Assessment of Performance
of Commercial Banks in India

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Abstract

Commercial banks occupy a crucial role in the development efforts as well as act as a catalyst for economic growth. Banking reforms have brought sea changes in the banking space and public sector banks are no exception to this. The major concern in the Indian financial sector has been the profitability of the commercial banking industry. The opening up of the banking sector for private players has put pressure on better performance of public sector banks. The private and foreign banks with advanced technology and management skills have put pressure on the profitability of public sector banks. Hence, these public sector banks need to be equipped enough to counter the pressures, otherwise, repercussions are likely to be great. With this background, the paper investigates the impact of banking reforms on the performance of public, private, and foreign banks. The performance of a bank can be measured by a number of indicators. Profitability is the most important indicator which assumes a greater importance in the ever-changing scenario of financial sector reforms. The viability of banks depends largely on the adequacy of profits and profitability. The study has analyzed the impact of banking sector reforms on the performance of all bank groups in India in the pre and post reform period. The undertaken regressors showed a significant impact on total income in the post-reform period for all bank groups.

Keywords: banking sector reforms, linear production function, dummy variable, pre reform period, post reform period, liberalization, commercial banks

JEL Classification: G21, G28, P17

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The commercial banking sector in India operated under a regime of financial repression in the seventies and eighties. The pricing of deposits and loans were administered to a large extent. However, in the nineties, the banking environment was transformed radically after the deregulation of the financial sector. The deregulation brought in a sea of changes in the form of banking sector reforms relating to rate deregulation, removal of barriers, introduction of prudential norms, and capital adequacy norms. These developments were expected to have important implications for operating performance and profitability in the banking system. It is ,therefore, extremely important to know the efficiency levels of various banks and their temporal behavior so as to understand how the banking industry has been reacting to the emerging challenges.

Objectives of the Study

1) To empirically test the impact of selected variables on the performance of public, private, and foreign banks.
2) To test whether the selected variables had significantly contributed towards the profitability of the banks considered for the study.

Review of Literature

Various studies made in assessing the performance of commercial banks with different banking indicators are as follows :

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Robert (1993) attempted to find out the trends in profitability in public sector banks in India during the period from 1973-1987.The study also assessed the operational efficiency of public sector banks and estimated the behavioural function for profit based on the key variables affecting profit for individual banks and for the banking industry as a whole. Pramodh, Ravi, and Nagabhushanam (2008) measured the productivity levels of 27 public sector banks. The Financial Express (2008) analyzed the scheduled commercial banks on the criteria of strength and soundness, credit quality, growth, efficiency, and profitability. Gupta and Sibal (2008) used the CAMEL's model for evaluating 20 old and 10 new private sector banks. Sinha and Chatterjee (2008) made a comparison of fund based operating performance and total factor productivity growth of selected Indian commercial banks (20 public sector, 8 private sector, and 2 foreign commercial banks) for a five year period from 2000-01 to 2004-05 using data envelopment analysis and the Malmquist total factor productivity (TFP) index.

Goyal and Kaur (2008) analyzed the performance of 7 new private sector banks operating in India during the period from 2001-2007 using five parameters, capital adequacy, asset quality, employee efficiency, earnings quality, and liquidity. Arora and Kaur (2008) studied the determinants of diversification of banks in India to analyze the financial performance of banks over the period from 2000-06.The banks were categorized into four categories, that is, nationalized banks, SBI and associates, new private sector banks, and foreign banks. Narwal and Goyal (2008) analyzed the cross relationship among various components of productivity for public, private, and foreign banks for the period from 2001-02 to 2005-06, using statistical tools like average, annual compound growth rate, regression, and parametric tests, which were used to establish, evaluate, and quantify the cross-sectional relationship among the variables. Verma and Saini (2010) analyzed the relation between market structure, conduct, and performance in the Indian banking industry in order to examine the relative role of efficiency and market power in determining the profitability of Indian banks for the period from 1984-85 to 2007-08.

