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Does Bank Competition Necessarily Contribute to Higher Profits? The Case of Indian Banking

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This paper empirically examines an important research question of whether changes in bank competition have influenced the profitability pattern of Indian banking. Using the two-step system generalized method of moments, we examine the implications of bank deregulation measures on bank profitability for a set of 70 commercial banks in India over the period 1997 to 2017. The findings show that a higher degree of bank competition that has led to the contraction of the interest rates margin has negatively affected bank profitability. The findings also suggest important policy implications for the Indian banking industry.

I. Introduction

Since the inception of financial liberalization, the banking sector in India has undergone multiple rounds of reforms. These reform initiatives primarily aimed to ensure more competitiveness, enhance stability, maintain efficiency, and increase profitability to cater to the needs of greater economic growth. Many empirical studies have attempted to investigate whether these reforms initiatives have changed the degree of bank competition, efficiency, stability, and productivity of the Indian banking industry (Das & Kumbhakar, 2016; Rakshit & Bardhan, 2019, 2022). The reform initiatives have resulted in a changing competitive environment, in a phased manner, where the banks of different ownership groups engaged in fierce bank competition (Das & Ghosh, 2009).

In an emerging economy such as India, the performance analysis of the banking industry holds relevance for the following reasons. First, the deregulation measures that accelerated bank competition have encouraged the big banks of advanced economies to operate in the domestic markets of the host economies to earn high profit margins (Rakshit & Bardhan, 2020). Second, the competition conditions have substantially changed the landscape of banking operations, and the greater competitiveness in the banking market has resulted in lower interest rates. These lower interest rates and regulatory failures have contributed to the growing incidence of non-performing loans in India. Against this backdrop, we address the following research questions. First, has bank competition increased in India since the inception of financial liberalization? Second, has bank competition affected banking performance over time?

The role of bank competition on bank profitability is empirically inconclusive, since the higher degree of bank competition does not necessarily imply greater bank profitability (Fang et al., 2019; Tan, 2016). Theoretically, the impact of bank competition on profitability is documented in the traditional structure–conduct–performance (SCP) paradigm. The SCP paradigm advocates that, in a concentrated banking industry characterized by a lower level of bank competition, banks tend to collude with each other to attain higher profits. A handful of recent empirical literature investigates the determinants of profitability in the Indian banking industry (Ahamed, 2017; Misra, 2015; Seenaiah et al., 2015; Singh, 2010) but they overlook the role of bank competition. It is widely speculated that greater competitiveness that significantly reduces the interest rate margins can adversely affect the bank performance of an economy.

In terms of methodological perspectives, we first estimate bank competition conditions in Indian banking using two non-structural measures of the industrial organization approach, namely, the Lerner index and the adjusted Lerner index. In the second stage, by applying the system generalized method of moments (SYS-GMM) of the dynamic panel data model, we empirically investigate the effect of bank competition on bank profitability from 1997 to 2017. The empirical findings suggest that the Indian banking industry is generally characterized by competition conditions. The estimated values of the Lerner index and adjusted Lerner index suggest that the banking system in India operates under a competitive environment. Concerning the impact of competition on bank profitability, we find that a higher degree of bank competition (lower market power) significantly reduces bank profitability over the examined period.

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The remainder of the paper is organized as follows. Section II presents the data and the empirical model. Section III discusses the empirical findings. Section IV concludes the paper with policy implications.

II. Data and Empirical Model

A. Data

We compile a dataset comprising 70 commercial banks in India over the period 1997 to 2017. These banks include 26 public sector banks, 19 private domestic banks, and 25 foreign banks. Information on bank-specific variables were obtained from the banks' balance sheets and income statements documented in Reserve Bank of India's annual publication reports titled *Statistical Tables Relating to Bank in India*. It provides yearly as well as bank-wise information on annual financial statements, balance sheets, and profit and loss indicators. Data pertaining to the number of employees were collected from *Performance Highlights of Banks*, an annual publication of the Indian Banks' Association. Macroeconomic variables were extracted from the Central Statistical Office, whereas institutional characteristics were obtained from the World Development Indicators of the World Bank.

B. Empirical model

In this study, we use the two-step SYS-GMM estimator as suggested by Arellano and Bover (1995) and Blundell and Bond (1998). Since some of the explanatory variables could be strictly endogenous or weakly exogenous, the application of SYS-GMM solves the issue of endogeneity, using the lagged differences of the regressors as instruments. The Hansen (1982) test is used to test overidentifying restrictions to determine the validity of the instruments. To make sure there is no possible second-order autocorrelation, we use the Arellano–Bond test. We determine whether the variables are endogenous with the Sargan overidentification test (Sargan, 1958).

