Self-Sufficiency through Development of Banking Market of Public Sector Banks in India

Dr. Sonia Kaushik[1], Prof. K. V. Bhanu Murthy[2], Prof. Amit Kumar Singh[3] and Dr. Roopa Johri[4]*

Abstract

Banking is the backbone of economic development in India. The growth of banking is the most reliable source of self-sufficiency. The private banks and foreign banks enhances the dependency on promoters and foreign country respectively but public sector banks are the most dependable as far as self-sufficiency is concerned. Unlike the other two types, PSBs have dual objective of profitability and maintaining liquidity. Also, PSBs are the main source of priority sector lending in India. PSBs accept savings from household sector and channelise these deposits into loans and advances and provide it to industries (short-term, medium-term, and long-term loans), household sector (e.g. Housing loans) and also, invest in other industries and companies. It is clear that PSBs leads to economic development by promoting self-sufficiency through mobilising deposits into loans and advances.

In banking economics, the market structure is measured in terms of deposits plus advances. The structure of banking market refers to the study of nature of banking. Hence, market structure is defined in terms of nature of the market which could be competitive or monopolistic. A monopolistic market restricts the market size whereas a competitive market leads to the expansion of the market. Using the Structure-Conduct-Performance Approach, we attempt to analyse various aspects related to structure of PSBs. In the industrial economics, market structure can be studied through three elements namely, product differentiation, market concentration, and advertisement expenditure.

In the present paper, our objective is to analyse the market development of PSBs which are main source of self-sufficiency. We want to examine the nature of market structure to see

[1] Associate Professor, Department of Commerce, Bharati College, University of Delhi
soniakaushik@bharati.du.ac.in
[2] Former Dean Faculty of Commerce and Business,
Delhi School of Economics, University of Delhi, Currently Professor, Delhi Technological University
bhanumurthykv@yahoo.com
[3] Professor, Department of Commerce, Delhi School of Economics, University of Delhi
aksingh1@commerce.du.ac.in
[4] Associate Professor, Department of Commerce, Bharati College, University of Delhi
roopa.johri@bharati.du.ac.in
* Corresponding Author

whether it is a growing market; to see whether there is competition in the market in terms of rivalry. Here, market share is measured in terms of size which has been taken as the sum of deposit and advances because these are two core banking activities which defines banking business. Product differentiation is measured as the non-interest income in proportion to total income but advertising expense is taken in absolute terms (as a structure variable) because if it is taken in proportion to total operational expenditure, then it becomes a conduct variable because in that case it would show changes in one variable correspond to the change in the conduct of banks.

We have used Herfindahl's measure of concentration to measure competition in the public sector banking industry. In order to capture inter-bank competition and rivalry, all public sector banks are divided into two groups; Nationalized group and the SBI group. Murthy's Index of Rank Dominance is used to express a degree of dominance of an ordinal measure such as rank. The Relative Index of Rank Dominance is used to establish the close rivalry that existed amongst PSBs. Semi-growth log equations are used for analysing the trends in market share, diversification, and advertising expenses. We have used growth rates to examine the growth in size is not homogenous across strategic groups in PSBs. In one of research paper (Sonia, 2017), the evolution of strategic groups was examined and found that there are strategic groups amongst public sector banks in India. So, here in this paper, PSBs are examined in terms of strategic groups.

It is encouraging to see that the overall impact of liberalization has resulted in growth of size of banks; healthy rivalry and competition. The growth rate of market size has been statistically significant in both SBI group, Nationalized Banks group. The Murthy's Index of Rank Dominance has given exciting results. SBI has been on first place in each year. While the relative index of rank dominance of other top four banks is very close to that of state bank of India. The Relative Index of Rank Dominance shows close rivalry amongst four other banks (Punjab National Bank, Bank of Baroda, Bank of India and Canara Bank). Also, there is no major change in the relative index of remaining 20 banks. The overall result shows that there is competition within the public sector banks in terms of strategic groups.

Key Words: *Banking, Household, Household savings, Market structure, Advertising, Product-differentiation*

JEL Keywords: *G21, H31, G51, L10, M37*

1.0 Introduction

The five pillars of self-reliant India are economy (focus on quantum jumps, not incremental changes), infrastructure (representative of modern India), system (technology driven), demography (vibrant demography of the largest democracy) and demand (full utilisation of power of demand and supply). In Atmanirbhar Bharat Abhiyan, Rs.20 lakh crore which is nearly 10% of GDP (including recent economic measures and RBI announcements) has been kept as package where the focus is on land, labour, liquidity and laws. The main objective of this Abhiyan is to cater to labourers, middle class, cottage industry, MSMEs and industries among other.

