Pakistan Journal of Applied Economics, Vol. 21 Nos. 1 & 2, (15-36), 2011

DETERMINANTS OF COMMERCIAL BANKS PROFITABILITY IN INDIA: A DYNAMIC PANEL DATA MODEL APPROACH

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The present study explores the determinants of profitability of commercial banks in India by employing Arellano and Bond (1991) dynamic panel data model for the unbalanced panel data of 87 banks for the period 1992-2006. The study used net interest margin and returns on assets as two alternatives for measuring profitability of banks. Empirical results reveal that profitability of banks is not only determined by its own characters but also by the industry specific and macroeconomic factors. Further, the study also finds the role of ownership and political factors in determining the profitability of banks in India. However, the determinants of profitability significantly varied across the groups.

I. Introduction

In recent years, the Indian banking industry has experienced substantial changes in its structure and functions. Consequently, many public sector banks became incompetent, inefficient and unprofitable.[1] The Reserve Bank of India (RBI) started a series of reforms based on the recommendations of Committee on Financial Sector Reforms in 1992, with the aim to improve financial strength of the banks.[2] These reforms and technical change in financial markets in the early nineties have affected all aspects of banking operations and impacted banks' profitability. Public sector banks were given operational freedom to participate in stock markets to secure the required capital. Deregulation measures adopted by RBI paved the way for foreign and private banks involvement in the domestic banking sector, thereby, intensifying competition in Indian banking industry.

* Assistant Professor in Banking and Finance, IBS, Hyderabad, India. The author is deeply indebted to late K. Sham Bhat, Department of Economics, Pondicherry Central University, India, for his constant guidance, affectionate care and encouragement during the course of this study. I never forget the values he followed, the commitments he gave to his profession and students and the association I had with him during my Ph.D. course. I sincerely thank him for his valuable comments on the earlier version of this paper. Thanks are also due to the University Grants Commission (UGC), New Delhi, and Pondicherry Central University, Pondicherry, India, for their financial support during the period of study.

[1] By 1991, only 15 out of 28 public sector banks declared net profit. The net profit to assets ratio of these banks varied between -6.8 per cent to + 0.5 per cent and half of the banks had negative net worth. Non-performing loans (NPLs) in the banks accounted for 24 per cent of total loan portfolios.

[2] Reforms include deregulation of interest rates, reduction of the cash reserve ratio (CRR) and statutory liquidity ratio (SLR), liberalising entry barriers, giving operational freedom, bringing capital and provisioning norms etc. (for details see Joshi and Little, 1998).

Growing competition due to increasing presence of foreign and private banks within the banking sector and as well from non-banking financial institutions, like mutual funds, insurance, investment companies, etc., led to greater uniformity in their financial products and services available to customers. Indian banks have responded to the increasing competition by offering wide range of products and services, and, increasing their off-balance sheet activities. Many banks have increased significantly in size and improved their profitability. In 2005-06 non-performing assets of Indian banks declined to 3.3 per cent of gross advances and 1.9 per cent of total assets. The net profit to assets ratio ranged between 0.47 to 1.13 per cent during the reform period. In view of these developments, the main purpose of this study is to explore determinants of profitability in public sector banks, private domestic banks and foreign banks in India, during the post reform period. In the relevant literature, bank profitability is generally expressed as a function of internal and external factors. The internal factors originate from banks' balance sheets and thus could be termed as bank-specific determinants. The external factors reflect the economic environment that affects operations and performance of banks. Identifying the determinants of profitability of commercial banks would help policy makers to design further attempts to improve the banks' performance. In this context, let us review the earlier literature pertaining to the study area, which will enable us to identify any possible research gap and directions for this study.

II. Review of Literature

Empirical studies on determinants of banks profitability have focused on either a panel of countries [see Haslem (1968); Short, (1979); Bourke, (1989); Molyneux and Thornton (1992); Demirguc-Kunt and Huizinga (2000), and Bikker and Hu (2002)] or on a single country [see Berger et al. (1987); Berger (1995); Neely and Wheelock (1997); and for US Petya Koeva (2003), Sanyal and Shankar (2005), for India, Barajas et al. (1999), for Columbia]. Most of these studies consider internal and external factors to examine bank profitability. The internal determinants include bank size, capital, risk management, expenses on management and business diversification. Studies such as Haslem (1968), Short (1979), Bourke (1989), Molyneux and Thornton (1992) Bikker and Hu (2002) and Goddard et al. (2004), links bank-size to capital-asset ratio and found positive relationship between capital ratios and profitability. They argued that higher capital ratios reflect the soundness and safety of banks and hence they will be in a position to raise capital at a cheaper rate. Thus, banks with rich capital tends to be more profitable.

Given the nature of bank business, the need for risk management is inevitable to ascertain a bank's financial health. Poor quality of assets and low levels of liquidity are the two major causes of bank failures. During the period of uncertainty and economic slowdown, banks may prefer a more diversified portfolio to avoid adverse selection and may also raise their liquidity holdings in order to reduce risk. In this context, both credit and liquidity risks are important. The literature provides mixed evidence on the impact of liquidity on profitability. Molyneux and Thornton (1992) observed a negative relationship between the level of liquidity and profitability. In contrast, Bourke (1989) reports converse results. Besides, Miller and Noulas (1997) observed that the effect of credit risk on profitability appears to be negative suggesting that more the exposure to high-risk loans, higher would be the accumulation of non-performing loans, resulting in lower returns. Lower operating expenses reflect high quality of bank management. There has been an extensive literature based on the idea that an expenses-related variables should be included in the cost part of standard macroeconomic profit functions. In this context, Bourke (1989), Molyneux and Thornton (1992) and Petya Koeva (2003) finds positive relationship between better-quality management and profitability. Demsetz and Strahan (1997) examined the role of diversification in US banks and found that banks with lower capital reserves are more active than their specialised counterparts in high risk lines of business such as derivatives. Contrary, Klein and Saidenberg (1997) report that, diversified banks on an average are less profitable. However, Goddard et al. (2001), observed, for European banks, that diversification in bank business would increase the size of a bank and would reduce average cost in the competitive markets.

