, i.e., by their respective head offices. Thus, there is only one board for each nationalized bank and meetings are less frequent (generally, once a month). The state bank group and nationalized banks are together referred to as the public sector banks (PSEs). In 1975, the state bank group and nationalized banks were required to sponsor and set up RRBs in partnership with individual states to provide low-cost financing and credit facilities to the rural masses.
RBI is the banker to banks—whether commercial, cooperative, or rural. The relationship is established once the name of a bank is included in the Second Schedule to the Reserve Bank of India Act, 1934. Such bank, called a scheduled bank, is entitled to facilities of refinance from RBI, subject to fulfillment of the following conditions laid down in Section 42 (6) of the Act, as follows:

- It must have paid-up capital and reserves of an aggregate value of not less than an amount specified from time to time; and

- It must satisfy RBI that its affairs are not being conducted in a manner detrimental to the interests of its depositors.

The classification of commercial banks into scheduled and non-scheduled categories that was introduced at the time of establishment of RBI in 1935 has been extended during the last two or three decades to include state cooperative banks, primary urban cooperative banks, and RRBs. RBI is authorized to exclude the name of any bank from the Second Schedule if the bank, having been given suitable opportunity to increase the value of paid-up capital and improve deficiencies, goes into liquidation or ceases to carry on banking activities. Specialized development financial institutions (DFIs) were established to resolve market failures in developing economies and shortage of long-term investments. The first DFI to be established was the Industrial Finance Corporation of India (IFCI) in 1948, and was followed by SFCs at state level set up under a special statute. In 1955, Industrial Credit and Investment Corporation of India (ICICI) was set up in the private sector with foreign equity participation. This was followed in 1964 by Industrial Development Bank of India (IDBI) set up as a subsidiary of RBI. The same year saw the founding of the first mutual fund in the country, the Unit Trust of India (UTI). A wide variety of financial institutions
(FIs) has been established. Examples include the National Bank for Agriculture and Rural Development (NABARD), Export Import Bank of India (Exim Bank), National Housing Bank (NHB), and Small Industries Development Bank of India (SIDBI), which serve as apex banks in their specified areas of responsibility and concern. The three institutions that dominate the term-lending market in providing financial assistance to the corporate sector are IDBI, IFCI, and ICICI. The Government owns insurance companies, including Life Insurance Corporation of India (LIC) and General Insurance Corporation (GIC). Subsidiaries of GIC also provide substantial equity and loan assistance to the industrial sector, while UTI, though a mutual fund, conducts similar operations. RBI also set up in April 1988 the Discount and Finance House of India Ltd. (DFHI) in partnership with SBI and other banks to deal with money market instruments and to provide liquidity to money markets by creating a secondary market for each instrument. Major shares of DFHI are held by SBI.

Liberalization of economic policy since 1991 has highlighted the urgent need to improve infrastructure in order to provide services of international standards. Infrastructure is woefully inadequate for the efficient handling of the foreign trade sector, power generation, communication, etc. For meeting specialized financing needs, the Infrastructure Development Finance Company Ltd. (IDFC) was set up in 1997. To nurture growth of private capital flows, IDFC will seek to unbundle and mitigate the risks that investors face in infrastructure and to create an efficient financial structure at institutional and project levels. IDFC will work on commercial orientation, innovations in financial products, rationalizing the legal and regular framework, creation of a long-term debt market, and best global practices on governance and risk management in infrastructure projects.
Private Banks in India

Prior to nationalization, Banks in India with the sole exception of SBI were in private hands with community and trade orientation. Nationalization of 14 banks in the year 1969 and another set of 6 banks in the year 1980 reduced the importance of private sector banks and public sector banks started playing a major role in extending the horizon of banking services to the nook and corner of the country. With history repeating itself, private sector banking got a fillip with the Government of India relaxing the conditions for opening of private sector banks in the year 1994, as a part of their liberalization program. Housing Development Finance Corporation Limited (HDFC) was amongst the first to receive an ‘in principle’ approval from the RBI to set up a bank in the private sector. As on 31st March, 2005, there are 30 private banks operating in the country. Private Banks have been playing a crucial role in enhancing customer oriented products with no choice left with the public sector banks except to innovate and compete in the process. Reserve Bank of India has come out on clear cut terms their guidelines on ownership and governance in private sector banks.

On the issue of aggregate foreign investment in private banks from all sources (FDI, FII, NRI), the guideline stipulate that it cannot exceed 74% of the paid up capital of a bank. If FDI (other than by foreign banks or foreign bank groups) in private banks exceeds 5%, the entity acquiring such stake would have to meet the “fit and proper” criteria indicated in the share transfer guidelines and get the RBI’s acknowledgement for transfer of the shares. The aggregate limit for all FII investments is restricted to 24% of which can be raised to 49% with the approval of the board/shareholders. The current aggregate limit for all NRI investment is 24%, with the individual NRI limit being five percent, subject to the approval of the board/shareholders.
Co-operative Banks in India

The Co-operative banks have a history of almost 100 years. The Co-operative banks are an important constituent of the Indian Financial System, judging by the role assigned to them, the expectations they are supposed to fulfill, their number, and the number of offices they operate. The co-operative movement originated in the West, but the importance that such banks have assumed in India is rarely paralleled anywhere else in the world. Their role in rural financing continues to be important even today, and their business in the urban areas also has increased phenomenally in recent years mainly due to the sharp increase in the number of primary co-operative banks.

