An Evaluation Of Concentration Risk Profile Of Commercial Banks In India

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INTRODUCTION

Credit risk is the oldest and biggest risk that a bank, by virtue of its very nature of business, inherits. Credit risk strategy results from a bank's tolerance for risk as evidenced by how it selects, manages, and diversifies risk. Banks are moving away from a buy-and-hold strategy with respect to their loans. They are now syndicating risk, distributing the risk to enhance the value of their portfolio. When originating a loan, banks need to evaluate how much incremental risk they are adding, how much they need to be compensated for taking that risk. Many banks look at each credit inside than across the enterprise to understand the incremental risk that the new loan is adding to the portfolio. Prudent banking practice recognizes the dangers of excessive industry concentrations and overexposures to one or few borrowers. The objective of this research is to present a general framework for quantification of concentration risk followed by concentration risk profiling of public sector banks vis-à-vis private sector banks.

CONCENTRATION RISK STRATEGY

The credit risk in a bank's loan portfolio consists of three components[1]; Transaction Risk, Intrinsic Risk and Concentration Risk. Transaction risk focuses on the volatility in credit quality and earnings resulting from how the bank underwrites individual loan transactions. Intrinsic risk focuses on the risk inherent in certain lines of business and loans to certain industries. Commercial real estate construction loans are inherently more risky than consumer loans. Concentration risk is the aggregation of transaction and intrinsic risk within the portfolio and may result from loans to one borrower or one industry, geographic area, or lines of business. Bank must define acceptable portfolio concentrations for each of these aggregations.

The banks do have an opportunity to reduce their concentration in one line of business or industry. Outstanding would have to be replaced with more lending focused on lower risk lines of business and borrowers. Banks must constantly monitor the risk profile to ensure that its future lending practices are consistent with the desired risk profile[2].

Using the risk profile as a frame of reference, management should select a risk strategy that will be consistent with long-term objectives for portfolio quality and performance. *The three variable risk strategies in order of riskiness are: **Conservative, Managed** and **Aggressive.*** A ***Conservative*** strategy accepts relatively low levels of transaction, intrinsic and concentration risk. The strategy normally supports a values-driven culture. The ***Managed*** strategy accepts relatively low levels of risk in two categories but high levels in one category. For example: a bank that takes conservative levels of concentration and transaction risk but is more aggressive with intrinsic risk. An ***Aggressive*** strategy accepts relatively low levels of risk in one category, more aggressive risk in two categories. An example would be a bank that closely manages transaction risk but accepts higher levels of intrinsic and concentration risk. This strategy is normally employed in a production driven culture.

The most conservative banks manage borrower exposure through restrictive house limits and maximum exposure to industries and lines of business. Many banks also have wisely sought to mitigate risk through geographic diversification. Managing concentration limits will become a high priority for these lenders in the future because of the lingering pain from lessons leaned in commercial real estate, energy etc.

CONCENTRATION RISK TRENDS IN SCHEDULED COMMERCIAL BANKS

Bank business loans are described as "Commercial and Industrial", or C&I Loans[3]. Industry classifications such as manufacturing (durable and nondurable), mining, trade, transportation, communication and other public utilities, constructions, and services further describe the nature of C&I lending. Commercial banks have expertise and reputational capital in gathering, processing, analyzing, and monitoring information flows along this continuum. Credit analysis and pricing risk are integral part of this process. Portfolio theory preaches the lesson for insolvency protection: diversification. Banking law prohibits concentration with a single borrower, and

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[1] John E. Mckinley & John R. Barrickman, (1994), "Strategic Credit Risk Management-Introduction", Robert Morris Associates, , pp. 4-5.

[2] John E. Mckinley & John R. Barrickman, (1994), Op.cit. pp50

[3] Joseph F. Sinkey, Jr., (1998), " Commercial Bank Financial Management In the Financial Services Industry", First edition, Prentice-Hall International Inc. New Jercy. Op.cit. pp 402

prudent banking practice, supplemented by sound regulatory monitoring, avoids industry concentration because the bulk of bank business lending is concentrated in Commercial and Industrial (C&I) loans.

