Empirical Modeling of Profitability of Public Sector Banks in India

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The present research paper examines the impact of bank-specific and economy-specific variables on the profitability of public sector banks (PSBs) in India over the period 2005-2015. The paper uses a dynamic panel model suggested by Arellano and Bover (1995) and Blundell and Bond (1998) to examine the impact of bank-specific determinants viz. size, capital adequacy, quality of assets, net interest margin, non-interest income, operational efficiency and macroeconomic variables namely GDP growth rate and inflation on return on assets (ROA). The empirical results explicitly demonstrate that bank-specific and macroeconomic variables affect the variation in the profits of chosen banks over the period of the study. The results of the study are important both for academicians as well as policymakers. The policy implications from the study are that banks must pay attention to the bank-specific determinants and macroeconomic developments to sustain the growth of profitability.

Section I
Introduction

The profitability of banks can be measured with the help of several parameters *viz.* return on assets, net interest margin and return on capital employed. The profits of banks are important both for banks at the micro level and economy at the macro level (Aburime, 2009). Sustained profitability of banks is good for the financial stability and economic growth of the country (Flamini, *et al*, 2009; Sinha and Sharma, 2014). An efficient banking system can mobilise the

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resources effectively and can help in purveying of these resources to the production sector. The fall in profits of the banks can affect the solvency of the banks adversely, which in turn will hamper the growth of the economy. Therefore, it is important to explore factors which have a bearing on the profits of the banks. In a developing economy like India where banks are the chief source of finance for business, it is important to keep their performance under surveillance (Arun and Turner, 2004).

India has initiated a reform process in the banking sector since two decades ago, which has shifted the focus of public sector-dominated banking system from social orientation to profit orientation. The process of liberalisation is characterised by the increased importance of private sector banks *vis-a-vis* their public counterparts, liberalisation of the interest rates, change in monetary policy, prudential regulation and opening up of the banking sector to foreign financial institutions, and so forth. These developments have had implications on the net interest margin and profitability of the banks in India. Even after two decades of liberalisation, the Indian banking sector is dominated by public sector banks (PSBs). PSBs had a 73.2 and 73.9 per cent market share in credits and deposits respectively as of March 2014 (RBI, 2014).

Through looking at the dominant position enjoyed by the PSBs, the authors have selected PSBs for this study. The Financial Stability Report (2013) of the Reserve Bank of India (RBI) states that since 2010 there is an increase in the vulnerability of the banking sector indicator of stability. This makes a strong case for identifying the factors responsible for banks' profitability in the current scenario. Banks today are offering several other services in addition to the traditional banking products. As a result of this, their sources of revenue mobilisation have also moved from the traditional non-fund-based activities to fee and fund-based services. These changes in the functioning of the banking industry coupled with slowdown at the global level have warranted that banks' profits should be monitored continuously.

A fall in the quality of assets of the banks is also a matter of great concern. The NPAs of banks in our country have increased to alarming levels, thereby eating into their profits. As per the ASSOCHAM (Associated Chambers of Commerce and Industry of India) (2014) report, stressed assets (SAs) in India have almost doubled from 5.7 per cent in FY08 to 10.2 per cent in FY13, which has impacted the banking industry adversely. The present government is focusing on the issue of bringing reforms in the working of PSBs in general and resolving the NPA problem in particular. The focus is on bringing professionals from the private sector for the top posts i.e. CMDs and Board of Directors, fixing accountability for granted loans, finding ways to overcome corruption, etc. To address the problem of NPAs, recently Special Mention Accounts (SMAs) classification has been introduced along with defining a timeline for deciding the course and nature of remedial actions.

Analysing the reasons behind it and the extent of its effect on banks' margins is an important point to be explored. Besides this, the banking sector in India has also seen several mergers and acquisitions in recent years, which has resulted in a concentrated banking sector giving an impetus to the power of bigger banks. This can give rise to manipulation in the market by those that are more powerful. Therefore, it is necessary to observe the implications of these changes as well. The remainder of the paper is organised in four sections. Section II of the study gives an insight into the past studies. Section III provides information about the time series data, independent and dependent variables used in the study along with methodology of the study. Section IV presents the empirical results of the study. Section V concludes the study followed by scope for further research.