Following Athanasoglou et al. (2008) and Tan (2016), we express our empirical specification as

$$\pi_{it} = \alpha_0 + \delta\pi_{i,t-1} + \sum_{j=1}^{j} \beta_j X_{it}^{j} + \sum_{l=1}^{l} \beta_l X_{it}^{l} + \sum_{m=1}^{m} \beta_m X_{it}^{m} + \vartheta_{it} + \mu_{it} \quad (1)$$

where i denotes banks, t refers to the year, and α is a constant; bank profitability is indicated by π; $\pi_{i,t-1}$ denoted one-period-lagged profitability; and X_{it} represents the determinant of bank profitability. We further classify the determinants into banks-specific determinants (X_{it}^{j}), industry-specific determinants (X_{it}^{l}), and macroeconomic determinants (X_{it}^{m}). The terms ϑ_{it} and μ_{it} are unobserved bank-specific effects and a stochastic error term, respectively; β_j, β_l, and β_m are the parameters to be estimated; and δ is the speed of adjustment to equilibrium, with estimated values ranging from zero to one, higher values depicting slower adjustment and a less competitive structure and a lower values indicating a higher speed of adjustment with stronger competition.

C. Measurement of bank competition

C1. Lerner index (1934)

The Lerner index is formally defined as the relative difference between the price and the marginal cost divided by the price and corresponds to the inverse of the price elasticity of demand. It shows the ability of banks in terms of the extent to which they can exercise their market power by charging prices over the marginal cost. The Lerner index can be measured as follows:

$$Lerner = \frac{P_{i,t} - MC_{i,t}}{P_{i,t}} \quad (2)$$

where $P_{i,t}$ denotes the price of bank i at time t, MC denotes the marginal cost of banks, and e is the elasticity of demand. The value of the Lerner index ranges from a maximum of one to a minimum of zero.

C2. Adjusted Lerner index

According to Koetter et al. (2012), the adjusted Lerner index, an alternative indicator of market power, considers both the aspects of cost efficiency (reflected in the optimal choice of inputs by banks) and profit efficiency (reflected in the optimal choice of prices). Following Clerides et al. (2015) and Tan and Floros (2018), we use the following form for the estimation of the efficiency- adjusted Lerner index:

$$Adjusted\ Lerner\ Index = \frac{\pi_i + tc_i - mc_i * q_i}{\pi_i + tc_i} \quad (3)$$

for bank i operating in year t; π_i represents the profit of the bank; tc, mc, and q denotes the total cost, the marginal cost, and the total output of the bank, respectively. The interpretation of the efficiency-adjusted Lerner index is similar to that of the conventional Lerner index. The descriptions of the variables, data sources, and their expected signs are presented in Table 1.

III. Results and Discussion

Table 2 presents the results for the effect of competition on bank profitability. Turning to our main variable of interest, we find that the results confirm a positive and significant impact of the Lerner index on bank profitability in India. The main implication of this finding is that a higher degree of bank competition in India has a negative impact on bank profitability, while banks exercising greater market power earn more profits. Bank competition that results in lower interest rates prevents banks from charging a price higher than marginal costs in the market. Thus, higher bank competition significantly reduces bank profitability in India. This finding is in line with our prior expectations and corroborates other findings, including those of Sufian (2012) and Chornopoulos et al. (2015).

Concerning capitalization, the findings confirm a negative and significant impact of bank capitalization on the return on assets (ROA) and the return on equity (ROE). This finding is relevant to the banking sector in India because equity is an expensive financial instrument and, to provide better remuneration to equity holders, banks should provide better margins to compensate for additional risks. We

Table 1. Description of the variables, data sources, and their expected sign

Variable	Measurement	Expected Sign	Source
Profitability indicators			
ROA	The ratio of net income to total assets		RBI
ROE	The ratio of interest income to total equity		RBI
NIM	The ratio of net interest income to earning assets		RBI
PBT	**Profit before taxes/ total assets**		
Bank- Specific Variables			
Bank size	This is defined as the natural logarithm of total banking assets	Inconclusive	RBI
Credit risk	The ratio of Non-performing loans to total loans	Negative	RBI
Liquidity Risk	Liquid assets to total assets	Inconclusive	RBI
Capital Risk	Total Regulatory Capital Ratio	Inconclusive	RBI
Diversification	The ratio between non- interest income to total revenue	Inconclusive	RBI
Capitalization	The ratio between equity and total assets	Inconclusive	RBI
Asset Quality	Loan/ total assets	Positive	RBI
Labour productivity	Total revenue divided by the total number of employees	Positive	RBI
Industry Specific variables			
Bank Competition	We measure bank competition by applying three non-structural indicators namely the Lerner index, adjusted Lerner index, and Boone indicator. Details are given in the methodology section	Inconclusive	RBI
Concentration	Herfindahl Hirschman Index (HHI) and three bank concentration ratio (CR3) measured by total assets of largest three banks/ total assets of the entire banking industry	Inconclusive	RBI
Financial Freedom		Positive	WDI
Stock Market Development	The market capitalization of the listed companies to GDP	Positive	
Macroeconomic Variable			WDI
GDP growth rate	The annual real GDP growth rate	Inconclusive	WDI
Inflation rate	An annual inflation rate proxied by the consumer price index (CPI)	Inconclusive	WDI