For the purpose of concentration risk trend analysis, the post-liberalization period of fourteen years i.e., from 1994 to 2007 has been considered. The concentration risk is generally analyzed in terms of the region, occupation-industry lines of business. However, in this study, for facilitating comparative analysis of concentration risk profile of public sector banks against the private sector banks, the region-wise component of concentration risk is not considered. This is justifiable on the ground that the private sector banks generally confine their operations within the target geographical area compared to public sector banks where their network operations are widely distributed throughout the width and the breadth of the country. Therefore, the concentration risk profile analysis is focused only on the two components:- (1) Occupation-wise concentration risk profile, and (2) Industry-wise concentration risk profiles.

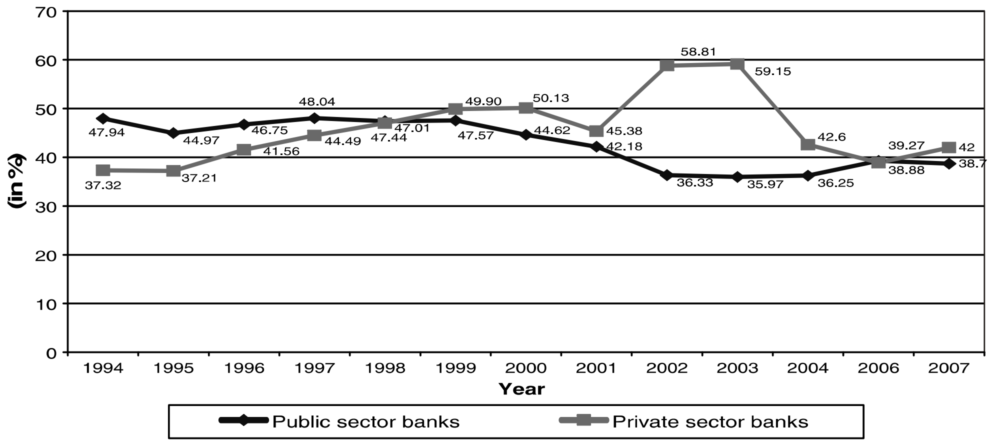
Table 1: Trends In the Share of the Single Largest Occupation of Public and Private Sector Banks: 1994-2007

Year	Public Sector Banks		Private Sector Banks	
	Single largest Occupation	% of concentration	Single largest occupation	% of concentration
1994	Industry	47.94	Industry	37.32
1995	“	44.97	“	37.21
1996	“	46.75	“	41.56
1997	“	48.04	“	44.49
1998	“	47.44	“	47.01
1999	“	47.57	“	51.10
2000	“	44.62	“	50.13
2001	“	42.18	“	45.39
2002	“	36.33	“	58.81
2003	“	35.97	“	59.15
2004	“	36.25	“	42.6
2006	“	39.27	Professional & Personal loan	38.88
2007	“	38.70	“	42.00

Source: *Basic Statistical Returns of Scheduled Commercial banks in India. www.Rbi.org.in*

For the purpose of profiling concentration risk, the single largest occupation is considered as a first step in developing the profile-score. Accordingly, the results are shown in **Table 1** and the corresponding **Graph 1** for both public and private sector banks. The single largest occupation for both the sectors happens to be Industry. The share of the occupation was highest at 47.94 percent in the year 1994 for the public sector banks, but gradually and significantly reduced to 35.97 percent in the year 2003 and gradually increased to 38.70 in the year 2007. On the contrary, the share of the occupation, which was less than 40 percent till 1995 for private sector banks, increased significantly to over 59 percent in the year 2003. There is reversal of the trend with index value reducing to around 40 percent during 2004-07.

Graph 1: Trends in the share of single largest Occupation of Public and Private sector banks



