

COMPETITION IN INDIAN COMMERCIAL BANKING SECTOR IN THE LIBERALIZED REGIME: AN EMPIRICAL EVALUATION

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Abstract In this paper, we have measured the degree of competition in Indian banking sector for the period 1997-98 to 2004-05. We have estimated a structural model containing first order condition for profit maximization, coupled with cost function and inverse demand function. Our findings support that the competitive environment of Indian banking sector has improved during the regime of ongoing liberalization and competition has become more severe in the latter two years compared to that in earlier periods.

Keywords: Competition, Indian Banking.

1. INTRODUCTION

The purpose of this study is to analyze the art and the degree of competition in Indian banking sector for the period 1997-98 to 2004-05 where the market prohibits free entry by imposition of legal and/or economic barriers. This study also traces the average degree of competition for each year of our investigation as the banking sector has been passing through the ongoing process of liberalization. India has initiated reform in banking sector as an important counterpart of broad economic reform in 1991. Most of the commercial banks were under the control of public sector and the system was over regulated and over administered. Nevertheless, acute problem arises in productivity, efficiency, and profitability front of the commercial banks. The policy of directed investment in the form of high SLR and CRR, directed credit programs, extra administrative interference in credit decision making, high operating costs, regulated interest rates, non-transparent accounting system coupled with nonexistence of operational flexibility, internal autonomy and absence of competition contaminated the health of the commercial banks and threatened their future survival. The remarkable developments to enhance competition in banking sector are:

1. It abolished administered interest rate regime by allowing banks to determine lending and deposit rates. Although the reform was initiated in 1991, the transformation into a fully price competitive setup was not effective until 1994. The entry restrictions in banking sector by new private sector banks was diluted to accelerate the competition provided they fulfill certain criteria: the start-up capital requirement of Rs

100 crores, consecutive net profit records for three years, capital adequacy ratio of 8 percentage and net NPA rate of less than 15 percentage.

2. Competition has infused by allowing the operation of new private sector banks and more liberal entry of foreign banks. It was mandatory on the part of CBs to get license from RBI to open new branches until 1992. RBI has withdrawn the practice of branch licensing and given greater freedom to banks to rationalize their existing branch network to relocate branches and establishing extension counters provided they attain the revised capital adequacy norms and prudential accounting system.
3. Measures to broaden the ownership base of PSBs have also taken into account. Operational flexibility and functional autonomy of PSBs will definitely improve due to partial privatization. Government diluted the holding stake of equity to 51%. It has further proposed to reduce holding to minimum 33% on case-by-case basis. The entry of new private banks and foreign banks will promote competitiveness by introducing new products and better technology.

Foreign banks operating in India have achieved the freedom to open new branches, provided they also fulfill the norms set for the entrance of new banks. Foreign banks have also permitted to collaborate with new private sector banks. Foreign equity in private banks is permissible. It allowed joint venture between local banks and foreign banks in the business of non-bank financial services.

The basic tenet of these policies is withdrawal of government intervention in the financial system by way of ceiling in

interest rates or direction of credit allocation and increased freedom of entry in the sector.

The efficiency and progress of financial sector depends on portfolio management of assets, information acquisition, and stock of skilled human resource. PSBs now enjoys greater autonomy to recruit skilled and specialize human resources from the open market with market ruled remunerations to cope with the new technological and business challenges of the new and emerging banking activities.

The government has undertaken deregulation to encourage competition to increase productivity and efficiency. The banks guided by the principle of free market are likely to change product mix, client mix, and geographical areas of activities by executing appropriate human resource management given the technological constraint. Banks are likely to shift higher funding cost and interest rate risk to borrowers. The synergic effect of deregulation and competition will lead to higher level of efficiency, better resource allocation, innovation of products, and progress in technology. Therefore, one can expect that competition in Indian banking sector has experienced periodic changes.

An increase in competition erodes present profit as well as present value of future profits. Competition puts pressure on output prices, cost structure, product mix, technological progress, and profit rate and profit margins. Changes in competition regulate present profit as well as present value of future profits. Competition puts pressure on output prices, cost structure, product mix, technological progress, and profit rate and profit margins.