Section II
Review of Literature

The issue of profitability of banks has become very popular among researchers in recent years and a variety of empirical studies are available in the area, though most of the initial studies on banks' profitability have been carried out in developed nations only. Most of the studies have focused on the banking system of a single country only e.g. Berger, *et al* (1987); Berger (1995); Angbazo (1997) in the US; Guru, *et al* (2002) in Malaysia; Barajas, *et al* (1999) in Colombia; Afanasieff, *et al* (2002) in Brazil; Mamatzakis and Remoundos, (2003); Dietrich and Wanzenried (2011) in Switzerland; Lui and Wilson (2010) in Japan; Bodla and Verma (2006) in India; and Javaid, *et al* (2011) in Pakistan. A few of the studies have analysed the panel of the countries as well to determine the factors affecting the profitability of the banks (Bourke, 1989; Molyneux and Thorton, 1992; Demigruc-Kunt and Huizinga, 1999; Bikker and Hu, 2002; Athanasoglou, *et al*, 2006). These studies suggest that profits of a bank are affected by various factors which are specific to the bank and related with broad economic environment as well.

In bank-specific factors we may include cost efficiency, capital adequacy, liquidity, asset quality and size of the bank. The broad economic factors affecting banks' profitability are GDP growth rate, inflation, interest rates and growth of stock markets, etc. as observed from the empirical studies. The review of literature suggests that internal factors have more effect on the profitability of the banks than macroeconomic factors (Madishetti and Rwechungura, 2013). Capital adequacy is one of the important determinants of profits of banks as observed from the literature. It refers to sufficiency of the capital to absorb any future uncertainty (Kosmidou, 2008). There are several guidelines (Basel norms and others imposed by the central bank of a country) to ensure that banks are adequately capitalised to protect the interests of the depositors and general public at large.

Although there is a general consensus that statutory capital requirement is a must to reduce moral hazard and to avoid any failure, the debate is about how much capital is sufficient? The impact of the capital adequacy ratio on profits of the banks is found to be mixed. There are empirical studies which report a positive relationship between capital asset ratio and profits of banks (Berger, 1995; Demirgüc-Kunt and Huizinga, 1999; Naceur, 2003). Garcia-Herrero, *et al* (2009) argue that banks which are well-capitalised have smaller bankruptcy costs and better profitability. According to the proponents of this school of thought, excess capital acts as a cushion to absorb any adverse shocks in the economy (Bourke, 1989; Demirgüc-Kunt and Huizinga, 1999; Goddard, *et al*, 2004; Pasiouras and Kosmidou, 2007; Sufian and Chong, 2008; Dietrich and Wanzenried, 2011; García-Herrero, *et al*, 2009; Ramadan, *et al*, 2011).

At the same time, there is no dearth of studies which contradict these results. The scholars who believe in this opposite theory argue that equity is expensive and it is difficult to obtain additional equity while higher requirements restrict the competitiveness of the banks (Koch, 1995). With regard to expenses, asset and liability management, funding management and control over non-interest cost, the studies have empirical evidences to state that reduced expenses and better cost decisions result in improved performance (Guru, *et al*, 2002). Almumani (2013) too, in the context of Jordan, reports that profitability is dependent upon the cost income ratio. Exposure to high-risk loans increases the quantum of unpaid loans, which further brings down the banks' profits.

