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An Analysis of Banking Efficiency in India: With Reference to Commercial Banks

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Abstract: *India's banking system is going through a crisis of unprecedented nature since 2010. The gross non-performing assets are estimated to be around 9.3 percent of gross loans and advances in 2016/17, having risen from 5 percent a year earlier. Bank credit has been sluggish for the reason that increase in bad loan provisioning and falling net interest incomes have only added to the stress of the banks. The Economic Survey of 2016-17 has highlighted the rising concerns about the rapidly deteriorating deficiency of India's banks. While the government protects banks in the public sector from any capital inadequacy problems, banks in the private sector and those owned by foreign interests have to face hurdles on their own with no assurance of support of any kind from government. This paper undertakes an empirical study for measuring the efficiency of banks and finds privately owned banks and foreign banks performed a lot better than the public sector banks.*

Keywords: *Gross Non-Performing Assets, Capital Inadequacy Problems.*

I. INTRODUCTION

India's financial system has been recognized to be more sophisticated in the developing world with numerous institutions. Among the financial sector institutions commercial banks have been playing a major role. Aside from functioning as an intermediary between savers and investors, their role of significant providers of credit to small and as big investors and households has been growing in importance over the years. As a proportion of total domestic credit, credit to private sector has been increasing: from 27.8 percent of gross domestic product (GDP) in 2000 to 52.6 percent in 2015 (World Bank, 2017). Consequently, private sector investment went up as well, It increased from 24.3 percent of GDP in 2000 to 33.3 percent in 2015 (World Bank, 2017).

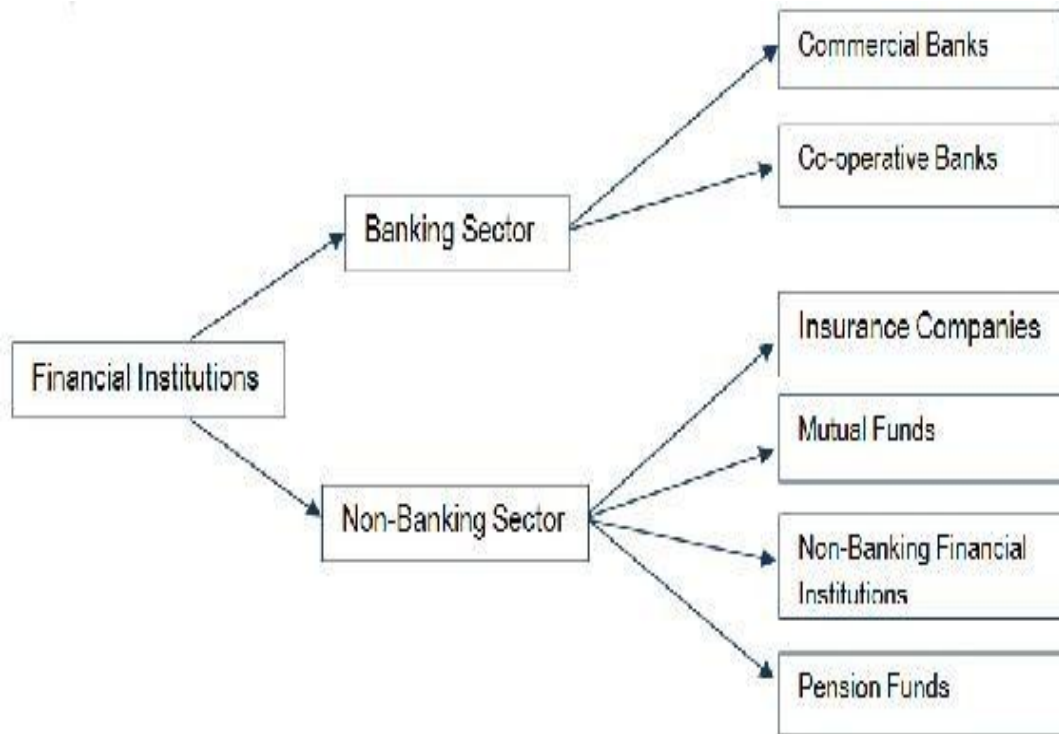
The rise in bank credit to private sector is also worrisome. Inefficiency of banking system reflected in poor appraisal of projects and sanction of loans to undeserving borrowers due to political pressures have led to high costs on the economy. Bank failures are not unusual in the private sector, where public sector banks are free from such possibility of government's full protection. In the Indian context public sector banks (PSBs), dominate the banking sector with 70 percent share of and their share of non-performing assets is the highest: more than 80 percent of NPA of the banking system. The proportions of NPA as percent of total loans and advances have gone up since 2015-16. It grew from 5 percent (IMF 2017a) to reach 9.3 percent in 2016-17. According to the Economic Survey for 2016-17 (Government of India, 2017), NPAs of all banks (public and private sector banks and foreign banks stood at a record level of 12 percent of as of January 2017¹. This figure is the highest among amongst the emerging markets. In this context, measurement of efficiency of banks ever since the banking reforms which were introduced in the early 1990s and implemented well into the late 1990s becomes important not only for the bank managements but also for the central bank, the Reserve Bank of India (RBI), which is the entrusted with the responsibility of maintaining