Monopoly and perfect competition are two distinct and extreme models of market competition. However, market competition lies somewhere in between these two extremes, in most of the cases. Few studies have investigated the degree of competition of Indian commercial banks¹. Bresnahan (1982) and Lau (1982) method of testing competitive behavior is accomplished by using a simultaneous equation model to estimate a system of equations involving the supply and demand functions as well as a cost equation to derive long run average degree of competition using time- series data. In contrast, the short-run measure of the degree of competition can be estimated using panel data. Following Ucida and Tsutsui (2005), ours is a modest effort to estimate short-run measures of the market power of Indian commercial banks using a different model estimated by them.

We organize our paper as follows. In section 2, we focus on the relevant literature on the measurement of competition. Section 3 describes the model used in our study. Section 4 deals with data source and estimation methods. Section 5 analyses the empirical findings of our study and section 6 concludes.

2. LITERATURE REVIEW

There are enormous academic writings on the subject of competition in the banking. The literature on market power usually investigates the effects of market concentration on financial institutions' profit and prices. An increase in competition erodes present profit as well as present value of future profits. Competition puts pressure on output prices, cost structure, product mix, technological progress, and profit rate and profit margins.

This area is debatable at both the theoretical as well as the empirical levels. At present, two focal approaches are used to evaluate the level of market power within a particular sector. The approaches differ according to whether the underlying model of the sector is structural or non-structural. The traditional structure-conduct-performance literature on competition in markets, or its absence, is commonly measured by the market power of firms. The Herfindahl Index (HI) or various concentration ratios are generally used to structure hypotheses about the relationship between concentration and market power. The HI is obtained by the sum of the squares of the market share of each firm as regards to total assets, total loans, or total deposits. The three or five-firm concentration ratio measures the market share of the three or five largest firms. The HI is generally considered a more relevant market power measure as it captures both the number and size distribution of all firms in the market. The higher the value of HI and the x-firm concentration ratio, the lower will be the degree of competition and vice versa. The lower bound is zero when the market is perfectly competitive. Thus, firms in more concentrated markets are expected to earn higher profits for collusive or monopolistic reasons than under more competitive conditions. However, a concentration ratio includes information about the few firms included, but completely disregarded the competitive impact on the market of the remaining firms. Both measures are silent about the possibility that the degree of competition may not be completely linked to market formation. Nonetheless, the association between concentration and market structure has been a theme of important debate. The disagreement is mainly concentrated on two competitive hypotheses: the structure-conduct-performance hypothesis and the contestability hypothesis.

According to structure-conduct-performance, the market structure determines conduct and conduct yields market performance, where market structure captures number of firms, the cost structure, the degree of product differentiation, vertical integration, and so on. Conduct consists of price, investments, advertisement, etc. and performance consists of efficiency, mark-up pricing, and profits, and so on. This paradigm unambiguously argued that there exists a non-linear and increasing relationship between concentration and market power (Ceteroli, 1999). That is, as the market becomes

1 To our knowledge Prasad and Ghosh (2005) is the only study.

more concentrated, the firms are likely to collude and act as a monopolist in setting prices above the competitive level. This implies that there is an inverse relationship between concentration and consumer welfare. Departure from competition means loss of welfare and economic growth because market power of some banks accomplished them to control the supply of loans by charging higher price per unit of loans.

Accordingly, efforts have been made to test empirically the relationship; however, the findings are not free from ambiguity. The obvious failure to elucidate clearly the correlation between concentration and market power has provoked many to search for non-structural models. The advantage of these models to measure the degree of competitiveness is that it requires no information about market structure. Gilbert (1984) has pointed out that banking competition models relied on reduced form models (such as concentration measures) and thus he has advised structural models to measure market conduct.