Research Methodology

For the purpose of determining the impact of reforms on the banking sector, the study period was divided into three parts. The public sector banks cover the time period from 1980-1991 (pre-reform period), 1992-2010 (post-reform period), and 1980-2010 (the whole study period). For old private sector banks, the study period covers the time period from 1985-1991(pre-reform period), 1992-2010 (post-reform period), and 1985-2010 (the whole study period). For new private sector banks, only one study period - 1996-2010 was considered, since they came into existence in the post reform period and started publishing their accounts in the year ending March 31, 1996. In case of case of foreign banks, the study period covered the time period from 1987-1991 (pre-reform period),1992-2010 (post-reform period), and 1987-2010 (the whole study period).

The period under study was reshuffled to catch the exact impact of banking reforms. The year 1991 is considered to be the year when the financial sector reforms began, however, it has been assumed that the effect of the reforms would have taken some time to percolate. For this purpose, the first period covers the years from 1980-1995 in case of public sector banks, 1985-1995 for old private sector banks, and 1987-1995 for foreign banks. The second period has been stretched over from the years 1996 to year ending March 31, 2010. The third period covers the whole period from 1980 to the year ending March 31,2010 in case of public sector banks , 1985 to the year ending March 31,2010, for old private sector banks, and 1987 to the year ending March 31, 2010 for foreign banks. In case of new private sector banks, only one period from 1996 to the year ending March 31, 2010 was considered.

The splitting of the study period in the above mentioned way was because of certain reasons. The first and foremost reason was the entry of new private sector banks in the post- reform period and publishing of their accounts since the year ending March 31, 1996. Thus, the results have been explained for both the time periods : 1992-2010 (post-reform period) over the 1980-1991 period (pre-reform period), and the 1996-2000 period (post-reform period) over the 1980-1995 period (pre-reform period).

The study considered the following variables : Total assets (x_1), net interest margin (x_2), total expenditure (x_3), total business (x_4), non-interest income (x_5), establishment expenses (x_6), number of employees (x_7), number of branches (x_8), and net worth (x_9). The impact of different regulatory norms is going to be well reflected in terms of behavior of various selected variables. In order to satisfy the stated objectives, linear production function of the following form was figured out :

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 \text{-------------} b_nx_n + e^u$$

Where,

a = Intercept b_i's are regression coefficients and x_i's are independent variables,

N = Number of input variables,

e^u = Error term or disturbance in the relationship representing factors other than x that affects y.

e^u also stands for unobserved factors. It does not matter how many explanatory variables are included in each stage.

There shall always be factors which cannot be included and are collectively contained in u. The impact of banking sector reforms in the post liberalized period was ascertained by employing a dummy variable. It is known that over a long period of time, not only do the functions shift (their constant intercept changes), but also their slopes may well be expected to change, and elasticities and propensities change over time. The changes in the parameters of a function have been captured by introducing an appropriate dummy variable in the function. To capture this shift, the dummy variable $'Z'$ was introduced. Zero value was assigned if observations pertained to the pre-reform period, and value 1 was assigned to observations of the post-reform period. The coefficients of the dummy variable were examined and tested for their significance. The linear production function was used in the following form :

$$Y = b_0 + b_1x_1 + b_2x_2 + \text{-------------} b_nx_n + b_nZ + u$$

$b_n > 0$

Where,

Y = dependent variable,

b_0 = Intercept,

$b_{i's}$ = regression coefficients.

Z = dummy variable for the shift in the function.

In the pre-reform period, the function would be

$$Y = \overset{\uparrow}{b_0} + \overset{\uparrow}{b_1}x_1 + \overset{\uparrow}{b_2}x_2 \ldots\ldots\ldots\ldots\ldots\ldots (i)$$

In the post-reform period, the function would be

$$Y = \hat{b}_0 + \hat{b}_1x_1 + \hat{b}_2x_2 + \hat{b}_n Z \ldots\ldots\ldots\ldots (ii)$$
$$= (\hat{b}_0 + \hat{b}_n Z) + \hat{b}_1x_1 + \hat{b}_2x_2 \ldots\ldots\ldots (iii)$$

◗ **Choice of Inputs and Outputs :** The ratio between the number of observations and number of input and output variables need to be specified. Cooper, Seiford, and Tone (2000) stated that a number of observations should be at least three times the sum of input and output variables.