Liquidity which is one of the focus point of Atamnirbhar Bharat Abhiyan is primarily maintained by banks under the stewardship of RBI. In India, there are public sector banks, private sector banks and foreign banks. In case of private and foreign banks, we have to depend on promoters capital and foreign capital respectively which does not go with the concept of self-reliance. So, we have taken public sector banks which can be depended upon as the primary source of self- reliance. The dual objective of profitability and maintaining liquidity besides priority sector lending leads to economic development and self-sufficiency eventually. Therefore, banking is the backbone of economic development in India. The growth of banking is the most reliable source of self-sufficiency. The private banks and foreign banks enhances the dependency on promoters and foreign country respectively but public sector banks are the most dependable as far as self-sufficiency is concerned. Unlike the other two types, PSBs have dual objective of profitability and maintaining liquidity. Also, PSBs are the main source of priority sector lending in India. PSBs accept savings from household sector and channelise these deposits into loans and advances and provide it to industries (short-term, medium-term, and long-term loans), household sector (e.g. Housing loans) and also, invest in other industries and companies. It is clear that PSBs leads to economic development by promoting self-sufficiency through mobilising deposits into loans and advances.

In banking economics, the market structure is measured in terms of deposits plus advances. The structure of banking market refers to the study of nature of banking. Hence, market structure is defined in terms of nature of the market which could be competitive or monopolistic. A monopolistic market restricts the market size whereas a competitive market leads to the expansion of the market. Using the Structure-Conduct-Performance Approach, we attempt to analyse various aspects related to structure of PSBs.

In the present research paper, our objective is to analyse the market development of PSBs which are main source of self-sufficiency.

1.1 Research Questions

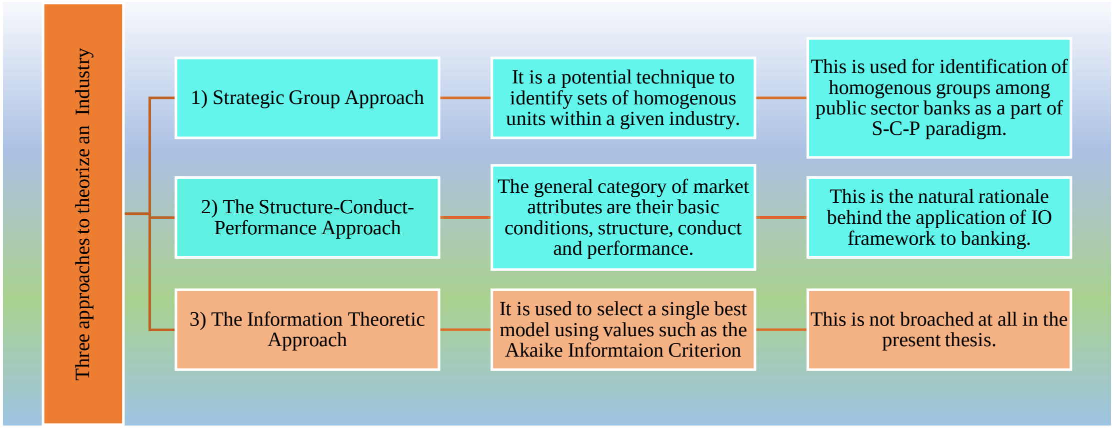
In the industrial economics, market structure can be studied through four elements namely market concentration, product differentiation, market share and advertisement expenditure. For this analysis, we have taken market size as the sum of deposit and advances which represent core banking business. The absolute advertisement expenditure is a proxy for selling cost. It is taken in absolute terms as a structure variable because when it is taken in proportion then it becomes a conduct variable. The non-interest income has been taken as a proxy for product differentiation which is very much part of structure. Concentration ratio has been chosen to look into the nature of public sector banking market. The analysis has been done for the two strategic groups, SBI group and NB group which are present in the public sector banks in India (Sonia, 2017).

Our research questions are as follows:

1. To examine the nature of market.
2. To see whether it is growing market or a saturated market.
3. To see whether there is competition in the market in terms of rivalry.
4. To measure the rate of growth of structure variables amongst strategic groups within PSBs.
5. Is there significant difference between strategic groups in terms of market concentration?
6. To examine the market dominance pattern amongst strategic groups.

1.2 Theoretical Framework

The S-C-P framework has been used to study the nature of banking market.



The S-C-P paradigm assumes that there are certain attributes which are given and are referred as basic conditions. Furthermore, there is a chain of causation that logically determines all the other attributes in a sequence as follows: In the chain, basic conditions are the primary determinants of the market or industry structure. In the next step, the structure of the industry influences the conduct or behavior of the participants in the industry. Conduct, in turn influences performance finally. The schema of traditional S-C-P paradigm was like the flow chart below:

Source: Authors' own compilation

1.3 Literature Review

While concentration is a crucial aspect of market structure, it is important to keep in mind the limitations of concentration as a measure of competition. These limitations are analyzed by (Deb A. T., 2005) and (Murthy & Deb, 2009). A fall in concentration ratio is equated with a rise in competition. However, an analysis of concentration ratio needs to be supplemented by an analysis of identities of the leading firms for an understanding of competition. If a fall in concentration is accompanied by a change in identities of leading firms, it indicates a greater degree of competition as compared to a situation characterized by a fall in concentration with no change in identities of leading firms. In the first case, there is reallocation of the market share among leading firms and the rest of the firms. In the second case, there is reallocation of market share among the leading firms as well. Clearly, an analysis of concentration ratio needs to be supplemented by an analysis of changes in the identities of leading firms, if any.

