

The Competition And Market Structure “Indian Banking Sector”

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Abstract

The study of the competitiveness in our growing banking sector gained lots of importance. The major reforms were taken place to pace the financial growth of the economy by 1998. This study evaluates the level of competition and market structure of Indian banking sector because of the entry of foreign banks and privatization of state owned banks over the period 2000 to 2015 of 68 banks. This study utilized the panzar and rosse model. And market structure is measured by using K bank concentration ratio and the herfindahl hirschman index (HHI) for the period 2000 to 2015. The finding of panzar and rosse model shows that banks are earning profits under monopolistic competition.

Introduction

World over, the financial system has undergone dynamic changes during last few decades. Banking outcome in terms of providing financial services can be realized using fewer inputs due to continuous deregulation, globalization, financial innovation in financial services and technological advancement. Financial innovations are the act of creating new financial instruments, technologies, institutions and market. In the case of long run, bank competition is positively related to economic growth while financial innovations are negatively related to economic growth. But this is opposite in the case of short period (Adu-Asare Idun and QQ Aboagye, 2014). The wave of reforms in the form of financial liberalization in the past has also added new dimensions in the banking environment. The new environment has witnessed new players and wide ranging of products under universal banking system, so the significant changes in the market structure and risk profile of banking system. The banking sector of India has inherited a system that better characterize with higher level of government control, lesser bank competition and unproductive allocation of resources.

Deregulation, financial innovation and globalization have made significant changes in the banking sector. Deregulation has opened up the new opportunities for banks. Liberalizations have intensified competition in the banking industry by opening market for the new foreign and

private sector banks. Deregulation has come in three stages. In the first stage, quantitative control on the banks assets and ceiling on the interest rate on the deposits has been lifted.

In the second stage, specialization of business between banks and other financial intermediaries have been relaxed which allow both parties to compete in each other's market. In the third stage, competition has been exhilarated. Deregulation of financial markets and banks has been directed towards their competitive actions. As we know, banks operate under the observant eyes of regulators. So, deregulation has also been accompanied by some regulation for the soundness of financial system.

The financial reforms of 90s, focusing on the deregulations, has set an environment where Indian banking system has been meeting major changes in the form of increased competition, concentration and restructuring. New environment has prompted the banks to launch wide range of services and products to their clients and also introduced IT friendly system in their operations. As a result, structure of their balance sheet and components of their profit and loss account has experienced significant changes. Besides, universal banking system is replacing the traditional way of banking, and now commercial banks are dealing with the wide range of market products. It has added one more dimension in the banking risk. The safety and soundness of banking system turn into a major challenge for the supervisory authority.

As the largest developing country of the world, economic development of India gets a lot of attention. And the financial system of our country, that is, banking is very important in proper growth and development of the economy as the whole. And competition is imperative for the growth of every sector of the economy whether it be textile, automobile or banking etc. Competition helps in providing the low rate credit to small and medium sized firms. So, it is very essential to maintain the level of competition in the market. Competition policy means "applying rules to make sure that companies compete with each other and in order to sell their products, innovate and offer good services to the customer" (Todd, 2007). Banking sector is recognized by competition policy and there should be proper coordination between competition policy and regulations in banking sector. Competition helps in removing the inefficiencies in the system and improving the performance of banking sector. And economic growth of the country too positively affected by the competition in the banking sector (Banya, 2017).

Structure-conduct-performance theory in the banking sector says that market structure helps in determine the conduct of the banks, which in turn determines the performance of banking sector. New banking environment set by financial reforms in the opened economy of globalized world has an important implication for banking structure, performance and risk. By 1998 major reforms in the banking sector were well placed. This study examines the level of competition of Indian banking sector for the period 2010-2015 by using Panzar and Rosse model. It further explains whether conditions of Indian banking sector have been improved.