financial stability. The objective of this paper is to undertake an empirical study on the measurement of banking efficiency in India over a period of 17 years (1999-2000 to 2015-16). The paper is organized along the following lines. Section I review of trends in operations of commercial banks during 2002-15 since the introduction of economic reforms; Section III outlines different measures of efficiency of banks operations; Section IV quantifies efficiency of banks in terms of index numbers with base year as 1990-2000=100; and the last Section lists some conclusions with policy implications.

II. INDIA'S FINANCIAL SECTOR AND COMMERCIAL BANKS

India's financial sector (Figure 1) has undergone drastic changes since the introduction of reforms in the late 1990s towards economic liberalization (Mohan and Ray, 2017). India is ranked India as the sixth largest economy (International Monetary Fund, 2016).

Figure 1: Financial Institutions in India: 2017



Source: Mohan and Ray (2017)

The financial sector consists of 93 scheduled banks out of which 27 are public sector banks and 21 are in the hands of private ownership, the rest being owned by foreign interests. The other institutions cover development finance institutions; cooperative institutions, regional rural banks, post office banks, insurance companies and two major stock markets.

Table 1: India's Financial Sector Institutions: Number

India's Financial Sector Institutions: Number									
Institutions	Av. (2000-2005)	Av. (2002-2010)	2010	2011	2012	2013	2014	2015	2016
<i>Commercial Banks</i>									
Public Sector Banks	27	28	28	28	28	26	27	27	27
Private Sector Banks	29	24	20	20	20	20	20	20	21
Foreign Banks	0	29	32	34	41	43	43	44	45
Non-Banking Fis	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<i>Insurance Companies</i>									
Life	11	18	23	23	24	24	24	24	24
Non-Life	12	17	25	25	27	27	28	28	29
Re-Insurers	1	1	1	1	1	1	1	1	1
Pension Fund	1	0	1	1	1	1	1	1	1

Source: RBI (2017) N/A = not available

¹ An Asset quality review (AQR) carried out by the banks in response to Reserve Bank of India's directive in late 2014-15 reveals that the stressed assets (defined as sum of gross NPA, re-structured assets and written off accounts) was estimated to be in the range of 17.7 percent of gross advances in 2016 (Mohan and Ray 2017, Mundra 2016a and 2016b). A subsequent estimate released in May 2017, shows that it was 16.6 percent (Panagaria, 2017).

Commercial banks, which dominate the financial sector because of their ability to create money under the fractional reserve system, are our main focus in our study. The non-banking financial institutions (NBFI) sector operates under the following three institutionalized categories: (i) All-India Financial Institutions (AIFIs), (ii) Non-Banking Financial Companies (NBFC) and (iii) Stand-Alone primary dealers. The insurance sector in India is considered as one of the largest in the world. The establishment of Insurance Regulatory and Development Authority Act (1999) has contributed to make the insurance sector becoming more competitive.

Commercial banks have made substantial progress in mobilizing savings and disbursed credit during the 17-year study period. Table 2 reports the performance. Deposits, which were 41.35 percent of GDP in 1999-2000, reached 73.80 percent of GDP in 2015-16. The loans and advances increased from 20.37 percent in 1990-2000 to 57.74 percent of GDP in 2015-16.