The evolution of market structure of public sector banking industry during the period 1992-2006 was examined by a research scholar (Bajaj, 2008). In the study, the focus was mainly on two aspects of market structure, first, concentration, and second, product differentiation. The study figures out pattern of dominance in the market using three variables namely assets, deposits, and advances. She found out that the share of public sector banks was slowly decreasing over the period because of entry of new private banks and foreign banks. The linear trend of concentration ratio was statistically declining, and the linear trend of product differentiation was statistically rising. Top five banks in terms of size are ranked in the study which reveals a fair amount of stability in the market structure. The identities of the five top banks remained unchanged throughout the period of analysis. The ranks of a few of them have undergone some change, but overall, no substantial churning among the top banks could be noticed in the industry over the said period. This shows that the pattern of market dominance has not changed in the industry over time. While SBI stayed dominant in absolute terms, but it may fall over time. Therefore, one also needs to examine the relative dominance of SBI with respect to its nearest rival. It is quite possible that the relative dominance of SBI has fallen in the new scenario. There is still another dimension in the story. Whatever there is the expansion of market of public sector banking industry and by individual PSBs, one does not know how the expansion of market of public sector banking industry is being shared among different PSBs.

A comparative study of public and private banking industry in India to assess the impact of banking reforms and competition on these two segments (Gupta L. , 2013) was conducted in

2013. The period of the study was 1995-96 to 2009-10. She found out that competition has emerged in Indian banking industry because of liberalization. Further, she found out that the competition has emerged in form of new banks vs. incumbents rather than in the form of public vs. private banks. Lastly, she concluded that conduct puts an impact on both structure and performance. But the study does not talk about competition within public sector banks in India.

A bank level data study was conducted to estimate the extent to which revenues earned reflects changes in input prices (Claessens & Laeven, 2004). The study used production function approach to study competition of specific banks in 50 countries banking systems. But, (Murthy & Deb, 2013) discards the use of production function approach for measurement of competition. It provides a methodology to arrive at the market form in banking industry through an analysis of all the aspects of basic conditions, structure, conduct and performance. Therefore, in the present study, production function approach will not be used.

A conceptual and theoretical framework to measure and model competition in private banking industry in India (Murthy & Deb, 2014) was given in 2014. The study used Bodenhorn's measure of competition in terms of degree of mobility. It provides the theoretical background of an alternative mechanism based on S-C-P framework, which apart from including traditional elements of S-C-P framework included entry, economies of scale, product differentiation and price cost margin, also incorporates basic conditions and strategic groups to analyze the process of market dynamics in the industry. The paper argued that competition affects basic conditions, structure, conduct and performance. The result demonstrates that variables related to basic conditions, structure, conduct and performance influence competition. The study concludes that private banking industry in India is characterized by monopolistic competition.

In all of these studies, public sector banks have been treated as homogenous lots. Mostly, the focus has been on the study of behavioural aspect of PSBs. But, in the present paper, we have examined public sector banks in terms of two strategic groups, SBI group and NB group and overall.

1.4 Objectives and Hypotheses

1.4.1 Objectives

The primary objectives are as follows:

1. To measure the rate of growth of structure variables in the PSBs.
2. To measure the product differentiation in the PSBs.
3. To measure the growth rate of concentration ratio in the PSBs.
4. To examine the impact of advertisement expenditure on the PSBs.
5. To examine the market dominance pattern in the PSBs.

The Secondary objectives are as follows:

1. To study the growth pattern of SBI group.
2. To study the growth pattern of NB group.
3. To examine whether there is a significant increase in product differentiation due to higher advertisement expenditure in case of SBI group.
4. To examine whether there is a significant increase in product differentiation due to higher advertisement expenditure in case of NB group.
5. To measure the concentration ratio of SBI group.
6. To measure the concentration ratio of NB group.
7. To examine whether the advertisement expenditure is going to rise in a quest to capture more market share by SBI group.
8. To examine whether the advertisement expenditure is going to rise in a quest to capture more market share by NB group.
9. To examine the dominance pattern in SBI group.
10. To examine the dominance pattern in NB group

1.4.2 Hypotheses

Following are the primary hypotheses of the study.

H1: There is no growth in the output of PSBs.

H2: There is no change in the product differentiation of PSBs.

H3: There is no growth in the concentration ratio of PSBs.

H4: There is no change in the advertisement expenditure of PSBs.

H5: There is no change in the dominance pattern of PSBs.

Secondary hypotheses are as follows:

H1: There is no growth in the output of SBI group.

H2: There is no growth in the output of NB group.

H3: There is no change in the ratio of non-interest income to total income in case of SBI group.

H4: There is no change in the ratio of non-interest income to total income in case of NB group.

H5: There is no change in the concentration ratio of SBI group.