While the co-operative banks in rural areas mainly finance agricultural based activities including farming, cattle, milk, hatchery, personal finance etc. along with some small scale industries and self-employment driven activities, the co-operative banks in urban areas mainly finance various categories of people for self-employment, industries, small scale units, home finance, consumer finance, personal finance, etc. Some of the co-operative banks are quite forward looking and have developed sufficient core competencies to challenge state and private sector banks. According to NAFCUB (National Federation of Urban Cooperative Banks & Credit Societies Ltd.) the total deposits & landings of Co-operative Banks is much more than Old Private Sector Banks & also the New Private Sector Banks. This exponential growth of Co-operative Banks is attributed mainly to their much better local reach, personal interaction with customers, and their ability to catch the nerve of the local clientele. Though registered under the Co-operative Societies Act of the Respective States (where formed originally) the banking related activities of the co-operative banks are also regulated by the Reserve Bank of India. They are governed by the Banking Regulations Act 1949 and Banking Laws (Co-operative Societies) Act, 1965.
The commercial banking structure in India consists of: Scheduled Commercial Banks and Unscheduled Banks. Scheduled commercial Banks constitute those banks which have been included in the Second Schedule of Reserve Bank of India (RBI) Act, 1934. RBI in turn includes only those banks in this schedule which satisfy the criteria laid down vide section 42 (6) (a) of the Act.

For the purpose of assessment of performance of banks, the Reserve Bank of India categories them as public sector banks, old private sector banks, new private sector banks and foreign banks. IDBI and IDBI Bank Ltd. have been merged to form Industrial Development Bank of India (IDBI) Ltd. IDBI is notified as a scheduled bank by the Reserve Bank of India (RBI) under the Reserve Bank of India Act, 1934. RBI has categorized IDBI under a new sub group "other public sector bank".

Table 2.3
Lists of Banks in India

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Bank Name</th>
<th>Sr. No</th>
<th>Bank Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Allahabad Bank 11 Indian Overseas Bank</td>
<td>11</td>
<td>Indian Overseas Bank</td>
</tr>
<tr>
<td>3</td>
<td>Bank of Baroda 13 Punjab &amp; Sindh Bank</td>
<td>13</td>
<td>Punjab &amp; Sindh Bank</td>
</tr>
<tr>
<td>4</td>
<td>4 Bank of India 14 Punjab National Bank</td>
<td>14</td>
<td>Punjab National Bank</td>
</tr>
<tr>
<td>5</td>
<td>Bank of Maharashtra 15 Syndicate Bank</td>
<td>15</td>
<td>Syndicate Bank</td>
</tr>
<tr>
<td>6</td>
<td>Canara Bank 16 UCO Bank</td>
<td>16</td>
<td>UCO Bank</td>
</tr>
<tr>
<td>7</td>
<td>Central Bank of India 17 Union</td>
<td>17</td>
<td>Union Bank of India</td>
</tr>
<tr>
<td>Bank of India</td>
<td>8 Corporation Bank</td>
<td>18 United Bank of India</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-------------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td>9 Dena Bank</td>
<td>19 Vijaya Bank</td>
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<td></td>
</tr>
<tr>
<td>10 Indian Bank</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SBI Group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 State Bank of India</td>
<td>4 State Bank of Mysore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 State Bank of Bikaner &amp; Jaipur</td>
<td>5 State Bank of Patiala</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 State Bank of Hyderabad</td>
<td>6 State Bank of Travancore</td>
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<tr>
<td><strong>Old Private Sector Banks</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Bank of Rajasthan</td>
<td>9 ING Vysya Bank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Catholic Syrian Bank</td>
<td>10 Jammu &amp; Kashmir Bank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 City Union Bank</td>
<td>11 SBI Commercial &amp; International Bank</td>
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<td></td>
</tr>
<tr>
<td>4 Dhanlaxmi Bank</td>
<td>12 Karur Vysya Bank</td>
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</tr>
<tr>
<td>5 Federal Bank</td>
<td>13 Lakshmi Vilas Bank</td>
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<td></td>
</tr>
<tr>
<td>6 Nainital Bank</td>
<td>14 Karnataka Bank</td>
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</tr>
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<td>7 Ratnakar Bank</td>
<td>15 South Indian Bank</td>
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<td></td>
</tr>
<tr>
<td>8 Tamilnad Mercantile Bank</td>
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<tr>
<td><strong>New Private Sector Banks</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Axis Bank (Previously UTI Bank)</td>
<td>5 IndusInd Bank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Development Credit Bank</td>
<td>6 Kotak Mahindra Bank</td>
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<td></td>
</tr>
<tr>
<td>3 HDFC Bank</td>
<td>7 Yes Bank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 ICICI Bank</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Foreign Banks (As on March 31, 2011)</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1 Abu Dhabi Commercial Bank</td>
<td>17 DBS Bank</td>
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<td>2 American Express Banking Corp.</td>
<td>18 Deutsche Bank</td>
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<tr>
<td>3 Antwerp Diamond Bank</td>
<td>19 FirstRand Bank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 AB Bank</td>
<td>20 Hong Kong &amp; Shanghai Banking Corp.</td>
<td></td>
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<tr>
<td>5 Bank International Indonesia</td>
<td>21 JPMorgan Chase Bank</td>
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<td></td>
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<tr>
<td>6 Bank of America</td>
<td>22 JSC VTB Bank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Bank of Bahrain &amp; Kuwait</td>
<td>23 Krung Thai Bank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Bank of Ceylon</td>
<td>24 Mashreq Bank</td>
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</tr>
</tbody>
</table>
Theories for Evaluation of Performance