Some studies consider profit persistence in banking, i.e., the performance of a bank in the current year is affected by its previous year performance, reflecting barriers to market competition, informational opacity and/or sensitivity to regional or macroeconomic shocks to the extent that these are serially correlated. Athanasoglou et al. (2005), Goddard et al. (2004), and Santiago and Francisco (2007) found statistical evidence that bank profits persist overtime. The external determinants of bank profitability are distinguished between industry specific determinants such as market concentration, industry size and ownership, and macroeconomic determinants such as inflation, interest rates/ money supply and the economic growth. Earlier literature about structural effects on bank profitability was based on the application of the structure-conduct-performance (SCP) hypothesis and the efficient-structure (ES) hypotheses. The SCP hypothesis assumes that higher market concentration yields monopoly profits. In contrast, the special case of SCP, the relative-market-power (RMP) hypothesis assumes that banks with high market share offer well differentiated products and services, establish higher prices and earn non-competitive profits. Similarly, the x-efficiency version of the efficient-structure (ESX) hypothesis states that higher efficiency in producing services would enable banks to increase their market share and profitability.

Studies such as Smirlock (1985), Berger and Hannan (1989) and Berger (1995), investigated the profit-structure relationship and found that, superior management and increased market share, especially in the case of small-to-medium-size banks, raise profits. In contrast, weak evidence is found for the ESX hypothesis. In this context, Berger (1995) argued that, increased concentration is the result of higher managerial efficiency and evidence of positive relationship between profit and concentration may be on account of a spurious result due to correlations with other variables. Thus, controlling for other factors, the role of concentration could be negligible. Conversely, Bourke (1989), Molyneux and Thornton (1992), Petya Koeva (2003) and Sanyal and Shankar, (2005) argued, that increased concentration is rather reflection of increasing deviations from competitive market structures,

which lead to higher profits. However, as regards the other structural variables, Naceur (2003) found that, the size of banking industry and financial market development are positively related to bank's profitability. Another, much debated issue in the literature is an effect of ownership status on bank profitability. A little empirical evidence supports the theory that, privately-owned institutions will make relatively higher profits; however, the results are rather mixed. Short (1979) and Barth et. al. (2004), found negative relationship between the government ownership and the bank profitability. In India, Petya Koeva (2003) and Sanyal and Shankar (2005) found a strong positive relationship between the privately owned banks and profitability. However, Bourke (1989) and Molyneux and Thornton (1992) reported ownership status is irrelevant for explaining profitability.

The last group of profitability determinants deals with macroeconomic variables. The most frequently used variables are the inflation rate, the long run interest rates/ money supply. Revell (1979) introduced the issue of the relationship between the bank profitability and inflation and, found that , the effect of inflation on bank profitability depends on whether banks' wages and other operating expenses increase at a faster rate than inflation. In this context, Perry (1992) argued that, the extent to which inflation affects bank profitability depends on whether inflation expectations are fully anticipated. Bourke (1989) and Molyneux and Thornton (1992) found a positive relationship between either inflation or long-term interest rate and profitability. In addition, Demirguc-Kunt and Huizinga (2000) and Bikker and Hu (2002) included variables such as GDP, annual growth rate of GDP and GNP per capita, unemployment rate and interest rate differentials to examine the possible correlations between profitability and business cycle movements and found some statistical evidence. A rather interesting issue is whether politics of a country affects bank profitability. Using bank level data, studies such as La Porta et al. (2002), Sapienza, (2004), Khwaja and Mian, (2005), and Micco et al. (2007), found that politics play a vital role in the lending decisions of banks, particularly in state-owned banks. They stated that, state-owned banks are inefficient because they are captured by politicians and tend to favour firms with politically connected directors by lending more and allowing higher default rates.

The above literature reveals the following research gaps: (i) Studies such as Short (1979), Bourke (1989), Molyneux and Thornton (1992), Demirguc-Kunt and Huizinga (2000), Goddard et al. (2004), and Petya Koeva (2003) used linear models such as ordinary least squares (OLS), fixed effects and random effects and dynamic panel specifications to examine bank's profitability determinants. Each method has its own merits and demerits, over the other. If the banks included in the sample are widely dispersed in terms of performance then the OLS method is not suitable since it does not consider the firm specific effect [Awdeh Ali (2005)]. The Fixed Effects method solves this problem and allows us to take into consideration the firm-specific effects on regression estimates. This method is an appropriate specification when we are focusing on a specific set of N firms and our inference is restricted to the behavior of these set of firms [Baltagi 2003)]. However, this model does not take into consideration the time effect and often results in a loss of large degree of freedom if N is large. It would be robust only under the omission of any relevant time-varying factors.

The Random Effects Model, which, besides incorporating the firm-specific effects, takes into consideration the time effects and is an appropriate specification if we are drawing N individuals randomly from a large population. However, in static relationships the literature usually applies least squares methods on Fixed or Random Effects models. But, in dynamic relationships where the model includes a lagged dependent variable among the regressors these methods produce biased results, especially when time dimension T gets smaller, (and inconsistent estimates). To address this problems Arellano and Bond (1991) proposed a dynamic model through which efficiency estimates can be obtained by using all lagged values of the explanatory variables as instruments [(Maddala, (2005); and Baltagi, (2003)]. Since 15 years, the Indian banking system witnessed radical structural, technological and regulatory changes, in addition to changes in the structure of the entire economy; it is worthwhile to apply this technique to look at the dynamic nature of performance of commercial banks in India.

Most of the above studies conclude that internal factors explain a large part of banks profitability; nevertheless external factors may also have important impact on its performance. However, the relation between bank's characteristics or external factors and profitability are not constant across countries or at different periods within the same country. Majority of the studies on determinants of profitability focus on developed countries, whereas studies in developing countries like India are rare, and in recent years only two studies, [Petya Koeva (2003), and Sanyal and Shankar (2005)], have found on the profitability of Indian banks. These studies primarily focused on the relationship between productivity and ownership of Indian banks during the initial period of reforms and used fixed and random effects models. No study is available on the subject of exploring bank's internal, external and political determinants of profitability in recent years. It is also important to note that not a single study has examined the concept of profit persistency for Indian commercial banking sector during the reforms period. The present study is an effort to study this issue by employing dynamic panel data model.

The rest of the paper is organized as follows. Section III describes the methodology and data for our empirical analysis. Section IV offers empirical results and discussion of the study. The concluding remarks are presented in section V.

