A Panel Data Analysis of Profitability Determinants:
Empirical study of Indian Public and Private Sector Banks

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Abstract

The present paper empirically analysis the determinants of profitability of 26 Public and 19 Private sector banks in India for the period from the year 2011-2016. Theoretical framework is based upon Market Power Theory (Bain, 1951) -and Signalling Theory (Arrow, 1972 and Spence, 1973). Secondary source of data has been used. Return on Assets (ROA) has been used as a predictor of profitability of the Indian Banks. Independent variables, namely spread ratio, provision and contingencies, Credit Deposit Ratio, Operating Expenses Ratio, Profit per Employee, Business Per Employee, Non-Interest Income, Investment Deposit Ratio, Capital Adequacy Ratio, Non Performing Asset Ratio, Type of Bank have been used. Correlation and Panel Data Regression Analysis has been used. Multicollinearity has also been checked with the help of VIF values. Various Hypotheses have been developed on the basis of review of literature to test the association between profitability of respective banks and other independent variables. The results show that 64.94% variation in ROA is explained by variations in independent variables. The study also reveals an interesting result that provision and contingencies (negative) significantly influences the profitability of banks @10%, Non-Interest Income (positive), Business per Employee and Capital Adequacy Ratio (positive) @5%, Profit per Employee (positive) and Investment Deposit Ratio(negative) @1% respectively. Various variables namely Spread and Credit Deposit ratio have positive insignificant association with profitability and Operating expenses; Non-Performing Assets have negative insignificant association with profitability.

Keywords: Public Sector bank, Private sector banks, profitability, ROA, Panel Data

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Introduction

Indian economy witnessed a profound change during its growth phase. Indian Banking sector has remained stable despite global upheavals, thereby retaining public confidence over the years. Strong growth in savings amid rising disposable income levels are the major factors influencing deposit growth which has been increased during last year. Access to banking system has also improved over the years due to persistent government efforts to promote banking-technology and promote expansion in unbanked and non-metropolitan regions. Indian banking industry has recently witnessed the role out of innovative banking models like payments and small finance banks. RBI's new measures may go a long way in helping the restructuring of the domestic banking industry.

The Indian banking industry is doing remarkably well in terms of lending credit, advances, investment, overseas operations, increasing shareholder value, efficiently capital allocation and contributing to GDP of Indian economy. Various measures have been recently adopted to quicken India's transition to cashless economy, including a ban on cash transactions over Rs 200000 (US$ 3,100), tax incentives for creation of a cashless infrastructure, promoting greater usage of non-cash modes of payments and making Aadhaar-based payments more widespread. Demonetization of high denomination bank notes of Rs 1000 and 500, w.e.f November,08,2016, has also been undertaken in order to eliminate black money and the growing menace of fake Indian Currency notes, thereby creating opportunities for improvement in economic growth. Enhanced spending by the Indian government on infrastructure, speedy implementation of projects and continuation of reforms are expected to provide further impetus to growth. It provides a clear picture that India's banking sector is poised for robust growth as the rapidly growing business would turn to banks for their credit needs.

After introduction of globalization policy since 1991, the Indian banks have opened their way to enter overseas countries too. They have expanded their operations beyond territories of India. Several Indian banks are pursuing global strategies; as Indian companies globalize and people of Indian origin increase their investment in India. At same time, a large number of global banks have stepped up their focus on India, keen to participate in the sector's growth. Due to competition being faced by new entrants, Indian banks have to adopt new strategies to survive and sustain their growth rate. They have become globally competitive, adopted customer oriented approach, high technology, online banking and are following best global practices in accounting and disclosure. At present, Indian banking industry is by far, the most dominating segment of the financial sector, accounting for as it does, over 80% of the financial flow in the financial sector.

The Indian banking industry is now graduating beyond traditional boundaries of plain vanilla banking. It has entered new areas such as, new assets management, wealth management, treasury products, private banking, doorstep banking, internet and mobile banking, credit cards, investment advisory services etc. Prudent regulatory polices (framed by RBI) have ensured that Indian banks emerge unscathed from the global credit crisis. India is among the few countries to have implemented Basel II framework. Most of the banks have put in place the framework for asset-liability match, credit and derivatives risk management. Indian banks are rapidly focusing on SMAC (Social, Mobile, Analytics & Cloud) techniques to reach new customers. Now a paradigm shift can be observed from traditional branch banking to net banking in India.

However, the banks are now facing a number of challenges such as frequent changes in technology required for modern banking, stringent prudential norms, increasing competition, worrying level of NPA.s, rising customer expectations, increasing pressure on profitability, assets-liability management, liquidity and credit risk management, rising operating expenditure, shrinking size of spread and so on. The reforms in banking sector have also brought the profitability under pressure. RBI's efforts to adopt international banking standards have further forced the banks to shift the focus to profitability for survival (Badola & Verma, 2006). Profitability remained depressed with the return on Assets (ROA) continuing to linger below 1% during last years. Further, though Public sector Banks account for 72% of the total banking assets, in terms of profits it has only 42% share in overall profits. Hence, profitability has become major area of concern for bank's management.