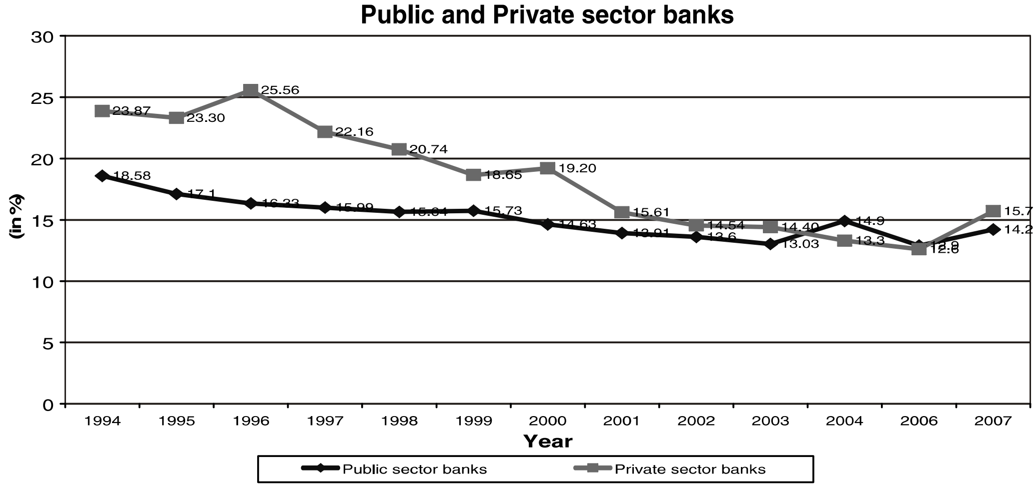
The single largest industry concentration profile is shown in **Table 2** and the corresponding **Graph 2** for both public and private sector banks. The single largest industry for public sector banks happens to be basic metals and metal products. The share of this industry is highest at 18.58 in the year 1994, in the succeeding year it concentrated in engineering industry with the share of 17.05, and in the subsequent years, public sector banks concentrated only on textiles. It is interesting to note that the share of single largest industry decreased consistently from 18.58 percent in 1994 to 13.03 percent in 2003. During 2004-07, there has been a marginal increase with construction industry replacing textiles. Single largest industry for private sector banks happened to be textiles from 1994 to 1999. The share of this industry was highest at 23.87 in the year 1994 that increased significantly to 25.56 in the year 1996 and reduced to 18.65 in 1999. In the year 2000, 'other industry' category replaced the textiles industry as the single largest industry with the concentration risk of 19.20. In the year 2001, textiles industry holds back the position with concentration risk of 15.61 followed by basic metals and metal products industry becoming the single largest with the concentration risk of 14.54 and 14.41 respectively in the year 2002 and 2003. But construction emerged as the single largest industry with 15.70 percent in 2007.

Table 2: Trends In The Share of Single Largest Industry of Public and Private Sector banks: 1994-2007

Year	Public Sector Banks		Private Sector Banks	
	Single Largest Industry	% of concentration	Single Largest Industry	% of concentration
1994	Metal	18.58	Textiles	23.87
1995	Engineering	17.05	"	23.30
1996	Textiles	16.33	"	25.56
1997	"	15.99	"	22.16
1998	"	15.64	"	20.74
1999	"	15.73	"	18.65
2000	"	14.63	Other Industry	19.20
2001	"	13.91	Textiles	15.61
2002	"	13.60	Metals	14.54
2003	"	13.03	Metals	14.40
2004	Construction	14.90	Chemical	13.3
2006	"	12.90	Other Industry	12.6
2007	"	14.20	Construction	15.7

Source: *Basic Statistical Returns of Scheduled Commercial banks in India. www.Rbi.org.in*

Graph 2: Trends in the share of single largest Industry of Public and Private sector banks



MEASUREMENT OF CONCENTRATION RISK

There is no standardized method for measuring the concentration risk of credit portfolio. General methods suggest by John & John[4] is based on profile scoring for each of the occupation-wise, industry-wise, region-wise etc. concentrations. An alternative approach for measuring the concentration risk of a credit portfolio is to determine the Concentration-Index based on the standard deviation of the credit portfolio for each of the occupation-wise, industry-wise, region-wise etc. concentrations. Measurement of concentration risk of credit portfolio of commercial banks in India based on Index method is discussed first and then profile-scoring method is explained later.

Concentration-Index Method: The concentration-index approach indicates the degree of dispersion of individual components of the credit portfolio from the average value. Higher the dispersion, greater will be the

[4] John E. Mckinley & John R. Barrickman, (1994)"Strategic Credit Risk Management", Robert Morris Associates.

standard deviation and vice-versa. Higher standard deviation means higher degree of concentration risk and lower standard deviation implies low degree of concentration risk.