To outperform competing bank institutions, more emphasis on internal operational performance is required. This means it is imperative to develop an effective way to conduct performance evaluations that can measure the overall organizational performance and link it to the corporate goals. That is, a holistic evaluation model of banking performance is a key to bank’s survival. Many different theories and methods of performance for conducting an evaluation have been applied in various organizations for many years. These approaches include ratio analysis, total production analysis, regression analysis, Delphi analysis, Balanced Scorecard, Analytic Hierarchical Process (AHP), Data Envelopment Analysis (DEA) and others. Each method has its own basic concept, aim, advantages and disadvantages. Which one is chosen by management or decision makers for assessing performance depends on the status and type of the organization. However, all the successful enterprises have some common features, including a specific vision, positive actions, and an effective performance.

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evaluation. In below we imply some methods to evaluate the performance of the banks.

**Balanced Scorecard**

Balanced scorecard is one of the most important posed instruments in the field of business in the last century. In the beginning of 1990, Robert Kaplan, Professor of commercial academy of Harvard University along with David Norton being manager of a research company in this time, began a research program in order to assess successes factors of 12 top American companies and to study performance evaluation of these companies. Thus, Kaplan and Norton announced that due to do a complete evaluation of performance, performance of the organization should be evaluated in four perspectives: 1. Financial Perspective, 2. Customer Perspective, 3. Internal Processes Perspective, 4. Learning & Growth Perspective. Kaplan and Norton's findings determined that successful companies define their objectives from the four perspectives of aims and select measures for evaluation, they designate lower aims from these measures during evaluative period, and then they plan and fulfill administrative proceedings and innovations for achievement of these aims. Kaplan and Norton called this method of performance evaluation as a method of balance or balanced scorecard. Balanced scorecard completes the financial indexes of last performances with the determiner indexes of future performances. Aims and indexes of balanced scorecard are determined by strategy and perspective of organization. These aims and indexes look at performance of organization in four aspects: financial, customer, internal process and growth and learning. As it is shown in Figure 2.2, these four perspectives provide a frame for balanced scorecard.  

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Figure 2.2

Balanced Scorecard Framework*

Financial
To succeed financially, how should we appear to our shareholders?

Customer
To achieve our vision, how should we appear to our customers?

Vision and Strategy
To satisfy our shareholders and customers, what business processes must we excel at?

Internal Business
To satisfy our shareholders and customers, what business processes must we excel at?

Learning & Growth
To achieve our vision, how will we match our ability to change and improve?

Perspective and Strategy:

Financial Perspective: in order to achieve financial success, how should we encounter shareholders?

In Financial perspective of balanced scorecard, economical results of utilizing strategies are evaluated. As financial operation can be evaluated with indexes like operational interest, capital return and surplus value rate in systems of planning, before strategic planning and control systems, it can be evaluated in balanced scorecard as an operation for performance evaluation and an instrument for controlling as well as financial performance with similar indexes and relations.32

Perspective: In order to achieve our aims, how should we behave with customers?

In customer perspective of balanced scorecard, managers firstly designate customer and market's parts trending to compete. Designated parts will include customers as well as present and potential markets. This perspective balanced scorecard involves several public indexes and a series of secondary indexes. Essential indexes consist of customer satisfaction, customer preservation, attraction of new customer, profit per customer, market share in customer and market's parts.\(^{33}\)

Internal Processes Perspective: What commercial processes are necessary in order to satisfy shareholders and customers?

In internal processes perspective of balanced scorecard, managers firstly designate key internal processes that should be emphasized due to fulfill strategy on them (these process enable the organization to value for the customer attraction and preservation and to provide shareholders' expectations). Every business involves a collection of special processes in order to put a value on customer and financial results for shareholders. Procedure of balanced scorecard selects the concatenate model of Porter value as a public pattern for using in perspective of internal processes which include three processes of innovation, operation and after-sales service.