The total asset taken as proxy for the size of a bank does not seem to have significant influence on profits as reported by many studies across the countries (Javaid, *et al*, 2011 – Pakistan, Ramadan, *et al*, 2011 – Jordan; Hoffmann, 2011 – US; Ani, *et al*, 2012 – Nigeria). However, literature also has evidence that the size of a bank has a positive relationship with profitability (Bourke, 1989; Boyd and Runkle, 1993; Akhavein, *et al*, 1997; Anbar and Alper, 2011). The impact of deposits and volume of the loan on the profits of the bank has been studied by many researchers. Deposits have a significant positive effect on the profits of commercial banks (Javaid, *et al*, 2011). The volume of the loan also has a seemingly positive impact on the profitability of banks (Dietrich and Wanzenried, 2011).

Non-interest income and real interest rates have also been identified as contributing factors to profit by some of the studies (Anbar and Alper, 2011). On the contrary, Gischer and Juttner (2001) find that fee-income generating businesses actually exert a negative impact on banks' profits. Credit risk is one of the important determinants which negatively affect the profitability of banks. Credit risk affects the strength of the banks' loan portfolio adversely; thus it results in reduction in profitability of the banks (Duca, *et al*, 1990; Sufian and Chong, 2008; Ramadan, *et al*, 2011). A study by Molyneux and Thornton (1992) confirms the structure-conduct-performance (SCP) hypothesis which states that increased market power leads to monopoly profits. But there

is no dearth of studies presenting a contradictory opinion to it (Berger, 1995; Mamatzakis and Remoundos, 2003; Athanasoglou, *et al*, 2006; Dietrich and Wanzenried, 2011). Government ownership also has a significant positive relationship with return on equity (Molyneux and Thorton, 1992).

Foreign banks have higher profitability than domestic banks in case of developing nations whereas in developed nations domestic banks have better profitability than their foreign counterparts (Demirgüc-Kunt and Huizinga, 1999). Conversely, Heffernan, *et al* (2008) in his study on Chinese banks from 1999 to 2006 reported that foreign ownership does not have any significant effect on the profitability of the banks. While studying the effect of macroeconomic variables on the profitability of banks, it has been observed that variations in bank profitability can be significantly explained by inflation (Revell, 1979). Similar observations have been made by a few other studies, which found evidence of positive relationship between GDP growth rate, inflation and profits of the banks (Bourke, 1989; Demirgüc-Kunt and Huizinga, 1999; Guru, *et al*, 2002; Naceur, 2003; Sufian and Chong, 2008; Athanasoglou, *et al*, 2008). Taxation has a negative impact and stock market growth positively affects the banks' profits (Naceur, 2003; Dietrich and Wanzenried, 2011).

Mamatzakis and Remoundos (2003) in their study find that the supply of money has a significant impact on the profitability of banks. Per capita income also has a boosting effect on the banks' profits. Demirgüc-Kunt, *et al* (2001) in their study find that there exists a high correlation between business cycles and banks' profits. The effect of variation in market rate has a negative impact on banks' performance but this is not found to be significant as banks usually hedge their position against the market rate risk (Flannery, 1981). The profitability of the banking sector is enthused by a rise in industrial production index and improved budget balance (Sayilgan and Yildirim, 2009).

Although a lot of work has been carried out for assessing the profitability of commercial banks in the world, very little work has been done in case of the Indian banking sector. There are a few mentionable studies which have examined the profitability of banks in India (Dangwal and Kapoor, 2010; Prasad and Ravinder, 2012). Verghese (1983) in his study determined whether the nationalisation process initiated in 1969 has adversely affected the profits of banks. Bodla and Verma (2006) in their study reported that operating expenses, non-interest income and net profits have significant impact on the profits of the banks. In another study by Sharma and Bal (2010), it has been observed that in recent years concentration ratios have increased, which is an indication of growing competition in the Indian banking sector.

Against this backdrop, the study aims at evaluating the impact of bank-specific and macroeconomic variables on the profitability of the government-owned public sector banks and find out their relative significance. As suggested by the literature, we have taken return on assets (ROAs) as dependent variable

and the first lag of ROA {(ROA(-1)}, capital adequacy ratio (CAR), log of total assets (LogTA) which is a measure of the size of the bank, net interest margin (NIM), operating efficiency (OE), non-performing assets (NPA), non-interest income or other income (OI), GDP growth rate (GDP) and inflation (INF) as explanatory variables. On account of the inclusion of lag of dependent variable as an explanatory variable, the panel study becomes dynamic in nature; hence, dynamic panel data techniques have been applied.