It was also necessary to get an agreement on a common set of inputs and outputs to be included in the study. A resource used by a unit should be included as an input. A unit shall convert resources to produce outputs so that the outputs should include the amount of products and services produced by the unit. Therefore, the output may include a range of performance and activity measures. In addition to this, other external factors, which may affect the production of these outputs, must be identified and included in the assessment model. The input variables included all important variables through which the impact of banking sector reforms will be reflected. The total income has been considered as a measure of output, which is particularly applicable to the Indian banking industry. After the financial deregulation, banks in India started paying more attention to increase their gross income. It also reflects the integrated contribution of all input facilities and management. Most of the studies conducted in the Indian banking industry - Subrahmanyam (1984, 1993, and 1995), Subrahmanyam and Swamy (1994), and Aggarwal (1991) followed this measure of output.

Analysis and Results

The results are discussed in the Tables 1 and 2. The Table 1 explains the dummy results in the post-reform period (1992-2010) over the pre-reform period (1980-1991). The objective was to assess whether the banking sector reforms

Table 1 . 1992-2010 Over 1980-1991 (Dummy Results)

	Public Sector Banks Dummy	Private Sector Banks Dummy	Foreign Banks Dummy	Scheduled Commercial Banks Dummy
Total Assets (b_1)=A				
Intercept	991.0759	271.437	154.166	924.287
	(2000.761)	(1071.451)	(581.872)	(3238.208)
Dummy Coefficient	14486.948**	3432.138*	1387.155	17315.200**
	(3031.269)	(1322.211)	(691.018)	(4809.223)
Net-Interest Margin (b_2)=B				
Intercept	2664.02	20.028	392.877	2942.849
	(4472.161)	(507.616)	(633.605)	(4828.735)
Dummy Coefficient	-2722.467	673.204	1441.123	130.677
	(7239.604)	(673.529)	(752.301)	(7469.236)
Total Expenditure (b_3)=C				
Intercept	1589.429	-44.645	-132.472	-1651.820
	(614.022)	(70.780)	(232.006)	(698.082)
Dummy Coefficient	-5236.760**	-91.257	-649.225*	-5854.990**
	(990.840)	(95.851)	(284.551)	(1088.397)
Total Business (b_4)=D				
Intercept	2670.869	103.442	168.900	1909.702
	(2659.316)	(402.978)	(877.799)	(3489.303)
Dummy Coefficient	22606.910**	1172.310*	520.211	22970.520**
	(3932.952)	(524.792)	(1059.077)	(5123.102)
Non Interest Income (b_5)=E				
Intercept	4293.559	181.600	492.41	5410.689
	(4713.960)	(759.166)	(429.145)	(4507.231)
Dummy Coefficient	775.475	346.103	1545.490**	4938.795
	(7552.952)	(1028.096)	(508.413)	(6898.314)
Establishment Expenses (b_6)=F				
Intercept	-9345.839	652.476	400.249	-11563.800
	(6234.583)	(395.566)	(656.932)	(6810.611)
Dummy Coefficient	-29802.854*	-58.023	1966.865*	-36214.700**
	(11066.057)	(534.764)	(733.824)	(11423.070)
Number of Employees (b_7)=G				
Intercept	303759.100	-51127.980	-10753.380	35056.380
	(99523.650)	(4893.452))	(1683.531)	(181001.700)
Dummy Coefficient	138737.671**	-4632.832**	2524.008	155068.500**
	(25335.991)	(1602.081)	(1692.040)	(51930.440)
Number of Branches (b_8)=H				
Intercept	-416435.000	-25276.390	-9199.655	-478498.000
	(59718.000)	(1145.954)	(2419.850)	(61258.050)
Dummy Coefficient	-47945.077	-803.803	1646.539	-70960.700*
	(26832.474)	(627.461)	(2539.834)	(34211.080)

Net Worth (b$_9$)=I				
Intercept	8532.535	435.315	961.819	9623.224
	(2789.658)	(400.169)	(951.238)	(3766.917)
Dummy Coefficient	12189.975**	1796.795**	2423.386*	27097.050**
	(4281.483)	(511.095)	(1115.036)	(5528.722)
A+B+C+D+E+F+G+H+I=J				
Intercept	-1633.738	-1079.301	566.158	-138.450
	(4167.564)	(1028.100)	(369.690)	(3068.831)
Dummy Coefficient	-5706.339**	-45.867	105.824	-4952.355**
	(1573.043)	(88.267)	(226.585)	(1621.180)

**.significant at the 0.01 probability level (2 tailed).

*.significant at the 0.05 probability level (2 tailed).