H6: There is no change in the concentration ratio of NB group.

H7: There is no change in the ratio of advertisement expenditure of SBI group.

H8: There is no change in the ratio of advertisement expenditure of NB group.

H9: There is no change in the dominance pattern of SBI group.

H10: There is no change in the dominance pattern of NB group.

Alternate hypotheses are opposite to the null hypotheses.

1.5 Methodology

Methodology has been divided into three subsections. The first subsection 1.5.1 shows the time period and source of data used. Second subsection 1.5.2 shows variables used in the present chapter. After that tools used for the analysis are explained in subsection 1.5.3. We have used semi-log growth equation, paired t-test and t-test for equal variance. All these subsections are explained below.

1.5.1 Data Set and Data Source

For the present study, annual data from 1992 to 2017 has been taken from RBI website. The Reserve Bank of India publishes the data annually. For the present study, 25 public sector banks, i.e., Nationalized Banks (9) and State Bank group (6) have been chosen. Those who have left and joined in between 1992 to 2017 have been left because in semi-log equation and paired t-test, the number of observations should be same for both time periods.

1.5.2 Variables

Market structure can be studied through four elements. First element is concentration ratio which helps us to comment on the nature of the market. It compares the size of individual bank in comparison to the public sector banking industry as a whole. In the present chapter, we have used HHI index to calculate the concentration ratio. It was propounded by Hirschman Herfindahl. For this we have used the sum of deposit and advances as market size. The second variable is non-interest income. It is a proxy for product differentiation. Also it shows the monopolistic power in the market. The absolute amount of non-interest income has been taken as a structure variable. The third variable is market size which represents the sum of deposit and advances. Actually the core banking business is accepting deposits and extending loans. That is why we have taken the sum of deposit and advances as market size. This variable represents a barrier to entry that are present in the market. In other way round, it says that when there is an increase in the market share it works as a barrier to entry in the market for the potential new entrants. The fourth variable is advertisement expenditure. It is known as deferred revenue expenditure. That means advertisement expenditure once done gives benefit over many years not in the same year when the expenditure is actually incurred. The basic purpose of advertisement expenditure is to inform the customers about the product features services so that it remains in the memory of the investors. This should not be linked with increasing sales because the advertisement expenditure is incurred to make the product stay in the limelight. But after a certain time period, the effectiveness of advertisement expenditure decreases. Here, comes the inverted u shape of advertisement expenditure which says that after a certain time period or a saturation point the effectiveness of advertisement decreases. These variables are explained below.

1. Market Size- Barriers to Entry

It is sum of deposit and advances. Market size is the variable that represents core banking business which is deposits and advances. So, it is measured as sum total of deposits and advances. It is expected to affect concentration in the public sector banking industry in a positive way.

2. Advertisement Expenditure- A Proxy to Selling Cost

As an absolute term, advertisement expenditure is considered as part of structure whereas when it is in proportion to Total expenditure it is considered as part of conduct. Because advertisement expenditure is a deferred revenue nature expenditure, and it brings enduring benefits. It is done with an objective to increase sales. So, it is taken as a proxy for selling cost.

3. Non-Interest Income - Product Differentiation

Other income in absolute terms, it shows the amount of product differentiation in an industry. Therefore, it is a structure variable; a proxy of product differentiation.

4. Concentration Ratio- Nature of the Market

It compares the size of an individual banks in relation to PS banking industry as a whole. In the present chapter, we have used HHI (Hirschman Herfindahl Index) to calculate concentration ratio in terms of deposit plus advances.

Table 1.1: List of Market Structure Variables

Name of the variable	**Structure variable**	**Expected sign**
Market size	Market share (Barriers to entry)	Positive
Non-interest income	Product differentiation (Monopolistic power)	Positive
Advertisement expenditure	Advertisement (Proxy to Selling cost)	Positive
Concentration ratio	Nature of the market	Negative

Source: Authors’ own Compilation

1.5.3 Statistical Tools used for the Analysis

We have used Herfindahl's measure of concentration to measure competition in the public sector banking industry. In order to capture inter-bank competition and rivalry, all public sector banks are divided into two strategic groups: SBI group and NB group. Murthy's Index of Rank Dominance (IRD) is used to express a degree of dominance of an ordinal measure such as rank. The Relative Index of Rank Dominance (RIRD) is used to establish the close rivalry that existed amongst PSBs. Semi-growth log equations are used for analysing the trends in concentration ration, market size, diversification, and advertisement expenditure.

1.5.3.1 Growth Model: Semi-log

The growth rate is used for analysing trends in market structure variables of both strategic groups (SBI group and NB group). Further, it is examined through growth rates that the growth in structure variables is not homogeneous across strategic groups in PSBs. The growth rate has been calculated by using the semi-log regression function.

A semi-log function is the best for determining growth rates.

Log Yt = a + b*t 1

Log Y (t-1) = a + b*(t-1) 2

Equation 1 minus equation 2

Log t – Log (t-1) = b 3

Or

Log (Yt/Y (t-1)) = b 4

Hence, b is measure of the relative change of Y over time and it is the exponential growth rate.