III. Methodology and Data

The empirical analysis is undertaken for a representative sample of three bank groups of commercial banks in India viz; public, domestic private and foreign banks for the period 1992-2006. Assuming that previous year's performance of a bank may affect current performance of that bank, the study employs Arellano and Bond (1991) dynamic panel data model developed for first difference equation to remove the firm specific effect. The specification of the model is followed as:

$$\Pi_{it} - \Pi_{it-1} = \alpha + \beta(\Pi_{it-1} - \Pi_{it-2}) + \chi(BS_{it} - BS_{it-1}) + \psi(IS_{it} - IS_{it-1}) + \delta(ME_{it} - ME_{it-1}) + \gamma(OS_{it}) + (\varepsilon_{it} - \varepsilon_{it-1}) \qquad i=1,\ldots,N;\ t=1,\ldots,T, \qquad (1)$$

where, Π is the profitability variable, BS indicates the bank specific variables, IS denotes the industry specific variables, ME represents the macroeconomic variables, OS indicates the other specified dummy variables, α, β, χ, ψ, δ and γ are the parameters to be estimated and ε is error term.[3]

In equation (1) error-term (ε_{it} - ε_{it-1}) and the lagged dependent variable are correlated due to presence of the lagged dependent variable among the set of explanatory variables. The standard way to deal with this correlation and the other possible endogenous problems is to adopt an instrument variable procedure. Arellano and Bond (1991) proposed a generalized method of moments (GMM) estimator procedure that use lagged values of the explanatory variables in levels as instruments. This method involves a two step estimation. In the first step, the errors are assumed to be both independent and homoscedastic, across the sample and over time. In the second step, relaxing the assumptions, a consistent estimate of the variance-covariance matrix is constructed by the residuals obtained in the first step. However, Griliches and Hausman, (1986) found that this difference estimator procedure leads to the aggravate measurement error biases. Therefore, Arellano and Bover (1995) proposed an alternative method that estimates the regression in differences jointly with the regression in levels. The estimator uses lagged differences of the explanatory variables as instruments. This instrument variable procedure is valid under assumption that the correlation between the bank specific effect and the levels of the explanatory variables is consistent overtime. The consistency of the GMM estimator depends on two assumptions; the error term does not exhibit serial correlation and the instruments included in the model are valid. To test these assumptions, the study uses two diagnostic tests proposed by Arellano and Bond (1991). The first test is a Sargan test on over identifying restrictions, which tests the overall validity of the instruments. The second test is a serial auto correlation test to establish the absence of serial correlation in the error terms. The study tests whether the differenced error term is second-order serially correlated or not. Given the nature of the model, it is presumed that the error term is probably the first order-serially correlated. Under the null hypothesis of absence of the second order-serial correlation this test has standard normal distribution.

Definition, measurement and the expected relationship of the selected variables of the study are reported in Table-1. Two alternative measures of bank's profitability are used in this study: Net Interest Margin (NIM) and Return on Assets (ROA). The NIM and the ROA are used in most of the banks' performance studies. The ROA measures the profit earned on banks assets and reflects how well bank management use the bank's real investments resources to generate profits, while the NIM is focused on the profit earned on interest activities. The explanatory variables are bank specific (BS), industry structural (IS), macroeconomic (ME) and other specified (OS) variables.

Among the bank specific variables, EFF is cost efficiency which is estimated by the employed stochastic cost frontier approach and estimates of the cost frontier are

[3] A value of β between 0 and 1 implies that profits persist, but they will eventually return to their normal (average) level. If β value close to 0 means that the industry is fairly competitive and adjustment takes at high speed, while a value of β close to 1 implies less competitive structure and adjustment takes at very slow.

reported in Appendix I.[4] According to the efficient- structure (ESX) hypothesis, the most cost efficient banks produce services and products at lower costs, gain a large market share, resulting in higher market participation and higher profits. Thus, bank efficiency and profitability are positively associated due to the fact that cost minimization leads to profit maximization.

Higher capitalization may reflect the strength and soundness of banks and the higher management quality. It is also a sign that well capitalized banks face lower expected bankruptcy costs and lower the need to go for external funding, which in turn reduces their cost of funding and increase their profit. Thus, it is hypothesized that capital to assets ratio (CA) is expected to have positive impact over banks' profitability.

Financial services diversification enables banks to offer wide range of products and services and spread the lending risk across a large number of asset categories, thereby reducing monitoring costs. Many Indian banks recognize the importance of off-balance sheet business and increase in non-interest income by offering various services such as letter of credit, securities under writing, fund transfer (drafts and checks, etc), selling insurance products and other types of non-traditional banking activities. Non-interest income to assets ratio (NIA) reflects the extent of diversification in bank's services. It is expected to have positive impact on bank profitability. It is hypothesized that variable NIA and bank profitability are positively related.

Conventionally, banks collect deposits and transfer them into loans. For banks, loans is the primary source of income generation and is expected to affect bank performance. Other things being equal, if more deposits are transformed to loans, the interest margin and profit will be higher. However, if a bank is highly loan concentrated, then higher loans to asset ratio, will lead to higher (credit) risk and higher non-performing loans, resulting in lower returns. Thus, increased exposure to credit risk may lead to decrease in banks' profitability. Moreover, higher credit-deposit ratio may lead to liquidity problems. Therefore, to see the relationship between loans and profitability, the study includes loans to assets ratio (LA) in the model and expects no predeterminate relationship.

[4] A Battese and Coelli (1992) stochastic cost frontier approach in Cobb-Douglas form (log) is specified and estimated as follows:

$$\ln C_{it} = \alpha + \sum_{j=1}^{4} \beta_j \ln X_{ijt} + \sum_{k=1}^{3} \theta_k \ln P_{kit} + v_{it} + \eta_{it} + u_{it}$$