Growth and Learning Perspective: how do we promote individuals' abilities in order to achieve perspective?

Learning and growth of organization derives from three principle sources of humanitarian power, information systems, instructions and organizational

processes. Level of achievement to capabilities and special power are evaluated in these sources of learning and growth perspective of balanced scorecard. In order to evaluate aims related to this perspective, factors like achievement rate of customer to information and internal processes by managers and operational employees are evaluated regarding information systems and coextensive rate of employees' motivations with goal of organization about instructions and organizational procedures.34

CAMEL Model

This system has been applied by National Credit Union Administration (NCUA) in October 1987.35 Also Federal Reserve Bank of America assesses its banks on a scale of one to five by using the CAMEL model components which is monitoring various aspects of bank's health. The rank 1 is the highest rank (strongest performance) and rank 5 is the lowest rank (weakest performance). Reliability, profitability and liquidity are the most important criteria for assessing the competency performance of a bank. Therefore, since 1988 the Basel Committee on Banking Supervision has stated that the CAMEL model is necessary to evaluate financial institutions.36 In 1997 another component was added to the CAMEL model which was called market risk (S). However, most of developing countries use CAMEL instead of CAMELS to evaluate the performance of financial organizations.37 It means they don't consider the market

risk. CAMELS framework is a common approach to evaluate the financial health of the organization.

This system was created by U.S. bank supervising organizations.\textsuperscript{38} Also the Asian Development Bank, African Development Bank, Central Bank of America (the Federal Reserve Bank) and the World Bank use these parameters to evaluate the performance of financial organizations.\textsuperscript{39} In addition, the International Monetary Fund use compressed index of financial institutions to evaluate the accuracy of the financial systems of the members.\textsuperscript{40} Testing CAMELS system needs information from various sources such as balance sheet financing, financing sources, data macro-economic, budget and cash flow forecasting, staffing and operation. In this model, the overall condition of the banks and their strengths and weaknesses are assessed.\textsuperscript{41}

1 - Capital adequacy ratio

The capital adequacy ratio measures the financial strength of a financial institution. Section 17 of Indian Banking Regulation Act (1949) states that every banking company in India is required to create a reserve fund and it should hold at least 20% of the firms’ disclosed profits in the fund.\textsuperscript{42} However prior to the reforms in 1991 there existed no measure of measuring the financial strength of banks in India. One of the many suggestions of the Narasimham Committee was

\textsuperscript{41} Babar, Haseeb Zaman & Zeb, Gul, "CAMELS Rating System for Banking Industry in Pakistan", op. cit.
\textsuperscript{42} Reserve Bank of India, \textit{Banking and Monetary Statistics of India}, 1954.
to initiate a capital to risk asset system. The Basel Committee released guidelines on capital measures and standards in July 1988. These guidelines were implemented in India in 1992. Starting from March 2000 Indian banks were required to maintain CAR at 9% and it is 10% for new private banks and banks undertaking. The guidelines for capital and risk weighted assets have been outlined in detail by the Reserve Bank of India. The CAR increases if riskless assets such as cash and investments in government securities increase or if capital increases. The capital adequacy ratio for private banks could have increased as cash in hand and balances with RBI increased by 73% in 2007; however the increase was only 19% for public banks (RBI). A higher CAR displays greater financial strength for an institution. After the crisis the private banks seem to be performing better if measured in terms of financial strength.

2- Asset Quality

The asset quality of a bank can be assessed by concentration of loans to different industries, the number of non-performing assets (NPA's) and loans and loan loss provision ratio. The ratio of priority sector advances is monitored by the government and has a floor of 40% of net bank credit for private and public banks in India and 32% for foreign banks operating in India. However upon closer examination of these advances in 2010, the percentage of NPA to total assets increases by 13.81% for public banks whereas it decreases by 6.93% for private banks. The private and public banks closely follow each other till 2009 and start diverging after that. The number of non-performing assets from priority sector for public banks increases to 66.8% and only 32% come from non-priority sectors.

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Public banks, of which the government of India still has a majority stake, are not forced to lend to the government for its own projects because the percentage of NPA’s from public sector for public banks is at a mere 2% at its maximum. However the priority sector and the non-priority sector composition of NPA’s which was diverging from 2005 – 2008 now seems to be converging.

3- Management Quality

Assessing management quality can be a very challenging task, so the metrics used in the CAMEL framework to assess it are: operating costs and operating profits. It is evident that public banks had higher operating profits as compared to the private sector banks. However, private banks show an upward trend before and after the crisis and the public banks show a downward trend before and after the crisis. So based of this metric the management of the public firms by the Government of India, is not really healthy for the banks.