Section III
Data Source and Methodology

For analysing the determinants of profitability of banks in India the study has used six bank-specific variables and two macroeconomic variables as explanatory variables. Besides this, the lag of dependent variable has also been used as explanatory variable. The panel data set used in the study spans for a period of 10 years i.e. from 2005 to 2014, with a sample of 26 public sector banks in India (see appendix for details). The data has been extracted from the website of Reserve Bank of India and the prowess database of CMIE.

(i) Dependent Variable

The literature suggests that profits of the banks can be measured by return on asset (ROA) and return on equity (ROE). ROA is expressed as ratio of net profit to total assets. ROE is the net profit available for equity shareholders divided by the outstanding number of equity shares. In this study we have chosen ROA as a proxy for profitability of the banks. In case of banks, ROA is the commonly used indicator of profitability and it finds support from literature as well (Evanoff and Fortier, 1988; Sinha and Sharma, 2014). ROA is considered better than ROE in case of banks as banks with a lower leverage or a higher equity may have lower ROA but a higher ROE. Therefore, in our study we have used ROA as a measure of profitability.

(ii) Bank-Specific Independent Variables

The independent variables internal to a bank have been identified from empirical studies conducted in the past. Theoretically also, these variables affect the profits of the banks to a large extent. Our study includes the following bank-specific variables:

❑   *Asset Size:* The total assets of the banks have been used as a proxy for bank size in a large number of studies. Bank size is measured by the natural logarithm of the total assets of the banks. One school of thought suggests that increased bank size attributes to economies of scale and greater diversification, which in turn reduces risk and increases the profits (Smirlock, 1985). However, there can be a possible negative effect of it on profits as well since in a large firm expenses are also high (Stiroh and Rumble, 2006; Pasiouras and Kosmidou, 2007).

❑ *Capital to Asset Ratio:* It is measured by the ratio of equity to total assets of the bank. This is one of the basic ratios for capital strength. A higher capital to asset ratio may have a positive effect on the profits but the results of the studies reviewed are found to be mixed in this regard. There are some studies which have proved that banks that are well-capitalised are more profitable (Berger, 1995; Bourke, 1989; Molyneux, 1993; Bashir, 2003). However, if capital requirements imposed by regulators are binding, it may force the banks to hold excess capital than the optimum level, thus resulting in higher costs and reduced profits for the banks (Buser, *et al*, 1981; Miller, 1995).

❑ *Non-Interest Income:* In this era of universal banking and cut-throat competition, traditional banking activities do not yield sufficient amount of profits for banks. Therefore, banks are offering a variety of services which are in addition to their traditional role and there is a shift from non-fund-based activities to more fee and fund-based activities. These activities are a rich source of income for banks nowadays (Sufian and Habibullah, 2009). Therefore, in our study we expect that non-interest income should have a positive impact on the profits. In the study, non-interest income has been measured as the ratio of non-interest income to the total assets.

❑ *Operating Expenses to Total Assets:* In the present study, this ratio has been used as a proxy for operational efficiency of a bank. It can be expressed as the ratio of intermediation cost to the total assets. Generally, higher amount of intermediation costs should have a negative impact on the profitability of banks. Nevertheless, higher intermediation cost also improves the operational efficiency of the banks and an efficient bank can generate higher profits.

❑ *Non-Performing Assets (NPAs):* NPAs have been measured as the ratio of net NPAs to the total advances by the bank. This ratio signifies the credit quality of a bank and has been considered as a proxy for credit risk. A higher exposure to credit risk is expected to have a negative effect on the profits. Therefore, a negative relationship between NPAs and profitability is hypothesized in the study.