where C is the total cost, X is a set of output variables and P is a set of input prices. ß θ and η are parameters to be estimated. The u_{it} is non negative random variables associated with inefficiency in the banks and assumed to be truncation of the $N(\mu_{it}, \sigma^2 u)$ distribution, v_{it} is random variables, captures the effects of uncontrollable factors, assumed to be independent and identically distributed with $N(0, \sigma^2 v)$ distribution and independent of the u_{it}. Using intermediation approach, which measures bank's output in monetary terms and include interest expenses in total expenses, the study include advances, deposits, investments in government securities and non-interest income as outputs and labour, physical capital, and purchased funds as inputs. The price of labour (PL) is estimated by salaries and wages divided by number of employees. The price of physical capital (PPC) is the ratio of total expenses of premises and fixed assets to total assets. The price of purchased funds (PPF) is the ratio of interest expenses on borrowings from RBI to total borrowings, considering RBI is the principal lender to banks. Since inefficiency leads to higher than optimal costs, the inefficiency term u_{it} added. Cost efficiency measures how the costs of a bank relative to the best practicing bank when both the banks produce the same output under the same conditions. The above model is estimated by the maximum likelihood (ML) method. Efficiency score value ranges from 0 to 1, where later implies a fully efficient bank. Positive η indicates inefficiencies fall overtime and, conversely, negative η implies inefficiencies increase overtime. If $\eta = 0$, then technical efficiency is time-invariant i.e., banks never improve their efficiency. The variances of the error terms in model are reparameterised and expressed as $\sigma^2 = \sigma^2 u + \sigma^2 v$ and $\gamma = \sigma^2_u / \sigma^2$. The value of γ will lie between 0 and 1. If u_{it} equals zero, which indicates full technical efficiency, then γ equals zero and deviation from the frontier are entirely due to noise v_{it}. If γ equals one all deviations from the frontier are due to technical inefficiency. (for more details see Kumbhakar and Sarkar, 2003). The cost function is estimated by using Frontier 4.1.

Overhead expenses are seen as the outcome of bank management. The ratio of overhead expenses to total assets (OHA) provide information on variation in bank costs over the banking system. It reflects employment as well as the total amount of wages and salaries. It is used as an indicator of management's ability to control costs and is expected to have a negative relationship with profits. The overhead expenses may also represent for the size of the bank. If the OHA is proportionate to profits, increase in OHA may lead to increase in profits, due to the fact that economies of scale are associated with the size of the unit. However, since the study has already included cost component in the model, i.e., cost efficiency, the rational behind inclusion of overhead component is to find out the specific impact of employee's expenses on bank profitability. Since cost efficiency is derived value from the estimated residuals in the cost function, it does not lead to any specification problem in the second stage analysis. The expected relationship between bank profitability and overhead expenses is negative.

Considering industry specific structural variables, the study include size of a banking industry and stock market capitalization to examine how performance of a bank is related to the relative development of banking industry and stock market. Stock market capitalization divided by gross domestic product (MGDP) is used to measure the size of the equity market and as a proxy of financial market development.[6] The size of the banking sector is measured by the total assets of banks to gross domestic product (AGDP) and it is intended to reflect the importance of bank finance in the economy. In addition, stock market capitalization and the size of the banking industry will indicate the complementarities or substitutability between bank and the equity market financing. Negative relation between MGDP and bank profitability implies that they are substitutable due to the fact that relatively well developed stock markets can substitute for bank finance whereas positive relationship indicates that they are complementarities.

According to the SCP hypothesis concentration and profitability are positively related; because, banks in highly concentrated markets tend to collude and charge higher rates on loans, pay lower rates on deposits and impose higher fee on monetary transactions. If higher concentration is the results of higher managerial efficiency or some deviations or regulations (for example, entry barriers or/and low competition) in the market, then concentration leads to monopoly profits. However, this relationship may be influenced by third variables (like, sources of finance, growth of the economy, etc.,) and profits can be negatively affected by concentration. For instance, a more concentrated banking industry imposes a deadweight loss in the credit market as a whole, because banks with monopoly power would determine equilibrium with higher loan rates and a smaller quantity of loanable funds, resulting in a reduction in the total quantity of loanable funds and thereby harming the overall credit growth. Since the RBI started liberalizing entry norms with intention of intensifying competition in the Indian banking, market concentration of banking

6 The study prefers to include market capitalisation in Bombay Stock Exchange (BSE) rather than National Stock Exchange (NSE) for two reasons. First, NSE was set up in 1994 but our data set starts from 1992 onwards. Second, though the volume of transactions in the BSE is lesser than the NSE, former is the oldest stock exchange in India and is expected to reflect pulse of not only domestic economy but also global economic trends. Hence, we prefer BSE as it is considered as barometer of strength of financial markets in India.

industry is declining. Therefore, to examine the relationship between banking industry concentration and profitability, a Herfindhal-Hirschman Index (HHI) is computed.[7]

To control macroeconomic factors, growth rate of economy (GROW), inflation rate (INF) and rate of interest (RINT) are included. The GROW is a measure of total economic activity and is expected to have an impact on numerous factors related to the supply and demand for loans and deposits. Growing economy will certainly raise people's income and generate stronger cash flows in the banks which may lead to higher bank margins. In contrast, it will also raise banks expenses because under expansive demand conditions, banks feel less pressure to control their costs, resulting in low profits. Inflation may affect both the cost and revenue of banks. The effect of inflation on bank profitability (either positive or negative) depends on an extent to which an economy is mature enough to predict inflation. If inflation is anticipated accurately then banks could adjust their operating expenses and deposit and lending rates with raising inflation in order to increase their revenues faster than their costs, thus acquiring higher margin. If inflation is not anticipated correctly then banks would be sluggish in adjusting their interest rates which may result in increasing bank's cost faster than their revenues, thereby, adversely affecting their profitability. Interest variable controls marginal cost of funds of banks. Higher interest rates are associated with higher profitability. In developing countries demand deposits frequently pay zero or less than the market interest rates. If a bank is lending from its collection of deposits the higher interest rate in the economy would have favourable impact on the bank margins. Conversely, if a bank is more dependent on market borrowings, the higher interest rate would have unfavorable impact on its profitability.

Other specified variables are dummy variables of ownership and the political party in power. In Indian banking industry public, private and foreign banks operate in a competitive market. The public sector banks are required to fulfill some social and economic objectives as per the government guidelines. Hence, one might expect them to have different performance characteristics against the sole profit-maximizing motive of the non-public sector banks. A relationship between the bank profitability and ownership may also exist due to spillover effects from the technologically advanced private and/or foreign owned banks compared to state owned banks Therefore, the study includes two dummy variables to test whether there is any ownership-performance relationship in existence across the public, private and foreign banks, i.e., D_PSB is 'zero' for other than public sector banks and 'one' for public sector banks and D_FB is 'zero' for other than foreign banks and 'one' for foreign banks. It is hypothesized that when we move from the non-foreign banks to foreign banks profitability will be larger and it would be lower as we move from the non-public sector banks to the public sector banks.