The Bresnahan (1982) methodology is accomplished by using a simultaneous equation model to estimate a system of equations involving the supply and demand functions as well as a cost equation. Alternatively, the contestability hypothesis advocates that even in the features of increased concentration, present firms may still act competitively once a prospective free entrant who can offer similar services at lower costs come into being (Baumol, Panzar, and Willig 1982). The entry threat results in increasing market shares by lowering prices of their products by the incumbent firms. This analysis means that greater concentration may lead to a higher level of consumer welfare. The Panzar and Rosse (1987) model offers a very simple approach to test empirically the market structure of an industry for competitiveness. Inferences made are based on the "H-statistic", which is calculated as the sum of the factor price elasticity estimated from a reduced form of revenue function. Both the size and the sign of H-statistic are used to discriminate between the different market structures. The insight behind the H-statistic rests exclusively on microeconomic theory, which outlines how revenues react to changes in input prices for the different market structures. An increase in these costs will reduce revenue for a firm enjoying monopoly power, but increases revenue proportionately for firms in a perfectly competitive market. Therefore, a perfectly competitive market will have an H-statistic equal to one, while the monopolist will have a negative H-statistic. The monopolistically competitive market should have an H-statistic that somewhere lies between zero and one.

The performances of production firms are often measured in terms of their efficiency. Technical efficiency of a firm can be measured in two ways - input oriented measure, i.e., comparison of the observed level of inputs with the minimum level of input that could produce the observed

level of output. Another is the output-oriented measure of technical efficiency, which compares the observed output, and the maximum level of output that could be produced with the observed input level. Calculations of scale-efficiency measures are relevant when production/cost frontier exhibits variable returns to scale. Scale efficiency arises due to either decreasing or increasing returns to scale. Cost function or cost frontier is used as a conventional technique to measure allocating efficiency. The efficiency hypothesis advocates that different efficiency scores coupled with economies of scope determine the higher than normal profits, but not collusion. The theory of Efficient Structure Hypothesis (ESH) states that efficient firms increase their size and market shares because of their ability to generate higher profits, which usually leads to higher market shares or concentration (Demsetz, 1973; Peltzman, 1997). Thus, the positive relationship between profits and concentration is explained by lower costs achieved either through superior management or through more efficient production processes. It states that high concentration and market share may be favorable to consumer if some parts of efficiency gains are passed on to the consumer through lower price paid by the consumers.

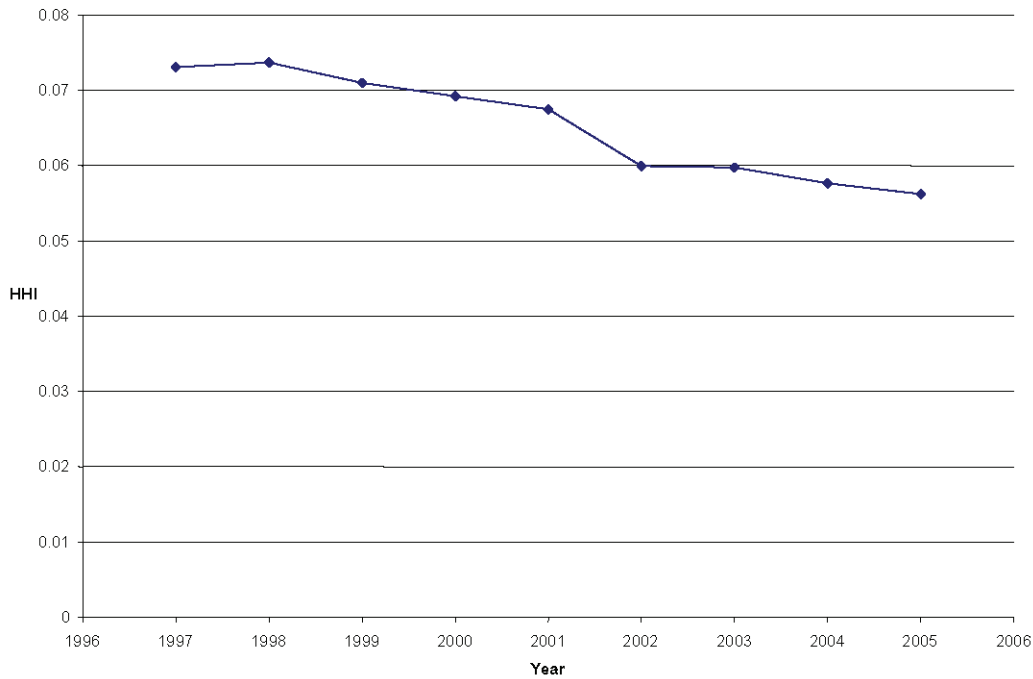
Empirical evidence supports that in concentrated markets banks charge higher rates on small business loans and pay lower rates on retail deposits (Berger and Hannan, 1989, 1997; Hannan 1991). Researchers found that in markets that are more concentrated, deposit rates are sticky or slow to respond to changes in open market interest rates, and the sticky character is more pronounced with respect to increases than with respect to decreases, consistent with market power (Hannan and Berger, 1991; Neumark and Sharpe, 1992; Jackson, 1997). Studies related to local market structure have tested the price-taking versus price-setting behavior of banks, and those support both schemes (Hancock, 1986; Shaffer, 1989; English and Hayes, 1991; Hannan and Liang, 1993).

