CHAPTER-7

FACTORS AFFECTING REVENUE EFFICIENCY, COST EFFICIENCY AND PROFIT EFFICIENCY OF INDIAN SCHEDULED COMMERCIAL BANKS

The present chapter discusses the various factors affecting Revenue Efficiency, Cost Efficiency and Profit Efficiency of Indian Scheduled Commercial Banks. To achieve this objective, Panel Data Tobit Regression Model is used. Efficiency scores are the dependent variables. These are regressed with a series of explanatory variables. Explanatory variables include bank specific variables, industry specific variables and economy specific variables that may influence Banks’ efficiency.

7.1. Hypotheses Development

For building the hypotheses, theoretical as well as empirical relationship of various variables with efficiency is considered. These variables related to bank, industry and economy are explained along with their hypotheses as follows:

A. Bank Specific Variables

Numerous bank specific variables may affect efficiency performance of banks. These variables may include banks’ capital, leverage, cash availability, interest income, non-interest income, operating expenses, non-operating expenses, size, ownership, market share etc. The list is inexhaustive. Researchers around the globe have taken different variables randomly in their research. In order to put these variables in a well defined structure and to evaluate banks comprehensively, the present study selects bank specific variables as per CAMEL framework and controls the effect of size and time.

CAMEL Framework was developed in the U.S in 1979 and its supervisory regulators include the Federal Reserve, the Office of the Comptroller of the Currency, National Credit Union Administration and Federal Deposit Insurance Corporation. CAMEL framework is an assessment criterion or a quantitative technique used to classify banks’ overall condition. It represents the performance of banks from some vital parameters as C- Capital Adequacy, A- Asset Quality, M- Management Soundness, E- Earning Quality and L- Liquidity Management. Thus this framework includes financial as well
as managerial indicators of banks’ performance and is the most organised and exhaustive. These parameters are explained as follows:

I. Bank Specific Variables as per CAMEL Framework

1) Capital Adequacy: Banks’ capital is the amount of banks’ own funds that act as a safety stock in case of unfavourable conditions (Athanasoglou et al., 2005). The capital of the bank helps to promote stability, safety and soundness of the bank. It also helps to prevent systemic disaster thus leading to reduction in losses to the bank depositors (Fatima, 2014). A bank having adequate capital provides confidence in the continual financial viability of the bank to the customer, the public and the regulatory authorities. In the present study two ratios namely, Capital Adequacy Ratio (CAR) and Equity to Total Assets (ETA) ratio are used to measure the capital strength of the banks. These are explained as below:

(i) Capital Adequacy Ratio (CAR): Banking Sector being highly leveraged sector is exposed to various types of risks like credit risk, market risk and operational risk. In order to face these risks, banks should have sufficient and adequate capital. Thus banks are required to maintain Capital Adequacy Ratio (CAR) stipulated by Reserve Bank of India (RBI) through BASEL norms. CAR is measured by dividing the Capital (Tier I, Tier II and Tier III) by risk weighted assets. It depicts the minimum capital requirement which banks have to hold with themselves. High CAR depicts that well-capitalized banks require less borrowing which leads to reduction in their cost of borrowing and makes them efficient (Gupta et al., 2008 and Ghosh, 2009). Besides, it can absorb greater level of unexpected losses. Number of researchers have used CAR as one of the factors affecting efficiency. Gupta et al. (2008) found positive effect of CAR on technical efficiency and Ghosh (2009) found positive effect of CAR on Profit Efficiency. However, Bhattacharyya et al., (1997), Das and Ghosh (2006), Kumar and Gulati (2009) and Gulati (2011a) found negative relation of CAR with the efficiency scores. In the present study the following hypothesis has been framed:
H1- There is a positive relationship between Capital Adequacy Ratio and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

(ii) Equity to Total Assets (ETA): Equity to Total Assets is one of the measures used to evaluate the strength of the capital of a bank (Pasiouras and Kosmidou, 2007). The difference between assets and deposits is defined as capital of the bank. Higher the Equity to Total Asset ratio, higher is the protection available to depositors. Moreover banks with high equity have less need to depend on external funding. A high equity capital would decrease the cost of capital of a bank thus enhancing the profitability and efficiency of the banks (Molyneux, 1993). A low equity to total assets of a bank may influence confidence and safety of the customer for the respective bank. Several studies found a positive and significant relation of Equity to Total Assets with efficiency of the banks as Grigorian and Manole (2002), Pasiouras et al. (2007), Semih Yildirim and Philippatos (2007), Ioannis et al. (2008), Sufian and Noor (2009), Brack and Jimborean (2010), Sufian and Habibullah (2010), Sufian et al. (2012a), Sanchez et al. (2013), Pančurová and Lyócsa (2013) and Raphael (2013). Jaffry et al. (2005), Chauhan and Pal (2009) and Sufian and Kamarudin (2015) also found a positive association between the two though it was insignificant. However Caner and Kontorovich (2004), Ariff and Can (2008), Sufian (2009) and San et al. (2011) reported that Equity to Total Assets shows negative impact on the efficiency of banks. The following hypothesis has been framed and tested in this study