7 In the literature, the HHI is used to measure market concentration. It is calculated by squaring the market share (proportion of bank assets to total industry assets) of each bank competing in market, and then summing the resulting numbers. Thus, HHI = $s1^2 + s2^2 + s3^2 + ... + sn^2$ (where sn is the market share of the ith bank). The HHI number range from close to 0 to10, 000. Decreases in the HHI generally indicate a loss of pricing power and/or an increase in competition, whereas increases imply the opposite. The U.S. Department of Justice considers a market with a result of less than 1,000 to be a competitive marketplace, a result of 1,000-1,800 to be a moderately concentrated market place and a result of 1,800 or greater to be a highly concentrated market place (for more see Brown and Frederick, 1988).

India is a democratic country with strong multiple political party system. Normally once in every five years, there would be a change in the central government. Whenever the new government comes in power it would try to implement its own political ideology and try to accomplish the party promises to maximize the vote bank. This would certainly affect all economic units in the country including financial institutions. Since, the study period covers all major structural changes in Indian economy it is worthwhile to study the effect of a political party in power on the profitability of commercial banks. Micco, et. al., (2007) strongly supported this hypothesis that, politics plays a role in determining banking activities, particularly during the election years. Since reforms were implemented we have seen three parties (or coalitions) ruling India. They are the Congress party (or led coalition), the Bharathiya Janata Party (BJP) led coalition National Democratic Alliance (NDA) and the United Front. Hence, the study includes two dummy variables. They are D_CONG i.e., 'zero' for other than Congress and 'one' for Congress and D_NDA i.e., 'zero' for other than NDA and 'one' for NDA. It is hypothesized that there was high level of profitability during the Congress (or led coalition) and the NDA regime; than the United Front regime, due to the fact that the economic reforms during NDA and Congress (or led coalition) were similar and higher than the United Front government.

Due to non-availability of data of all banks for -2006, the study finally made the unbalanced panel data for 87 commercial banks, which consists of 28 public sector banks, 29 private domestic and 30 foreign banks, with a total of 1,123 observations. The necessary information for empirical analysis was obtained from various reports and publications of the Reserve Bank of India and PROWESS data base provided by the Center for Monitoring Indian Economy (CMIE).

IV. Results and Discussion

For the purpose of primary investigation, the summary statistics results of the study selected variables are presented in Table 2. All monetary values have been converted into 1993-94 prices using GDP deflator. The mean values of the two profitability measuring variables, net interest margin and returns on assets, reveal that foreign banks are relatively highly profitable than the other two groups. On an average, in India, commercial banks earn 2.19 per cent of interest margin and 18 per cent of total returns on their assets. Mean values of efficiency shows that private domestic banks and foreign banks are relatively more efficient than the public sector banks. However, on an average, the cost efficiency of commercial banks in India record 0.93 points, which is close to efficient frontier. The mean values of capital to assets reflects that foreign banks are financially far sound as its value is higher than the other two groups; the non-interest income to assets shows that foreign banks involved in higher level of diversified banking business than private and public sector banks. Similarly, the loans to assets indicates that loans occupy major portion in the banks asset portfolio and foreign banks have higher loans in proportion to their assets than the other groups. However, on an average, Indian banks operate in risky situation. The overhead expenses to assets reflect that wages and salaries of foreign banks are more than the other two groups. This may be due to the fact that foreign

banks hire their employees by paying higher than the public and the private domestic banks. On an average, personnel expenses occupy around 3.96 percent of their assets. Banks assets to gross domestic product (AGDP) indicate that assets of public sector banks are higher followed by the private domestic sector banks. The Indian banking sector occupy 49.45 per cent of GDP, the market capitalization to GDP reveal that stock market capitalization also occupy a significant portion in GDP and it is recorded around 55.42 per cent. The Herfindahl-Herschman index indicates that economic reforms induced competition into the banking sector as its value is near 800 points and the degree of concentration Indian banking gradually decreases during the study period (see Figure 1). The mean values of rate of interest, growth rate of economy and inflation indicate that Indian economy, on an average, experience around 10.5 per cent annual rate of interest, 6.25 per cent annual GDP growth rate and 5.24 per cent annual rate of inflation, respectively. Standard deviation of variables indicates that there is a slight variation in the data set and it is higher on LA which may be due to inconsistency over banks lending policies.

The results of the dynamic panel equation on the net interest margin and returns on assets are provided in Tables 3 and 4, respectively. The statistically significant coefficients of the lagged profitability variables, net interest margin (NIM_{t-1}) and returns on assets (ROA_{t-1}), confirm the dynamic character of the model specification. An obvious interpretation of this is that large values of NIM/ROA (positive or negative) one year stimulate banks to increase the NIM/ROA in the next year. If the NIM/ROA for a bank is at the mean of 0.57, in the following year the effects of NIM/ROA and the intercept alone result in the NIM/ROA being unchanged at 0.57. In the present case, lagged profitability variable coefficients take, on an average, a value of below 0.14, which means that profit persistency of banks is low. It is important to note that failure to reject the null hypotheses of our diagnostic tests, both Sargan and second order serial correlation, support the overall validity of given instrumental variables and no auto correlation in the model, respectively. The results partially support the efficient structure (ESX) hypothesis. The first bank level variable i.e., cost efficiency, is statistically significant in the public sector and all banks groups on both equations of the NIM and the ROA. Thus, our findings moderately support the efficient structure hypothesis; thereby evidencing that efficiency is not the sole determinant of profitability.

Consistent with the previous evidence on this subject, the results also emphasize that capital strength is one of the main determinants of profitability of banks. The findings exhibit that positive relationship between capitalization and profitability whether the variable used is either net interest margin or return on assets for measuring profitability. The results are uniform in all groups except in case of the domestic private banks in the net interest margin equation. This indicates that well capitalized Indian banks are lower expected bankruptcy costs, which in turn reduces their need for external funding, leads to higher profitability.

The coefficient of the ratio of non-interest income to assets is positive and statistically significant in all ROA specifications. It supports that Indian banks offer a wide range of non traditional products and services involving in more off-balance sheet business activities which helps them to have more non-interest income from

those services. However, non-interest income is negatively associated with bank margins when NIM is used as a measure of profitability. This means that higher concentration on non interest income related activities will reduce interest margins suggesting for a policy implication of balanced approach towards both interest and non-interest activities to keep profits increasing.

The coefficient of loans to assets ratio is positive and statistically significant in all groups except in the public sector banks. It reveals that bank loans are interest earning assets and, increase in interest margin increases profits. Public sector banks seems to have poor asset quality management compared to other groups as its coefficient is negative and statistically significant in ROA equation. This may be due to higher levels of non-performing loans, priority sector lending, lesser interest rates and income. However, on an average, the asset quality of Indian banks is satisfactory as its coefficient is positive and statistically significant in all banks equation on both the ROA and NIM specifications.