Banking Sector Development in India

In the Indian banking sector, commercial banks are the oldest, largest and the fastest growing financial intermediaries. In 1949, reserve bank of India and imperial bank of India was nationalized. Fourteen commercial banks were nationalized in July 1969, and in April 1980, six more were nationalized. The banking sector has been ruled by the public sector from the time when the nationalization of banks took place in, that is, from 1969. Indian economy was suffering from financial repression at that time. Role of the technology was limited and there was lack of steps taken for the management of the risk and credit worthiness of the entities etc. This resulted in low profitability and poor asset quality. In early 90s India launched major economic reforms in the backdrop of economic crisis in the form of widening fiscal deficit and external deficit. The liberalization and the privatization were the major components of these reforms. The Indian government has also taken a series of reforms to create an efficient, competitive and stable banking sector. This contributes in making the system consistent with the market oriented environment,

In august 1991, the government appointed a committee on the financial system under the chairmanship of M. Narasimhan. Under his recommendations, statutory liquidity ratio has been reduced from 38.5% in 1991 to 25% in 1997. Cash reserve ratio has been brought down from 15% in 1991 to 4.1% in June, 2003. Scheduled commercial banks are given freedom to open new branches and upgrade extension counters, after attaining prudential accounting reforms and capital adequacy ratio. This committee has advocated that interest rates should be determined by the market forces. Banking has been made open to the private sectors also. Reserve bank of India has set up a board of financial supervision with an advisory council to toughen the management of banks and financial institutions etc.

In April 1998, the government for the second time employed committee on banking sector reforms under the chairmanship of M. Narasimhan. This committee was hold to make the banking sector stronger. The committee placed greater importance on the structural measures and improvement in the standards of disclosure and levels of transparency. Under this committee recommendations, new area for the banks financing have been opened up such as insurance, credit cards, asset management and leasing etc. Committee advised a strong banking system regarding capital adequacy convertibility. Net non-performing assets for all the banks were to be brought down to 3% by 2002. In the private banks, the limit for the foreign direct investment has been increased from 49% to 74%. The concept of online banking has introduced. In May, 2005 reserve bank of India has issued guidelines for the merger and amalgamation of private sector banks. The idea of banking ombudsman has introduced. The focus on the issues like risk management, improvement in technology for the payment and settlement etc is emphasized.

In nutshell, banking sector in India has represented the wonderful growth after the 1990s. Financial sector reforms in India have been initiated in the early 1990s, to create an efficient, competitive and stable financial sector and for the economy growth also. Since 1991, Indian government took initiatives in improving the country's financial sector. These include lowering the cash reserve ratio from 4.1% (2003) to 4% (august, 2015), lowering the statutory liquidity ratio from 25% (1997) to 21.5% (august, 2015).

Literature Review

1 Market structure

Concentration index is measured by various methods which are: k bank concentration ratio (CRK), HHI, Hall Tideman Index (HTI), The Rosenbluth Index (RI), The Comprehensive Industrial Concern Index (CCI), The Hannah and Kay Index (HKI), The U Index (U); The Multiplicative House Index (HM), The Additive House Index (HA), The Entropy Measure (E). But this study consists of only two methods, which are “k” bank concentration and “HHI”. Hall and Tideman (1967) suggested the six properties of measures of competition. These are:

- A concentration index should be one dimensional measure;
- Concentration in an industry should be independent of the size of that industry;
- Concentration should increase if the size of any firm is increased at the expense of smaller firm;
- If the firm is divided into k equal parts, then the concentration index should be reduced by proportion $1/k$;
- If all the firms are divided into k equal parts, then the concentration should be a decreasing function of N;
- A concentration measure should be between 0 and 1.

Table: 1 Total asset of banks in India in respective year

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total	1033157.04	1211916.2	146053.3	164423	186745	22744812	2694204.7	3347712.5	4188976.8	5136494.9	5899204.2	7068347.1	8168825.2	9388287.9	10759199	11770937.23

Table: 2 Total branches of banks in India in respective year

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015

Total	51 11 8	152 330	51 15 3	50 33 2	52 27 8	53 39 1	54 92 6	57 59 8	61 70 9	66 26 7	71 56 4	77 88 0	84 97 4	91 97 9	102 018	109 370
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The k bank concentration ratio

This is one of the techniques of measuring competition. It is a one dimensional measure, which ranges from 0 to 1.

$$Cr_k = \sum MS_i$$

Where, MS = market share of i'th firm;

K = number of largest firms in the market.