1.5.3.2 Herfindahl-Hirschman index (HHI) (Hirschman, 1964)

The Hirschman-Herfindahl Index (HHI) is a generalized measure of concentration which precise the information on the number and size distribution of firms into a single value. It is the sum of squares of relative sizes or market shares of the firms in the market, where the relative sizes are proportions of the total size of the market. Mathematically, it can be given as:

$$\text{HHI} = \sum_{i=1}^{n} (S_i)^2$$

HHI = Hirschman-Herfindahl index

S i = Percentage market share of the i th firm

n = Total number of firms in the market

1.5.3.3 Murthy's Index of Rank Dominance (IRD) and Relative Index of Rank Dominance (RIRD)

The index of rank dominance (IRD) is an innovative measure which gives us a coefficient that expresses the degree of dominance of an ordinal measure such as rank. IRD has been further refined as a relative- Relative Index of Rank Dominance (RIRD), which measures dominance in a relative sense. This gives the proportionate weight of the rank dominance index. It will also be established through RIRD whether close rivalry exist amongst public sector banks or not.

Amongst the public sector banks, the dominant position of a bank (i.e., highest rank) for the longest period has been estimated with the help of index of rank dominance (IRD) and relative index of rank dominance (RIRD).

$$I_{rd} = \sum_{1992}^{2017} \frac{(Rank\ Score\ on\ the\ basis\ of\ market\ size)i}{Maximum\ rank\ score}$$

where;

I_{rd} = is the index of Rank Dominance. Rank Score = 25, 24, 23.... (In decreasing order of rank)

1.6 Findings

The objective of this paper is to look into the market structure and dominance pattern in the two strategic groups (SBI group and NB group) amongst PSBs as a result of reforms. So, findings are divided in four sub-sections, as mentioned below.

1.6.1 Growth Rate of Structure Variables

First of all, using semi-log growth equation has been used to caculate growth rates of structure variables. The following table shows growth rate for all these groups.

Table 1.2: Growth Rate of Market size, Advertisement Expenditure, Product differentiation and Concentration Ratio

Banks / Variables	All Banks	SBI group	NB group
Market size	6.9%, Significant	6.4%, Significant	7%, significant
Advertising Expenditure	2.5%, significant	2.9%, significant	2.3%, significant
Product differentiation	0.34%, not significant	0.55%, significant	0.33%,not significant
Concentration Ratio	-0.595% Significant	-0.086% Significant	-0.178% Significant

Source: Authors' own Calculation

Table 1.2 shows growth rates for all the variables and all for both the strategic groups, namely, SBI group and NB group. First of all, in case of size, growth rate is positive and statitically significant in case of all banks, SBI group and NB group. It means that size of each group is increasing significantly. In case of advertisement expenditure, there is positive and significant growth rate in all the three cases. It shows that banks are putting more emphasis on advertisement of their products and services. It is increasing over the time period which is a good sign of the growth of banking industry. Product differentiation, income from fee-based activities, is positive and significant only in case of SBI group which means that SBI and group is quite successful in achieving higher standard of fee-based income. In case of all PSBs and NB group, it is statistically not significant which means that fee-based income of these groups does not have a trend, i.e., we cannot comment on the trend of these groups. This is quite interesting. After so many years of liberalisation, still all PSBs, SBI group and NB group prefer to play safe, ie, they are investing more funds in government securities which is a safe investment. It shows that these bank groups are risk-averse. The trend of concentration ratio is statistically significant in case of all PSBs, SBI group, and NB and it shows a decline in the concetration ratio and consequently, there is increase in the competition within each group. The decline in the concentration trend is highest in case of NB group. It means there is fairly high competition within NB group than SBI group and all PSBs .

1.6.2 Concentration Ratio

In order to study the nature of competition in public sector banking industry, we have used Hirschman Herfindahl Index (HHI) concentration ratio. It was expected with the entry of new private banks that it will reduce the level of concentration. And, consequently, a fall in the concentration ratio will decrease the monopoly power in the market. For analyzing the concentration, sum total of deposits and advances that constitutes its total market is being taken.

Table 1.3: Trend of Concentration Ratio: All PSBs

All PSB	Coefficients	Standard Error	t Stat	P-value
Intercept	9.64006947	3.3802743	2.85186012	0.00879904
time	**-0.0059775**	0.00168633	-3.544702	0.00164926

Source: Authors' own Calculation

Table 1.4: Trend of Concentration Ratio: SBI group

SBI group	Coefficients	Standard Error	t Stat	P-value
Intercept	1.18053766	4.00818189	0.29453196	0.77088401
time	**-0.0008622**	0.00199958	-0.4311955	0.67017463