4- Earnings Performance

To assess the earnings performance of a bank, it will be helpful to look at a variety of ratios and measures; these include: (1) return on equity (ROE), (2) return on assets (ROA) and (3) net interest margin to total assets. Return on equity helps measure the firm’s profitability by measuring the amount of profit a firm generates with the money invested by shareholders. Return on Equity can be further broken down into three more components, by the DuPont Analysis technique, to help understand the difference in the ratio between two different companies in the same industry or within different industries. The DuPont model was created by F. Donaldson Brown an electrical engineer. It is a technique that is used to examine the profitability of a company by integrating the elements

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of the income statement with the balance sheet. It can be broken in three main parts: (1) profit margin, (2) asset turnover, and (3) equity multiplier. Net interest margin to total assets measure the profitability of the bank’s lending and borrowing activities.

5- Liquidity

A financial institution must be liquid to meet the demand of creditors and depositors. Liquidity directly arises from the four factors of CAMEL mentioned above. Liquidity has an inverse relationship with profitability; therefore a financial institution must strike a balance between the two elements. Liquidity is usually measured by the current ratio or the quick ratio. Liquidity is directly related to holdings of cash and other assets that can be converted into cash within a year.45

Bankometer

Bankometer model as developed on the recommendations of IMF (2000) has been used to measure the financial soundness (solvency) of the Indian commercial banks. Bankometer ratios are derived from both the CAMELS and CLSA stress test parameters with some modifications. The changes in the selected ratios are made only to synthesize the measurement of banks soundness. This procedure has the quality of minimum number of parameters with maximum accurate results. 46

Bankometer Parameters

1. Capital Adequacy Ratio: 40 % < CAR < 08%

2. Capital to Assets Ratio \( \frac{\text{Capita}}{\text{Asset}} \geq 0.04\% 

3. Equity to total Assets \( \frac{\text{Equity}}{\text{Asset}} \geq 0.02\% 

4. NPLs to Loans \( \frac{\text{NPLs}}{\text{Loans}} \leq 0.15\% 

5. Cost to Income ratio \( \frac{\text{Cost}}{\text{Income}} \leq 0.40\% 

6. Loans to Assets \( \frac{\text{Loan}}{\text{Asset}} \leq 0.65\% 

These percentages explain a bank that:

- has capital adequacy ratio between 8% to 40%,
- has more than 4% capital to assets ratio,
- has equity to assets ratio greater than 2%,
- has controlled non-performing loans (NPLs) ratio below 15% and
- has maintained liquidity by controlling loans to assets ratio below 40%,

The performance of the banks can be measured under Bankometer procedure by measuring their respective solvency. The ability to predict which banks are vulnerable to financial distress is of critical importance to central banks, creditors and equity investors. When a bank goes insolvent, creditors often lose portion of principal and interest payments, while equity investors can potentially lose all of their investment. Additionally, even if the bank survives after a financial distress, the survival costs will significantly reduce the future growth outlook. It is therefore important for management to focus more on trying to predict the banks that are vulnerable to financial distress in near future using Bankometer ratio, which is.\(^{47}\)

S = 1.5* CA + 1.2* EA + 3.5* CAR + 0.6*NPL + 0.3*CI + 0.4*LA

Where ‘S’ stands for solvency

CAR stands for capital adequacy ratio

CA stands for capital assets ratio

EA stands for equity to assets

NPL stands for non-performing loans to loans

CI stands for cost to income

LA stands for loans to assets

All banks having ‘S’ value greater than 70 are solvent and termed as super sound banks, while those banks having ‘S’ value below 50 are not solvent. The area between 50 and 70 is defined as gray area because of the susceptibility to error classification. 48

Efficiency

Evaluation of bank efficiency range is from cost efficiency to profit efficiency, revenues efficiency, technical efficiency and also X-efficiency. Two main approaches in estimating bank efficiency are intermediation approach and the production approach. Most of the studies on bank efficiency employed the intermediation approach where deposit is treated as input to the financial institutions to produce outputs such as loans, and other financial services. In this approach, bank is treated as the intermediary that provides funding to savers and

48 Ibid.
investors. Therefore, the service flows are assumed to be proportional to the stock of the financial values in the accounts.\textsuperscript{49}

The stock of the financial values is defined as the number of dollar of loans and deposits.\textsuperscript{50} Hence, this method manipulated the dollar amount of loans and deposits which are easily obtainable from the financial statements of the banks as compared to the employment of the total number of transactions in deposits and loans. Therefore, this approach uses funds raised and expenses incurred in the intermediation process as inputs, while funds loaned and income generated as outputs. Besides that, the estimation of bank efficiency can also be done using the production approach which defined the financial institution as producing services for its customers. Hence, the banks are required to minimize the utilization of resources in providing various services and products to their customers.\textsuperscript{51}

Nevertheless, banks may also choose to minimize the products and services provided at a given level of inputs factors. In this case the deposits are treated as the output of the bank because bank output consists of number and type of transaction processed over a given time period. According to Rao (2002) this approach is suitable in investigating the efficiencies of the branches of banks.\textsuperscript{52} Avkiran (2004) suggested that this approach is more suitable in evaluating operating efficiency as it strongly focus on the operations where interest expenses are normally ignored. However, this approach is rarely used by the analysts

because the number and type of transaction processed are not easily obtainable from the financial statements of the banks.\(^{53}\)