H2- There is a positive relationship between Equity to Total Assets ratio and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

2) Asset Quality: Bank’s assets include cash in hand, cash at bank, money at call and short notice, investment in securities, fixed asset, loans and advances to customers and banks. Loans and Advances are the primary assets of banks that generate major share of banks’ income. So, loan quality has a direct bearing on efficiency of banks. In order to measure the asset quality of a bank, three ratios are taken, namely, Net Non-Performing Assets (NPA) to Net Advances, Total Investments to Total Assets
(TITA) and Total Loans and advances to Total Deposits (TATD). These are explained as follows:

(i) **Net Non-Performing Assets to Net Advances (NPANA):** The main source of income for a bank is interest charged on loans and advances for the duration of loan, but banks also have the highest risk of loss due to a debtor’s non-payment of loan and interest. This non-payment for more than 90 days or 3 months converts loans into Non-Performing Assets (NPAs) for a bank. Thus NPAs represent the bad loans on which the borrowers fail to satisfy their repayment commitment. More the bank is exposed to these types of bad loans, lower is the efficiency of a bank (Joseph and Prakash, 2014). To reveal how well a bank is managing its loan, Net Non-Performing Assets (NPAs) to Net advances is measured. In other words, it describes the overall quality of the bank's loans and advances. Higher Net Non-Performing assets (NPAs) to Net advances ratio reflect rise in bad quality of loans in relation to total loans and advances; whereas lower ratio indicates better performance of a bank. Several studies found a negative and significant association between Net Non-Performing assets (NPAs) to Net Advances ratio and efficiency of a bank as Caner and Kontorovich (2004), Burki and Niazi (2006), Staub et al. (2010), Gulati (2011b), Garza-García (2012) and Noor and Ahmad (2012). The foregoing arguments help to develop the following hypothesis:

H₃- There is a negative relationship between Non Performing Assets (NPA) to Net Advances and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

(ii) **Total Investments to Total Assets (TITA):** The ratio of Total Investments to Total Assets is used as a tool to measure the percentage of total assets confined up in investments. This indicates the extent of deployment of assets in investment other than loans and advances. Investments highlight the alternative opportunities that are available to banks for parking their funds. Bank’s investments include investment in government securities, other approved securities, shares, debentures, bonds, and other non-approved investments. These investments help banks to earn good returns with low risk and to protect themselves from huge NPAs, but investments are often considered as evidence
of lazy banking as the primary business of the banks is to lend (Ketkar and Ketkar, 2008). The higher level of investment may also indicate poor credit off-take or conservative lending (Chisti, 2012). Only two studies were found that checked the relation of Total Investments to Total Assets with efficiency of the banks i.e. Ataullah and Le (2006) and Ketkar and Ketkar (2008). Ataullah and Le (2006) reported positive whereas Ketkar and Ketkar (2008) reported negative association of investments to total assets with efficiency of Indian Banks. Since the available empirical evidences are mixed. The following hypothesis is framed and tested:

**H4-** There is a positive/negative relationship between Total Investments to Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

(iii) **Total Loans and advances to Total Deposits (TATD):** Loans and advances to Deposit ratio is used to determine asset quality of banks. This ratio indicates the quantum of loans and advances lent by banks out of their deposits. The main function of the bank is to lend the money of depositors to the borrowers in order to earn profits. Thus this ratio reflects the ability of the bank to use its available resources in the most advantageous manner by converting the available deposits into high earning loans and advances. Higher ratio depicts that higher loans and advances are formed from deposits by banks. Further, it indicates that the banks generate more income from their loans and advances. As suggested by review of literature, Niazi (2003), Burki and Niazi (2006), Ariff and Can (2008) and Raphael (2013) found a positive relation of Loans and advances to Deposit ratio with efficiency of the banks. Alternatively this high ratio indicates that the banks are at high risk due to probable failure of repayment of loan and interest from the borrowers’ side. Thus from the above discussion, the following hypothesis is developed:

**H5-** There is a positive/negative relationship between Total Loans and advances to Total Deposits and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

3) **Management Soundness:** Management Soundness is another vital parameter of CAMEL framework. Management Soundness shows the capability of management to deploy its resources (Purohit and Mazumdar, 2003). This can be judged from the
proficiency of managers as to how they manage to minimise their expenses and get best returns from these expenses. Bank expenses include interest expenses paid by banks on their deposits and borrowings and operating expenses incurred for functioning of the banks. Moreover, managing these expenses is one of the most important parameters to measure the potential of the managers of the banks. Thus management soundness is analyzed by three ratios, namely: Total Expenses to Total Income (TETI), Operating Expenses to Total Expenses (OETE) and Business per employee (BPE). These are explained as follows:

(i) **Total Expenses to Total Income (TETI):** This ratio gives the information about the competence of the management regarding the expenses incurred in relation to the income generated by the bank. A high ratio implies less efficient management suggesting that the banks are not able to maintain their expenses at the minimum (Pasiouras and Kosimidou, 2007), while a lower ratio indicates greater profitability of the banks (Makkar and Singh, 2012). Thus this variable is expected to have negative impact on the efficiency of banks. Ataullah and Le (2006) also found negative impact of total expenses to total income on the efficiency of the banks. The current study also draws a hypothesis that:

H₆- There is a negative relationship between Total Expenses to Total Income and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

(ii) **Operating Expenses to Total Expenses (OETE):** The operating expenses of banks include payments to and provisions for employees, rent, taxes and lighting, printing and stationary, advertisement and publicity, depreciation on banks’ property, directors’ fees, allowances and expenses, auditors’ fees and expenses, law charges, postage, telegrams, telephones etc, repair and maintenance, insurance and other expenses. Poor management of these expenses may lead to lower profitability and lower efficiency of banks (Kosmidou, 2008). In other words, decrease in expenses will improve the efficiency of the banks. Niazi (2003) reported a negative association between Operating Expenses to Total expenses and Efficiency. Previous studies used Operating Expenses to Total Assets for determining the impact of operating expenses on the efficiency of the banks. Though few studies reported positive and significant association
between Operating Expenses to Total expenses and Efficiency (Das and Ghosh, 2006; Sufian and Noor, 2009 and San et al., 2011) yet majority of studies reported that Operating Expenses to Total Assets had negative and significant impact on the efficiency (Sufian, 2009; Sufian and Habibullah, 2010; Garza-García, 2012; Sufian et al., 2012a; Raphael, 2013 and Sufian and Kamarudin, 2015). Sharma et al. (2012) observed negative but insignificant impact on efficiency of banks. Thus the ratio of operating expenses to total asset is expected to be negatively associated with efficiency. Hence the following hypothesis is tested:

H7- There is a negative relationship between Operating Expenses to Total Expenses and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

(iii) Business per employee (BPE): Employees play a crucial role in providing services to the customers of the banks. Each and every activity of a bank is directly related to the skills, attitude and behaviour of employees. Banks do not just make any product to offer to its customers, they rather offer services to them through their employees. So to assess management soundness, it becomes necessary to evaluate the business generated by per employee. The same is calculated by dividing the total business i.e. deposits plus loans and advances by total number of employees working in a bank. This ratio shows the productivity of the workforce of a bank. Higher the ratio, higher the efficiency of a bank in providing services to the customers. Bala and Kumar (2011) found positive and significant impact of BPE on the efficiency of banks. Though, Gupta et al., (2008) also reported positive impact but the relation was insignificant. However, Kumar and Gulati (2009) and Gulati (2011a) found a negative relation between the two but the same was insignificant. In the current study, the following hypothesis is framed:

H8- There is a positive relationship between Business per Employee and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

4) Earning Quality: Earning Quality refers to the profits earned by a bank and is calculated by deducting the expenses from income generated. Banks having high profits are able to absorb huge losses and can expand their operations in new
markets (Balasundaram, 2008). They can also satisfy their owners by paying them adequate amount of returns (Balasundaram, 2008). In order to measure the earning quality of a bank three ratios are used, namely, Return on Assets (ROA), Spread to Total Assets (STA) and Non-Interest Income to Total Income (NIITI). These are explained as follows:

(i) **Return on Assets (ROA):** Return on Assets is calculated by dividing the net profit generated by the bank with total assets. It indicates banks’ effectiveness in utilizing their assets for generating profits. A higher ROA indicates superior quality of assets in generating income which leads to higher efficiency of banks (Ataullah and Le, 2006). Several studies have determined the relation of ROA with the efficiency of banks. Hassan (2005), Sufian and Noor (2009), Pančurová and Lyócsa (2013), Sanchez *et al.* (2013), and Raphael (2013) supported a positive association of ROA with efficiency of banks. Caner and Kontorovich (2004), Ariff and Can (2008) and San *et al.*, (2011) also found a positive relationship though it was insignificant. Ataullah and Le (2006) reported that for income based model of efficiency, ROA had positive and significant relation whereas for loan based model, ROA had negative and significant association. Similarly, Das and Ghosh (2006), Chauhan and Pal (2009), Gulati (2011a), Gulati (2011b) and Raina and Sharma (2013) exhibited a negative association between ROA and efficiency. For the current study, the following hypothesis is framed:

H₀- There is a positive relationship between Return on Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