Shaffer (1993), Shaffer and DiSalvo (1994), Zardkoohi and Fraser (1998) and Ucida and Tsutsui (2005) applied the Bresnahan (1982) and Lau (1982) methodology to the banking industries of USA, Canada, and Japan. Prasad and Ghosh (2005) estimated the Panzar and Rosse (1987) H-statistic of Indian banks in the period 1997-2004 for a sample of 64 banks and found monopolistic competition equilibrium. They derived the result from a sample that does not cover the entire market. Estimated conduct parameter is likely to be biased when sample does not cover the complete market.

3. MODEL

We assume that bank i collects deposit d_i from market and lends q_i amount and purchases b_i amount of securities at

Figure 1: HI



time t . Here we assume intermediation approach and treat deposit as input in the production of single homogeneous output loans together with other factors (Sealy and Lindley 1977; Klein, 1971). Banks are price taker in input and money markets. There are no cost complementarities, i.e., there exists no economies of scope.

The profit function of bank i at time t is:

$$\Pi_{i,t} = P_t(Q_t)q_{i,t} + r_{i,t}^b b_{i,t} - r_{i,t}^d d_{i,t} - C_{i,t}(q_{i,t}, d_{i,t}) \quad (1)$$

where, $P_t(Q_t)$ is the inverse demand function for loans,

$Q_t = \sum_{i=1}^n q_{i,t}$, is the aggregate demand for output, where n is the number of banks, $r_{i,t}^b$, $r_{i,t}^d$, and $C_{i,t}(q_{i,t}, d_{i,t})$, stands for yield on bonds, rate of interest on deposits and operating cost respectively. Banks interact strategically to set output level to maximize profit level, i.e., the i th bank's problem is to maximize $\Pi_{i,t}$ profit function subject to $b_{i,t} + q_{i,t} = d_{i,t}$ (2)

The first order conditions for profit maximization are as follows:

$$\frac{\partial \Pi_{i,t}}{\partial q_{i,t}} = P_t(Q_t) + q_{i,t} \frac{\partial P_t}{\partial Q_t} \frac{\partial Q_t}{\partial q_{i,t}} - r_{i,t}^b - \frac{\partial C_{i,t}}{\partial q_{i,t}} = 0 \quad (3)$$

$$\frac{\partial \Pi_{i,t}}{\partial d_{i,t}} = r_{i,t}^b - r_{i,t}^d - \frac{\partial C_{i,t}}{\partial d_{i,t}} = 0 \quad (4)$$

We can write equation (3) as:

$$P_t \left(1 - \frac{\lambda_{i,t}}{\eta_t}\right) = r_{i,t}^b + \frac{\partial C_{i,t}}{\partial q_{i,t}} \quad (3a)$$

$$\text{where, } \lambda_{i,t} = \left(\frac{\partial Q_t}{\partial q_{i,t}} \frac{q_{i,t}}{Q_t}\right) \text{ and } \eta_t = -\frac{\partial Q_t}{\partial P_t} \frac{P_t}{Q_t}$$

$\lambda_{i,t}$ is the index of the competitiveness of oligopoly conduct. We define conjectural variation as the reaction the firm conjectures about the output of its competitors if the firm is to change its own output. $\lambda_{i,t} = 0$ implies perfect competition,

whereas $\lambda_{i,t} = 1$ implies monopoly equilibrium. It is evident that as $\lambda_{i,t}$ moves farther from zero, the conduct of the firm moves farther from perfect competition (Bresnahan, 1989). $q_{i,t} / Q_t < \lambda_{i,t} < 1$ represents the collection of game equilibrium whose one-shot game is Cournot equilibrium, and for identical firms Cournot equilibrium is $1/n$ and price elasticity of demand for loans is η_t .