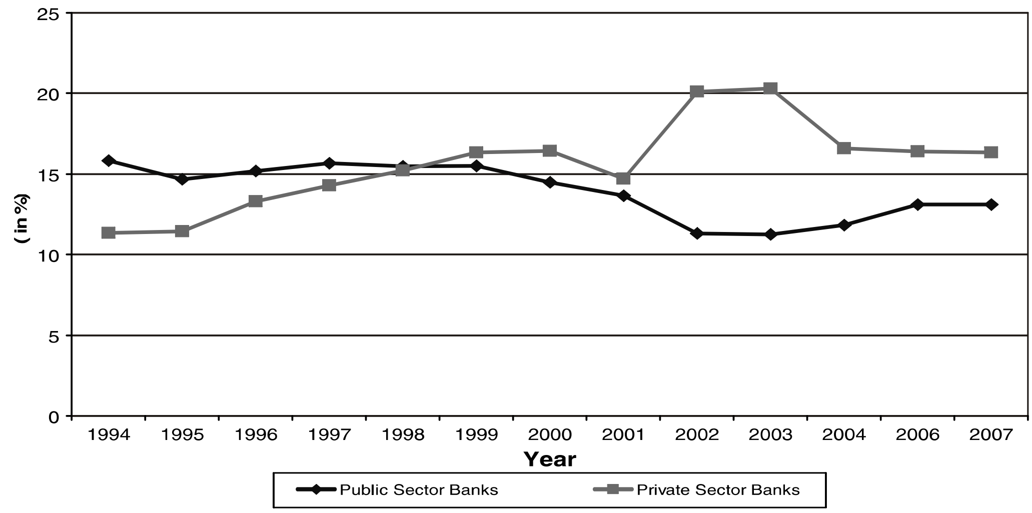
The volume of occupation-wise concentration risk profile of public and private sector banks as measured by the standard deviation is presented in **Table 3** and the corresponding **Graph 3.**

Table 3 : Occupation-wise Concentration-Index of Public and Private Sector Banks : 1994-2007

Year	Public Sector (%)	Private Sector(%)	Year	Public Sector(%)	Private Sector (%)
1994	15.83	11.34	2001	13.64	14.70
1995	14.66	11.43	2002	11.33	20.10
1996	15.18	13.31	2003	11.24	20.31
1997	15.67	14.28	2004	11.84	16.58
1998	15.48	15.21	2005	NA	NA
1999	15.50	16.34	2006	13.12	16.39
2000	14.47	16.43	2007	13.10	16.35

Source: *Index values are computed based on the data provided under Table 1*

Graph 3: Occupation-wise Concentration-Index of Public & Private Sector Banks: 1994-2007



The concentration index represented by the standard deviation stood high at 15.83 in the year 1994 and gradually and consistently reduced to 11.84 in the year 2004. The trend was reversed, though not significantly, during 2006-07. Contrary to this, the concentration index of private sector banks which stood at 11.34 in the year 1994 increased significantly to more than 15.21 in the year 1998 and further increased to more than 20.00 in the year 2003. During 2004 to 2007, there is significant reduction in concentration risk index level.

The volume of industry-wise concentration risk profile of public and private sector banks as measured by the standard deviation is presented in **Table 4** and the corresponding **Graph 4**.