Source: Authors' own Calculation

Table 1.7: Concentration ratio of all PSBs, SBI group, and NB group

All PSBs	
Years	**C.Ratio**

1992	0.10855939
1993	0.10541179
1994	0.10130867
1995	0.09686379
1996	0.10003767
1997	0.09887031
1998	0.09957228
1999	0.10300704
2000	0.10308522
2001	0.10730041
2002	0.10286664
2003	0.101053
2004	0.0960617
2005	0.09519245
2006	0.08986454
2007	0.08568051
2008	0.08548955
2009	0.09300879
2010	0.08797433
2011	0.08747012
2012	0.08583928
2013	0.08688326
2014	0.08882098
2015	0.09194781
2016	0.09730401
2017	0.10755478

Authors' own Calculation

SBI group	
Years	**C.Ratio**
1992	0.65474588
1993	0.63258189
1994	0.59937888
1995	0.57878025
1996	0.5825493
1997	0.57124031
1998	0.58253049
1999	0.59700631
2000	0.5943373
2001	0.60195551
2002	0.58500544
2003	0.56914594
2004	0.54350957
2005	0.53119439
2006	0.50701337
2007	0.49447356
2008	0.50129757
2009	0.55352982
2010	0.54654178
2011	0.58233448
2012	0.57207536
2013	0.57568483
2014	0.60048111
2015	0.63071521
2016	0.62013384
2017	0.66670469

NB group	
Years	**C.Ratio**
1992	0.074186475
1993	0.072038344
1994	0.073024629
1995	0.071288259
1996	0.071700574
1997	0.07219358
1998	0.072218218
1999	0.070103097
2000	0.068789364
2001	0.068928734
2002	0.069441881
2003	0.069546676
2004	0.068830598
2005	0.068315625
2006	0.068839981
2007	0.068124484
2008	0.066729208
2009	0.067462885
2010	0.067549517
2011	0.068825238
2012	0.069481896
2013	0.068451918
2014	0.070217674
2015	0.071351536
2016	0.070017108
2017	0.071642466

Table 1.5: Trend of Concentration Ratio: NB group

NB group	**Coefficients**	**Standard Error**	**t Stat**	**P-value**
Intercept	0.9265742	1.2361103	0.74958861	0.46078757
time	**-0.0017893**	0.00061666	-2.9015144	0.00783225

Source: Authors' own Calculation

Table 1.6: Annual Compound Growth rate (Concentration Ratio)

Banks group	**Instantaneous Growth Rate**	**Annual Compund Growth Rate**	
All PSBs	-0.0059775	-0.595	Lowest decline
SBI group	-0.0008622	-0.086	Moderate decline
NB group	-0.0017893	-0.178%	Highest decline

Source: Authors' own Calculation

The trend results of all PSBs, SBI group, and NB group are statitically significant. There is declining trend in the concentration ratio. This means concentration ratio is significantly declining in all PSBs, SBI group, and NB group. There is competition within each group. But it is interesting to see a highest significant declining trend in NB group.

It means they are competing rigorously within their group. There is moderate competition in SBI group. While in all PSBs, the concentration ratio trend is declining with lowest rate. But still, The concentration ratio of all PSBs, SBI group and NB group is given below.

Further, in order to examine the intensity of competition, the concentration ratio has been put in a range which is given by Woolridge and Pearson in 1993. The concentration ratio is PSB group is below 40% in all the year from 1992 to 2017 which shows that competition is fairly high in the PSB group because it falls in low category. Whereas in case of SBI group, the concentraion somewhere falls between 40-70% category and it falls in medium category which shows there is moderate comeptition in SBI group over the time period. Lastly, in case of NB group, the concentarion ratio falls below 40% category over the time period. It fall in low category which depicts fairly high degree of competition amongst NB group banks. Since, the SBI group is in medium range, it is monopolistic in nature whereas the NB group is in low concentration range, it is competitive in nature. It is shown in the table below:

Table 1.8: Market Concentration - Hirschman Herfindahl Index (HH Index)

Concentration Ratio **Criteria for Market concentration via Hirschman Herfindahl Index (HH Index)**				
		NB group	**SBI group**	**PSB group**
0 – 40%	**Low**		**C.Ratio** **(<70% but >40%)**	**C.Ratio (<8%)**
40 - 70%	**Medium**	**C.Ratio (< 11%)**		
70 - 100%	**High**			
Source: Woolridge and Pearson (1993).				

Source: Authors' own Calculation

1.6.3 Index of Rank Dominance and Relative Index of Rank Dominance

Index of rank dominance and relative index of rank dominance helps us to comment on the structure and rivalry amongst public sector banking industry. Market size has been taken to assign ranks for all banks.

The table 1.9 shows that state bank of India has been on first place in each year. It means that state bank of India highest rank in all the years. And remaining banks are given ranks according to their market size. A bank with highest market size is given 25th rank and the second highest market size having bank is given 24th rank and so on. In other words, the rank of State bank of India has occupied first place in each year but despite that its relative index of rank dominance is 0.0769. While the relative index of rank dominance of other top four banks is very close to that of state bank of India. The top four other banks are Punjab National Bank. Canara Bank, Bank of Baroda, Union Bank of India. These have remained in top slot in almost all the years. And if we look at the remaining 20 banks, their relative index of rank dominance has no major fluctuations. It means all the banks are performing consistently and competing with each other.