The methods of evaluating bank efficiencies can be broadly divided into parametric and nonparametric approach. The parametric approach in measuring bank efficiency focused on the production or cost function, which based on the assumption that firms in the economic operate under rational behavior.\(^{54}\) In this approach, the cost function had to be specified and the efficiency scores are derived from the residuals or dummy variables. This approach had been widely used in measuring cost, profit, as well as revenue efficiency. In addition, the measurement of efficiency is also done using the nonparametric approach that is by utilizing the method of Data Envelopment Analysis.

**Types of Bank Efficiency Measurement**

The five major types of bank efficiency measurement, namely the cost efficiency, profit efficiency, revenues efficiency, technical efficiency, and the x-efficiency were reviewed in detail in the following section.

1. **Cost Efficiency**

Cost efficiency analysis focus on minimization of the cost of production by the banks while still producing the same amount and combination of outputs. The analysis of cost efficiency in the developed countries was mainly done in the European and U.S. market. In developed countries, most of the banks will experience cost inefficiency when they become too large.


2. **Profit Efficiency**

The measurement of profit efficiency takes into account both cost and revenue efficiency.\(^{55}\) This is because profit is obtained from the subtraction of costs of production from the revenues generated in providing the banking products and services. Thus, profit efficiency deals with the issue of bank maximizing its profit for a given combination of outputs.

3. **Revenue Efficiency**

Berger et al. (1996) analyzed revenue efficiency in terms of economies of scope and scale of 683 US banks in 1978 and 1984 and 626 banks in 1990. Using banks deposits as both input and output, they found no evidence of revenue economies of scope for all the banks over the period of 1978, 1984, and 1990. Besides that, there is only weak evidence of revenue scale economies found in the small banks.

4. **Technical Efficiency**

Technical efficiency is defined as the ability of the banks to use it input in an efficient way in order to achieve a desirable output. Thus, it is a proportional reduction in the usage of input in which the inputs were not waste and the firms can exhibit constant return to scale or achieve scale efficiency. In this context, technical efficiency can be divided into two broad categories, namely the pure technical efficiency and allocative efficiency. Pure technical efficiency is being defined as the excess usage of input level at a given output level due to the management of the operations of the firms. Therefore, it is more concern on the ability of the management to maximize the production of outputs at a given level of inputs or to minimize the inputs usage at a given level of outputs. On the other

hands, allocative efficiency is due to the proportional reduction in costs after the firms achieved their optimal combination of inputs. Therefore, it is more concern with the price of the factors of productions which cannot be controlled by the management as the increase in costs might due to regulatory policies and other market factors.

5. X-Efficiency

According to Mester (1996) x-efficiency is defined as the efficiently use of inputs by the management. Hence, it is known as the managerial efficiency because it refers to how well the management using the factors of productions.

Approaches for Measuring Bank Efficiency

The methods used to measure bank efficiency can be divided into two main categories, namely the parametric and non-parametric approach. The parametric approach uses a form of specific production function derived to ‘parameterizing’ the relationship between the level of inputs and outputs used in the analysis. On the other hand, the non-parametric approach employs a linear programming technique to come out with the efficiency scores in measuring how far an observation lies from the frontier developed based on the observed data. In below we review both methods in details.

1. Parametric Techniques

The parametric approach of measuring bank efficiency focused on the production or cost function base. Besides that, the estimation of the production and cost function are based on the assumption that firms in the economy operate under rational behavior.60

According to Eisenbeis et al. (1999), this approach derives the efficiency scores from either the residuals or dummy variables. Among the well-known methods under the parametric approach are Stochastic Frontier Approach (SFA), Distributional-free Approach, Thick Frontier Approach (TFA), and Cost-Frontier Analysis.61

The advantage of parametric approach is it allows for noise in the measurement of inefficiency.62 Furthermore, according to Karim (2001), the parametric approach places on a priori restrictions on substitution possibilities among the factors of productions. Thus, the parametric approach permits the estimation of both economies and diseconomies of scale of different output levels.63

Nevertheless, the major drawback of the parametric approach is that it has to make assumptions about the particular form of the economic function being

62 Ibid.
estimated and the distribution of efficiency. Due to this matter, the parametric approach actually presumes the shape of the frontier by imposing a particular functional form and associated behavioral assumptions. This may lead to wrong estimation when the functional form is misperceived because the efficiency measurement may be subjected to specification errors.