Source:1. Statistical Tables Relating to Banks in India, Published by Reserve Bank of India(various issues).

2. Database on Indian Banking Published by IBA, Mumbai (1999).

3. Performance Highlights of Public sector, Private Sector and Foreign Banks in India published by IBA (various issues).

Notes: 1. Data for the years 1980 to 1987 relate to the calendar year(that is January-December),while those for the year 1988-89 pertain to the 15 month period, that is from January1,1988 to March 31,1989.From 1989-90 onwards, data relates to the financial year period (that is ,April-March).

2. Figures in parenthesis indicate standard errors

Table 2. 1996-2010 Over 1980-1995 (Dummy Results)

	Public Sector Banks Dummy	Private Sector Banks Dummy	Foreign Banks Dummy	Scheduled Commercial Banks Dummy
Total Assets (b$_1$)=A				
Intercept	3485.065	604.657	661.482	3717.637
	(1708.175)	(706.537)	(420.569)	(2739.923)
Dummy Coefficient	16069.81**	4445.618**	1123.023	19412.66**
	(3260.046)	(1053.945)	(626.688)	(5107.200)
Net-Interest Margin (b$_2$)=B				
Intercept	2723.294	48.289	649.102	3328.944
	(3847.491)	(376.162)	(408.111)	(4163.093)
Dummy Coefficient	-6879.476	1215.286	1771.549**	-1657.870
	(81715.850)	(644.513)	(596.520)	(8261.827)
Total Expenditure (b$_3$)=C				
Intercept	-2990.400	-56.506	-432.242	-3259.55
	(731.259)	(53.652)	(180.110)	(811.892)
Dummy Coefficient	-2503.198	-150.574	-349.094	-3251.170
	(1482.369)	(97.483)	(276.305)	(1594.631)
Total Business (b$_4$)=D				
Intercept	6232.821	282.713	411.678	5448.448
	(2129.063)	(283.011)	(627.451)	(2873.918)
Dummy Coefficient	25674.632**	1583.773**	287.368	26041.920**
	(3927.646)	(474.594)	(960.913)	(5269.409)
Non Interest Income (b$_5$)=E				
Intercept	4722.343	245.419	954.677	6825.162
	(4084.871)	(590.508)	(293.038)	(3905.384)

Dummy Coefficient	-896.271	482.980	1469.281**	2819.576
	(8513.745)	(1082.067)	(432.444)	(7672.074)
Establishment Expenses (b_6)=F				
Intercept	-15652.18	-680.932	1023.188	-17843.100
	(5100.353)	(313.398)	(461.278)	(5355.254)
Dummy Coefficient	-48366.412**	-2.439	1785.231**	-53420.100**
	(12202.624)	(560.829)	(676.326)	(11911.310)
Number of Employees (b_7)=G				
Intercept	160208.300	-44757.300	-9735.386	-55718.100
	(93684.400)	(6647.144)	(1374.007)	(142676.600)
Dummy Coefficient	128965.758**	-816.557	2779.219	167146.4
	(21956.862)	(1831.711)	(1425.350)	(37314.340)
Number of Branches (b_8)=H				
Intercept	-304868.900	-25921.200	-8387.404	-384263.900
	(61030.600)	(1377.119)	(2074.706)	(67806.200)
Dummy Coefficient	22840.468	-832.423	798.018	13706.408
	(24972.094)	(672.782)	(2402.201)	(34477.924)
Net Worth (b_9)=I				
Intercept	10698.19	761.546	1507.764	9623.224
	(2427.317)	(269.168)	(630.168)	(3766.917)
Dummy Coefficient	12847.348**	2138.616**	2600.206**	24097.050**
	(4763.575)	(440.028)	(907.488)	(5528.722)
A+B+C+D+E+F+G+H+I=J				
Intercept	2056.566	-1173.509	651.574	1096.858
	(4445.206)	(1456.764)	(370.191)	(3316.484)
Dummy Coefficient	4130.120*	-46.868	130.425	3802.178*
	(1749.729)	(159.063)	(154.393)	(1812.088)

**.significant at the 0.01 probability level (2 tailed).

*.significant at the 0.05 probability level (2 tailed).