This index gives equal weightage to the key K banks, but disregards minor banks in the market. There is no seeded rule for measuring value of k, it is an arbitrary decision. Concentration ratio is computed by dividing the total assets/deposits/loans of k largest banks to the total assets/deposits/loans of all the banks in the market. The index approaches to zero for an infinite number of equally sized firms (given that k chosen for the calculation of concentration ratio is comparatively small when compared to total number of banks) and it equals to unity if the banks included in the calculation of concentration ratio make up the entire industry.

The Herfindahl-Hirschman index

HHI index was first proposed by Albert O. Hirschman in 1945, in his book “National Power and Structure of Foreign Trade”. At that time, concentration is measured by summation of each firm market share. Later in 1950, Oris C. Herfindahl presented this index in his unpublished doctoral dissertation at Columbia University, “Concentration in US Street Industry”. At this time, concentration is measured by summation of squares of each firm's market share.

So, HHI got its name on the name of two economists, Albert O. Hirschman and Oris C. Herfindahl. HHI is a statistical measure of concentration, which got its importance in the research area after it, is used by department of justice and federal reserve in the analysis of competition after the merger. This measure of concentration can also be used in variety of ways like:

- It can be used to measure the concentration of income and wealth in US household.
- It can be used to measure the extent of concentration of output of firms in banking or industrial market.
- It can be useful for analysis of horizontal mergers.

Table: 3 Values of HHI and level of concentration

HHI	Level of competition
Less than 1000	Competitive

1000-1800	Concentrated market
More than 1800	Very concentrated market

In 1982, department of justice published formal guidelines for the horizontal merger. These guidelines were based on HHI, for the proper application of antitrust laws regarding mergers. Horizontal mergers are the mergers, which are between the firms operating in the same product and geographic market. If the post-merger HHI does not exceed the numerical guidelines, it is generally presumed that merger would not be seriously anticompetitive and no further analysis is conducted. If after merger HHI changes, and that change is less than 200 from the pre-merger situation, and post-merger market HHI is lower than 1800, it means concentration is increased enough (competition is not considered anticompetitive). Such firms in the market would have market power to maintain prices above the competition level of significant period. If this value exceeded, the regulators will check for existence of potential mitigating factors. If the mitigating factors are not enough to justify the merger, the regulators may require the divestiture of some branches and officers, in order to bring the concentration to or below the threshold level. If the divestiture would not accomplish this goal, merger application denied. HHI is considered as instrument, which works on mergers.

HHI is calculated by squaring the market share of each firm in the market and then summing up their squares:

$$HHI = \sum (MS)^2$$

Here, MS= market share of ith firms

N= number of firms

The analysis of merger can be understood with the help of following example.

Suppose, Bank A holds 50% of the bank's deposits;

Bank B holds 40% of the bank's deposits;

Bank C holds 30% of the bank's deposits;

Bank D holds 20% of the bank's deposits.

$$HHI = (50)^2 + (40)^2 + (30)^2 + (20)^2$$

$$= 5400$$

Now assume bank C acquire bank D

$$HHI \text{ (after merger)} = (50)^2 + (40)^2 + (50)^2$$

$$= 6600$$

HHI has been increased from 5400 to 6600 after merger. With this example, we can also say that, HHI gives much weightage to firms, who have greatest market share and vice versa. With this, we can conclude, when there is less concentration, the number of firms in the market are large with smaller market share, and competition increase. When there is more concentration, there is small number of firms in the market with largest market share, which reduces the competition.

Al-Muharrami *et al.* (2006) measures the changes in concentration during the period 1993-2002 within Arab GCC countries banking industries by HHI and k bank concentration ratio. The result shows that concentration does not increased in GCC countries. With the exception of Oman and Qatar banking industry, concentration measure report indicates that four to six countries show the decline in concentration. GCC banking is not highly concentrated.