Interestingly, the study finds a positive and statistically significant coefficient on the overhead to asset ratio in all NIM and ROA specifications except in the domestic private banks in the ROA equation. The overhead variable has an estimated coefficient of 0.984 in the returns on asset, which suggest that 98.4 per cent of a bank's overhead costs is passed on to its depositors and lenders in the form of lower deposit and/or higher lending rates (Naceur, 2003). Turning to the industry structural variables, the coefficient of industry size (AGDP) is negative and statistically significant except in the public sector banks group in NIM and ROA specification and for domestic private banks in ROA specification. It reveals that banks in competitive markets and where banking assets constitute a larger portion of the GDP, would have smaller margins and are less profitable. The stock market capitalization to GDP is positive and statistically significant in respect of NIM variable for the domestic private, foreign and all bank groups. However, in respect of ROA specification it is observed only in the case of domestic private and all bank groups. This may be due to the complementarities' effect between equity and debt funding. As stock markets develop, availability of improved information availability increases the potential pool of borrowers, making it easier for banks to identify and monitor them. It leads to increase the volume of business thereby making higher margins possible.

The market concentration (HHI), the coefficient is positive and statistically significant in the public sector banks and negative in all bank groups in both the measures of profitability specifications. This coefficient is also negative and statistically significant in foreign banks in ROA specification. As to the literature, concentration is usually negatively related to profitability once other effects in the profitability equation are controlled. The study observes two contradictory outcomes: First, the relatively low value of the coefficient of the lagged profitability variable is consistent with low market power. Second, our estimations show that even though there was a considerable fall in the HH Index since 1992 (see Figure 1) suggesting that the industry is moving to a more competitive structure and hence profitability should have declined. The improvement of the managerial practices (captured by the bank-specific variables) resulted in increased profitability. But the positive and significant of this coefficient in respect of public sector banks indicate

that the process of deregulation has intensified competition in public sector group and it has positive effect on their profitability. However, in totality, Indian banks seem to be adversely affected by new competition.

Moving to macroeconomic determinants, inflation coefficient (INF) is negative and statistically significant in all groups, except in the public sector groups in both the NIM and ROA specifications. Its coefficient in the public sector group is positive but significant only in ROA specification. In general, it reveals that inflation is not accurately anticipated by Indian banks, therefore, they are sluggish in adjusting their interest rates, thereby, raising costs faster than bank revenues which would lead to adversely affecting bank's profitability. Positive sign in the public sector banks may be due to their rigid salary structure. For taking a decision over changing salaries of their personnels, public sector banks have to wait for the government nod even though the economy is in inflationary pressure, and hence, personnel expenses may not go with inflation. Another macroeconomic variable rate of interest (RINT) is negative and statistically significant in all groups except in the public sector group in both the measures of profitability equations. Higher interest rates, besides higher inflation in India seem to have created difficulties for banks to adjust their cost structure with increasing cost of borrowings thereby affecting banks profitability. Last macroeconomic determinant is growth rate of the economy. Its coefficient is positive and statistically significant in all groups and in both ROA and NIM equations, except in public sector and private domestic bank groups in NIM equation. This means that Indian banks seem to be exploring all the opportunities available in the prosperous economy in recent years to improve their bank business and profitability.

The profitability of Indian banks is also determined by its ownership characteristics as state ownership is negatively associated, whereas, foreign ownership is positively related with bank profitability. It reveals that foreign banks are more profitable than the domestic banks. Therefore, the study finds no spillover effects of foreign banks over the domestic banks. Supporting the earlier studies on an impact of political party in power on the performance of banks, the present study fiunds a statistically significant negative relationship between the Congress (or led) government and profitability of domestic private and all bank groups in both the NIM and ROA specifications and significant positive relationship between NDA government and profitability of domestic private, foreign and all bank groups in NIM equation and domestic private and all bank groups in ROA equation. This may be due to the induction of new products and services in the banking sector through more liberal entry of private and foreign banks and deregulating most of the interest rates during the NDA regime. Further, it may also be due to the fact that banking reforms were a bit faster in NDA regime than in the Congress (or led) government [Arvind (2007)].

V. Concluding Remarks

The study employed a dynamic panel data model to explore the determinants of profitability of commercial banks in India. The empirical results reveal that profitability of banks is affected by not only its own characteristics but also by the industry specific and macroeconomic factors.

The study reveals that, commercial banks in India show a tendency to persist their profits over time. Efficiency is not the sole determinant of profitability as other internal variables, such as, the ratio of capital to assets and the ratio of overhead expenses to assets are also significant and having positively associated with the profitability of the banks. The ratio of non-interest income to assets is positively associated with the profitability of banks in case of returns on assets specification; and negatively associated in case of net interest margin specification. Further, the ratio of loans to assets is positively associated with the profitability of banks except public sector banks. In case of the structural variables, industry size is negatively associated with profitability of banks. Development of stock market is positively related with profitability of private domestic, foreign and all banks groups. The bank concentration is positively associated with profitability of public sector banks and negatively associated with foreign banks and all banks groups. Coming to the macroeconomic determinants, inflation and rate of interest are negatively associated with profitability of banks; and growth rate of the economy is positively associated with banks profitability. Further, our empirical results also reveal the presence of nexus between political party in power and banks performance in India as bank profitability is negatively associated with the Congress party regime and positively associated with the NDA regime. Besides, the study finds that ownership character is also one of the determinants of bank profitability in India.