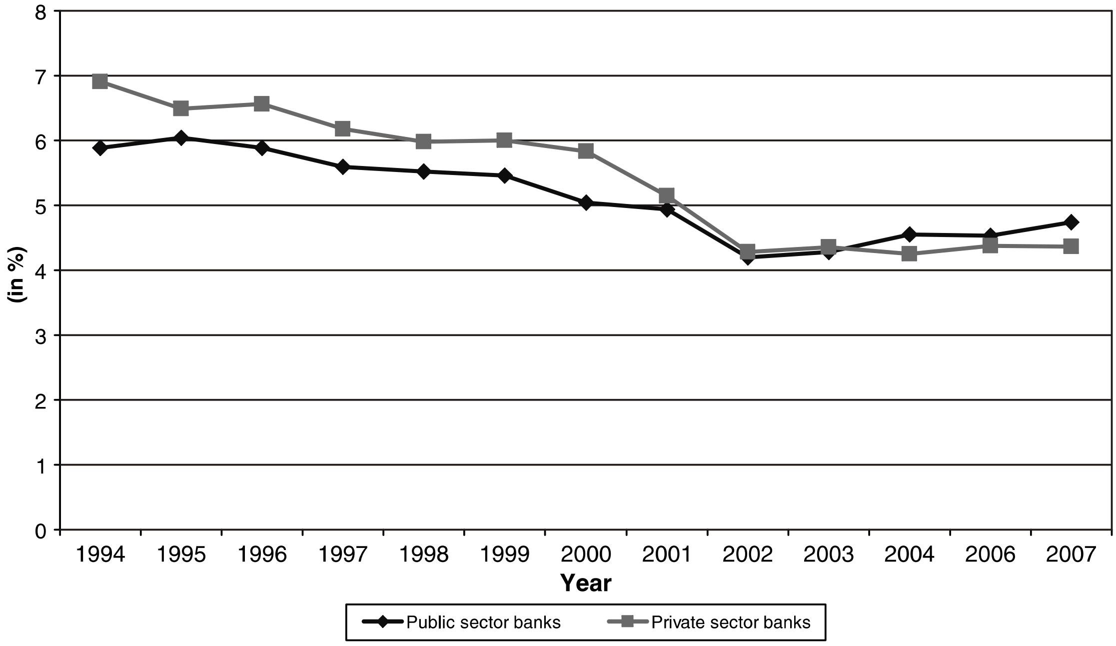
Table 4 : Industry-wise Concentration-Index of Public and Private Sector Banks: 1994-2007

Year	Public Sector (%)	Private Sector (%)	Year	Public Sector (%)	Private Sector (%)
1994	5.89	6.91	2001	4.94	5.15
1995	6.04	6.49	2002	4.20	4.28
1996	5.89	6.56	2003	4.28	4.35
1997	5.59	6.18	2004	4.55	4.25
1998	5.52	5.98	2005	NA	NA
1999	5.46	6.00	2006	4.53	4.37
2000	5.04	5.83	2007	4.74	4.36

Source: *Index values are computed based on the data provided under Table 2.*

The concentration index represented by the standard deviation for public sector banks stood at 5.89 in the year 1994 and gradually reduced to 4.28 in the year 2003. During 2004-07, there has been a moderate increase in concentration risk profile in one component. The concentration index of private sector banks which stood at 6.91 in the year 1994 gradually reduced to 4.25 in the year 2004. During 2004-2007, there is a marginal increase in concentration index in one component.

Graph 4: Industry-wise Concentation-Index of Public & Private Sector Banks



Profile-Score method[5]**:** To quantify the level of concentration risk in the portfolio, it is first necessary to break down the outstanding of the loan portfolio by Occupation and Industry wise. To determine the each concentration risk score for Indian commercial banks (Public Sector vis-à-vis Private Sector), the following steps are followed.

Step I : Definition of Concentration Risk

$$\textbf{(i) Occupation} = \frac{\text{Outstanding Credit (Largest)}}{\text{Total Bank Credit}}$$

$$\textbf{(ii) Industry} = \frac{\text{Outstanding Credit (Largest)}}{\text{Total Bank Credit (Industry)}}$$

Step II: Assignment of Concentration Risk Score

(i) Occupation:

Largest Concentration as a Percent of Total Credit Outstanding	Risk Profile	Risk Level
0 -25	0 -15	Low
26 - 50	16 - 30	Moderate
51-100	31 - 45	High
Risk Profile Point ________________		

** Any one line of business with outstanding credit of over 25% of total credit would be considered moderate and over 50% of capital would be considered high.

Industry:

Largest Concentration as a Percent of Total Credit Outstanding	Risk Profile	Risk Level
0 -15	0 -15	Low
16 - 30	16 - 30	Moderate
31-100	31 - 45	High
Risk Profile Point _______________		

[5] John E. Mckinley & John R. Barrickman, (1994)"Strategic Credit Risk Management", Robert Morris Associates.

When determining concentrations for lines of business, only homogeneous sub-segments of the C&I portfolio, such as asset based lending, basic metals & metals products, mining, transportations, engineering, textiles, food manufacturing & processing, constructions should be considered. The concentration in the C&I portfolio will be captured with the borrower and industry concentration.