(ii) **Spread to Total assets (STA):** Spread is the difference between interest received and interest paid. Spread is an important measure in case of banking business because the core business of a bank is to lend loans and advances out of its deposits, thus generating income for banks. It shows the competence of bank in managing and matching its interest expenditure with interest income effectively. In other words, high spread for a bank shows the ability of a bank in earning high interest on advances and paying low interest on deposits (Chisti, 2012). It actually ensures effective Asset Liability Management (ALM) in a
In prior research, Net Interest Margin (NIM) is taken to determine its impact on the efficiency. Raphael (2013) reported that it had positive impact on the efficiency of banks whereas Sanchez et al. (2013) found negative association between the two. Since higher spread depicts the wider margins between interest income and interest expenses which facilitates banks to earn higher profits that would typically result in higher efficiency, it is expected that higher the spread, higher would be the efficiency of a bank. Thus the following hypothesis is framed:

H\textsubscript{10}-There is a positive relationship between Spread to Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

(iii) Non-Interest Income to Total Income (NIITI): Banks provide a number of fee-based and other services as well along with the primary function of depositing and lending money. Income earned from these allied services is termed as non-interest income. It may include commission, exchange, brokerage, profit/loss on redemption and sale of investment, profit/loss on sale of land, buildings and other assets, profit/loss on exchange transactions, income earned by way of dividends etc. from subsidiaries, companies and/or joint ventures abroad/in India and miscellaneous income. The ratio of Non-Interest Income to Total Income depicts how much portion of total income includes non-interest income. Higher share of non-interest income shows that bank is less dependent on the interest income. Moreover, this diversification helps banks to earn additional profits and indicates managerial efficiency (Sufian, 2009). However, the empirical studies reported mixed results as Ariff and Can (2008), Sufian (2009), Gulati (2011b) and Raphael (2013) found positive relation of Non-Interest Income with the efficiency of banks, while Sufian and Habibullah (2010), Uddin and Suzuki (2011) and Sharma et al. (2012) reported negative association between the two. In the present study, the following hypothesis is framed:

H\textsubscript{11}- There is a positive relationship between Non-Interest Income to Total Income to Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.
5) **Liquidity Management**: Liquidity refers to the ability of a bank to pay back the money demanded by the depositors. Banks will be able to meet their money demand only if they maintain sufficient funds with them. It depicts the capability of a bank to achieve a balance between sources and use of funds (Alshatti, 2015). Moreover, managing these funds in terms of how much of cash, balance with the RBI, balance with other banks (both in India and abroad), and money at call and short notice is required to be maintained by bank is one of the important parameters that affects the efficiency of banks. Alshatti (2015) also suggested that banks are required to handle their liquidity issues in order to execute their operations efficiently and to increase their profitability. Liquidity Management is analyzed by using two ratios namely Cash Deposits Ratio (CDR) and Liquid Assets to Total Assets (LATA). These are explained as follows:

**(i) Cash Deposit Ratio (CDR)**: Absolute Liquidity in case of a bank refers to the cash available with the bank. Cash Deposit Ratio depicts how much deposits are retained by bank in the form of cash. The optimal amount of cash maintained with banks will help them to maintain a balance between profitability and liquidity. Ignoring liquidity may create financial problems and result in mess with the subsequent withdrawal of deposits (Alshatti, 2015). On the other hand, a higher proportion of a bank’s deposits in the form of cash and cash equivalents indicate that banks have not lent their money or invested their money to generate income. Thus the following hypothesis is framed:

\[ H_{12} \text{- There is a positive/negative relationship between Cash Deposit Ratio to Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.} \]

**(ii) Liquid Assets to Total Assets (LATA)**: Liquid Assets include cash in hand, balance with the RBI, balance with other banks (both in India and abroad), and money at call and short notice. The ratio of Liquid Assets to Total Assets indicates the overall liquidity position of a bank in relation to total assets. The high Liquid Asset to Total Asset ratio indicates incompetence on the part of bank management in organizing their resources in higher interest yielding assets (Elsiefy, 2013). Banks with more liquid assets depict poor cash management suggesting that banks have not lent their money as loans and advances and have
failed to generate major proportion of bank’s income in the form of interest. Idris et al. (2011) suggested that lesser the funds tied up in liquid assets, the higher is the profitability which in turn makes banks efficient. Even Ghosh (2009) reported that liquid assets had negative impact on the efficiency of Indian Banks though the results were insignificant. Contrary to this an opinion persists that banks having a larger volume of liquid assets are perceived to be safe and secure as these assets help banks to meet unexpected withdrawals. Das and Ghosh (2009) found positive and significant impact of Liquid Assets to Total Assets on efficiency. Thus the effect of liquidity on efficiency of banks is somewhat ambiguous. In the present study, the following hypothesis is framed and tested:

\( H_{13} \): There is a positive/negative relationship between Liquid Assets to Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