❑ *Net Interest Margin (NIM):* NIM is a measure of the difference between interest income and the interest expenditure of a bank. It is expressed as a percentage of what a bank earns on loan minus the interest paid on borrowed funds divided by the amount of the assets on which it is earned. A higher value of NIM will have a positive effect on the ROA.

(iii) Macroeconomic Variables

Our study includes the following macroeconomic variables:

❑ *GDP Growth Rate:* GDP is one of the leading macroeconomic indicators. In a period of higher GDP growth rate the profitability of the financial sector is also expected to rise. Studies have also established a positive correlation between GDP growth rate and profits of the banks (Curak, *et al*, 2012)

Therefore, in our study too we expect this variable to appear with a positive sign in our regression model.

❑   *Inflation Rate:* Inflation is the persistent rise in the prices of the goods. Inflation has an important impact on the purchasing power of individuals, which ultimately has an impact on the profits of the business units, including the banking sector. This study strives to explore the probable effect of inflation on the profitability of banks. Table 1 provides a description of the various factors used in the study and their expected effect as explained above.

Table 1
Variables Included in the Study

Variable	*Description*	*Expected Effect on Dependent Variable*
Dependent Variable		
Return on Assets (ROAs)	Ratio of profits after tax to total assets	–
Independent Variables		
Lagged value of return on assets {ROA(-1)}	Ratio of profits after tax to total assets	Positive
Asset size (Log TA)	Natural log of total assets of banks	Negative/Positive
Capital to asset ratio (CAR)	Ratio of equity to total assets	Positive/Negative
Non-interest income (OI)	Non-interest income to total assets	Positive
Operating efficiency (EFF)	Ratio of intermediation costs to total assets	Negative
Non-performing assets (NPA)	Ratio of non-performing loans to total advances	Negative
Net interest margin (NIM)	Ratio of net interest income to total assets	Positive
GDP growth rate (GDP)	Yearly GDP growth rate	Positive
Inflation (INF)	Rate of inflation (CPI)	Negative/Positive

(iv) Methodology

The persistency of profitability has also been identified in many studies of a similar nature. Therefore, in our study we have included the lagged value of dependent variable as a regressor, which has resulted in dynamic panel data in our case. As a result, the general panel data model such as fixed effect and random effect could not be applied because of their limitation in dealing with the dynamic panel data. As in case of the dynamic panel data, the results of regression obtained with the help of a static model *viz.* fixed effect or random effect are not considered as reliable as regression coefficients of independent variable become biased because of the endogenous nature of some of the determinants.

This kind of relationship, if not accounted for, may lead to the possibility of correlations between some of the coefficients of the explanatory variables and

the error terms, which will make the regression coefficients biased. To counter these concerns, we have used the generalised method of moments (GMM) estimator used for dynamic panel models given by Arellano and Bover (1995) and Blundell and Bond (1998). We have applied the two-step Arellano and Bond GMM estimator. To empirically investigate the effects of internal and external factors on bank profitability, the following linear model has been used:

$$ROA_{i,t} = \alpha + \beta_1 {}^* ROA_{i,t-1} + \beta_2 {}^* CAR_{i,t} + \beta_3 {}^* EFF_{i,t} + \beta_4 {}^* NPA_{i,t} + \beta_5 {}^* LogTA_{i,t} + \qquad (1)$$

$$\beta_6 {}^* NIM_{i,t} + \beta_7 {}^* OI_{i,t} + \beta_8 {}^* INF_{i,t} + \beta_9 {}^* GDP_{i,t} + \varepsilon_{i,t}$$

Where $ROA_{i,t}$ is the profitability of bank i at time t, with i=1,........ N and t=1,....T. The notations of all the independent variables and dependent variable are explained in Table 1. β is the vector of regression coefficients to be estimated and $\varepsilon_{i,t}$ is the disturbance term i.e. unexplained variation in the dependent variable, which is assumed to be identically and independently distributed with mean 0 and variance σ_e^2. The regression coefficient of the lagged value of dependent variable (ROA) i.e. β_1 measures the speed of mean reversion. If β_1 assumes a value between 0 and 1 it may be inferred that profitability is persistent but will return to equilibrium in the end. A value closer to 0 gives an indication that the market is relatively competitive and adjustment happens at a high speed whereas a value closer to 1 means mean reversion is slow and hence the market is less competitive. The impact of other independent variables has been studied with the help of their respective regression coefficients and their respective *p*-value.