Step III: Determining Composite Concentration Risk:

(i) Occupation __________

(ii) Industry __________

Total

Average by 2 __________

Composite Concentration Risk Profile Score ____________

The score for Occupation & Industry should be averaged. The resulting average would be plotted on the scale and become the measure of concentration risk of the portfolio.

Step IV: Composite Risk Profile

The composite risk profile for the entire bank is defined by summing the risk scores for occupation and industry. These risk scores can be measured with the help of following risk strategy.

Conservative: Accepts relatively low level of risk in all categories of Bank Credit. This strategy normally supports a value driven culture.

Managed: Accepts relatively low levels of risk in two categories, but higher levels of risk in one category. For example, a public sector bank will undertake conservative levels in one industry or occupation but more aggressive in other industry or occupation.

Aggressive: Accepts relatively Low level of risk in one category, more aggressive risk in two categories.

Composite Risk Score	Composite Risk Profile
0 -10	Low
11-20	Moderate
Above 20	High

The **Table 5** and the corresponding **Graph 5** lists the occupation-wise profile-score for both public and private sector banks for each of the 14 years starting from 1994 upto 2007. The profile score for each year is based on the following score:

Largest Concentration as a Percent of Total Credit Outstanding	Risk Profile
0-25	0 -15
26 - 50	16 - 30
51 -100	31 - 45
Risk Profile Point _____________	

** Any one line of business with outstanding credit of over 25% of total credit would be considered moderate and over 50% of capital would be considerate high.

The occupation profile score for the year 1994 in case of public sector banks is 14.38, which is computed as follows:

$$0.4794 \times 30 = 14.38$$

Where the value 0.4794 is the largest concentration percent of total credit outstanding (see Table 1) and the value 30 represents the risk profile scale applicable for concentration value which is between 26 - 50 percent. Similarly, other values are computed for the remaining years for both the public and private sector banks. The occupation-wise profile-score for public sector banks was highest at 14.38 in the year 1994 and gradually reduced to just over 10 percent till the year 2004 and again marginally increased to over 11 percent during 2006 & 2007. But in case of private sector banks, the profile score doubled from 11.2 in the year 1994 to over 26.62 in the year 2003. But there is significant reduction in profile score since the year 2004.

Table 5: Occupation-wise Profile-Score for Public and Private Sector Banks: 1994-2007

Year	Public Sector (%)	Private Sector (%)	Year	Public Sector (%)	Private Sector (%)
1994	14.38	11.20	2001	12.65	13.62
1995	13.49	11.16	2002	10.89	26.46
1996	14.03	12.47	2003	10.79	26.62
1997	14.41	13.35	2004	10.88	12.78

1998	14.23	14.10	2005	NA	NA
1999	14.27	14.97	2006	11.78	11.66
2000	13.39	22.56	2007	11.61	12.60

Source: *Profile-score computed on the basis of data contained in Table 1*

Graph 5: Occupation-wise Profile-Score for Public and Private sector banks: 1994 - 2007

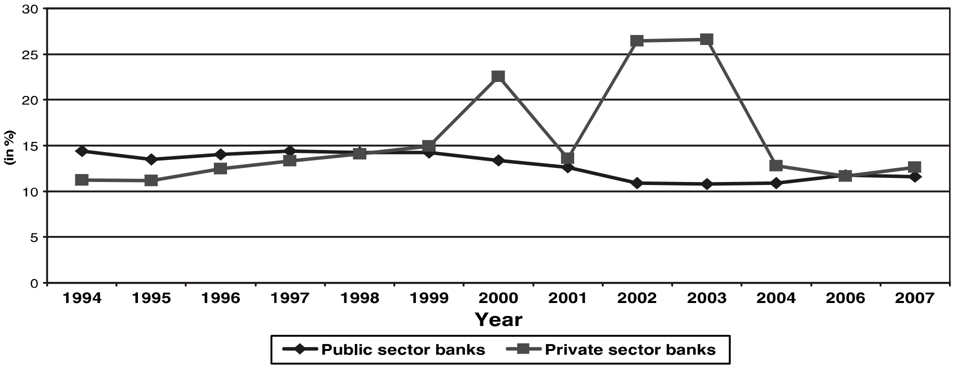


Table 6 and the corresponding **Graph 6** provide the industry-wise profile-score for both public and private sector banks for each of the 14 years starting from 1994 to 2007. The profile score for each year is based on the following score:

Largest Concentration as a Percent of Total Credit Outstanding	Risk Profile
0 -15	0 -15
16 - 30	16 - 30
31- 100	31 - 45
Risk Profile Point ______________	

** Any one line of business with outstanding credit of over 25% of total credit would be considered moderate and over 50% of capital would be considerate high.