Source: Author(s) Calculation

find that bank size is significantly and negatively related to bank profitability when measured by ROA and ROE. A possible explanation for this finding can be linked to the fact that the management and operating costs associated with large banks are higher. Moreover, large banks usually employ greater numbers of employees, which increases their labor costs and can ultimately decrease bank profitability in India. This finding is not unusual and is in agreement with the previous studies of Goddard et al. (2011) and Francis (2013). Contrary to this finding, however, we note a positive and significant effect of bank size on the net interest margin.

We observe a negative association between diversification and bank profitability, except for the first model. The argument behind this finding is that, as in traditional banking activities, there is a high degree of bank competition in the non–interest-based income activities in the banking industry, reducing the share of non-interest income to total assets. In such a situation, diversification can lead to lower bank profitability. This finding is consistent with the results of Demirgüç-Kunt and Huizinga (1999), Gischer and Juttner (2001), and Tan (2016). We find labor productivity, financial freedom, and stock market capitalization to have a positive and significant impact on bank profitability in India in almost all specifications, as expected.

Turning to the macroeconomic variables, we find that inflation is positively and significantly linked to bank profitability when we use the ROA, the ROE, and profit before tax as profitability indicators. This result suggests that Indian banks can anticipate the inflation rate and the bank regulatory authorities could therefore manage the interest rate in line with the expected inflation rate. Pasiouras and Kosmidou (2007) and Garcia- Herrero et al. (2019) report similar results.

We then check the robustness of our main findings. Table 3 reports robustness test results. First, we use an additional measure of bank competition, the adjusted Lerner index. To measure the market structure of the entire banking industry, we employ the Herfindahl–Hirschman Index (HHI) in the robustness analysis. First, with regard to bank competition, just as the Lerner index used previously, the adjusted Lerner index has a positive and significant impact on bank profitability in India. This result implies that a higher degree of bank competition (lower market power) reduces bank profitability over the examined period.

Second, concerning the market structure, the estimated values of HHI and the three-firm concentration ratio are

Table 2. Effects of bank competition on profitability

	ROA	ROE	NIM	PBT
Lagged ROA	0.312*** (0.0705)			
Lagged ROE		0.334*** (0.0794)		
Lagged NIM			0.278*** (0.0294)	
Lagged PBT				0.179*** (0.0546)
Liquidity Risk	-0.229*** (0.0546)	-0.091*** (0.0098)	-0.044*** (0.0049)	0.352*** (0.1292)
Bank Competition (Lerner index)	0.560*** (0.1396)	0.336*** (0.1055)	0.141** (0.0686)	2.949*** (1.0027)
Diversification	0.087*** (0.0021)	-0.088*** (0.0031)	-0.161*** (0.0511)	0.007 (0.0605)
Capitalization[a]	-0.421*** (0.0918)	-0.013*** (0.0047)	0.011*** (0.0015)	-0.001 (0.0141)
Bank Size	-0.090*** (0.0096)	-0.063* (0.0051)	0.084*** (0.0046)	0.014 (0.0093)
Labour Productivity	0.066 (0.0098)	0.282*** (0.0817)	0.201*** (0.1110)	0.227*** (0.0296)
GDP Growth	-2.3568*** (1.0254)	-8.916*** (3.0874)	-3.393*** (1.0549)	-9.442*** (3.0761)
Inflation	0.361*** (0.0758)	0.288*** (0.0453)	-0.157*** (0.0589)	0.381*** (0.0956)
Stock Market Capital	0.056*** (0.0103)	-0.023* (0.0128)	0.003 (0.0636)	0.227*** (0.0584)
Financial Freedom	0.004*** (0.0066)	0.024*** (0.0071)	0.011*** (0.0050)	-0.029*** (0.0066)
Constant	-2.55*** (0.1698)	0.788** (0.0021)	-1.510*** (1.2768)	1.541*** (1.8285)
Observations	1430	1435	1432	1435
Cross- Sections	70	70	70	70
Hansen P value[1]	0.16	0.12	0.24	0.30
AR (1)[2]	-3.84 (0.000)	-3.99 (0.000)	-2.26 (0.024)	-2.64 (0.008)
AR (2)[3]	-0.37(0.712)	0.00 (0.997)	1.26 (0.208)	0.70 (0.485)