2 Competitive conditions

There is always a relationship between market structure and competition. The market power of banks increased when the markets are more concentrated, because of collusions, cartels, and mergers. This helps in earning monopolistic profits, by lowering the deposits rate, and increasing the lending rates.

The literature conveys the structural and non-structural approach for measurement of competition. Non-structural approach is formal approach, whereas structural approach is non-formal. Structure-conduct-performance paradigm is structural approach. Structure-conduct-performance paradigm contain two hypotheses that are, structure affect the conduct of banking sector, which in turn affects the performance of banking industry. The second, called non-structural approach is to measure the competitive behavior in the market. Under this, there are two techniques of estimating the competition. One is developed by Breshanan and Lau in 1982, called lerner index. Second is developed by John C. Panzar and James N. Rosse in 1987, called panzar and rosse model.

Wahid and Wahid (2017) measured the bank competition by using panzer and rosse model of 17 islamic and 21 conventional banks in Malaysia over the period 2004-2013. The result shows that Islamic banks are relatively more competitive than conventional banks. And level of competition of banks increased continuously from 2004 to 2013.

Simpasa (2013) examined the level of competition by applying panzer and rosse model and lerner index for the period 1998-2011 in Zambian. The result shows that banks are earning their revenue under the monopolistic competitive environment; this result is consistent with the result given by lerner index. The result supports that foreign banks penetration and privatization can higher the competitive pressure in banking sector.

Perera, Skully and Wickramanayake (2006) considered the nature of competition and structure of 113 domestic South Asian banks by using reduced form Panzar-Rosse specification test for the period 1995 to 2003. This study also assessed whether traditional interest based product market segments are more competitive than those that also include fee and commission based products. The experiment discovered that bank revenues are earned under the conditions of monopolistic competition during the period of study. The study further concluded that in Bangladesh and Pakistan competition is greater in traditional interest based product markets while India and Sri Lanka domestic commercial banks face more competitive pressure in fee based product market from other financial intermediaries.

Staikouras, Koutsomanoli and Fillipaki (2006) measured the degree of competition and concentration in the European Union banking environment (EU-10, EU -15) over the period 1998-2002. The study has applied the methodology of Panzar and Rosse based on a Non-

structural estimation of market competition. The results of the study mentioned that European Banks are operating under the conditions of monopolistic competition. Bank interest revenue in 10 new EU members was earned under the conditions of higher competition than those existed in old EU 15 member states. But it was not the case for total operating revenues; smaller banks earn interest income in less competitive environment than larger banks, while an opposite is observed for total revenue.

Semih Yildirim and Philippatos (2007) examined the level of competitive condition in 14 Central and Eastern European (CEE) transition economies by Panzar and Rosse. The study has found the monopolistic competition in banking industry for the period 1993-2000. Huang and Liu (2014) assessed the competitiveness in the banking sector of 17 central and eastern European (CEE) countries over the period 1994-2008 by using a Panzar and Rosse H-statistics. The study tested whether these markets have achieved long run equilibrium by using censored stochastic frontier model (CSFM). The results of the study disclosed that majority of banking markets are operating under monopolistic competition (by using H-statistics) and most of the banking markets in long run equilibrium (by using CSFM).

Al-Muharrami (2009) illustrated the market structure and evaluated the competition in Saudi Arabian Banks during the period of 1993-2006. The study examined the market structure by using the most frequently applied measure of concentration, that is, K- bank concentration ratio (CRK) and herfindahl- hirschman index (HHI). The study evaluated the competition using the H-statistic by Panzar and Rosse. The results of the study established that banks are working under monopolistic competition and they are moderately concentrated.

Kumar and Patel (2014) prospected the competitiveness in the banking sector of Fiji by applying panzar and rosse model and computed concentration ratio and HHI for the period 1999-2010. This study computed the concentration ratios and herfindhal-hirschman index (HHI) based on total assets, loans and deposits to examine the concentration level. The results of the study exhibited that there is monopolistic competition which is indicated by low H-statistics.

Arrawatis and Misra (2012) examined the level of competition among banks over the period 1994-2009 in India. This study applied panzar and rosse model and found that Indian banks are working under monopolistic competition. Molyneux (1996) investigated the level of competition in Japanese banking sector from 1986 to 1988. This study used panzar and rosse model and found that value of H- statistics is less than zero, which indicates the prevalence of monopoly competition in the market.