II. Control Variables

1) **Size (LNTA):** Size of a bank is the most important variable affecting efficiency of banks. Size effect is captured by taking natural Logarithm of Total Assets. Large banks enjoy higher economics of scale than small banks (Staikouras and Wood, 2004; Kosmidou et al, 2005 and Elsiefy, 2013). Thus large sized banks are likely to be more efficient as the economies generated on account of their size helps them to reduce per unit cost of gathering and processing information (Boyd and Runkle, 1993 and Pasiouras et al., 2007). Banks larger in size are relatively better than banks smaller in size as they can easily expand their business and can compete with their counterparts (Sufian, 2009). Ataullah and Le (2006), Das and Ghosh (2006), Burki and Niazi (2006), Pasiouras et al. (2007), Semih Yildirim and Philippatos (2007), Ghosh (2009), Sufian (2009), Sufian and Noor (2009), Sufian et al. (2012), Noor and Ahmad (2012), Raphael (2013), Pančurová and Lyócsa (2013) and Sanchez et al. (2013) exhibited positive association of size with the efficiency of the banks. However, increase in size may lead to decrease in profits due to complexity of the operations of larger banks (Pasiouras and Kosmidou, 2007). Moreover, large banks may have cumbersome bureaucracy problems (Davydenko, 2010). Chauhan and Pal (2009), Sufian and Habibullah (2010) and San et al. (2011)
found negative impact of size on the efficiency of the banks. Thus the following hypothesis is tested in the study:

H_{14} - There is a positive/negative relationship between Size and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

2) **Time Dummy (TD):** Time Dummy is used to incorporate the effect of introduction of reforms on the efficiency of banks. For dummy value, 1 for the Reformatory era and 0 for Post Reformatory Era is taken. It may impact the efficiency of banks positively or negatively. Therefore the following hypothesis is tested in the study:

H_{15} - There is a positive/negative relationship between Time Dummy and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

### B. Industry Specific Variables

Several industry specific variables also influence the efficiency of banks. In the present study, two industry specific variables are taken, namely, Ownership and Market Share in terms of Total Assets. These are discussed as follows:

1. **Ownership Dummy:** Indian Banking System has diverse ownership split as Public Sector Banks, Private Sector Banks and Foreign Sector Banks. To capture the impact of ownership, two dummies are considered as independent variables; one dummy for Public Sector Banks (PUBD) with a value of 1 assigned to these and 0 for all other banks. Similarly, another dummy of Private Sector Banks (PVTD) is created, while Foreign Sector Banks are considered as the reference sector. The available studies are uncertain about the ownership-wise performance of banks as some studies reported that Public Sector Banks were more efficient banks (Bhattacharyya et al., 1997; Sathye, 2003; Ataullah and Le, 2006; Varadi et al., 2006; Das and Ghosh, 2006; Sahoo et al., 2007; Sharma et al., 2012 and Karimzadeh, 2012) while others showed that Private sector banks were better (Chatterjee and Sinha, 2006; Chauhan and Pal, 2009 and Gulati, 2011a). Still some other researchers highlighted that Foreign Sector Banks (FSBs) were the most efficient ones (Sanjeev, 2006; Debasish, 2006; Gupta et al., 2008; Ketkar and Ketkar, 2008; Kalluru and Bhat, 2009 and Prabhakar et al., 2012). Since there is no
clear empirical evidence with respect to efficiency of banks on the basis of ownership, the following hypothesis is framed and tested:

H_{16} - There is a positive/negative relationship between Public Dummy and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H_{17} - There is a positive/negative relationship between Private Dummy and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

II. Market Share in terms of Total Assets (MSTA): Market Share in terms of Total Assets depicts the share of assets held by bank in relation to total assets of banking sector. In other words, it is calculated by dividing particular bank’s assets by banking sector’s total assets. A bank having high market share is able to compete effectively in the market (Garza-García, 2012). Grigorian and Manole (2002) also proposed that a bank having greater market share turns out to be more efficient owing to economies of scale. Garza-García (2012) found mixed results as Market Share in terms of Assets was positively related to Technical Efficiency; whereas it was negatively associated with Pure Technical and Scale Efficiency. In the current study, the following hypothesis is tested:

H_{18} - There is a positive relationship between Market Share in terms of Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

C. Economy Specific variables

The economy specific variables are beyond the control of banks and their impact appears at macro level. The economic state through which an economy is passing has a direct impact on the financial sector, specifically banks. Favourable economic conditions encourage banks to lend more loans and advances and earn higher returns while unfavourable conditions restrict their lending activities (Sufian, 2009). Two important macro variables namely, Inflation and Gross Domestic Product are used in the present study. Both these variables have a strong influence on the efficiency of banks at the macro level. These are explained as follows:

I. Inflation (INF): Inflation directly affects the prices of goods and services. It also affects the interest rate of banks thus directly affecting their efficiency. The effect of inflation on bank’s performance depends on whether the inflation is anticipated or
unanticipated (Perry, 1992). Anticipated inflation implies that banks anticipate the inflation rate and adjust their interest rates timely and increase their revenues more as per increase in their cost (Athanasoglou et al., 2005). Unanticipated inflation depicts an opposite situation where banks are slow in adjusting their interest rates resulting in increase in their costs more than the revenues (Athanasoglou et al., 2005 and Athanasoglou et al., 2006). Sufian et al. (2012), Pančurová and Lyócsa (2013), Sanchez et al. (2013) and Sufian and Kamarudin (2015) reported that inflation had negative and significant impact on efficiency. Grigorian and Manole (2002), Jaffry et al. (2005) and Brack and Jimbori (2010) also found negative relation of inflation and efficiency though it was insignificant. Thus the following hypothesis is framed and tested in the present study:

H$_{19}$- There is a negative relationship between Inflation and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

II. Gross Domestic Product (GDP): GDP is used to indicate the macroeconomic environment of the country. It affects a bank’s performance in accordance with the economic conditions existing within an economy (Alexiou and Sofoklis, 2009). GDP has direct effect on the supply of deposits to the banks and demand for loans from the banks (Sufian, 2011). Sufian and Noor (2009) mentioned that high Gross Domestic Product indicates favourable economic conditions prevailing in the economy. This enables banks to earn better returns from their loans and advances (Pasiouras and Kosmidou, 2007). On the other hand, slow down in Gross Domestic Product deteriorates the credit quality and increases the default rate, thereby reducing the bank’s efficiency (Sufian and Habibullah, 2010). GDP is used by taking natural Logarithm of Gross Domestic Product (LNGDP). Grigorian and Manole (2002), Jaffry et al. (2005), Sufian and Noor (2009), Sufian et al. (2012) and Sufian and Kamarudin (2015) found positive and significant association between efficiency and Gross Domestic Product. Thus GDP is expected to have a positive impact on bank’s performance. The following hypothesis is tested in the present study:

H$_{20}$- There is a positive relationship between Gross Domestic Product and Revenue Efficiency, Cost Efficiency and Profit Efficiency.
Table: 7.1 shows a synoptic view of these variables and their expected relationship with efficiency.

### Table: 7.1 Description and Expected sign of the Explanatory Variables

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Ratios used</th>
<th>Symbol</th>
<th>Description</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Adequacy</td>
<td>Capital Adequacy Ratio</td>
<td>CAR</td>
<td>Tier I + Tier II to Risk Weighted Assets</td>
<td>+</td>
</tr>
<tr>
<td>Equity Capital to Total Assets</td>
<td>ETA</td>
<td>EQTA</td>
<td>Equity to total assets</td>
<td>+</td>
</tr>
<tr>
<td>Asset Quality</td>
<td>Net NPAs to Net Advances</td>
<td>NPANA</td>
<td>Net NPA to Net Advances</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Investment to Total Assets</td>
<td>TITA</td>
<td>Total Investments to Total Assets</td>
<td>+/-</td>
</tr>
<tr>
<td></td>
<td>Total Loans and advances To Total Deposits</td>
<td>TATD</td>
<td>Total Loans and advances to total deposits</td>
<td>+/-</td>
</tr>
<tr>
<td>Management Soundness</td>
<td>Total Expenses To Total Income</td>
<td>TETI</td>
<td>Total expenses to total income</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Operating Expenses/ Total Expenses</td>
<td>OETE</td>
<td>Operating expenses to total expenses</td>
<td>-</td>
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<tr>
<td>Earning Quality</td>
<td>Return on Assets</td>
<td>ROA</td>
<td>Profit after tax to total assets</td>
<td>+</td>
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<td></td>
<td>Spread To Total Assets</td>
<td>STA</td>
<td>Spread to total assets</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Non-Interest Income To Total Income</td>
<td>NIITI</td>
<td>Non-Interest Income to total income</td>
<td>+</td>
</tr>
<tr>
<td>Liquidity Management</td>
<td>Cash Deposit Ratio</td>
<td>CDR</td>
<td>Cash to total deposits</td>
<td>+/-</td>
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<td></td>
<td>Liquid Assets To Total Assets</td>
<td>LATA</td>
<td>Cash and Cash equivalents to total assets</td>
<td>+/-</td>
</tr>
<tr>
<td>Size</td>
<td>Log of Total Assets</td>
<td>LNTA</td>
<td>Natural log of total Assets of the banks</td>
<td>+/-</td>
</tr>
<tr>
<td>Time</td>
<td>Time Dummy 1</td>
<td>TD</td>
<td>Taking 0 for the reformatory era and 1 for the post reformatory era</td>
<td>+/-</td>
</tr>
<tr>
<td>Industry Specific</td>
<td>Public Dummy</td>
<td>PUBD</td>
<td>Public Sector Banks as 1 and otherwise 0</td>
<td>+/-</td>
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<td></td>
<td>Private Dummy</td>
<td>PVTD</td>
<td>Private Sector Banks as 1 and otherwise 0</td>
<td>+/-</td>
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<tr>
<td></td>
<td>Market Share in terms of total assets</td>
<td>MSTA</td>
<td>Particular bank’s assets divided by total assets of banking sector</td>
<td>+</td>
</tr>
<tr>
<td>Economy Specific</td>
<td>Inflation (WPI)</td>
<td>INF</td>
<td>Inflation (WPI)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Log Of GDP</td>
<td>LNGDP</td>
<td>Natural log of Gross Domestic Product</td>
<td>+</td>
</tr>
</tbody>
</table>