Note: *, ** and *** represents level of significance at 10%, 5% and 1%, respectively. Estimations were performed using SYS-GMM. Two steps results have been reported only. Figures in the parentheses represent robust standard error. The endogenous variable is instrumented using two periods lagged. [1] is the test for overidentifying restrictions, where H0: overidentifying restrictions are valid. [2] Arellano-Bond test p- value that average autocovariance in residuals of order 1 is 0 (H_0: no autocorrelation). [3] Arellano-Bond test p- value that average autocovariance in residuals of order 2 is 0 (H_0: no autocorrelation). In all our model, number of instruments were less than number of cross-sections.

found to be positive and significant. The positive impact of these concentration measures on bank profitability lends support for the SCP hypothesis. Concerning bank-specific and other macroeconomic indicators, the results are largely consistent with our previous results. Considering the consistency between the main results and additional robustness tests, we tend to claim that all the estimated models are a good fit for this empirical analysis.

IV. Conclusion and Policy Implications

The main purpose of this paper is to investigate the impacts of bank competition and stability on bank profitability in India over the period 1997 to 2017. By examining the different indicators of bank competition and risk on bank profitability, this paper contributes significantly to the empirical banking literature on emerging countries such as India. The findings imply several policy recommendations for the groups of stakeholders, including the Indian government, the banking regulatory authorities, and bank managers, to improve bank profitability in India. First, the Reserve Bank of India should review contestable competition policies and consider the possibility of increasing bank market power without hampering the agenda of bank competition. Second, since the Indian banking industry is grappling with a growing incidence of non-performing loans, which is adversely affecting bank profitability, the government should implement strict regulatory policies to maintain the banking sector's stability.

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Table 3. Robustness test

	ROA	ROE	PBT	NIM
Lagged Dependent Variables	0.314*** (0.0827)	0.320*** (0.0733)	0.268*** (0.0665)	0.343*** (0.1188)
Credit Risk (NPL)	-0.056** (0.0035)	-0.023 (0.0063)	-0.059*** (0.0018)	0.005 (0.0056)
Capital Risk	0.280*** (0.0642)	0.008 (0.0547)	0.370*** (0.1058)	-0.125*** (0.0364)
Bank Competition (ALI)	2.139*** (0.1776)	2.097*** (0.2216)	0.080*** (0.0035)	0.098*** (0.0010)
HHI	1.869*** (1.1028)	10.86** (1.382)	0.110 (0.4837)	0.469*** (0.2456)
CR3	0.284* (0.1237)	0.448** (0.1858)	3.006*** (1.462)	3.146*** (1.5875)
Diversification	-0.114*** (0.0087)	-0.104*** (0.0067)	-0.004 (0.1142)	-0.089*** (0.0235)
Capitalization	-0.098 (0.0091)	-0.3263 (0.1822)	-0.234*** (0.1164)	0.090*** (0.0125)
Bank Size	0.017 (0.0693)	0.095*** (0.0382)	0.077*** (0.0267)	0.033*** (0.0098)
Labour Productivity	0.010 (0.1339)	0.017 (0.1234)	0.171*** (0.0429)	0.089*** (0.0251)
GDP Growth	-4.850*** (1.219)	-2.800*** (1.254)	-9.539*** (3.4159)	-3.540*** (1.560)
Inflation	0.097** (0.0421)	0.164*** (0.0645)	0.155*** (0.0085)	0.004 (0.0655)
Stock Market Capital	0.002 (0.0821)	0.031 (0.0841)	-0.02** (0.0754)	0.033** (0.0732)
Financial Freedom	0.020*** (0.0098)	0.002*** (0.0115)	0.001*** (0.0120)	0.003*** (0.007)
Constant	3.502 (2.2553)	9.856*** (2.7328)	1.10*** (0.4718)	9.58*** (1.023)
Observations	1430	1435	1432	14735
Cross- Sections	70	70	70	70
Hansen P value	0.96	0.94	0.97	0.95
AR (1)	-3.16 (0.002)	-3.55 (0.000)	-3.72 (0.000)	-1.97 (0.004)
AR (2)	-1.06 (0.290)	-0.94 (0.349)	-0.36 (0.716)	1.15 (0.250)

Note: *, ** and *** represents level of significance at 10%, 5% and 1% respectively. Estimations were performed using SYS-GMM. Two steps results have been reported only. Figures in the parentheses represent robust standard error. The endogenous variable is instrumented using two periods lagged. Arellano-Bond test p-value that average autocovariance in residuals of order 1 is 0 (H_0: no autocorrelation). Arellano-Bond test p-value that average autocovariance in residuals of order 2 is 0 (H_0: no autocorrelation).

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