Hamza and Kachtouli (2014) scrutinized the level of competition and market power during the period 2004-2009 in MENA and south east region by applying three bank concentration ratio, five bank concentration ratios, HHI and lerner index, H-statistics. The banks under the study were conventional and Islamic banks and it was found that under HHI, both markets are less concentrated, while according to concentration ratio, the Islamic market is considered as moderately concentrated. H-statistics and lerner index found the monopolistic competition in the market.

Al-Muharrami (2008) examined the market structure of Kuwait banking industry for the period 1993-2002 using k bank concentration ratio and HHI, and evaluates the monopoly power of

banks using the H-statistics by PR model. The study found that Kuwait banking industry has moderately concentrated market and PR model characterized a perfect competition in the market. The study conducted in Fiji for the period 1999 to 2000 (kumar and Patel, 2013) exhibits that banking markets are operating under monopolistic competition by using (H-statistics)

Methodology and Data

The Panzer and Rosse Approach

This model is given by panzer and rosse in 1987. It helps in determining the competitive behavior of banks. This model gives us the indicator, h-statistics, which is based on the comparative static properties of reduced form of revenue operation, by using the cross sectional data. This model helps in distinguishing the perfect market competition, monopoly market competition, monopolistic market competition and oligopoly market competition. Panzar and rosse model pre-assumes that banks adopt different price strategies based on their factor prices and market structure in which they operate. Panzar and rosse model depicts the percentage variation in equilibrium revenue because of the percentage per unit change in the prices of all factor inputs (unit price of labour, capital and funds) used by firm. This model in conclusion depicts the relationship between input prices and revenue earned by the specific firm.

The panzer and rosse model gives us the clear cut interpretation, when we apply this to the study of competitive behavior of banking sector. A value of $H=1$ indicates a perfect competitive market. In this situation, when marginal and average cost increases, there is proportionate increase in factor input prices, which changes the proportionate revenue without changing the output of the firm. A value of H lies between 0 and 1 indicates a monopolistic competitive market. In this situation, there is free entry and exit of firms. This will lead to the situation of equilibrium in the market. Revenue increases, but it is less than proportionally to the change in input prices, because demand for the products are inelastic. A value of H equal to and less than 0 indicates monopoly competitive market. In this situation, increase in the input price will lead into higher marginal cost, a reduction of equilibrium output and a subsequent fall in the total revenue. Bikker and Haaf, 2002 explained the assumptions, which must be made to apply this model:

- Banks are operating under long run equilibrium;
- Cost structure is homogeneous;
- Performances of banks are influenced by the action of other market participants;
- The price elasticity of demand is greater than unity.

Shaffer 1982, 1983; Molyneux et al. 1994; explained the bank revenue equation (reduced form). In this equation revenue is explained by factor prices that are, unit price of labor, unit price of capital and unit price of funds. It is further explained by other control variables like provision to total assets, banks total assets, and number of branches of each bank to the total number of branches of whole banking system for the period 2000 to 2015. (Equation 1)

$$\ln \text{trev} = \alpha_0 + (\alpha_1 \ln p_l + \alpha_2 \ln p_k + \alpha_3 \ln p_f) + \alpha_4 \ln \text{riskast} + \alpha_5 \ln \text{asset} + \alpha_6 \ln \text{br} \quad (1)$$

Equation (2) is used to test whether the banking market is in long term equilibrium or not. This also investigates the equality of the “risk adjusted rates of return” across banks. The value of H is represented by sum of elasticity’s of ROA with respect to the input prices ($\beta_1 + \beta_2 + \beta_3 = H$).

$$\ln(\text{ROA}+1) = \beta_0 + (\beta_1 \ln \text{pl} + \beta_2 \ln \text{pk} + \beta_3 \ln \text{pf}) + \beta_4 \ln \text{riskast} + \beta_5 \ln \text{asset} + \beta_6 \ln \text{br} \quad (2)$$

Where:

Ln represents the Natural logarithm;

TREV represents the total revenue to total asset;

ROA represents the net profit to total asset;

PL represents the personnel expenses to employees (unit price of labor);

PK represents the capital expenses to fixed assets (unit price of capital);

PF represents the ratio of annual interest expenses to own funds (unit price of funds);

RISKAST represents the provisions to total assets;

ASSET represents the bank total asset;

BR represents the number of branches of each bank to the total number of branches in banking system.