The industry profile score for the year 1994 in case of public sector banks is 2.79, which is computed as follows:

$$0.1858 \times 30 = 5.57$$

Where the value 0.1858 is the largest concentration of percent total credit outstanding (see Table 2) and the value 30 represents the risk profile scale applicable for concentration value, which is between 16-30 percent. Similarly, other values are computed for the remaining years for both the public and private sector banks.

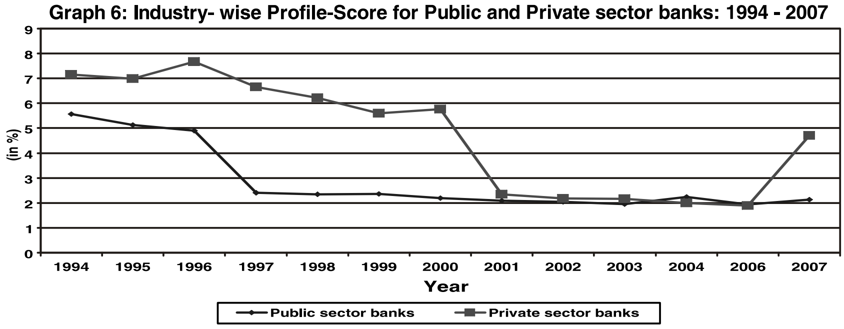
Table 6 : Industry-wise Profile-Score for Public and Private sector banks: 1994-2007

Year	Public Sector (%)	Private Sector (%)	Year	Public Sector (%)	Private Sector (%)
1994	5.57	7.16	2001	2.09	2.34
1995	5.13	6.99	2002	2.04	2.18
1996	4.90	7.67	2003	1.95	2.16
1997	2.40	6.65	2004	2.24	1.99
1998	2.35	6.22	2005	NA	NA
1999	2.36	5.60	2006	1.94	1.89
2000	2.19	5.76	2007	2.13	4.71

Source: *Profile-score computed on the basis of data contained in Table 2*

The industry-wise profile-score for public sector banks was highest at 5.57 in the year 1994 and gradually reduced to just over 1.95 percent in the year 2003. It increased marginally to over 2 percent during the years 2004 to 2007.

Graph 6: Industry- wise Profile-Score for Public and Private sector banks: 1994 - 2007



On the contrary, in case of private sector banks, the profile score decreased dramatically from 7.16 in the year 1994 to 1.89 in the year 2006. But during 2007, industry-wise risk profile increased significantly to 4.71 percent due to more concentration in construction industry.

COMPOSITE PROFILE-SCORE FOR PUBLIC AND PRIVATE SECTOR BANKS DURING 1994-2007

The composite risk profile for the entire bank is defined by summing the risk scores for occupation-wise concentration and Industry-wise concentration. The risk scores are measured in relation to each of the three possible risk strategies: low, moderate and high.

Composite Risk Score	Composite Risk Profile
0 -10	Low
11- 20	Moderate
Above 20	High

The composite score for each year is computed as follows.

(i) Occupation-wise profile-score __________

(ii) Industry-wise profile-score __________

Total

Average by 2 __________

Composite Concentration Risk Profile Point ____________

For example; the composite score for public sector banks for year 1994 is arrived at;

(i) Occupation-wise profile-score 14.38

(ii) Industry-wise profile-score 5.57

Total 19.95

Composite Concentration Risk Profile Point 9.97

(Average = 19.95 / 2)

Similarly, the scores for other years are computed and shown in **Table 7.** The profile-score for public sector banks decreased from 9.31 in the year 1995 to 6.87 in the year 2007. Likewise, the profile-score for private sector banks gradually increased from 9.07 in the year 1995 to 14.39 in the year 2003 and again it decreased to 7.38 percent in the year 2004 through 2007.