Table 2: Growth of Commercial Banks in India: 2000-2016

Year	Deposits (Billions) Rs.	GDP (Billions) Rs.	Deposits As Percentage (%) of GDP	Loans & Advances (Billions) Rs.	Loans as Percentage (%) of GDP
1999-00	9003.07	21774.13	41.35	4434.69	20.37
2000-01	10552.33	23558.45	44.79	5256.83	22.31
2001-02	12026.99	25363.27	47.42	6457.43	25.46
2002-03	13556.23	28415.03	47.71	7392.33	26.02
2003-04	15755.3	32422.10	48.59	8636.32	26.64
2004-05	18375.59	36933.69	49.75	11508.36	31.16
2005-06	21646.79	42947.06	50.40	15168.10	35.32
2006-07	26969.34	49870.90	54.08	19812.35	39.73
2007-08	33200.61	56300.62	58.97	24769.36	43.99
2008-09	40632.01	64778.27	62.72	29999.24	46.31
2009-10	47524.56	77841.15	61.05	34970.54	44.93
2010-11	56158.74	87360.39	64.28	42974.88	49.19
2011-12	64535.49	99513.44	64.85	50735.59	50.98
2012-13	74296.77	112727.64	65.91	58797.73	52.16
2013-14	85331.73	124882.05	68.33	67352.13	53.93
2014-15	94351.01	135760.86	69.50	73881.79	54.42
2015-16	100927.0	136753.31	73.80	78965	57.74

Source: RBI (2017) and Authors' Calculations

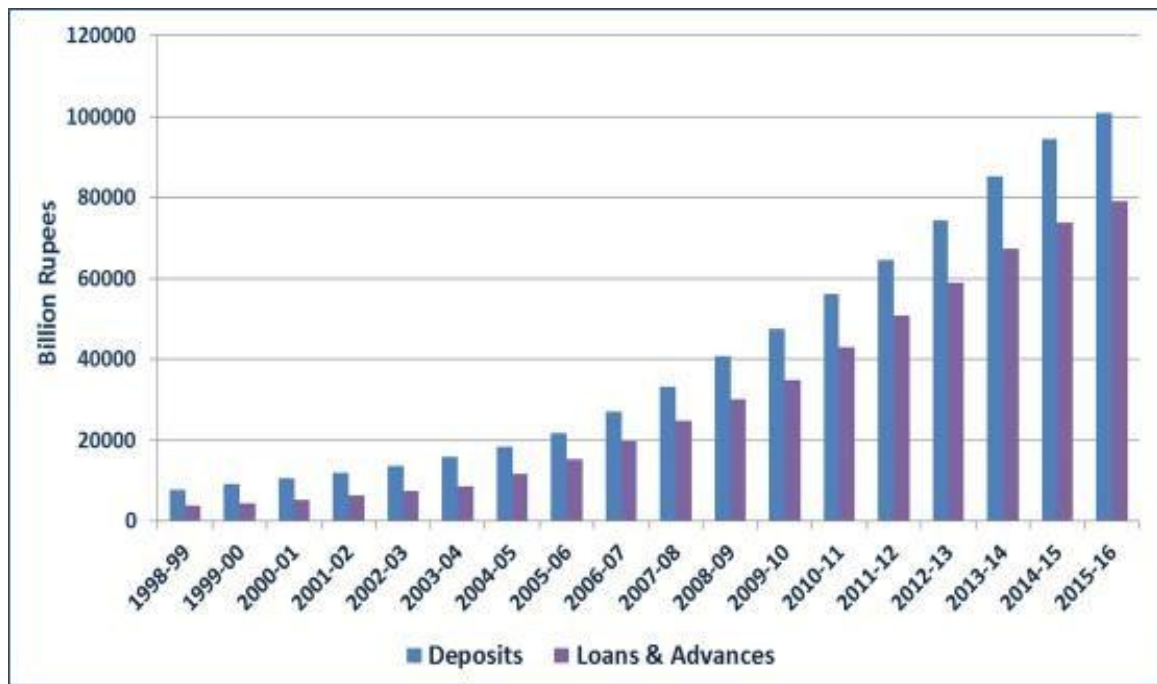
In 2015-16, deposits of public sector banks in 2015 were Rs. 65,025 billion (47.9 percent of GDP) which amounted to 72.9 percent of market share. The loans and advances of public sector banks in 2015 were Rs. 49,283 billion (36.3 percent of GDP), the market share being 71.6 percent., whereas the deposits held by private sector banks were Rs. 17,573 billion (12.9 percent of GDP), with a market share of 19.7 percent of market share. Their lending was Rs. 14,334.22 billion (10.6 percent of GDP), amounting to 20.8 percent of market share; the deposits held by foreign banks were Rs. 2,679 billion (2.9 percent of GDP). Their share was 4.4 percent. Their lending was Rs. 3,355 billion (2.5 percent of GDP) with a market share of 4.9 percent.