De Bandt and Davis (2000) found that Log linear form improve the regression goodness of fit. And it may reduce simultaneity bias. In long term equilibrium, rates of return should be uncorrelated with the input prices. We add one to ROA ($\text{ROA}+1$), to remove the effect of negative values of ROA. If the market is found to be in equilibrium, then it does not imply that competitive conditions are not allowed to change during the sample period. It only implies that change in the market is taken as gradual.

Values of H-statistics in measuring competitive behavior

$H \leq 0$ monopoly equilibrium: each market operates independently as under monopoly profit maximization conditions (H is a decreasing function of the perceived demand elasticity) or perfect cartel

$0 < H < 1$ monopolistic competitions free entry equilibrium (H is an increasing function of the perceived demand elasticity)

$H = 1$ perfect competition. Free entry equilibrium with full efficient capacity utilization.

Equilibrium test

$H < 0$ Disequilibrium

H=0 Equilibrium

Sources: Panzar and Rosse (1982, 1987); Shaffer (1982, 1983)

The Data

The data is gathered from prowess and website of reserve bank of India. This study covers the 68 number of banks for the period 2000-2015. These banks are state bank of India and its associates, nationalized banks, private sector banks and public sector banks. The final sample consists of $16 \times 68 = 1088$ observations.

<Insert Table 4>

The Result

Market Structure

Market structure is measured by HHI and CR for the period 2000-2015. Bank size is measured by taking the size of total deposits, total loans and total assets of all banks under the study. CR shows the decreasing trend, except in the case of borrowings (0.27 for the period 2000 and 0.34 for the period 2015) and HHI (682.667 for the period 2000 and 782.145 for the period 2015)

<Insert Table 5, Table 6, Table 7>

Regression Result

This study uses the cross sectional data and time series data to yield the suitable result (a panel regression methodology). One of the advantages of having panel data is that it allows controlling for heterogeneity bias, or the confounding effects of omitted variables that are stable over time. The paper uses the fixed effect estimators. This helps in correcting the effect of any combination of the time invariant variables, which have been omitted knowingly or not, from the regression model. ROA equation is estimated to assess the equilibrium, whereas TREV equation is estimated to assess the level of competition in the banking sector. (Table 7)

<Insert Table 8>

In the TREV equation, the coefficients of unit price of capital, labor and funds have positive signs and statistically significant at 1% level of significance. It indicates that there is direct relationship between unit price of capital, labor, funds and total revenue. The sign of RISKAST is positive and statistically insignificant at 1% level of significance. This indicates that banks with greater provision to total assets in their balance sheet may generate higher revenue. The coefficient of ASSET is negative and statistically significant at 1% level of significance. This indicates that size in terms of assets, decrease the total revenue. This further concludes that larger banks do not seem to be more efficient than smaller banks. The coefficient of BR is positive and statistically significant at 1% level of significance, advising that banks with the greater number

of branches generate higher revenue per branch. This further proposes that Indian banks should not be not over branched.

H-Statistics value is estimated by using TREV equation, suggesting that value of H-statistics is positive ($0.39242+0.084315+0.213499=0.690234$, 0.69 app.) for the period. This result indicates that Indian banks earned their revenue in the monopolistic competition during the period from 2000 to 2015.