The profile-score for all the 14 years are shown on the **Graph 7.** The average profile-score for the period of 14 years was 7.85 for public sector banks and 10.8 for private sector banks. As the average profile-score for public sector banks was less than 10, it is concluded that the concentration risk profile is low. But for private sector banks with a risk profile-score of more than 10 but below 20, it is concluded that the concentration risk profile is moderate.

Table 7 : Composite Profile-Score for Public and Private Sector Banks: 1994-2007

Year	Public Sector (%)	Private Sector (%)	Year	Public Sector (%)	Private Sector (%)
1994	9.97	9.18	2001	7.37	15.96
1995	9.31	9.07	2002	6.46	14.32
1996	9.46	10.07	2003	6.37	14.39
1997	8.40	10.00	2004	6.61	7.38
1998	8.29	10.16	2005	NA	NA
1999	8.31	10.28	2006	6.86	6.77
2000	7.74	14.16	2007	6.87	8.65

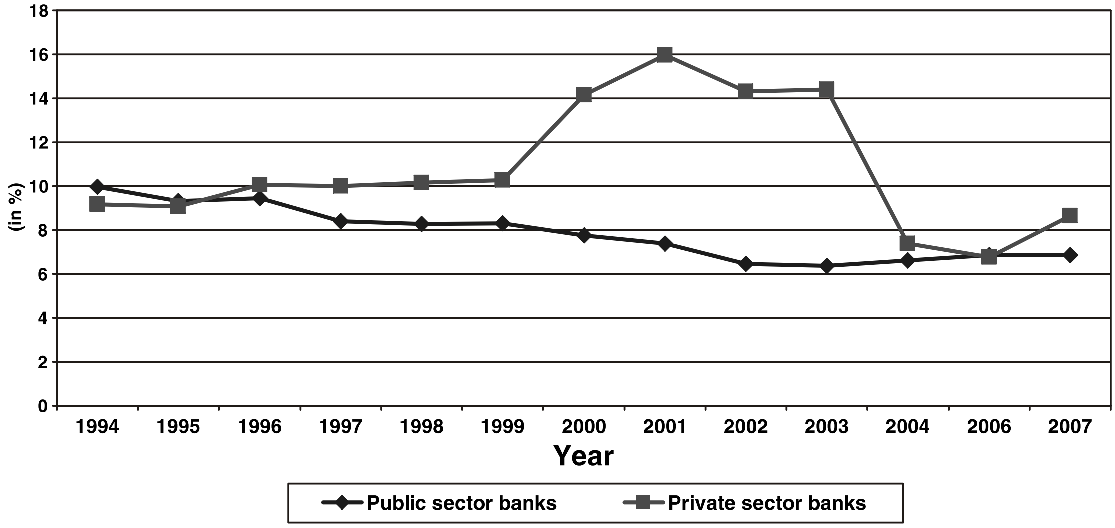
Public sector bank : Private sector banks

Total	102.02	140.30
Average by 14 years	**7.85**	**10.80**
Concentration Risk-Score	**Low**	**Moderate**

CONCLUSION

Concentration risk is a very significant component of overall credit risk profile of a banking institution. A prudent credit risk management is based on the principle of diversified portfolio to avoid concentrations in any one or couple of occupations or industry. Trends in concentration risk profile of public sector banks during the post-liberalization period clearly indicate a paradigm shift in the portfolio approach to credit risk management. The occupation-wise and industry-wise concentrations reduced significantly during the study period. On the contrary, the trends in concentration risk profile of private sector banks signify an opposite direction. The occupation-wise

Graph 7: Composite Profile-Score for Public and Private Sector Banks: 1994 - 2007



concentration risk increased substantially during 1999-2003 before decreasing to the moderate level of 42 percent in the year 2007.

Both the approaches suggested for quantification of concentration risk yielded satisfactory results. Under the profile-score method, with a score of less than 10 for public sector banks, and more than 10 for private sector banks, it is concluded that public sector banks' risk profile is low, while that of private sector banks' risk is moderate.

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In ROI analysis, it is found that small farmers are getting more rates of returns than the other two groups. The present study reveals that due to mulberry cultivation, small farmers are more benefited. The same level of benefit can be extended to all farmers. In this regard, Government of India and Central Silk Board have to extend more training facilities to reduce the cost of cultivation. Further, it is suggested that marketing facilities should be expanded. By following the suggested practices, there is chance to get a favourable price for the growers.

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