To examine the validity of our model, two types of tests have been computed. The validity of instruments is verified with the help of the Sargan-J test. This test takes care of the fact whether restrictions have been over-identified with the null hypothesis that there is no correlation between instruments and errors. If null hypothesis is accepted, it means that the instruments chosen are valid. The second type of test is related with the serial correlations in the differenced residuals (first-order-m1 and second-order-m2). The presence of first-order serial correlation in the differenced residuals does not lead to inconsistency of the estimations. However, second-order serial correlation must not be presented in the residuals. The null hypothesis of the serial test is that there is no serial correlation in the residuals.

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Section IV
Analysis and Results

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(i) Descriptive Statistics

The results of descriptive statistics are given in Table 2. The dependent variable ROA has a positive mean value of 0.8694 with a standard deviation of 0.3602, indicating a fairly higher degree of variability in the series. The distribution of

ROA series is negatively skewed. Capital adequacy ratio has a mean value of 12.60 per cent (approximately) while standard deviation of capital adequacy ratio is 1.18, indicating that observations in the series are closer to the mean. It shows that all public sector banks have almost the same level of capital. The values of ratio of intermediate cost to total assets i.e. efficiency series are more dispersed this maybe because of the size differences of banks included in the study. The series of all bank-specific determinants are leptokurtic except those of total assets where the distribution is closer to normal. The distribution of inflation and GDP series has been found to be mesokurtic. The NPA variable has been observed to be the most volatile among all the variables included in the study. The Jarque-Bera test is significant for all the variables.

Table 2
Descriptive Statistics

Variable Statistic	ROA	CAR	EFF	NPA	LogTA	NIM	OI	INF	GDP
Mean	0.8694	12.5996	1.7504	1.3930	13.8938	2.6311	1.0302	8.3150	7.5540
Median	0.8800	12.5450	1.6948	1.1850	13.8345	2.6404	0.9800	8.5950	7.8200
Maximum	2.0100	18.1600	3.7161	8.1100	16.7016	3.9779	2.5222	12.1100	9.5700
Minimum	-0.9900	9.2100	0.5580	0.1500	11.9651	0.2309	0.1630	4.2500	4.4700
Standard Deviation	0.3602	1.1840	0.4355	1.0138	0.8724	0.5975	0.3209	2.4374	1.8182
Skewness	-0.6687	0.4386	0.7559	2.3514	0.4890	-0.6691	1.1539	-0.0583	-0.4772
Kurtosis	6.0266	4.5204	4.6623	13.5937	3.2857	4.5414	6.0491	1.8167	1.8333
Jarq-Bera	118.61	33.3790	54.692	1455.38	11.248	45.138	158.41	15.3164	24.6136
Prob.	0.0000	0.0000	0.0000	0.0000	0.00361	0.0000	0.0000	0.0005	0.0000
Obs.	260	260	260	260	260	260	260	260	260

Source: Authors' calculation.

(ii) Results of the Correlation Matrix

The relationships among the study variables depicted in the model have been tested using correlation, which is presented in Table 3. The correlation analysis shows that CAR, EFF, NIM, OI, INF and GDP have a positive relationship with ROA, whereas NPA and LogTA have a negative relationship with ROA. It shows that banks with better capital adequacy ratio, higher net interest margin, and divergent sources of income can have higher level of profits. As expected, NPA brings down the profit of the banks. It may also be observed from Table 3 that the value of coefficient of correlation among the independent variables is fairly low, which indicates that there are no multi-collinearity issues involved. Here it is pertinent to mention that Kennedy (2008) in his study stated that multi-collinearity poses a problem when the coefficient of correlation is more than 0.80 and in our case all correlation coefficients are less than this value.