ROA equation is used to estimate the long term equilibrium. The sign of regression coefficient of unit price of labor is positive and statistically significant at 1% level of significance. This indicates that greater number of the staff generate the higher net profit to total assets. The sign of unit price of capital (PK) is negative and statistically significant at 1% level of significance. This indicates that larger the capital, lowers the net profit to total assets of the banks. The coefficient of unit price of funds is also negative, but statistically significant at 1% level of significance. This indicates that larger funds in the banks decrease the net profit to assets. In ROA equation, the value of H-statistics is equal to 0($0.002617-0.001758-0.006434=0.006434$, 0.00 app.) from the period 2000 to 2015. This value indicates that banking industry is in long term equilibrium. So at the end, it infers that banks earned their revenue for the period 2000 to 2015 under monopolistic competition.

Concluding Remarks

This paper investigates the market structure of Indian banking industry by using the most frequently applied measures of concentration, that are, k-bank concentration ratio and HHI, and evaluates the monopoly powers of banks during the years 2010-2015 by using “H-statistics”. Concentration ratio in case of total assets and total deposits identifies a decreasing trend. But it is not in the case of total borrowing of Indian banking sector for the sample period. During the sample period, the estimated value of panzar and rosse “H-statistics” is 0.69 (app). This rejects the condition of being in perfect and monopoly competition, and concludes that banks are working under monopolistic condition. This helps in improving the condition of banking sector in the economy.

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Table: 4 Banks under study

Type of Bank	Name of Bank
SBI and its associates	State Bank of Bikaner & Jaipur
SBI and its associates	State Bank of Hyderabad
SBI and its associates	State Bank of India
SBI and its associates	State Bank of Mysore
SBI and its associates	State Bank of Patiala
SBI and its associates	State Bank of Travancore
Nationalised Bank	Allahabad Bank
Nationalised Bank	Andhra Bank
Nationalised Bank	Bank of Baroda
Nationalised Bank	Bank of India
Nationalised Bank	Bank of Maharashtra
Nationalised Bank	Canara Bank
Nationalised Bank	Central Bank of India
Nationalised Bank	Corporation Bank
Nationalised Bank	Dena Bank
Nationalised Bank	I D B I Bank Ltd. [Merged]
Nationalised Bank	Indian Bank
Nationalised Bank	Indian Overseas Bank
Nationalised Bank	Oriental Bank of Commerce
Nationalised Bank	Punjab & Sind Bank
Nationalised Bank	Punjab National Bank
Nationalised Bank	Syndicate Bank
Nationalised Bank	Uco Bank
Nationalised Bank	Union Bank of India
Nationalised Bank	United Bank of India
Nationalised Bank	Vijaya Bank
Old Private Sector Bank	Catholic Syrian Bank Ltd.
Old Private Sector Bank	City Union Bank Ltd.
Old Private Sector Bank	D C B Bank Ltd.
Old Private Sector Bank	Dhanlaxmi Bank Ltd.
Old Private Sector Bank	Federal Bank Ltd.
Old Private Sector Bank	I N G Vysya Bank Ltd. [Merged]
Old Private Sector Bank	Jammu & Kashmir Bank Ltd.
Old Private Sector Bank	Karnataka Bank Ltd.

Old Private Sector Bank	Karur Vysya Bank Ltd.
Old Private Sector Bank	Lakshmi Vilas Bank Ltd.
Old Private Sector Bank	Nainital Bank Ltd.
Old Private Sector Bank	R B L Bank Ltd.
Old Private Sector Bank	South Indian Bank Ltd.
Old Private Sector Bank	Tamilnad Mercantile Bank Ltd.
New Private Sector Bank	Axis Bank Ltd.
New Private Sector Bank	H D F C Bank Ltd.
New Private Sector Bank	I C I C I Bank Ltd.
New Private Sector Bank	Indusind Bank Ltd.
Foreign Bank	A B Bank Ltd.
Foreign Bank	Abu Dhabi Commercial Bank Ltd.
Foreign Bank	B N P Paribas
Foreign Bank	Bank of America N A
Foreign Bank	Bank of Bahrain & Kuwait Bsc
Foreign Bank	Bank of Ceylon
Foreign Bank	Bank of Nova Scotia
Foreign Bank	Bank of Tokyo-Mitsubishi U F J Ltd.
Foreign Bank	Barclays Bank Plc
Foreign Bank	CitiBank N A
Foreign Bank	Credit Agricole Corporate & Invst. Bank
Foreign Bank	D B S Bank Ltd.
Foreign Bank	Deutsche Bank A G
Foreign Bank	H S B C Bank Oman S A O G
Foreign Bank	Hongkong & Shanghai Banking Corpn. Ltd.
Foreign Bank	J P Morgan Chase Bank, National Association
Foreign Bank	Krung Thai Bank Public Co. Ltd.
Foreign Bank	MashreqBank P S C
Foreign Bank	Mizuho Bank Ltd.
Foreign Bank	Royal Bank of Scotland N V
Foreign Bank	Shinhan Bank
Foreign Bank	Societe Generale
Foreign Bank	Standard Chartered Bank - India Branches
Foreign Bank	State Bank of Mauritius Ltd.