Table 1.9: Rank Dominance and Relative Index of Rank Dominance: All PSBs

Banks	rank dominance	relative index of rank dominance
State Bank of India	1	0.076
Punjab National Bank	0.898	0.069
Canara Bank	0.891	0.068
Bank of Baroda	0.888	0.068
Union Bank of India	0.77	0.059
Bank of India	0.768	0.059
Oriental Bank of Commerce	0.703	0.054
Corporation Bank	0.64	0.049
Syndicate Bank	0.545	0.041
State bank of Hyderabad	0.541	0.041
Allahabad Bank	0.521	0.040
State bank of Patiala	0.503	0.038
Andhra Bank	0.495	0.038
Indian overseas Bank	0.485	0.037
Central bank of India	0.448	0.034
Indian bank	0.446	0.034
State Bank of Bikaner & Jaipur	0.376	0.028
State bank of Travancore	0.345	0.026
Dena Bank	0.315	0.024
Uco Bank	0.305	0.023
Vijaya Bank	0.275	0.021
Bank of Maharashtra	0.255	0.019
State Bank of Mysore	0.213	0.016
Punjab and Sind Bank	0.185	0.014
United Bank of India	0.176	0.013

Source: Authors' Own Calculation

Table 1.10: Rank Dominance and Relative index of Rank Dominance: SBI group

Bank	Rank Dominance	Relative Index of Rank Dominance
State Bank of India	1	0.285714286
State Bank of Hyderabad	0.80128205	0.228937729
State Bank of Patiala	0.6474359	0.184981685
State Bank of Travancore	0.51282051	0.146520147
State Bank of Jaipur	0.37179487	0.106227106
State Bank of Mysore	0.16666667	0.047619048

Source: Authors' Own Calculation

Table 1.11: Descriptive Statistics (IRD and RIRD): SBI group

Rank Dominance		Relative Index of Rank Dominance	
Mean	**0.58333333**	Mean	**0.16666667**
Standard Error	0.1222775	Standard Error	0.03493643
Median	0.58012821	Median	0.16575092
Mode	#N/A	Mode	#N/A
Standard Deviation	**0.29951747**	Standard Deviation	**0.08557642**
Confidence Level(95.0%)	0.31432431	Confidence Level(95.0%)	0.08980695

Source: Authors' own Calculation

This SBI strategic group result is quite interesting. The RD of these banks is not similar to that of RIRD. The individual ranks of banks are high but when these are competing with all other banks in the group, it shows somewhat a different picture. It shows that SBI group banks are competing within the group.

The descriptive statistics table shows so many interesting facts. First of all, the mean of rank dominance is 0.583 but in case of relative index of rank dominance it is just 0.1666. Secondly, the standard deviation is 0.299 in case of rank dominance, but it is 0.085 in case of relative index of rank dominance. It shows that all the banks in SBI group are competitive and consistent with little standard deviation in their relative index of rank dominance. Similarly, sample variance is also quite less in case of relative index of rank dominance. The rank dominance index and RIRD of NB group is shown below:

Table 1.12: Rank Dominance and Relative index of Rank Dominance: NB group

Banks	Rank Dominance	Relative Index of Rank Dominance
Punjab National Bank	0.937246964	0.093724696
Bank of Baroda	0.929149798	0.09291498
Bank of India	0.914979757	0.091497976
Canara Bank	0.886639676	0.088663968
Central Bank of India	0.74291498	0.074291498
Union Bank of India	0.722672065	0.072267206
Indian Overseas Bank	0.62145749	0.062145749
Syndicate Bank	0.611336032	0.061133603
Uco Bank	0.568825911	0.056882591
Indian Bank	0.481781377	0.048178138

Oriental Bank of Commerce	0.477732794	0.047773279
Allahabad Bank	0.453441296	0.04534413
Andhra Bank	0.315789474	0.031578947
Corporation Bank of India	0.307692308	0.030769231
United Bank of India	0.253036437	0.025303644
Bank of Maharashtra	0.236842105	0.023684211
Vijaya Bank	0.234817814	0.023481781
Dena Bank	0.182186235	0.018218623
Punja and Sindh Bank	0.12145749	0.012145749

Source: Authors' own Calculation

Table 1.13: Descriptive Statistics (IRD and RIRD): NB group

Rank Dominance		***RIRD***	
Mean	**0.52631579**	Mean	**0.05263158**
Standard Error	0.0626684	Standard Error	0.00626684
Median	0.48178138	Median	0.04817814
Mode	#N/A	Mode	#N/A
Standard Deviation	**0.2731652**	Standard Deviation	**0.02731652**
Confidence Level(95.0%)	0.13166141	Confidence Level(95.0%)	0.01316614