Therefore, the determinants of bank performance and profitability have attracted the interest of academic research as well as of banking management, financial markets and bank supervisors.

Review of Literature

A snapshot of the empirical studies reviewed for the present study has been presented in table 1.

Table 1: Empirical Studies on the Profitability predictors of Banks

Author	Period of study	Sample size/Country of the study	Dependent Variable	Independent variables	Statistical techniques used	Significant explanatory variables
Athanasoglou et al. (2005)	1985-2001	Greek Banks	ROA (profits to assets ratio) and ROE (Profits to equity).	Bank specific (operating efficiency, financial risk, size), industry specific (industry concentration, ownership status) and macroeconomic factors (cyclical output, inflation)	GMM technique, Panel data analysis	operating efficiency, financial risk, effect of business cycle is asymmetric.
Anwar & Herwany (2006)	1993-2000	Provincial Government's Banks and Private Non - Foreign Exchange Banks Indonesia	ROA (Net Income/total assets) and ROE (Net Income to total Equity).	LOTA (Loan to Total Assets), TSTD (Time and Savings Deposits to Total Deposits), CRTA (Capital and Reserves to Total Assets), LIQ (Loans to Deposits Ratio), TETA (Total Expenses to Total Assets), LOGTA (Logarithm of Total Assets), MON (Growth in Money Supply), INT (Interest Rate), INF (Inflation Rate).	Regression Analysis	TETA (Total Expenses to Total Assets and CRTA (Capital and Reserves to Total Assets) dominantly and consistently affect ROA and ROE. In General, it can be concluded that cost management, capital adequacy, and assets and liabilities management are the most im portant factors that determine the bank's profitability.
Badola & Verma (2006)	1991-92 to 2003-04	Public sector Banks India	Net Profits	Spread (S), Non -Interest Income (NII), Credit/ Deposit Ratio (C/D), NPA as percentage to Net Advances (NPA), Provision and Contingencies (P&C), Operating Expenses (OE), Business per Employee (BPE), Profit per Employee (PPE).	Step-wise multivariate analysis	Spread (+), Non-Interest Income (+), Credit/ Deposit Ratio (+), NPA(-), Provision and Contingencies (-), OE (-), BPE (+),PPE(+)
Amburime (2006)	2000-2004	31 banks Nigeria	ROA (profits to assets ratio)	capital size, size of credit portfolio and ownership concentration, size of deposit liabilities, labour productivity, state of IT, ownership, control-ownership disparity and structural affiliation and bank risk	Panel Data Regression Analysis	capital size (+), size of credit portfolio (-), and ownership concentration (+)

Singh & Chaudhary (2009)	200-01 to 2006-07	All Public, Private And Foreign sector banks India	Operating Profits	Bank specific (investment, advances, deposits and assets) and macro economic (per capital income, exports, foreign exchange ratio etc.)	Simple Multiple Regression Analysis	Investments, Macro Economic factors (All Banks), advances, deposits and assets affected profitability of private sector and foreign sector banks only.
Ramlall, I. (2009)	2002-07	Taiwanese bank	ROA (Pre tax profits over total assets)	Bank Specific (Size, Capital, credit risk, efficiency), Industry specific (HHI -Deposits, HHI-Credits, HHIAssets), Macroeconomic factors (stock market capitalization, GDP, Interest rates, cyclical outputs, economic development).	Panel data analysis	Credit risk (negative), Capital (positive), well diversified system,
Bodla et al. (2010)	1998-99 to 2005-06	29 Private sector banks India	——	Inputs (Interest expense, Non Interest Expenses, NPA ratio), Outputs (Deposits, Advances, Investments)	Data Envelopment Analysis (DEA)	31.25% banks found to be efficient. NPA is reduced and Need to improve input parameters.
Vong & Chan (2010)	1993-2007	Banks in Macao	ROA (Net Income/Total Assets)	Bank specific, Macroeconomic and financial structure	Panel data Analysis	Bank size (negative), Efficiency (positive), Inflation (positive),
Manoj, P.K. (2010)		Old private sector banks (Kerala) India	Profitability (operating profit ratio= operating profits/total assets)and operational efficiency(Net Interest margin= net interest income/ total assets)	Assets size, PRIOR (share of priority sector advances in the total advances), government securities expressed as a ratio of total assets (GSEC), Non interest income, RURAL (ratio of rural and semi urban branches urban and metropolitan branches).	Multiple regression Analysis	Non interest income (+), Investment in government securities (-).
Malhotra et al. (2011)	2005-09	20 Public and 15 Private Sector Commercial Banks India	Profitability ratios (ROA, ROE)	Asset utilization, efficiency, total income to capital employed, deposit concentration, loan concentration, asset concentration, total deposit to owned funds, capital adequacy, interest expended to interest earned, interest spread, Net interest income to total funds.	Panel data Regression Analysis	Net interest margin has improved, cost of intermediation is actually rising and banks are responding to the increased costs with higher efficiency levels.
Ani W.U. et al.(2012)	2001-10	15 banks Nigeria	ROA (Net Income/Total Assets)	Total assets, Total equity to total assets, Assets composition (Total loans and advances (TL&A) to total assets (TA),	Pooled OLS, Multiple Regression Analysis,	Size (-), CAR, Asset Composition (+)