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2.   Figures in parenthesis indicate standard errors

had a significant impact on the banking sector immediately after the introduction of the financial reforms in the year 1991.

The dummy coefficient for the whole industry turned out to be significant but negative when all regressors were taken together along with the dummy variable. Therefore, this shows that the reforms did have an impact, but the impact did not mature immediately as explained by the coefficient. This shows that the reforms took some time to show their effect on the banking sector. The banks were exposed to certain prudential and regulatory norms, which lowered their profitability immediately after the introduction of the banking sector reforms. Therefore, the time period was reshuffled to the 1996-2000 period (post-reform period) over the 1980-1995 period (pre-reform period). The results were as per the expectations.

The regression coefficient for the whole industry turned out to be significant when all regressors were regressed together. Therefore, only the results of the Table 2 have been explained. The dummy coefficient for the total assets turned out to be significant for the public sector and old private sector banks in the post-reform period. The coefficient showed a significant improvement in the total assets of both banks groups. The regression coefficient was also significant for industry represented by the scheduled commercial banks. The significance could also be confirmed from the actual value of the total assets. The total assets for public sector banks, old private sector banks, and scheduled commercial banks were ₹ 52668 crore, ₹ 2882 crore, and ₹ 57811 crore at the end of the year 1980. It rose to ₹ 4441114 crore, ₹ 268978 crore, and ₹ 6025416 crore for public, old private, and scheduled commercial banks at the end of the year 2010. The dummy coefficient for net- interest margin turned out to be significant for foreign banks. The net-interest margin for foreign banks were ₹ 167 crore at the end of the year 1987 and ₹13811 crore at the end of the year 2010.

The dummy coefficient for the total business turned out to be significant for public sector, old private sector, and scheduled commercial banks. It could be supported by the total business for public sector banks, old private sector banks, and scheduled commercial banks, which was ₹ 64072 crore, ₹ 3458 crore, and ₹ 69661 crore at the end of the year 1980. It was hiked to ₹ 6393102 crore, ₹ 384033 crore, and ₹ 8249510 crore at the end of the year 2010.

The dummy results for non-interest income were found to be significant only for foreign banks. The non-interest income for foreign banks was ₹ 96 crore at the end of the year 1987, which increased to ₹ 9610 crore at the end of the year 2010. It magnified foreign banks' strategy of diversification in the range of products, which brought them significant portion of non- interest income to their total income.

The establishment expenses' dummy coefficient turned out to be significant for public sector banks (negative), foreign banks, and scheduled commercial banks (negative). In case of public sector banks, the negative dummy coefficient did point out a significant cut in establishment expenses. It was also well reflected in the coefficient of scheduled commercial banks. It could be well supported by the establishment expenses of different bank groups. It was ₹ 914 crore, ₹ 47 crore, and ₹ 914 crore for public, foreign, and scheduled commercial banks at the end of the year 1980 and ₹ 40268 crore, ₹ 4560 crore, and ₹ 54251 crore at the end of the year 2010 for public, foreign, and scheduled commercial banks.

The dummy coefficient for a number of employees was significant only for the public sector banks. The number of employees at the end of the year 1980 were 553849, which increased to 734594 at the end of the year 2010. The employees significantly contributed to the banks' profitability in the post-reform period. The dummy coefficient for net worth was found to be significant for all bank groups in the post-reform period. The net worth was ₹ 456 crore at the end of the year 1980, ₹ 29 crore at the end of the year 1985, ₹ 36 crore at the end of the year 1987, and ₹ 456 crore at the end of the year 1980, which increased to ₹ 230923 crore, ₹ 20034.52 crore, ₹ 51833.77 crore, and ₹ 402536 crore at the end of the year 2010 for public sector banks, old private sector banks, foreign banks, and scheduled commercial banks respectively. In order to know the impact of reforms, all regressors were regressed together. The impact was clear as the dummy coefficient turned out to be significant for the industry in the form of scheduled commercial banks.