1.1. Stochastic Frontier Approach (SFA)

The Stochastic Frontier Approach (SFA) came from the concept of cost frontier analysis. In this context, the cost frontier is used to the maximum amount of cost that the bank can reduce in order to produce the same amount and combination of financial services. The estimation is done by comparing the real expenses incurred by a bank to the simulated expenses by the best-practice bank. The advantage of this method is that the analysis is not restricted to the peer groups of banks with similar characteristics. Nevertheless, cost inefficiency might be overstated if positive random errors are mistaken for excess costs and understated if negative random errors are permitted to cancel out some or all the bank’s excess expenses. The SFA was proposed by Aigner et al. (1977), Meeusen and van de Broeck (1977), and Battese and Corra (1977). It expresses a functional form for economic decision such as cost, profit, or production relationship among inputs, outputs and the environmental factors. This approach

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allows for random errors which follow a symmetric distribution. In addition, the composed error model is usually assumed to be half-normal because the inefficiencies must have a truncated distribution, which are assumed to follow an asymmetric distribution. Besides that, the SFA has clear assumptions regarding the distributions of the regression residuals and thus, estimates the economic function with a two-part error structure. Therefore, the error-term in SFA must satisfy two main characteristics. First, the error-term must be symmetric in capturing the random variation of the frontier across firms, statistical noise, measurement error, and random shocks that are beyond the firm's control. Second, the error term also consists of a one-sided variable which captures the inefficiency in relation to the frontier. In this case, the cost inefficiency and random error are estimated as a separate and independent element. In this context, both inefficiency and error term are assumed to be orthogonal to the input, output, or environmental factors. All the firms in the analysis are taken as the conditional mean or mode of the distribution of inefficiency term.

1.2. Thick Frontier Approach (TFA)

The Thick Frontier Approach (TFA) was introduced by Berger and Humphrey (1991). This approach separates the banks into two major groups, namely the high cost and low cost groups, which is known as a quartile. The separation is done based on the accounting ratios. Unlike the SFA, TFA isolates random error by determining a separate cost function for each group under the

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analysis. In this case, the TFA estimates cost function using the lowest average cost quartiles of banks and assumed that the firms are of greater than average efficiency. Thus, the highest cost quartile actually represents the firms are actually in less than average efficiency. In this context, the TFA assumes that the error terms within the lowest and highest cost quartiles will represents only random measurement error and luck. Hence, the differences between the lowest and the highest quartiles will reflect inefficiency and market factors.\textsuperscript{71} In the TFA estimation, the deviations in predicted performance between the highest and the lowest quartiles represent the inefficiencies.\textsuperscript{72}

This approach did not specify any assumptions on the distribution of the inefficiency and random error. Therefore, it is less likely to be violated by the data as compared to the other frontier approaches. Nevertheless, it assumes that inefficiencies differ between the highest and lowest quartiles and the random error can be found within these quartiles. In addition to that, there is no assumption needed in the TFA as the efficiency are orthogonal to the outputs, and other explanatory variables specified in the cost or profit function.\textsuperscript{73} Besides that, the TFA is superior over other frontiers approaches as it does not have the problem of bias in inefficiency downwards by reducing the number of comparison firms every time an input or output characteristic is controlled in the analysis. According to Jondrow et al. (1982) this approach does not provide an exact point estimate of efficiency for individual firms but served as an approach for estimating the general level of overall efficiency. Consequently, it reduces the


effect of extreme points in the data. Furthermore, the measure of inefficiency is smaller because it is more realistic to expect firms to be able to achieve efficiency level being defined in the frontier rather than assuming all the firms off the frontier to be as efficient as the single firms which being used as a benchmark for efficiency measurement.  

1.3. Distributional Free Approach

The distributional free approach (DFA) was introduced by Berger et al. (1993). DFA assumes a functional form for the cost or profit frontier but no specific distribution on inefficiency is needed. In other words, the distribution of inefficiencies could follow any form as long as it is a non-negative. The random error in DFA is assumed to be two sided and normally distributed. On the other hand, the inefficiency term is assumed to be one-sided and half-normally distributed. The DFA separates the inefficiency from random errors and assumes that the efficiency of each bank under observation is constant over time. Besides that, the random errors tend to average out over time and thus leaving only the inefficiency which is explained by the residuals. In this context, the inefficiency for each bank measured by the difference between its average residual from the estimated cost or profit function and to the bank on the efficiency frontier. Since the random terms tend to cancel off over time, the explanatory variables are allowed to vary from year to year in order to reflect changes in technology and environment. Nevertheless, the application of DFA requires a reasonable number of degrees of freedom since too little number of years in the observation may result in large amounts of random error in the averaged residuals. On the other hand, too many years may lead to violation of the assumption of constant x-

efficiency for large number of banks which will result in less accurate measurement of efficiency.\(^6\)