Dutta and Gupta (2013)	2009-10 to 2011-12	Indian Public sector banks	ROA (Net Income/Total Assets)	Spread, Provision and Contingencies, Non Interest Income, Operating expenses, NPA	Backward Regression analysis	Spread, Provision and Contingencies, Non Interest Income, Operating expenses, NPA
Roman, A., Dănuleţiu, A.E.(2013)	2003-11	15 commercial Roman banks	Profitability ratios (ROAA, ROAE)	the ratio of total equity to total asset (EA), (NLP), non-interest expense over total assets ratio (NIEA), the ratio of loans to total assets (LA), the ratio of liquid assets to total assets (LIQA), funding costs (FC), (NIIR), (LNTA), the 5-bank concentration ratio (CR5), (MKCGDP), GDP growth rate,, (INF).,	Panel Data Regression Analysis	ratio of nonperforming loans, the management quality and the ratio of liquid assets to total assets, banking concentration and GDP.
Dhani.S. (2014)	2003-13	38 Indian banks listed on NSE/BSE.	ROA (Net Income/Total Assets)	Total deposits to total liabilities, Cash to deposits Cash/deposits, Employee cost to total expenses, % growth in net profits, Total debt to equity, Capital adequacy ratio, Yield on advances.	Multiple Regression Analysis	Yield on advances, Employee cost to total expenses, Total deposits to total liabilities.
Misra (2015)	2000-11	121 banks	Profitability ratios (ROA, ROE)	Asset quality, Ratio of loans to total assets, net interest Margin, Non Interest Income, Size of bank, CAR.	Panel Data Regression Analysis	Asset quality, Ratio of loans to total assets, net interest Margin, Non Interest Income, Size of bank, CAR.
Petria et al. (2015)	2004-2011	Banks in EU 27 banking system	Profitability ratios (ROAA, ROAE)	Bank size, CAR, Credit Risk, Management efficiency, Liquidity risk, Business mix indicator, Market concentration, Inflation, Economic growth	Panel Data Regression Analysis	credit and liquidity risk, management efficiency, the diversification of busin ess, the market concentration/competition and the economic growth
Boadi, L(2015)	1997-2014	Ghanaian Banks	ROA (Net Income/Total Assets)	Liquidity Ratio, Capital to Total Asset Ratio, Deposit to total asset ratio, overhead to total asset ratio, non interest income to total asset ratio, Non performing loans to total asset ratio, number of employees, economic growth, inflation, real interest rate.	Random effects and Pooled Ordinary least square models.	Capital structure, capital to asset ratio, GDP growth
Singh (2015)	2005-14	Public sector banks India	ROA (Net Income/Total Assets)	Secured advance to total advances, burden to total assets, burden to interest income, operating profits to total assets, non - interest income to total assets, Profit per employee, NPA, Deposits to total liabilities, NIM	Vector Error Correction Model (VECM), causality test.	Secured advance to total advances, burden to total assets, burden to interest income, operating profits to total assets, non-interest income to total assets, Profit per employee (long run), NPA, Deposits to total liabilities, NIM (short run).

Kumber (2016)	2006-16	Indian Private Sector banks listed on NSE	ROA (Net Income/Total Assets)	————————	Multiple Regression Analysis, CAMEL Model	Positive association with CAR, Profit per employee, Business Per employee
Kedia (2016)	2006-13	Indian Public sector banks	ROA (Net Income/Total Assets)	————————	Multiple Regression Analysis,	NPA, Credit Deposit Ratio, Non Interest Income, Operating Expense.
Singh & Sharma (2016)	2000-13	59 Indian banks	liquidity	Bank size, profitability, cost of funding, CAR, Bank ownership, deposit, GDP, inflation and unemployment	Panel Data Regression Anlaysis	Bank ownership, Bank size (-), profitability, CAR, Bank ownership, deposit, GDP(-), inflation.
Topak & Talu (2017)	2005-15	10 commercial banks on the BIST Banks Index	Profitabilty ratios (ROA, ROE)	Net Interest margin, the ratio of net fees and commission to toal operating expenses, ILID,ESA, Size, credit risk, OEI, NPL, Inflation, GDP, Exchange rate basket.	Panel data Regression Analysis	net interest margin (+),(FCE) (+), SIZE (+), credit risk (-), capital adequacy Ratio (-), OEI(-), Inflation, GDP (+), ERB (-).
Akinkunmi, M.A., (2017)	2001-15	20 commercial banks Nigeria	Profitability ratios (ROA, ROE, NIM)	Efficiency ratio, Credit risk, CAR, market concentration, Real GD, business mix indicator.	Panel data Regression Analysis	Efficiency ratio, Credit risk, CAR.