Conclusion

To sum up, there was a significant structural transformation in the banking sector after the introduction of the financial reforms. For public sector banks, the dummy coefficient for total assets, total business, establishment expenses, number of employees, and net worth was found to be significant. For old private sector banks, the dummy coefficient for total assets, total business, and net worth was found to be significant. In case of foreign banks, the dummy coefficient for net-interest margin, non-interest income, establishment expenses, and net worth turned out to be significant.

The intercept was also shifted downward for total expenditure, establishment expenses, and number of branches for public sector banks. For old private sector banks, the intercept was shifted downward for total expenditure, establishment expenses, number of employees, and number of branches. For foreign banks, the intercept was shifted downward for total expenditure, number of employees, and number of branches. It also signified the impact of undertaken regressors on total income of different bank groups.

Implications of the Study

The study suggests that banking sector reforms, particularly second phase of reforms, had a significant impact upon the performance of the banking sector. It is required that all banks groups should implement all recommendations of the first and second phase of banking sector reforms in the true spirit for creating a proper work culture and to face the global competition. It is extremely important to review the reforms for the third time, and any deficiency existing in the banks' functioning should be removed. The abovementioned indicators should be considered for the third banking sector reforms to improve the performance of the banking sector. The banking sector reforms have created a competitive environment and old private sector and foreign banks showed an improved performance over public sector banks with respect to certain indicators. Therefore, the public sector banks need effective strategies to improve their performance so as to meet the requirements of the global environment.

References

Aggarwal, R.N. (1991). Productivity growth and economies of scale in public sector banks in India: 1969-1986. *Productivity, 32*, 329-336.

Arora , S., & Kaur, S. (2008). Diversification in banking sector in India: Determinants of Financial Performance. *The Indian Journal of Commerce, 61* (3), 13-21.

Cooper, W.W., Seiford, L.M., & Tone, K. (2000). *Data envelopment analysis: Comprehensive text with models, applications, references and DEA solver software* (pp. 1- 15). Boston : Kluwer Academic Publisher.

Goyal, R., & Kaur, R. (2008). Performance of new private sector banks in India. *The Indian Journal of Commerce, 61*(3), 1-12.

Gupta, R. K., & Sibal, S.K. (2008). A camel model analysis of private sector banks in India. *Gyan Management, 2* (1), 3-8.

"India's best banks survey." (2008). *The Financial Express*. Retrieved from http://www.financialexpress.com/

Indian Banks Association. (1999). *Database on Indian banking*. Mumbai : IBA Publication.

Indian Banks Association. (Various Issues). *Performance highlights of public sector, private sector and foreign banks in India*. Mumbai : IBA Publication.

Narwal, K.P., & Goyal, P.   (2008). Productivity - based comparative analysis of public, private and foreign banks. *The Indian Journal of Commerce*, *61*(3), 22-35.

Pramodh, C., Ravi, V., & Nagabhushanam, T. (2008). Indian banks' productivity ranking via data envelopment analysis and fuzzy multi-attribute decision-making hybrid. *International Journal of Information and Decision Sciences, 1*(1), 44-65.

Reserve Bank of India. (Various Issues). *Statistical tables relating to banks in India*. Mumbai : RBI Publication.

Robert, M. (1993). Profitability in public sector banks in India. *Finance India, 8* (3), 705-711.

Sinha, R. P., & Chatterjee, B. (2008). Fund based activity of Indian commercial banks: A Malamquist approach. *Indian Economic Review, 43* (1), 83-102.

Subrahmanyam, G. (1984). An approach to interbank productivity comparisons. *Prajnan, 13* (3), 381-392.

Subrahmanyam, G. (1993). Productivity growth in India's public sector banks: 1970-1989. *Journal of Quantitative Economics, 9* (2), 209-223.

Subrahmanyam, G. (1995). A non structural test of competition in Indian banking. *The Indian Economic Journal, 43* (1), 26-34.

Subrahmanyam, G., & Swamy, S.B. (1994). Production efficiency differences between large and small banks. *Artha Vijnana, 36* (3), 183-193.

Verma, S., & Saini, R. (2010- 2011). Structure, conduct and performance of commercial banks in India. *Prajnan, 39* (2), 83-108.