The market share of the regional rural banks, also in the public sector and mainly serving the rural families was 3 percent of deposits in 2016. They were 2,678 billion (2.0 percent of GDP). The credit share was 2.6 percent with Rs. 1,812 billion (1.3 percent of GDP) for the same year.

The rise in bank deposits and credit disbursed over time also reflects the growth in number of bank branches across the country. According to RBI (2016a), there were around 65,920 branches in 2000, which went up by 91 percent to reach 125,672 in 2015. The spread of banking operations was well the across rural, semi-urban, urban and metropolitan centers in the country (Figure 2). In 2015, it is reported that public sector banks had the largest number of branches: 89,711 (68.8 percent), whereas the

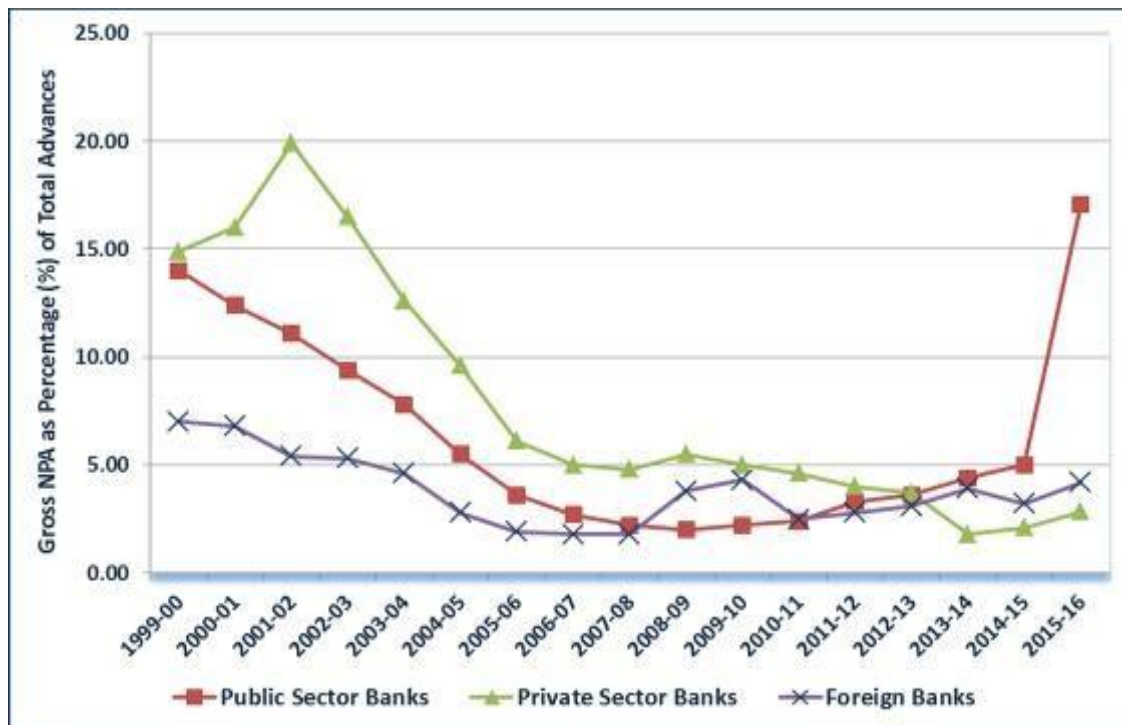
number of branches of private sector banks were 20,343 (15.7 percent) and foreign banks had 332 branches (0.3 percent). The numbers of branches of regional rural banks were 20,005 (15.3 percent).