Table 1 shows that a large number of empirical work has been carried out in number of countries (developed as well as developing) to study the determinants of profitability of banks. So, it appears to be a burning issue in the present competitive, liberalized and deregulated environment. Internal and external determinants (including bank specific, financial structure specific and macro economic) have been examined in predicting the profitability of banks in various studies. The predictors most frequently studied are spread, interest income, capital adequacy ratio, business per employee, profit per employees, NPA, operating expenses, credit deposit ratio, provisions and contingencies, non interest income, ownership concentration, assets size of banks, inflation, growth rate, market concentration, interest rates etc.

Need and Objective of the Study

The growth in the Indian banking industry has been more qualitative than quantitative and it is expected to remain the same in the coming years. Based on the projections made in the "India Vision 2020" prepared by the Planning Commission and the Draft 10th plan, the report forecasts that the pace of expansion in the balance-sheets of banks is likely to decelerate. As per the Reserve Bank of India (RBI) (report www.ibef.org, November, 2017),

India's banking sector is sufficiently capitalized and well-regulated. The financial and economic conditions in the country are far superior to any other country in the world. Indian banking sector has grown at a healthy pace from financial year 2013-16. Total banking assets have increased at a CAGR of 7.61 per cent to USD 1.957 billion during the financial years 2013-16. Assets of Public sector banks, which account for more than 70% of total banking assets, grew at a CAGR of 5%, whereas private sector expanded at CAGR of 13%. Public sector banks account for over 71.72% of interest income in the sector in FY 2016. Overall, the interest income for the sector has grown at 8.74% CAGR during FY 2009-16. Credit, market and liquidity risk studies suggest that Indian banks are generally resilient and have withstood the global downturn well.

India is well positioned to become the fourth largest economy in the world by 2025 with a GDP growth rate of 7-8% a year (McKinsey and Company's report 2010). Indian banks are subjected to tremendous pressures for enhancing profitability to sustain competition in the market. Now the focus of banks has been shifted from class banking to mass banking. The need of the concern is that the public sector banks are the oldest banks and private sector banks are new banks in India. Both public and private sector banks are facing different set of challenges. While public sector banks are plagued with asset quality issues leading to higher credit costs and losses. Private sector banks on the other hand face challenges of increasingly competitive intensity because of weak credit demand. Besides, the buoyant debt markets pose challenges of balancing growth and profitability. They are trying to overcome all these shortcomings and aiming profit maximization, a need was felt to study the profitability predictors of these banks.

Thus, the objective of the present study is to predict the profitability indicators of the public and private sector banks in India.

Data Base and Methodology

The study constitutes 26 public sector banks and 19 private sector banks in India. PSB includes SBI group (6 banks including 5 subsidiaries of SBI), 19 nationalized banks and one new public sector bank (IDBI Ltd). The secondary data has been used for the present study. The annual reports and websites of respective banks, the website of Reserve Bank of India and Indian Banking Association and their bulletins are the major source of data collection.

The determinants affecting the bank's profitability have been studied for the period from 2011-2016 respectively. This period is relevant because it represents the post recession period during which the banks in developed nations like USA have been affected badly. This period also poses certain challenges as shifting of focus of banks to client servicing. An assessment of profitability in the Indian banks too needs to be made during this time period.

The Product moment correlation coefficient analysis, Panel data regression analysis have been used to analyze the impact of determinants of profitability on the performance of public and private sector banks in India. SPSS 15.0 version software has been used for the present study.

Dependent Variable

Return on Assets (ROA) is taken as the dependent variable as it reflects as to how well a bank's management is using the banks real investment resources to generate profits.

It is calculated as:

ROA = Net Income/Total Assets

Independent Variables

1. Spread Ratio: Spread represents the difference of Interest received and interest paid. The ratio is calculated as a percentage spread to total assets. The higher the ratio, the more will be the profitability. It can be written as, Spread Ratio= Spread/Total Assets.

2. Provision and Contingencies: These represent a portion of profits kept for contingent situations and expenditure and thus have a direct bearing on the profitability.

3. Non Interest Income: This represents income of a bank from its allied and non-banking activities. Banks should operate at lower cost to increase profitability. This is calculated as, Non-interest income/Total Assets.

4. Credit Deposit Ratio: it is calculated as, Total advances/total deposits. The ratio bears a positive relationship with profitability as it highlights effective utilization of deposits which are the major and cheapest source of revenue to the bank. However, a lower ratio may indicate that the deposits are merely serving as a burden to the banking business.