#### 7.2. Results and Discussion

The results of factors affecting various efficiency parameters i.e. Cost Efficiency, Revenue Efficiency and Profit Efficiency using Panel Tobit Regression are presented in the following section.

#### 7.2.1. Panel Tobit Regression

The results of Panel Tobit Regression focusing on relationship of explanatory variables with various efficiency parameters are presented in Table: 7.2. The results are
### Table: 7.2 Results of Panel Tobit Regression

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variables</th>
<th>Revenue Efficiency</th>
<th>Cost Efficiency</th>
<th>Profit Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Adequacy</td>
<td>CAR</td>
<td>-0.0016816*</td>
<td>0.0004775</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>ETA</td>
<td>0.0053379*</td>
<td>0.000912</td>
<td>0.000</td>
</tr>
<tr>
<td>Asset Quality</td>
<td>NPANA</td>
<td>-0.0037982*</td>
<td>0.0008353</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>TITA</td>
<td>0.0098842*</td>
<td>0.0005913</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>TATD</td>
<td>0.0000437</td>
<td>0.000611</td>
<td>0.475</td>
</tr>
<tr>
<td>Management Soundness</td>
<td>TETI</td>
<td>0.0009764***</td>
<td>0.0004612</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>OETE</td>
<td>-0.0029647*</td>
<td>0.0006288</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>BPE</td>
<td>0.0000437</td>
<td>0.001025</td>
<td>0.016</td>
</tr>
<tr>
<td>Earning Quality</td>
<td>ROA</td>
<td>-0.0057144***</td>
<td>0.0027818</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>STA</td>
<td>0.0138777***</td>
<td>0.0056465</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>NIITI</td>
<td>0.0014639***</td>
<td>0.0007199</td>
<td>0.042</td>
</tr>
<tr>
<td>Liquidity Management</td>
<td>CDR</td>
<td>0.0060665*</td>
<td>0.0009715</td>
<td>0.000</td>
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<tr>
<td></td>
<td>LATA</td>
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<td>Bank Size</td>
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<tr>
<td></td>
<td>TD</td>
<td>0.0342735***</td>
<td>0.017566</td>
<td>0.051</td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry Specific</td>
<td>PUBD</td>
<td>0.1195621*</td>
<td>0.0336407</td>
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</tr>
<tr>
<td></td>
<td>PVTD</td>
<td>0.0502577***</td>
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<tr>
<td></td>
<td>MSTA</td>
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<tr>
<td>Economy Specific</td>
<td>INF</td>
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<td>0.0009403</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>LNGDP</td>
<td>0.2746056*</td>
<td>0.0841287</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Const</td>
<td>-2.95611*</td>
<td>0.767057</td>
<td>0.006</td>
</tr>
<tr>
<td>Log Likelihood</td>
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<td>236.67803</td>
<td>221.62775</td>
<td>0.000</td>
</tr>
<tr>
<td>Wald chi2(22)</td>
<td></td>
<td>509.51*</td>
<td>611.81*</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*,** and *** significant at 1%, 5% and 10% level of significance respectively
As seen from Table: 7.2, when Panel Tobit Regression is run with Revenue Efficiency scores as the dependent variable, Capital Adequacy Ratio (CAR) reveals a negative relationship with Revenue Efficiency and is statistically significant at 1% level of significance. Equity to Total Assets (ETA) reveals a positive relationship and is statistically significant at 1% level of significance with Revenue Efficiency. Net Non-Performing Assets to Net Advances (NPANA) have a negative relationship with Revenue Efficiency and is statistically significant at 1% level of significance. It is observed that Total Investments to Total Assets (TITA) exhibit positive relationship with Revenue Efficiency. It is significant at 1% level of significance. Total Loans and advances to Total Deposits (TATD) reveals a positive relationship with Revenue Efficiency but it is statistically insignificant. Total Expense to Total Income (TETI) was expected to have negative impact but it turned out be reverse in case of Revenue Efficiency which is significant at 5% level of significance. Operating Expenses to Total Expenses (OETE) has negative relationship with Revenue Efficiency and is statistically significant at 1% level of significance. Business per Employee (BPE) has negative impact on the Revenue Efficiency and is statistically significant at 5% level of significance. Return on Assets (ROA) reveals a negative relationship with Revenue Efficiency and is statistically significant at 5% level of significance. Spread to Total Assets (STA) has positive impact on the Revenue Efficiency which is statistically significant at 5% level of significance. It is observed that Non-Interest Income to Total Income (NIITI) exhibit positive relationship with Revenue Efficiency and is statistically significant at 5% level of significance. Cash Deposit Ratio (CDR) exhibits a positive and statistically significant relationship with Revenue Efficiency. It is significant at 1% level of significance. However, LATA has positive, but insignificant impact on Revenue Efficiency. Size (LNTA) reveals negative relationship with Revenue Efficiency scores which is statistically significant at 1% level of significance. Time Dummy (TD) reveals a positive relationship with Revenue Efficiency and is statistically significant at 10% level of significance. Public Dummy (PUBD) reveals a positive relationship with Revenue Efficiency and is statistically significant at 1% level of significance. Private Dummy (PVTD) also portrays positive relation with Revenue
Efficiency and is significant at 10% level of significance. Market Share in terms of Total Assets has positive impact on the Revenue Efficiency, but the coefficient is statistically insignificant. Inflation (INF) reveals negative relationship and is statistically significant at 1% level of significance for Revenue Efficiency. Log of Gross Domestic Product (LNGDP) has positive and statistically significant relationship with Revenue Efficiency and is significant at 1% level of significance.