Table 3
Correlation Matrix

	ROA	CAR	EFF	NPA	LogTA	NIM	OI	INF	GDP
ROA	1.00000								
CAR	0.35780	1.0000							
EFF	0.09171	-0.1270	1.0000						
NPA	-0.73040	-0.3196	0.1146	1.0000					
LogTA	-0.08640	0.0947	-0.4347	0.1256	1.0000				
NIM	0.35310	0.0163	0.7816	-0.0182	-0.2664	1.0000			
OI	0.36900	0.1444	0.5000	-0.1599	-0.2594	0.2925	1.0000		
INF	0.10030	0.2169	-0.5113	-0.2368	0.3347	-0.3899	-0.2456	1.0000	
GDP	0.34400	0.1080	0.2627	-0.4848	-0.3753	0.1543	0.2329	-0.1701	1.0000

Source: Authors' calculation.

The results of the dynamic panel model are presented in Table 4. According to the Sargan-J test, the chosen instruments are valid. Further, the tests of serial correlation in differenced residuals show that there is no evidence of first-order or second-order serial correlation. The relationship between lagged value of ROA i.e. ROA (-1) and ROA (profitability) is positive and statistically significant, which means the profits of the previous year positively contribute to the current year's profits. It shows that there is persistency in profitability. It validates our selection of the dynamic panel model.

The impact of capital adequacy ratio (CAR) on profits has been found to be negative and statistically significant as per our model. It gives an indication of the fact that banks are not able to use their available capital effectively though it may provide a cushion against financial distress but it is not without a dent in the profits. Another reason for negative impact of capital adequacy ratio on profit can also be attributed to the fact that profits themselves are used as a source of capital for the firm, which reduces its dependence on external sources of capital that generally have higher costs and hence lower profits. Similar results have been observed in studies by (Buser, *et al*, 1981; Miller, 1995).

The operating cost (EFF) has the most important effect on bank profitability among bank-specific variables. As expected it has a negative sign and 1 per cent increase in operating costs reduces the profitability by 0.3043 per cent. The operating expenses are affected by the level of productivity. The low productivity of the banks and high level of the scale inefficiency leads to increased operating costs for the banks, thereby reducing their profits. Efficient cost management is a prerequisite for better profitability and the positive impact of it on profitability shows that cost management of public sector banks in India has been effective. Similar results have been reported in the study of

Giustiniani and Ross (2008); Flamini, *et al* (2009); and Olweny and Shipho (2011).

In line with our expectations, the NPA has a significant negative effect on profitability. The result shows that 1 per cent increase in NPA reduces the profitability of the banks by 0.1751 per cent. These substandard assets increase the provisioning costs of the banks, which exert pressure on their profits. Our results are in harmony with the results of a study by Sinha and Sharma (2014). The impact of bank size (log of total assets) on profitability of banks is positive but is statistically not found to be important. Size is not an important factor of bank profitability in the Republic of Macedonia. The insignificance of bank size is also found in Goddard, Molyneux and Wilson (2004); Athanasoglou, *et al* (2008) and Giustiniani and Ross, (2008).

Net interest margin (NIM) also has a positive effect on ROA and it is found to be statistically significant. The positive effect is an indication that higher interest margin means access to low-cost debt or lending at higher rates, which ultimately results in higher profits for the banks. Non-interest income (OI) comes out to be the most important internal variable affecting the profitability of banks. It has a positive effect on the profitability of public sector banks and is significant at the 1 per cent level. The result shows that 1 per cent increase in other income leads to nearly 0.42399 per cent increase in profits of the banks. These results are in line with the study of Uzhegova (2010) and Anbar and Alper (2011).