5. Operating Expense Ratio: It is calculated as, Operating Expenses/Total expenses. The ratio has a negative relationship with profitability as it high ratio highlights operational inefficiency of a bank.

6. Profit per employee: The ratio has a positive relation with profitability and depicts employee efficiency.

   Profit per Employee= Net profits/total number of Employees.

7. Business per employee: The ratio bears a positive relation with profitability as it highlights the efficiency of human resources in relation to the core business of banking.

   Business per Employee= Deposits+ Advances/ Total number of employees.

8. Investment Deposit Ratio: This is calculated as, Investments/Deposits. The ratio highlights the efficiency of a bank to invest its deposits and surplus cash so as to generate profits.

9. Capital Adequacy Ratio: This is calculated as, Capital/ Risk Weighted Assets of a business. In the adoption of risk management strategies by a bank the ratio determines the cushion available to a bank against the credit risk, operational risk and market risk.

10. Non Performing asset ratio: this is calculated as, NPA/Total assets. The ratio bears a negative relationship with profitability as it indicates the credit risk of the bank

11. Type of bank: The total sample of 45 banks is represented by 26 public sector banks and 19 private sector banks.

Hypotheses of the Study

The hypotheses of the study are developed on the basis of review of literature supporting economic theories.

Market Power theory (Bain, 1951) states that increase in market power leads to monopoly, profits (Athanasoglou, Brissmis & Delis, 2005). The market theory assumes that extra profits result from a higher market concentration allows commercial banks to collude and earn supernormal profits. It arises due to the firms portfolio of differentiated products that also increase the market share and market power in determining prices for products (Mirzaei, 2012). This theory applies to banking Industry to explain bank's profitability and how it is affected by market share.

Signaling Theory (Arrow, 1972 & Spence, 1973) explains the positive relationship between CAR and profitability. It indicates that asymmetric information allows managers to have better information than outsiders about future cash flows. Therefore, managers expect to signal this information through capital structure decisions. If banks expect to increase their profitability, they should have higher capital, because the CAR of bank determines the capacity of banks to absorb unexpected losses. In this theory, an excessively high capital ratio indicates that a bank operates conservatively and ignores some potential investment opportunities. In light of above explanation and on the basis of prior literature, the hypothesis related to profitability predictors of the Public and Private sector banks has been developed and tested.

H_1: The higher the spread ratio, the more will be the profitability.

H_2: Provisions and Contingencies have a negative relationship with profitability

H_3: Non Interest Income bears a positive relationship with profitability.

H_4:   Credit Deposit ratio bears a positive relationship with profitability.

H_5:   Operating Expense ratio has a negative relationship with profitability.

H_6:   Profit per Employee has a positive relation with profitability and depicts employee efficiency.

H_7:   Business per employee bears a positive relation with profitability.

H_8:   Investment Deposit ratio bears a positive relation with profitability as more the profitable investments, more would be the profitability.

H_9:   Capital Adequacy Ratio bears a positive relationship with profitability.

H_{10}:   Non Performing Assets bears a negative relation with profitability as it highlights poor credit management of the banks.

H11:   Private sector banks outperform Public sector banks.

Results and Discussion

Correlation Analysis

The Pearson product moment correlation (r) was computed to examine the correlation between the dependent and independent variables and with the dependent variables. A correlation matrix of all the values of r for the explanatory variables along with dependent variables was constructed and is shown in table 2.

Table 2: Correlation coefficients between Variables and VIF coefficients

	ROA	Spread	P & C	NII	CDR	OE Ratio	PPE	BPE	ID Ratio	CAR	NPA Ratio	VIF Values
ROA	1.000											
Spread	.6869*	1.000										2.15
P&C	-.0067	.0314	1.000									1.26
NII	.5953*	.5056*	.1134*	1.000								2.46
CDR	.4137*	.3850*	.2424*	.5359*	1.000							1.77
OE Ratio	.1755*	.4365*	.0529*	.4239*	.1981*	1.000						1.67
PPE	.1709*	.0642*	.1343*	.1915*	.2885*	-.017	1.000					1.18
BPE	-.181*	-.5287*	.1305*	-.342*	-.193*	-.507*	-.169*	1.000				1.77
ID Ratio	.2469*	.1318*	-.067*	.5072*	.3386*	.1705*	.1674*	-.166*	1.000			1.66
CAR	.3997*	.4152*	-.066*	.2878*	.3970*	.3419*	.0888*	-.2737*	.3851*	1.000		1.71
NPA Ratio	-.7212*	-.483*	.1865*	-.423*	-.254*	-.269*	-.0345	.2716*	-.2382*	-.4202*	1.000	1.59

Note: *,**,*** indicate significance at 1%, 5% and 10% levels, respectively.