Figure 2: Commercial Banks: Deposits and Advances (Rs. Billions):1999/00 – 2015-16



Source: RBI, Handbook of Statistics on Indian Economy 2015-16

Figure 3: Gross Non-Performing Assets of Commercial Banks (Percentage): 2000-2016



Source: RBI, Handbook of Statistics on Indian Economy 2015-16

Concerned with the weakening quality of the assets, which was duly reflected in the rising ratio of gross NPA to gross advances since 2013-14, the RBI applied rigorous assessment standards in late 2014. The newly introduced Asset Quality Review (AQR) undertaken in mid-2015 revealed that the system-wide ratio of gross NPA to gross advances jumped up from 5.1 percent in September 2015 to 7.6 percent in March 2016 (IMF, 2017a). The stressed assets (non-performing assets plus restructured loans plus written-off assets), expressed as a ratio of GA was more alarming as it reached 17.08 percent in 2016 for public sector public sector banks, as compared to the corresponding ratios of 2.83 percent for private banks and 4.20 percent for foreign banks. The share of PSBs in the total stressed assets was

70.84 percent stressed assets for the entire banking system (Figure 3). The growing poor quality of assets has given rise to fears about the stability of financial system. The suggested reforms suggested since 2015 include several which range from the re-capitalization of PSBs to setting up a “bad bank” purchasing the NPAs.

III. MEASUREMENT OF EFFICIENCY

The methodologies for measuring bank efficiency vary. They depend upon the objectives of the researchers, who aimed at varying degrees of sophistication and technical superiority. In his contribution on measuring efficiency, Sathye (2003) highlights the problems faced in developing countries. He refers to the use of financial ratios. He approvingly cites Yeh (1996), while listing the demerits of benchmark ratios, which often happen to be arbitrary. Further, financial ratios have been found inadequate, as they fail to take into account the long term performance (Sherman and Gold, 1985). For this reason, a non-parametric approach, known as data envelopment analysis (DEA) came to be adopted by different studies, which include Charnes et al. (1978), Seiford and Thrall (1990), Casu and Molyneux (2003) and Sathye (2003).

The DEA is a linear programming technique and is sensitive to the choice of variables, as it takes up a given year for studying a sample case of banks. It has also two approaches: production approach (PA) and intermediation approach (IA). Under PA, DEA takes into consideration number of accounts of deposits or loans as inputs and outputs respectively. The assumption is that banks consider deposits as inputs and financial services as outputs. Under IA, banks as financial intermediaries, consider deposits as inputs and loans as output. Using DEA, the mean efficiency of banks is calculated and compared with the world mean efficiency level. If the mean efficiency is lower than the world efficiency, the conclusion is there is a need for the banks to improve their efficiency. The DEA procedure is applied to a given year, which has to be compiled for each year. For calculation of the world mean efficiency for each year, researchers pick up one year for a given country and compare the mean efficiency for the world for the same year. It is obvious that choice of years is arbitrary

Our objective is to compile a data series for India from the year, where adequate information is available on a consistent basis to the latest year for which similar, full information is equally available. The approach is simpler and measurement is easy and replicable.

This would also enable the series to be updated with minimum effort. We adopt the well-known benefit and cost approach (Campa and Hernando (2006)) Bank efficiency ratio is calculated following the standard procedure given below:

BER = bank efficiency ratio t = time

$$BER_t = \sum_{b=1}^n \left\{ \frac{\text{Net Profit}}{\text{Total Expenditure}} \right\} \cdot (\text{Market Share})$$

n = number b = bank

The formula takes into consideration the business share of each bank in a given year in relation to each other. Thus, we derive the BER for a given year, as a weighted average for that year. The base year BER ratio is set equal to 100; and thereafter for each year following the base year = 100, index numbers are constructed. The next section presents the BEI calculated on the basis of the Equation 1 above.

IV. THE RESULTS

Applying the BEI calculation procedure outlined in the Section III, we present the tabulated data on net interest income (interest earned on loans *minus* interest paid on deposits) and other income (charges and fees and others), and net profit (total income minus total expenditure, including provision for bad loans and contingencies) for all the commercial banks. Using the procedure above, we calculated the efficiency ratios for each bank in three categories: (i) PSBs; (ii) private banks; and (c) foreign

banks, for each year (1990-2000 to 2015-2015) covering 16 years in all. Thereafter, we also derived the weighted average efficiency ratio for each bank by using market shares of each bank in each of the 16 years in three different categories.

Thus, we have 16 plus 16 Tables for each category of banks, totaling 32 for each category of banks. These are provided as work-sheets as three *Appendices*: Appendix A for PSB, Appendix B for private banks and Appendix C for foreign banks. Using the base year 1999-2000 =100, we calculate annual bank efficiency index (BEI) for each year. While Table 3 provides BEI index numbers for PSB covering a 16 year period; Table 4 and Table 5 present BEI index numbers for private and foreign banks.