Multiplying equation (3a) by η_t we get:

$$R_{i,t} \left(1 - \frac{\lambda_{i,t}}{\eta_t}\right) = r_{i,t}^b q_{i,t} + q_{i,t} \frac{f C_{i,t}}{f q_{i,t}} \quad (5)$$

where, $R_{i,t} = P_t q_{i,t}$ is the interest income from loans and λ_t is the average degree of competition for year t (Bresnahan, 1982).

Equation (5) can be rearranged as:

$$RBA_{i,t} = \frac{\lambda_t}{\eta_t} R_{i,t} + q_{i,t} \frac{f C_{i,t}}{f q_{i,t}} \quad (6)$$

where, $RBA_{i,t} = R_{i,t} - r_{i,t}^b q_{i,t}$

We assume the cost function for bank i as:

$$\log C_{i,t} = C_0 + C_1 \log q_{i,t} + \frac{1}{2} C_2 (\log q_{i,t})^2 + C_3 \log d_{i,t} + \frac{1}{2} C_4 (\log d_{i,t})^2 + C_5 \log w_{i,t} + \frac{1}{2} C_6 (\log w_{i,t})^2 + C_7 \log q_{i,t} \log w_{i,t} + C_8 \log q_{i,t} \log d_{i,t} + C_9 \log d_{i,t} \log w_{i,t} + e_{i,t}^c \quad (7)$$

where, $w_{i,t}$ is the wage rate of bank i at period j.

Substituting derivatives of cost function in equation (6) we obtain:

$$RBA_{i,t} = \frac{\lambda_t}{\eta_t} R_{i,t} + C_{i,t} (C_1 + C_2 \log q_{i,t} + C_7 \log w_{i,t} + C_8 \log d_{i,t}) + e_{i,t}^o \quad (8)$$

We assume demand function for loans as:

$$\log P_{i,t} = b_0 - \frac{1}{\eta_t} \log Q_t + b_2 \log Y_t + b_3 \log NPA_{i,t} + b_4 \log BR_{i,t} + e_{i,t}^d \quad (9)$$

where, Y_t is GDP for the year t, $NPA_{i,t}$ is the net-nonperforming asset at period t, it embraces the credit risk of the banks in our analysis, and $BR_{i,t}$ is number of branches of bank i at period t.

Simultaneous estimation of (7), (8), and (9) provides estimate of the degree of competition together with the estimates of other coefficients. Bresnahan (1982) and Lau (1982) method of testing competitive behavior is accomplished by using a simultaneous equation model to estimate a system of equations involving the supply and demand functions as well as a price equation to derive long run average degree of competition using time-series data. However, the estimation of above simultaneous equation system helps us decipher the average degree of competition for each year by using the panel data.

4. DATA SOURCE

In India, commercial banks act mainly as financial intermediaries. Indian commercial banks collect deposits, give loans, and invest primarily in government securities and other securities as well. We have used the data of Statistical Tables Relating to Banks in India, RBI publications and Reports on Trends and Progress of Banking in India a RBI publication for the period 1996-97 to 2004-05. Estimated conduct parameter using Bresnahan-Lau technique is biased when sample does not cover the complete market (Shaffer, 2001). In our study, we have taken the whole banking sector of the country.

Our sample incorporates data for each bank including public sector, private, and foreign banks after excluding few observations that are either not available or outliers. The sample size of banks varies between 85 and 97. We plotted Herfindahl index (HI) as a measure of market concentration for loan (advances) in Figure 3.1. It shows continuous fall of HI in almost all the years tempting one to conclude that concentration decreases every year.