2. Non-Parametric Approach

The non-parametric approach employs mathematical programming approach in developing production frontier and measure the efficiency of a particular firm prior to the constructed production frontier.\(^7\) This approach is developed based on the concept of efficiency, which is similar to the microeconomic theory. The non-parametric approach is an input-orientated model that is widely used in the analysis of technical efficiency. The production frontier is generated from the real data for the firms under analysis and used to form the piecewise linear combinations that help to connect the set of ‘best-practice’ observations in the data set.\(^8\) Consequently, the linear combinations will yield a convex Production Possibility Set (PPS). The most important advantage of this approach over the parametric approach is that this approach makes no prior assumptions regarding the form of the production function. This is because the ‘best practice’ function emerged empirically from the observed inputs and outputs.\(^9\) In addition to that, the non-parametric approach does not require a priori functional specification of the unknown technology.\(^10\) Besides that, the DEA deals easily with multiple inputs and outputs production functions, as well as the

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variable returns to scale. Hence, it provides a meaningful measurement for the technical and scale efficiency analysis as well as providing the source of inefficiency. One of the most well-know non-parametric approach in estimating bank efficiency is Date Envelopment Analysis (DEA).

2.1. Data Envelopment Analysis (DEA)

According to Berger and Humphrey (1997) Data Envelopment Analysis (DEA) is a linear programming technique that is used to develop a set of best practice or frontier observations. The DEA uses the piecewise linear cost or production frontier in order to connect the costs or inputs of the efficient firms in the efficiency analysis. Hence, according to Berger and Humphrey (1991), firms on the vertices of the piecewise linear frontier are considered to be fully efficient and firms below the frontier are considered to be inefficient in relation to the frontier. In addition, the DEA furthered separated the inefficiency of the firm into technical and allocative efficiency. Therefore, the analysis of the cost and profit efficiency can be furthered decompose into technical and allocative efficiency by using this method. It is a solution of a linear programming problem to fit a nonstochastic, nonparametric production frontier based on the actual inputs and outputs of a decision making units. The best practice unit is achieved when there is no other decision making unit can alter the combination of its inputs for a given output levels or vice versa. In addition, the DEA measure served as an effective framework in the study of technical, scale, and allocative efficiency. Hence, it is widely employed to determine the relative efficiency and managerial performance of productive or response units given the same multiple inputs and multiple

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outputs. Nevertheless, the DEA measurement only accounted for the relative efficiency at a given point in time and therefore, the Malmquist Productivity Index is used in measuring the productivity change over time. The DEA estimation is based on the analysis on the way the unit under analysis manipulates the given level of inputs to produce more outputs or uses fewer inputs for a given level of outputs. In this case, a bank's relative efficiency is obtained by comparing its own cost ratios to the cost of the 'best practice' bank (being given 100% efficiency level) that encounters the same input prices and produces at the same output levels. This does not mean that the decision making unit or the best practice bank is efficient in an absolute manner because the DEA only provide a relative measure of efficiency. Hence, DEA is considered as a practical tool in determining the best practices and enables the analysts to construct an achievable efficient targets based on the results obtained from the observed outcomes and process characteristics. Besides that, efficiency measurement in DEA is based on the concept of Variable Return to Scale (VRS) and input-oriented cost minimization model. As compared to other models, DEA is more flexible because it does not require the specification of a particular functional form for the best practice banks' cost function. Therefore, the estimation of efficiency using DEA will not be subjected to possible miss-specification of the production function as compared to the parametric approach. In addition, DEA serves as a mathematical model that develops a single aggregate score that indicates the efficiency.

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performance status of each bank with relation to a designated peers group. Besides that, it can also be used for small samples estimations. Last but not least, the DEA model can also maintain fairness in performance assessment in order to handle non-commensurate multiple output and input because it can generate a set of weights for each input or output.

However, the DEA model assumes that there is no random error and no measurement error in the development of the frontier. This served as a major drawback of the DEA model and one must check for the sensitivity of the results acquired to different definitions of inputs and output. This is because, a small changes in the measurement error or luck of the firms on the frontier will result in large cumulative effect on the aggregate inefficiencies as all other firms are measured against these relative few ‘fully efficient’ firms. Thus, it can creates an upward bias in the measurement of inefficiency, resulting in a disproportionate large number of technical efficient DMUs in which the total number of inputs and outputs is high with relation to the number of DMUs. Moreover, according to Berger and Humphrey (1991), this method is very sensitive to number of exogenous constraints that are used to reflect the performance of different input or output characteristics. Hence, decrease in the number of observations may yield a

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downward pressure on the inefficiency measures which will eliminate some potentially more efficient firms from the comparisons. Besides that, DEA also impose less structure on the frontier and does not allow for random error owing to luck, data problems, or other measurement errors. Therefore, the data set must be free of errors and noises. If random error exists then, the efficiency score obtained may be subject to bias due to random deviation from the true efficiency frontier. Moreover, measurement errors and other erroneous factors may also affect the shape and position of the frontier constructed. Furthermore, it is difficult to draw statistical inference based on DEA model because the results are in the linear programming format in which it only considers radial inefficiency and ignores the slacks variables.\footnote{Berger, A.N., & Humphrey, D.B., "Efficiency of Financial Institutions: International Survey and Directions for Future Research" \textit{European Journal of Operational Research}, op. cit., pp.175-212.}