V. PUBLIC SECTOR BANKS (PSBs)

In all, 27 PSBs' performance was evaluated. At the end of 2015-16, 15 PSBs had net losses. Table 3 presents BEIs for each year beginning from fiscal year 1999-2000 to 2015-16 (base year 1999-2000 =100). We observe the BEI was subject to fluctuations throughout for the next the nine year from 1999-2000. From the base year 1999-2000 index of 100, BEI fell to 40 in the very next year, 2000-01; the index, steadily rose to 70 in 2001-02 only to decline in 2003 to 68. But it rose in 2003-04 to 170. However, BEI had a big fall in the following year to 88 and there was a recovery. It rose to 106 and reached 135 in 2008-09. Thereafter, the trend in declining efficiency continued and it reached a negative 21 in 2015-16. This negative BEI was due to re-classification of bad loans due to application of rigorous standards.

The Asset Quality Review of 2015-16 that was carried out to identify and reclassify bad assets shows that banks had to increase provisions for non-performing assets (Appendix 1), which deprived the banks of their interest income, as these provisions are locked in and cannot be lent. Further, rise in prudential norms requirements as well as operating expenses besides reduced interest spread margin have been identified to be the causes for declining profits.

Table 3: Public Sector Banks Index

Public Sector Banks			
Year	Weighted Market Share	Efficiency Ratio	Weighted Efficiency Index
1999-00	0.8221	0.2898	100
2000-01	0.8168	0.1156	40
2001-02	0.7972	0.2084	72
2002-03	0.7788	0.1970	68
2003-04	0.7835	0.4927	170
2004-05	0.7666	0.2556	88
2005-06	0.7412	0.2636	91
2006-07	0.7341	0.3065	106
2007-08	0.7334	0.3778	130
2008-09	0.7606	0.3918	135
2009-10	0.7755	0.3786	131
2010-11	0.79	0.3253	112
2011-12	0.7703	0.3153	109
2012-13	0.7678	0.2922	101
2013-14	0.7656	0.1753	60
2014-15	0.7532	0.1609	56
2015-16	0.7271	-0.0601	-21

Private Banks

The market share of private banks is 22.7 percent and its share of NPA is 11.7 percent of the entire banking sector. The weighted BEI (base year 1999-2000 = 100) displays fluctuations similar to ones we saw in respect of PSBs (Table 4). However, despite setbacks in the initial years (1999-2000 to 2008-09), private banks did far better than public sector banks during the subsequent years. Their BEIs were during 2009-10 were higher than those of PSBs during the same corresponding period. In sum, compared to PSBs, private banks had to perform as well as they have no protection of re-capitalisation privileges which are enjoyed by the former. Further, they are less exposed to bad loans as the PSBs (Appendix 2).

Table 4: Private Banks Index

Private Banks			
Year	Weighted Market Share	Efficiency Ratio	Weighted Efficiency Index
1999-00	0.1262	0.3192	100
2000-01	0.1288	0.2842	89
2001-02	0.1463	0.3222	101
2002-03	0.1649	0.2852	89
2003-04	0.1634	0.3808	119
2004-05	0.1793	0.2755	86
2005-06	0.2014	0.2955	93
2006-07	0.2066	0.2866	90
2007-08	0.2059	0.3176	100
2008-09	0.1857	0.3096	97
2009-10	0.1765	0.3369	106
2010-11	0.1853	0.4145	130
2011-12	0.1857	0.4534	142
2012-13	0.1908	0.4820	151
2013-14	0.1922	0.4687	147
2014-15	0.2032	0.4557	143
2015-16	0.2272	0.3881	122