List and description of data considered for the variables:

$C_{i,t}$ = Operating cost of bank i at time t

$d_{i,t}$ = Deposits of bank i at time t

$r_{i,t}^b$ = Price received from bonds for bank i at time t

$q_{i,t}$ = Amount of advances (loans) of bank i at time t

$w_{i,t}$ = Expenses on employees/ total number of employees of bank i at time t

$R_{i,t}$ = Revenue from advances (loans) of bank i at time t

$P_{i,t}$ = Interest rate on advances (loans) of bank i at time t

Q_t = Total amount of advances (loans) by all banks at time t

Y_t = Gross domestic product at time t

$NPA_{i,t}$ = Non-performing asset ratio of bank i at time t

Table 1: Descriptive Statistics for the Variables Used

Variable	Average	Maximum	Minimum	Median	St. Dev
R	60281.89	1304351	4.00	20247	128381.5
C	35039.2	1007418	113.00	9594	84870.56
d	1187990	36704753	32.00	304557	2904424
q	641744.4	20237446	230.00	176212	1535760
rb	0.09839	0.338309	-0.24176	0.101083	0.029802
W	4.015005	30.76471	0.570336	2.667473	3.699579
P	0.117132	1.21103	0.000467	0.110899	0.056992
NPA	6.500036	61.37	0.00	4.98	7.229881
BR	569.0373	9161	1.00	84	1185.047

Table 2: System Estimation Results

Parameter	3SLS Estimate		Iterative SURE Estimate	
	Estimate	Probability	Estimate	Probability
λ 1997	0.4100	0.0000	0.3829	0.0000
λ 1998	0.2743	0.0000	0.2501	0.0000
λ 1999	0.3383	0.0002	0.3109	0.0002
λ 2000	0.2815	0.0000	0.2584	0.0000
λ 2001	0.3366	0.0002	0.3159	0.0007
λ 2002	0.2124	0.0000	0.1950	0.0000
λ 2003	0.2469	0.0000	0.2329	0.0000
λ 2004	0.2297	0.0000	0.2176	0.0000
λ 2005	0.1553	0.0000	0.1498	0.0000
C0	1.1981	0.0000	1.2309	0.0000
C1	0.2388	0.0147	0.3574	0.0000
C2	0.3202	0.0000	0.1989	0.0034
C3	-0.2478	0.0291	-0.3694	0.0002
C4	0.7436	0.0000	0.6524	0.0000
C5	0.3207	0.1555	0.2962	0.1095
C6	0.3714	0.0180	0.4379	0.0007
C7	0.5800	0.0000	0.5189	0.0000
C8	-0.4463	0.0000	-0.3398	0.0000
C9	-0.6057	0.0000	-0.5498	0.0000
b0	1.9227	0.2555	2.0078	0.2339
b2	0.5861	0.3354	0.5515	0.3635
b3	0.0529	0.0001	0.0551	0.0001
b4	-0.0135	0.0020	-0.0142	0.0011
η 1997	1.1695	0.0141	1.1926	0.0158
η 1998-99	1.1696	0.9816	1.1931	0.9186
η 2000-01	1.1736	0.6193	1.1976	0.5564
η 2002-03	1.1822	0.2478	1.2069	0.2085
η 2004-05	1.1752	0.6963	1.2000	0.6179
Adjusted-R Square				
for(7)	0.9435		0.9454	
for(8)	0.5379		0.5312	
for(9)	0.2905		0.2971	

BR_i , t = Number of branches of bank i at time t

R , C , d , q , and w is amount in Lakh, rb , P , NPA are ratios and BR is measured in numbers.

Simultaneous estimation of (7), (8), and (9) provides estimate of the degree of competition together with the estimates of other coefficients. The above is an over determined system of equations with unknown parameters where residuals are not independently and identically distributed. 3SLS and SURE estimate the parameters of the system, accounting for heteroskedasticity, and contemporaneous correlation in

the errors across equations. 3SLS is a system method that estimates all the coefficients of the model, then forms weights and re-estimates the model using the estimated weighting matrix. The iteration of SURE technique will produce estimates that converge to ML parameter estimates. In order to estimate λ_t , the average degree of competition for year t , we employ dummy variables for each year in equation (8). We use dummy variables for each two years from 1998 to 2005 in equation (9) to estimate η_t to avoid the problem of multicollinearity and to get a reasonable number of the estimates of η_t . We estimated the above-mentioned model

by Three -stage Least Squares and Iterative Seemingly Unrelated Regression equation and present it in Table 2.