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TABLE 1

Variables definition and expected relationship

Variables	Definition	Measurement	Expected relationship to ROA/NIM
Dependent variables (II):			
NIM	Net interest margin	(Interest earned-interest paid/total assets)*100	--
ROA	Returns on assets	(Net interest margin + Non interest income/ total assets)*100	–
Bank specific variables (BS)			
EFF	Cost efficiency	Employed stochastic cost frontier approach	+
CA	Ratio of capital to assets	(Paid up capital / total assets)*100	+
NIA	Ratio of non interest income to assets	(Non interest income/total assets)*100	+
LA	Ratio of loans to Assets	(Total bank loans / total assets)*100	+/-
OHA	Ratio of overhead to assets	(Salaries + wages / total assets)*100	-
Industry specific variables (IS)			
AGDP	Ratio of assets to GDP	(Total assets / GDP)*100	+
HHI	Herfindahl-Hirschman Index	Sum of squared share of business of each individual bank	+/-
MGDP	Market	(Total market apitalization in BSE/ GDP)*100	+/-
Macro economic variables (ME)			
INF	Inflation	Based on GDP deflator ((P (t) – P (t-1) / P (t-1))* 100	+/-
RINT	Rate of interest	Average rate of interest on Govt. Securities	+/-
GROW	Growth rate of economy	Annual growth rate on GDP	+/-
Other specific variables (OS)			
D_PSB	Dummy variable for PSB	Dummy variable taking value 1 for each PSB and 0 otherwise	-
D_FB	Dummy variable for FB	Dummy variable taking 1 for each FB and 0 otherwise	+
D_NDA	Dummy variable for NDA	Dummy variable taking 1 for each year if NDA ruled period and 0 otherwise	+
D_CNG	Dummy variable for Congress	Dummy variable taking 1 for each year if Congress or led ruled period and 0 otherwise	+

TABLE 2

Summary statistics: means of the selected variables by group
(Standard deviation in parenthesis)

Variables	Description	PSB	DSB	FB	All Banks
NIM	Net Interest Margin	1.138 (9.65)	0.97 (3.84)	4.39 (28.07)	2.188 (17.51)
ROA	Return on Assets	7.165 (14.0)	5.851 (6.03)	40.90 (119.96)	18.2 (72.24)
EFF	Cost Efficiency	0.92 (0.07)	0.94 (0.07)	0.94 (0.05)	0.93 (0.07)
CA	Capital to Assets ratio	3.17 (5.212)	2.37 (4.48)	31.42 (93.21)	12.5 (56.05)
NIA	Non Interest Income to Assets ratio	6.0277 (12.558)	4.88 (5.2)	36.52 (104.92)	16.014 (63.31)
LA	Loans to Assets ratio	80.35 (184.056)	62.12 (89.23)	219.25 (630.21)	121.79 (392.08)
OHA	Overhead expenses to Assets ratio	2.684 (4.65)	1.53 (1.41)	7.49 (23.41)	3.96 (14.155)
AGDP	Industry Assets to GDP ratio	39.13 (5.07)	6.66 (4.33)	3.65 (0.99)	49.45 (6.95)
HHI	Herfindahl-HirschmanIndex	-	-	-	803.39 (243.45)
MGDP	Market capitalization to GDP	-	-	-	55.42 (23.45)
RINT	Rate of Interest	-	-	-	10.47 (2.68)
GROW	Growth rate of economy	-	-	-	6.25 (1.54)
INF	Inflation	-	-	-	5.24 (2.58)
D_PSB	Dummy variable for public sector banks	-	-	-	0.35 (0.48)
D_FB	Dummy variable for foreign banks	-	-	-	0.34 (0.47)
D_NDA	Dummy variable for National Democratic Alliance	0.43 (0.50)	0.47 (0.50)	0.48 (0.50)	0.46 (0.50)
D_CON	Dummy variable for Congress	0.43 (0.50)	0.38 (0.49)	0.37 (0.48)	0.39 (0.49)
No. of Observations		392	350	381	1123

Note: PSB = Public Sector Banks, DSB: Domestic Sector Banks, FB = Foreign Banks.
Source: Author's estimation.

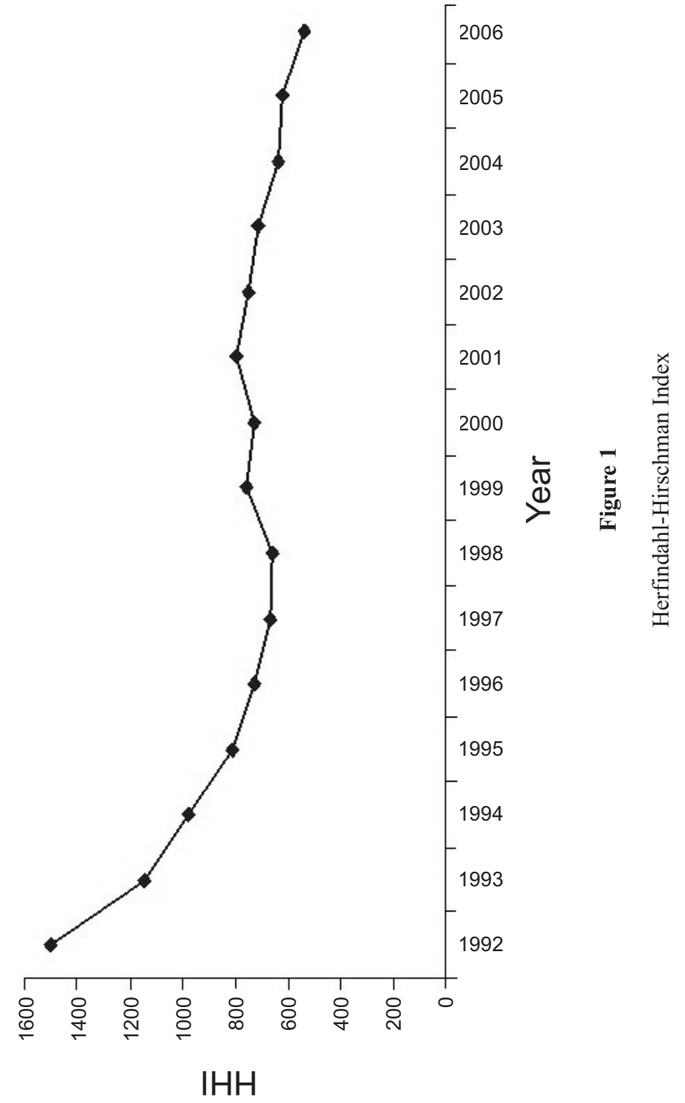

Figure 1

Herfindahl-Hirschman Index

TABLE 3

Results of dynamic panel data model on net interest margin (NIM)