Source: Authors' own Calculation

The results of both IRD and RIRD shows there is intense competition within the NB group. The descriptive statistics table shows so many interesting facts. First of all, the mean of rank dominance is .526 (0.583 in SBI group) but in case of relative index of rank dominance it is just 0.0526 (0.1666 in SBI group). It means SBI group enjoys more market share because of a smaller number of banks in the group. That is why their RIRD is fairly high than NB group which shows that there is more competition within NB group. Secondly, the standard deviation is 0.273 (0.299 in SBI group) in case of rank dominance, but it is 0.027 (0.085 in SBI group) in case of relative index of rank dominance. But since the variation in both RD and RIRD is less in NB group which is a better indication of consistency that banks in NB group are maintaining while being competitive. This shows that NB groups banks have been successful in retaining their ranks over the time period while facing the stuff competition with the entry of private sector banks. Overall, the result shows that all the banks in SBI group and NB group are competitive and consistent with maintaining their ranks.

1.7 Implications for theory and practice

This paper burst the most popular myth about public sector banks that these are inefficient and loss-making lot functioning with the support of government and RBI. It is clearly evident from the empirical results that banking market has been developing a lot since liberalization. There is stiff competition amongst all the banks both within the strategic groups and between strategic groups. The advertisement expenditure is statistically significant in case of all banks and both strategic groups which shows the growth and use of advertising a mean to increasing sales. Similarly, market size is also statistically increasing. SBI group has been able to diversify successfully into fee-based activities as compared to NB group. The changes in ranks of top five banks shows the intense rivalry in the public sector banking industry. It is the high time now that these banks should not be treated as alike, inefficient and loss-making units.

1.8 Conclusion

To investigate into market structure of public sector banks and strategic groups within public sector banks, we have applied semi-log growth equation (to examine growth rates), paired t-test (differences over the time period), Murthy's index of rank dominance and relative index of rank dominance (to study the dominance pattern), and concentration ratio (to measure and examine competition) to draw meaningful results.

The growth rate has been statistically significant and positive in case of market size and advertisement expenditure but in case of product differentiation, it is positive and significant only in case of the SBI group not in NB group and overall PSBs. It means only SBI group has been successful enough to use advertisement as a mean to offer different products to the general public. Secondly, the trend in concentration ratio has shown a significant decline over the time period in all PSBs, SBI group, and NB group. This decline clearly points out the rising competition within all PSBs, SBI group, and NB group. This declined was highest in NB group. This means that there is fairly high competition in NB group as compared to SBI group.

Another significant observation is that the dominance pattern shows that the strategic groups amongst public sector banks are rivals because they are consistently competing with each other. The Murthy's Index of Rank Dominance has given exciting results. SBI has been on first place in each year. While the relative index of rank dominance of other top four banks is very close to that of state bank of India. The RIRD shows close rivalry amongst four other banks (PNB, Bank of Baroda, Bank of India and Canara Bank).

It is encouraging to see that the overall impact of liberalization has been growing market share, healthy rivalry and competition amongst SBI and NB groups. These determinants are all market variables and not representative of government control. This means that public sector banks have adjusted to the new reality and shifted from being loss-making state-controlled units to profit-making market-oriented units and the most reliable source of self-sufficiency.

Bibliography

Murthy, K. V., & Deb, A. T. (2014, July). Measurement and Determinants of Competition in Private Banking Industry in India during 1992-2002. *IUP Journal of Applied Finance, 20*(3), 72-93.

Bajaj, S. (2008). Indian Public Sector Banking Industry: 1992-2006- An Impact of Reforms. Unpublished M.Phil Dissertation.

Gupta, R. (2013). A comparative study of public and private banking industry in India. An unpublished Ph.D. thesis.

Amel, D. F., & Rhoades, S. A. (1988, November). STRATEGIC GROUPS IN BANKING. *The Review of Economics and Statistics, 70*(4), 685-689.

Hannan, T. H. (1991). Bank commercial loan markets and the role of market structure: Evidence from surveys of commercial lending. *Journal of Banking and Finance, 15*, 133-149.

Heggestad, A. A., & Rhoades, S. A. (1976, January). An analysis of changes in bank market structure. *Atlantic Economic Journal, 4*(3).

Deb, A. T. (2005). The impact of Deregulation on Private Banking Industry. New Delhi, India: Department of Commerce, University of Delhi.

Murthy, K. V., & Deb, A. T. (2009). Business Group Ownership of Banks-Issues and Implications. *The Conference on Money and Finance in the Indian Economy.* IGIDR.

Gupta, L. (2013). Non-performing Assets and Commercial Banking in India. Department of Commerce, University of Delhi.

Claessens, S., & Laeven, L. (2004, June). What Drives Bank Competition? Some International Evidence. *Journal of Money, Credit and Banking, 36*(3).

Murthy, K. V., & Deb, A. T. (2013). Theoretical Framework of Competition as Applied to Banking. *International Journal of Banking, Risk and Insurance, 1*(2).

Murthy , K. V., & Deb, A. T. (2014, July). Measurement and Determinants of Competition in Private Banking Industry in India during 1992-2002. *The IUP Journal of Applied Finance, 20*(3), 72-93.