5. EMPIRICAL FINDINGS

We report the estimated values of the variables by 3SLS and Iterative Seemingly Unrelated Regression Equations in Table 2. Both the estimates are almost identical. In the cost equation, the estimated coefficients are highly significant, while coefficients of $\log d$, $\log d \times \log q$ and $\log d \times \log w$ are negative and significant at 1 percent level. This is perhaps because public sector banks with large number of branches consider deposit mobilization as the performance indicator of bank officials. Deposit size was only the measuring rod to judge the performance of the employees as well as the balance sheet of every bank. In the demand equation the coefficients of NPA and number of branches have the expected sign (positive and negative, respectively), and are both statistically significant at 1% level. The estimated value of elasticity η for the 1997 is statistically significant. The estimated values of λ_t are statistically significant in all years of our investigation.

Figure 2 depicts estimates of λ_t using both the methods of Three Stage Least Square and Iterative Seemingly Unrelated Regression Equation. The estimated value of λ_t by 3SLS is always slightly greater than that of the estimated value by Iterative SURE method. We can easily conjecture that λ_t had a downward trend in general in the year 2005 compared to the year 1997. The index of competitiveness decreased in alternate years from the measure of the previous year for the period 1997 and 2004. It never reaches the high 1997 level. There is no uniform change in the magnitude of the fluctuation of the degree of competition. However, the estimated parameter of the market power showed regular and consistent decrease from the year 2003.

We have tested the estimated value of λ_t against the following hypotheses:

1. Indian commercial banking market is perfectly competitive.
2. Monopoly (collusive) conduct of the Indian banks to maximize joint profit of the industry is the character of the market.
3. Cournot oligopoly equilibrium prevails in the Indian banking sector, where $1/n$ is the proxy for Cournot oligopoly.

Table: 3 Test of Market Structure

Parameter	Perfect Competition	Monopoly	Cournot Equilibrium
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λ 1997	Rejected	Rejected	Rejected
λ 1998	Rejected	Rejected	Rejected
λ 1999	Rejected	Rejected	Rejected
λ 2000	Rejected	Rejected	Rejected
λ 2001	Rejected	Rejected	Rejected
λ 2002	Rejected	Rejected	Rejected
λ 2003	Rejected	Rejected	Rejected
λ 2004	Rejected	Rejected	Rejected
λ 2005	Rejected	Rejected	Rejected

Rejected at 1% level of significance

Table: 3 shows that the above null hypotheses were rejected at 1 % level of significance against the respective alternative hypotheses. It indicates that Indian banking sector is more competitive than monopoly but less competitive than Cournot oligopoly equilibrium. In summary, we can conclude that the competitive environment of Indian banking sector has improved during the regime of ongoing liberalization and competition has become more severe in the latter two years.

6. CONCLUSION

In this paper, we have tried to analyze the art and the degree of competition in Indian banking sector for the period 1997-98 to 2004-05, where free entry into the market is prohibited by imposition of legal and/or economic barriers. This study also traces the average degree of competition for each year of our investigation as the banking sector has been passing through the ongoing process of liberalization. In this study, we have estimated a structural model containing first order condition for profit maximization, coupled with cost function and inverse demand function. Our findings support that the competitive environment of Indian banking sector has improved during the regime of on-going liberalization, and competition has become more severe in the latter two years compared to that in earlier periods. Therefore, it fulfills the objective of liberalization to make the banking sector more competitive. One can also expect that commercial banking sector in India will be more competitive in coming days if RBI implements the recommendations of Committee on Fuller Capital Account Convertibility (FCAC). Our finding unambiguously supports that the view that with liberalization the banking sector has become more competitive.

ACKNOWLEDGEMENT

The author thanks the participants of the Annual Money and Finance Conference organized by Indira Gandhi Institute of Development Research, Mumbai during January 23- 24, 2009 for their valuable comments. This is the revised version of the paper presented in that conference.

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