Variables	Description	PSB	DSB	FB	All Banks
Constant	-	1.392** (0.52)	-0.505* (0.106)	-3.291* (0.94)	-0.57* (0.058)
NIM_{t-1}	Lagged NIM	0.201* (0.045)	0.028 (0.047)	-0.045** (0.019)	0.143* (0.001)
EFF	Cost Efficiency	14.197* (27.38)	27.863 (20.77)	8.841 (108.43)	20.034* (3.86)
CA	Capital to Assets ratio	0.983* (0.099)	0.027 (0.035)	0.138* (0.007)	0.125* (0.0003)
IA	Non Interest Income to Assets ratio	-0.813* (0.036)	-0.616* (0.024)	-0.486* (0.015)	-0.427* (0.002)
LA	Loans to Assets ratio	-0.005 (0.003)	0.043* (0.002)	0.057* (0.002)	0.051* (0.0001)
OHA	Overhead expenses to Assets ratio	1.605* (0.14)	0.539* (0.11)	1.075* (0.123)	0.939* (0.013)
AGDP	Industry Assets to GDP ratio	0.029 (0.081)	-0.055* (0.019)	-0.518* (0.121)	-0.040* (0.01)
MGDP	Market capitalization to GDP	-0.012 (0.033)	0.025* (0.009)	0.102*** (0.054)	0.026* (0.004)
INF	Inflation	0.252 (0.25)	-0.270* (0.06)	-0.972* (0.247)	-0.361* (0.02)
RINT	Rate of Interest	-0.125 (0.59)	-0.776* (0.203)	-3.221** (1.22)	-0.267* (0.08)
GROW	Growth rate of economy	0.298 (0.31)	0.003 (0.086)	0.800* (0.13)	0.180* (0.038)
HHI	Herfindahl-Hirschman Index	0.012** (0.005)	0.001 (0.001)	-0.002 (0.004)	-0.004* (0.0005)
D_NDA	Dummy variable for National Democratic Alliance	0.232 (1.25)	0.928** (0.453)	7.935** (3.09)	1.25* (0.22)
D_CON	Dummy variable for Congress	-0.954 (2.05)	-2.457* (0.79)	-8.816 (6.18)	-0.76* (0.28)
D_PSB	Dummy variable for public sector banks	--	--	--	-10.23* (0.54)
D_FB	Dummy variable for foreign banks	--	--	--	0.034 (0.423)
Sargan test p-value		0.81	1.00	1.00	0.99
Serial correlation test p-value		0.502	0.515	0.644	0.586

Note:PSB = Public Sector Banks, DSB = Domestic Sector Banks, FB = Foreign Banks.
Standard errors are in parenthesis.
*Significant at one per cent, **Significant at five per cent, and ***Significant at ten per cent.
Source: Author's estimation.

TABLE 4

Results of dynamic panel data model on net interest margin (NIM)

Variables	Description	PSB	DSB	FB	All Banks
Constant	-	0.906* (0.27)	-0.197 (0.112)	-2.404* (0.73)	-0.378* (0.023)
ROA_{t-1}	Lagged ROA	0.230* (0.068)	0.089* (0.032)	-0.0002 (0.002)	0.010* (0.00004)
EFF	Cost Efficiency	04.096** (38.89)	33.703 (20.598)	36.146 (114.01)	13.243* (1.63)
CA	Capital to Assets ratio	0.759* (0.115)	0.059*** (0.034)	0.130* (0.009)	0.133* (0.0002)
IA	Non Interest Income to Assets ratio	0.153* (0.0188)	0.437* (0.017)	0.490* (0.017)	0.564* (0.001)
LA	Loans to Assets ratio	-0.004* (0.001)	0.044* (0.002)	0.059* (0.001)	0.052* (0.00008)
OHA	Overhead expenses to Assets ratio	1.697* (0.028)	0.068 (0.15)	1.254* (0.091)	0.984* (0.006)
AGDP	Industry Assets to GDP ratio	0.014 (0.016)	-0.019 (0.018)	-0.462* (0.105)	-0.013* (0.004)
MGDP	Market capitalization to GDP	-0.018 (0.011)	0.013** (0.0052)	0.043 (0.049)	0.004** (0.002)
INF	Inflation	0.222** (0.102)	-0.253* (0.051)	-1.278** (0.6)	-0.342* (0.019)
RINT	Rate of Interest	-0.187 (0.146)	-0.304* (0.11)	-1.451** (0.57)	-0.062*** (0.034)
GROW	Growth rate of economy	0.271* (0.066)	0.120** (0.06)	1.071*** (0.63)	0.053* (0.019)
HHI	Herfindahl-Hirschman Index	0.006** (0.003)	0.001 (0.001)	-0.019* (0.005)	-0.007* (0.0003)
D_NDA	Dummy variable for National Democratic Alliance	0.543 (0.5)	1.088* (0.247)	3.259 (5.97)	0.45* (0.087)
D_CON	Dummy variable for Congress	-0.092 (0.71)	-0.730*** (0.392)	-1.000 (5.69)	-0.447* (0.104)
D_PSB	Dummy variable for public sector banks	--	--	--	-7.620* (0.495)
D_FB	Dummy variable for foreign banks	--	--	--	1.112* (0.207)
Sargan test p-value		1.00	1.00	1.00	0.95
Serial correlation test p-value		0.68	0.50	0.67	0.86

Note:PSB = Public Sector Banks, DSB = Domestic Sector Banks, FB = Foreign Banks.
Standard errors are in parenthesis.
*Significant at one per cent, **Significant at five per cent, and ***Significant at ten per cent.
Source: Author's estimation.

APPENDIX I

Madimum Likelihood Estimates of
Stochastic Frontier Cost Function for Indian Commercial Banks

Variables	Coefficients	Standard-error	t-ratio
Intercept	-0.1617	0.0305	-5.2946*
Ln AD	0.1527	0.0145	10.5623*
Ln DP	0.2682	0.0237	11.3066*
Ln GS	0.2291	0.0233	9.8146*
Ln NI	0.2751	0.0138	19.9473*
Ln PL	0.0226	0.0129	1.7492***
Ln PPC	0.3389	0.0206	16.4736*
Ln PPF	0.0046	0.0064	0.7210
σ^2	0.0683	0.0121	5.6388*
γ	0.7327	0.0528	13.8821*
μ	0.4474	0.1562	2.8635*
η	-0.0519	0.0113	-4.5933*
Log Likelihood	608.360*		

Maximum Likelihood Estimates of Stochastic Frontier Cost Function
for Indian Commercial Banks.
Note:AD = Advances, DP = deposits, GS = Investments in government and other securities, NI = Non-Interest income, PL = Price of Labour, PPC = Price of physical capital, PPF = Price of purchased funds. *indicate significant at one per cent, and ***indicate significant at ten per cent level.
Source: Author's estimation.