In macroeconomic variables, inflation (INF) has a positive and significant relationship with ROA. It means that with an increase in inflation banks will also be able to increase their interest rates without fearing a fall in the loans sanctioned and thus beat the real inflation (Gul, *et al*, 2011). The coefficient of GDP variable is also positive and significant. The positive effect of GDP growth rate on profitability is an indication of improved business opportunities, which eventually leads to greater profitability for the banks. The results are consistent with the studies by Dietrich and Wanzenried (2011) and Curak, *et al*. (2012).

Table 4
Results of Regression

Dependent Variable – Banks' –Profitability (ROA)	*Fixed Effect Model*		
Independent Variables	*Coefficient*	*Standard Error*	*T-Statistic*	*P-Value*
ROA(-1)	0.148162	0.061948	2.391737	0.0177**
CAR	-0.063623	0.008704	-7.309826	0.0000*
EFF	-0.304322	0.077699	-3.916672	0.0001*
NPA	-0.175111	0.028425	-6.160522	0.0000*
LOG(TA)	0.028475	0.046935	0.606691	0.5447
NIM	0.362101	0.057447	6.303210	0.0000*
OI	0.423990	0.093518	4.533754	0.0000*
INF	0.027603	0.005240	5.267848	0.0000*
GDP	0.023236	0.008453	2.748883	0.0065*
F-statistic				
Sargan - J test statistics	16.82747			0.4661
	M-Statistics	P-Value		
AR(1)	-1.749425	0.0802		
AR(2)	-1.673531	0.0942		

Source: Authors' calculation.* Significant at 1 per cent level, ** Significant at 5 per cent level.

Section V
Conclusion

This paper analysed determinants of the Indian banking sector's profitability in the period 2005-and 2014 using a dynamic panel model. In this study, the impact of bank-specific and macroeconomic variables on profitability of the banks has been assessed. The bank-specific variables are internal and are results of bank policy and management. Therefore, banks have means to influence them. The study finds that the most important bank-specific determinant of bank profitability is non-interest income i.e. income from non-traditional sources. It is true in the Indian context as banking has become more competitive and banks are diversifying into insurance, merchant banking, consultancy and many other related areas so as to increase their profits. The second most important determinant of profit turns out to be efficiency in management of operating expenses. Therefore, it is imperative for all the banks to resort to cost-efficient strategies which will indirectly contribute to the profits of the banks.

The NPAs of the banks are the next most important determinants that are responsible for the draining of banks' profits. Therefore, it is important for the banks to initiate measures to control this menace so as to remain profitable. Among other bank-specific determinants, net interest margin and previous year's profits are important sources for profits of the present year. The capital adequacy ratio has a significant negative impact on the profits; therefore, it is important for the banks to ensure that they are not over-capitalised and are able to earn sufficient returns on their invested capital. Economy-specific variables i.e. inflation and GDP growth rate have a significant positive effect on the profits of public sector banks in India. Therefore, it is inferred that high economic growth will stimulate the growth of profitability of Indian public sector banks.

Scope for Future Research

Future research in this area can be carried out by including more economic variables such as stock market capitalisation, interest rates, taxation in addition to GDP and inflation, as well as regulation indicators. Further, the present study is confined to public sector banks in India; therefore, a comprehensive study including all the banks in the country can be carried out so as to ascertain the impact of ownership on profitability in the Indian banking system.

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Appendix
List of Public Sector Banks included in the Study

S. No.	Bank
01	Allahabad Bank
02	Andhra Bank
03	Bank of India
04	Bank of Maharashtra
05	Bank of Baroda
06	Canara Bank
07	Central Bank of India
08	Corporation Bank
09	Dena Bank
10	IDBI Bank Limited
11	Indian Bank
12	Indian Overseas Bank
13	Oriental Bank of Commerce
14	Punjab and Sind Bank
15	Punjab National Bank
16	State Bank of Bikaner and Jaipur
17	State Bank of Hyderabad
18	State Bank of India
19	State Bank of Mysore
20	State Bank of Patiala
21	State Bank of Travancore
22	Syndicate Bank
23	UCO Bank
24	Union Bank of India
25	United Bank of India
26	Vijaya Bank