Table 2 shows that there is high positive significant correlation between spread, Non Interest Income, Credit Deposit Ratio (more than .50) and ROA at 1% level. The variable OE ratio, PPE, ID ratio, CAR have positive significant correlation at 1% level. However, NPA ratio and BPE have negative significant correlation at 1% level. P&C ratio has negative insignificant relation with ROA. Because of higher correlation coefficients, it may cause to multicollinearity error problems between variables. Variance Inflation Factor (VIF) was used to test this situation. According to tests, VIF values were less than 10, so there was not a multicollinearity problem between variables.

Therefore, all explanatory variables can be used in panel data set at the same time.

Hausman Specification Test

Hausman specification test has been used to determine which one of the alternative panel analysis methods (fixed effects model and random effects model) in the panel regression model should be applied. With regard to this, H0 hypothesis claims that "random effects exist" and H1 hypothesis claims that "random effects do not exist". The results of the Hausman specification test for the panel regression model is given in Table 3.

Table 3: Hausman Specification Test results

Model	Chi-square Test	P value
ROA	16.50	0.0862***(at 10% level of significance)

The results presented in Table2 show that H0 hypothesis is accepted for ROA model with the significance level of 10%, thus not all of the individual effects in total profitability model is fixed, but are random. That is to say, the H0 hypothesis which says that random effects model is more effective than fixed.

Panel Data Regression Analysis

In this section, the findings of the panel regression analysis of the model is presented that explains various explanatory variables that are significant in determining the predictors of the profitability of Indian public and private sector banks. The random effects analysis was used in the analysis of the model (Table 3). The panel regression equation analyzing the determinants of profitability of commercial banks in India for five years of study can be framed as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \varepsilon$$

Where

Y = Profitability (ROA); X_1 = Spread; X_2 = Provisions and Contingencies; X_3 = Non-Interest Income; X_4 = Credit Deposit Ratio; X_5 = Operating Expenses; X_6 = Profit Per Employee; X_7 = Business Per Employee; X_8 = Investment Deposit Ratio; X_9 = Capital Adequacy Ratio; X_{10} = Non- Performing Assets; X_{11} = Dummy (Type of Banks); Error term

Table 4 shows the findings of analysis with the dependent variable i.e. profitability (ROA).

Table 4: Panel Regression Results on ROA for Indian Public and Private Sector Banks

Dependent Variables	ROA	
	Coefficient	t-statistics
Spread ratio	.0561482	.426
Provisions & Contingencies	-6.41	0.087***
Non-Interest Income	.65921.89	.004*
Credit Deposit Ratio	.0104795	.104
Operating Expenses	-.3067576	.533
Profit Per Employee	.0083049	.005*
Business Per Employee	.0054525	.022**
Investment Deposit ratio	-.1021479	.010*
Capital Adequacy ratio	.084184	.003*
Non-Performing Asset ratio	-.0475996	.359
Public sector banks	-.1101637	.652
Private Sector Banks	Omitted	Omitted
No. of observations	180	
Adjusted R2	0.6494	

Note: *,**,*** significant at 1%, 5% & 10% respectively.

Table 4 shows that NII, PPE, CAR is positive at 1% level, BPE is negative at 5% level, P&C ratio is negative at 10% level of significance. The other variables namely; Spread ratio, Credit Deposit ratio is positive (though insignificant) and Operating Expenses ratio, Non

Performing Asset Ratio is negative (though insignificant) for the period under study. The value for adjusted R2 (0.6494) explains that 64.94% variations in ROA score is explained by indicators namely Provision & Contingencies, Non Interest Income, Profit Per employee, Business per Employee, Investment Deposit Ratio, Capital Adequacy Ratio of public and private sector banks from period 2011-16. It also shows that private sector outperform the public sector banks in India during the period of study.

Summary and Concluding Remarks

On the basis of the results of the present study, it can be concluded that the variables, namely, provision & contingencies, Non Interest Income, Credit Deposit Ratio, Profit Per employee, Business per employee, Investment Deposit Ratio and Capital Adequacy Ratio have capacity of predicting the profitability of Public and Private Sector Banks in India.

The spread ratio indicates the efficiency with which financial resources are intermediated by the banks from savers to investors. It has positively contributed during period of study suggesting that PSBs are performing very well in their core businesses (fund based activities) than private sector banks. It may be due to greater contribution to priority sector lending and comparatively lesser involvement of private sector lending.

Non Interest income is an indicator of diversification of operations of banks. The significant positive association of Non Interest Income suggests that PSBs are performing well on account of banks' foray into non-traditional activities (fee based activities) as compared to private sector banks. Public sector banks need to control NPAs because it has negative insignificant association with profitability of the banks. The recovery of past dues locked in non-performing assets also played significant role in improving profitability of PSBs. It could be made possible by the strong initiatives taken by PSBs such as balance sheet cleansing through compromise settlements of chronic NPAs, corporate debt restructuring, setting up of debt recovery tribunals and enforcement of security interest for realization of dues without the involvement of judiciary. The decline in P&C gives rise to net profits. The provisions & Contingencies have negative significant association with profitability of banks. Thus, it supports the result of the present study.