Table: 5 Trends of Concentration in Total Assets

Year	CR2	CR3	HHI
2000	0.309854	0.36407	851.413
2001	0.315272	0.367684	878.7003

2002	0.31052	0.360491	798.2218
2003	0.296798	0.349717	758.9546
2004	0.282108	0.336169	695.8006
2005	0.276246	0.331762	650.9161
2006	0.276972	0.330921	610.0593
2007	0.27246	0.322076	577.6977
2008	0.267975	0.315493	570.9625
2009	0.18788	0.309906	597.6501
2010	0.240341	0.290629	564.5068
2011	0.2308	0.284328	552.7043
2012	0.22368	0.279774	527.3199
2013	0.22537	0.282597	533.7395
2014	0.228091	0.283568	538.5615
2015	0.174285	0.290144	566.0212

Table: 6 Trends of Concentration in Total Deposits

Year	CR2	CR3	HHI
2000	0.292999	0.349688	776.2065
2001	0.302546	0.358798	815.0129
2002	0.235475	0.34701	776.8336
2003	0.28547	0.340804	741.3015
2004	0.268571	0.325613	674.4438
2005	0.265083	0.321356	664.0027
2006	0.260903	0.318185	597.2236
2007	0.255213	0.309771	561.1794
2008	0.243326	0.295131	542.3476
2009	0.240902	0.293517	587.6168
2010	0.226593	0.278488	547.9624
2011	0.225109	0.280254	543.9638
2012	0.224527	0.284188	532.377
2013	0.22953	0.283134	533.7123
2014	0.234052	0.290913	545.2732
2015	0.237181	0.294673	560.6642

Table: 7 Trends of Concentration in Borrowings

Year	CR2	CR3	HHI
2000	0.274488857	0.33459	682.6674
2001	0.326445357	0.382998	806.4881
2002	0.570332172	0.627525	2390.937
2003	0.494956562	0.544481	1705.482

2004	0.446431183	0.497723	1289.459
2005	0.465774312	0.576081	1305.541
2006	0.38951742	0.52829	1046.301
2007	0.383272128	0.52768	1038.539
2008	0.394428251	0.502856	988.4673
2009	0.379980649	0.47522	917.2247
2010	0.379541135	0.47133	908.0415
2011	0.35029117	0.429133	804.2165
2012	0.330680861	0.396871	726.6519
2013	0.326291312	0.394562	713.7731
2014	0.31816573	0.374801	693.434
2015	0.341490551	0.185548	782.1451

Table: 8 Values of H- statistics in measuring competition behavior

Variable	Intrev		Ln(ROA+1)	
	Coefficients	t-statistics	coefficients	t-statistics
Intercept	-0.060518	-0.344893	0.009637	0.841644
Lnpl	0.039242	2.988257	0.002617	3.054363
Lnpl	0.084315	8.626810	-0.001758	-2.756155
Lnpl	0.213499	14.86855	-0.007293	-7.783833
Lnpl	0.362725	0.640355	-0.250710	-6.782839
Lnpl	-0.122575	-13.97617	-0.001444	-2.523444
Lnpl	0.078284	5.082206	-0.000644	-0.640406
Adjusted R ²	0.445264		0.333880	
H-Value	0.69		0.0	
Test result	Monopolistic competition		Equilibrium	
Number of observation	1088		1088	