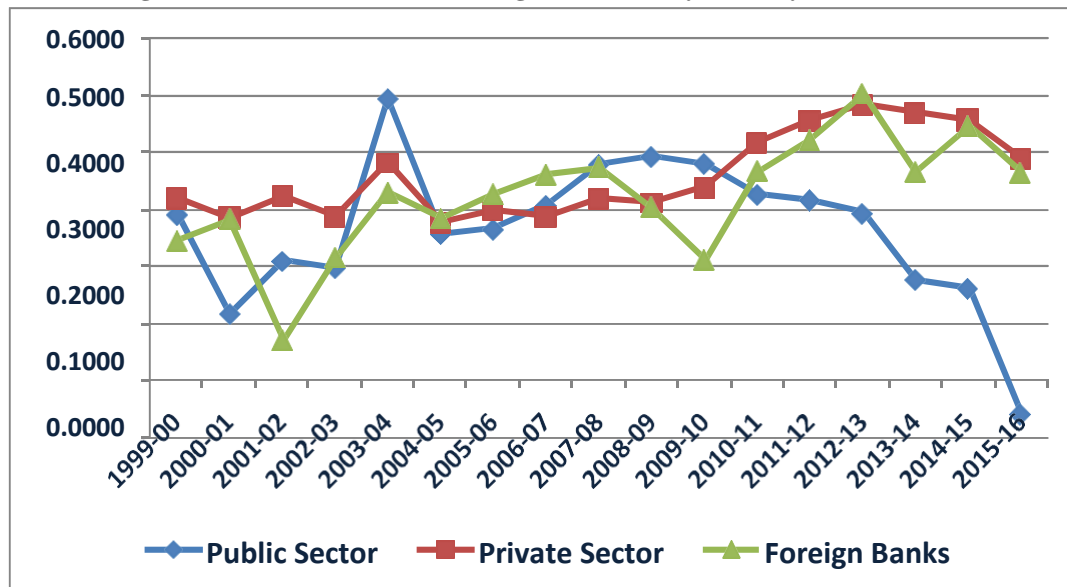
Foreign Banks

The market share of foreign banks is the least among the categories. With the BEI at 100 in the base year (1999-2000), we observe the BEI has been subject to volatility. Although it rose to 115 in the very next year, it fell to 28. It made a recovery by climbing up to 134 in 2003-04 again declining to 116 following year. But the subsequent fiscal years witnessed swings in BEI. However, it is notable that BEI was well above 100 until the fiscal year 2008-09. The BEI declined to 86 in 2009-10. Thereafter, foreign banks made a remarkable recovery. The final year of study, 2015-16 saw a fall in BEI: 149. It is due to application of stricter standards of classification of bad loans laid by RBI's new regulations (Table 5). A study of banks in three categories shows the PSBs as a category was the *worst* performer (Figure 5).

Table 5: Foreign Bank Index

Foreign Banks			
Year	Weighted Market Share	Efficiency Ratio	Weighted Efficiency Index
1999-00	0.0517	0.2437	100
2000-01	0.0544	0.2809	115
2001-02	0.0565	0.0694	28
2002-03	0.0563	0.2143	88
2003-04	0.0531	0.3270	134
2004-05	0.0541	0.2822	116
2005-06	0.0574	0.3249	133
2006-07	0.0592	0.3588	147
2007-08	0.0608	0.3717	153
2008-09	0.0537	0.3017	124
2009-10	0.048	0.2092	86
2010-11	0.0248	0.3647	150
2011-12	0.044	0.4193	172
2012-13	0.0415	0.5005	205
2013-14	0.0422	0.3632	149
2014-15	0.0436	0.4439	182
2015-16	0.0457	0.3621	149

Figure 5: All Scheduled Banks Weighted Efficiency Ratio by Market Share



VI. SUMMERY AND CONCLUSION

This paper applied simple benefits-cost approach to measure efficiency of banking operations in the Indian banking system. It covered three categories for ownership: the public and private sectors and foreign. A detailed year to year analysis of all banks in three categories showed PSBs did poorly during the entire period of study, covering 16 fiscal years: 1999-2000 to 2015-16. It is understandable that PSBs dominate the Indian banking scene to the extent of 70 percent. Further, in the absence of any pressures of market forces in a competitive economy, their lending operations and recovery measures of loans were below acceptable standards, ever since 1969 when the country witnessed nationalization of the then existing 19 major commercial banks. They have been carrying the burden of the past with accumulated bad loans which are to the 80 percent of non-performing assets of all banks.

The ultimate remedy is to get away from the past obsessions of the socialistic era by privatizing the publicly owned state banks of the colonial India before 1947 and re-privatizing the nationalized banks, which were private banks until 1969, for promoting efficiency. As a former deputy governor of India's central bank pointed out, that is one of the dilemmas of "efficiency and equity" (Mohan and Ray, 2017) faced by all the past governments whose policies were steeped in socialism, which have proved elsewhere that public ownership of commercial activities would never work.

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