The negative insignificant association of Operating expenses indicates the cost of efficiency of banks. Low interest expenses lead to higher profitability in earlier studies (Berger, 1995). In spite of it, banks should make efforts to bring down the operating costs. Adoption of technology seems to be the only solution for improving employee's productivity and reducing operating costs in the long run. Through computerization of branches of PSBs and introduction of core banking solutions, the non-labor costs have been increased initially, but

in the long run, it will help in reducing operating costs. However, PSBs need to justify the utilization of their deposits as they have negative Investment Deposit Ratio as compared to private sector banks. PSBs usually make investment in less risky assets, so their returns is also less as compared to private sector banks who make investment in riskier avenues also, where they can earn marginally higher returns.

CAR has significant positive association with profitability of banks showing hereby that Indian banks are solvent. CAR can have significant impact on the inflation in the economy. It signifies that the banks are having a cushion to absorb losses before they become insolvent. It implies stability in the financial market and protects deposit holders because if banking system were to go bankrupt, the entire economy would collapse within no time. Also, if savings of common people are lost, the government will have to step in and pay the deposit insurance.

Business per employee ratio is used to measure the productivity of employees and pricing of services rendered by banks. The significant positive association of BPE ratio of PSBs as compared to private sector banks may be due to the reasons namely; highly competitive environment, expansion in banking products, marketing strategies, penetration of banking into unbanked areas along with core banking solutions, outsourcing of routine jobs and rationalization of workforce through VRS etc. PSBs also focused on generation of banking services through human capital intensive processes in line with improved technologies rather than manpower intensive banking during past years.

Profit Per Employee ratio shows the efficiency of employees at workplace. The significant positive association of PPE with profitability of banks indicates that banks are making efforts to utilize the services of employees efficiently by selecting higher educated, experienced competent employees having better skills and imparting them latest technological education though various training programs.

Thus, the results of the present study show that the Indian banking sector remained relatively healthy during the current economic crisis and the performance of the banks was not impacted negatively in a significant manner as evidenced by Malhotra et al. (2011) also. So, we can conclude that the Public Sector Banks and Private sector banks have paved the way to Service-Led Growth in Indian Economic Development. Still, it is a need of hour to perform even better in competition to other new Private Sector and Foreign Sector Banks coming up. The results can ne concluded in table 5;

Table 5: (Results of the present study)

Independent Variables & Hypotheses	Relationship with ROA		Significance Level	Literature evidence
	Expected	Actual		
Spread ratio	Positive	Positive	X	Badola & Verma(2006), Dutta & Gupta(2013)
Provisions & Contingencies	Negative	Negative	10%	Badola & Verma(2006), Dutta et al. (2013), Dutta &Gupta(2013)
Non-Interest Income	Positive	Positive	1%	Manoj, P.K. (2010), Dutta et al. (2013), Badola & Verma(2006), Singh (2015), Misra(2015), Kedia(2016)
Credit Deposit Ratio	Positive	Positive	X	Badola & Verma(2006), Kedia(2016)
Operating Expenses	Negative	Negative	X	Badola & Verma(2006), Dutta et al. (2013), Dutta &Gupta(2013), Kedia(2016)
Profit Per Employee	Positive	Positive	1%	Badola & Verma(2006), Singh (2015), Kumber(2016)
Business Per Employee	Positive	Positive	5%	Badola & Verma(2006), Kumber(2016)
Investment Deposit ratio	Positive	Negative	1%	The fewer the funds tied up in liquid investments the higher we might expect profitability (Eichengreen and Gibson, 2001).
Capital Adequacy ratio	Positive	Positive	1%	Ramlall, L. (2009), Singh&Chaudhary(2009), Ani, W.U. et al (2012), Misra(2015),Kumber (2016), Akinkunmi,M.A. (2017), Topak &Tahu(2017)
Non-Performing Asset ratio	Negative	Negative	X	Badola & Verma(2006), Bodla et al. (2010), Dutta et al. (2013), Dutta &Gupta(2013),Roman A. (2013), Singh (2015)

References

Aburime, U.T., (2006), "Determinants of Bank Profitability: Company-level evidence from Nigeria" Acessed from http://ssrn.com/abstract=1106825.

Akinkunmi, M.A., (2017), "Determinants of Banks' Profitability in Nigeria: Does Relative Market Power Matter?" Journal of Finance and bank Management, June, Vol. 5(1), pp. 42-53

Anwar, M., and Herwany, A., (2006), "The Determinants of successful banks profitability in Indonesia: Empirical study for provincial government's banks and private non-foreign banks", working papers in Business, Management and Finance, Accessed from http://ideas.repec.org/s/unp/wpaman.html.

Ani, W. U., Ugwunta, D. O., Ezeudu, I. J. and Ugwuanyi, G. O.(2012), "An empirical assessment of the determinants of bank profitability in Nigeria: Bank characteristics panel Evidence", November, Journal of Accounting and Taxation, December, Vol. 4(3), pp. 38-43.

Arrow, K. (1973), 'Higher education as a filter', Journal of Public Economics, 2 (3), 193–216.

Athanasoglou P P, Brissimis S N and Delis M D (2005), Bank specific, industry- specific and macroeconomic determinants f bank profitability, Working Paper 25, Bank of Greece.

Boadi, I. (2015), "Profitability Determinants of the Ghanaian Banking Sector in ongoing Wave of consolidation" International journal of Business and management, November, Vol 10(12), pp.1-11.

Bodla, B.S., Bajaj, Verma, R., (2010), "An Analysis of efficiency of private sector banks in India", IUP Journal of Bank Management, Feburary. Accessed from http://www.allbusiness.com/banking-finance/banking-finance-sector-performance/15703950-1.html

Badola,B. S. and Verma, R. (2006), "Determinants of profitability of Banks in Indian: A Multivariate Analysis", Delhi Business Review X, Vol.7 (2): pp 79-88.

Bain, J.S. (1951) "Relation of Profit Rate to Industry Concentration: American Manufacturing", Quarterly Journal of Economics, 65: 293–324.

Berger, A. (1995), "The Relationship between Capital and Earnings in Banking," Journal of Money, Credit Banking, Vol. 27(2): pp 432-456.

Dani,S. (2014), "Profitability Determinants of Indian Banks: An Empirical Study", International Journal of Advanced research in Management and Social Sciences", May, Vol. 3(5), pp.174-198.

Dutta, S. Gupta, N., Rao, P.H. (2013), "Determinants of Return on Assets of Public Sector banks in India: An Empirical Study", Pacific Business Review International, May, Vol 5(11), pp. 23-28.

Eichengreen, B. and H.D. Gibson (2001). "Greek banking at the dawn of the new millennium." CERP Discussion Paper 2791, London.

Kedia N (2016), "Determinants of Profitability of Indian Public Sector Banks", IRA International Journal of Management and Social Sciences, ISSN 2455-2267, volume 2 march 2016.

Kumber V K (2016), Determinants of Profitability of Private Banks in India- Multivariate Analysis", International Journal of Information Research and Review, October 2016.

Manoj, P. K. (2010), "Determinants of Profitability and Efficiency of Old Private Sector Banks in India with Focus on Banks in Kerala State: An Econometric Study", International Research Journal of Finance and Economics, Vol. 47: pp 7-20. (Also available at http://www.eurojournals.com/finance.htm

Malhotra, D.K., Poteau, R., Singh, R., (2011), "Evaluating the performance of commercial banks in India", Asia Pacific Journal of Finance and Banking Research Vol. 5. No. 5, pp. 15-37.

Mirzaei, A. (2012). The Effect of Market Power on Stability and Performance of Islamic and Conventional Banks. Islamic Economic Studies, 18 (1 & 2), 45-81

Misra, S. (2015), "Determinants of Bank Profitability in India" IJICBM, January.

Petria, N., Capraru, B., lhnatov.,L., (2015), "Determinats of Banks' Profitability: Evidence from EU 27 banking systems", Procedia Economics and finance, Vol. 20, pp. 518-524.

Ramlall, I., (2009), "Bank-Specific, Industry-Specific and Macroeconomic Determinants of Profitability in Taiwanese Banking System: Under Panel Data Estimation", International Research Journal of Finance and Economics, 34, Accessed from http://www.eurojournals.com/finance.htm.

Roman, A., Danuletiu, A.E. (2014), "An Empirical Analysis of the Determinants of bank profitability in Romania", Annales Universitatis Apulensis Series Oeconomica, Vol.15 (2),pp.580-593.

Singh, G. (2015), "Determinants of Public Sector Bank's Profitability in India: An Empirical Study", accessed from www.researchgate.net/publication/281163679. January.

Singh R K and Chaudhary S (2009), "Profitability Determinants of Banks in India", International Journal of Global Business, Vol. 2 (1), pp.163-180

Singh, A., Sharma, A.K., (2016), "An Empirical analysis of macroeconomic and bank specific factors affecting liquidity of Indian Banks", Future Business Journal, Vol. 2(1), June, pp. 40-53.

Spence, M.A. (1973), 'Job market signalling', Quarterly Journal of Economics, 87, 355–74.

Topak, M.S., Talu, N.H. (2017), "Bank-Specific and Macroeconomic determinants of bank Profitability: Evidence from Turkey", International Journal of Economics and Financial Issues, vol. 7(2), pp. 574-584.

Vong, A.P.I.,and Chan, H.S., (2010), "Determinants of Bank Profitability in Macao", Accessed from http://www.amcm.gov.mo/publication/quarterly/July2009/macaoprof_en.pdf.