In Table: 7.2, when Panel Tobit Regression is run with Cost Efficiency scores as the dependent variable, it is observed that contrary to our hypothesis (H1), CAR reveals a negative, though insignificant relationship with Cost Efficiency. Equity to Total Assets (ETA) has positive and statistically significant relationship with Cost Efficiency. This relationship is significant at 1% level of significance. Net Non-Performing Assets to Net Advances (NPANA) reveals a negative relationship and is statistically significant at 1% level of significance for Cost Efficiency. Total Investments to Total Assets (TITA) exhibit positive and significant relationship with Cost Efficiency. Contrary to the hypothesis, Total Loans and advances to Total Deposits (TATD) discloses negative and significant relation with Cost Efficiency which is significant at 1% level of significance. Total Expenses to Total Income (TETI) has negative impact, as expected, on the Cost Efficiency and is statistically significant at 1% level of significance. Operating Expenses to Total Expenses has positive relation with Cost Efficiency, but it is insignificant. Business per Employee (BPE) has positive impact on Cost Efficiency and is statistically significant at 1% level of significance. Return on Assets (ROA) reveals a negative relationship with Cost Efficiency and is statistically significant at 1% level of significance. Spread to Total Assets (STA) is expected to have positive impact but it turned out be reverse in case of Cost Efficiency although it is insignificant. Non-Interest Income to Total Income (NIITI) exhibits positive relationship with Cost Efficiency which is statistically significant at 10% level of significance. Cash Deposit Ratio (CDR) reveals a positive relationship and is statistically significant at 1% level of significance for Cost Efficiency. Liquid Assets to Total Assets (LATA) reveals a negative relationship and is statistically significant at 1% level of significance for Cost Efficiency. Size (LNTA) reveals negative relationship with Cost Efficiency although it
is insignificant. Time Dummy (TD) reveals a positive relationship with Cost Efficiency and is statistically significant at 10% level of significance. Public Dummy (PUBD) reveals a positive but insignificant relationship with Cost Efficiency. Private Dummy (PVTD) has negative and insignificant relation with the Cost Efficiency. Market Share in terms of Total Assets has negative relation with Cost Efficiency but is statistically insignificant. Inflation (INF) reveals negative relationship and is statistically significant at 1% level of significance for Cost Efficiency. Log of Gross Domestic Product (LNGDP) reveals positive relationship and is statistically significant at 1% level of significance for Cost Efficiency.

When Panel Tobit Regression is run with Profit Efficiency scores as the dependent variable, CAR reveals a negative and significant association with Profit Efficiency of the banks. It is significant at 5% level of significance. Equity to Total Assets (ETA) discloses positive relationship with Profit Efficiency and is statistically significant at 1% level of significance. Net Non-Performing Assets to Net Advances (NPANA) reveals a negative relationship and is statistically significant at 1% level of significance for Profit Efficiency. Total Investments to Total Assets (TITA) and Total Loans and advances to Total Deposits (TATD) reveal positive relationship with Profit Efficiency and both are statistically significant at 1% and 5% level of significance respectively. Total Expenses to Total Income (TETI) has negative impact on Profit Efficiency though the association is insignificant. As expected, Operating Expenses to Total Expenses (OETE) has negative impact on Profit Efficiency and is statistically significant at 1% level of significance. Business per Employee (BPE) has positive impact on Profit Efficiency and is statistically significant at 1% level of significance. Return on Assets (ROA) reveals a negative relationship with Profit Efficiency and is statistically significant at 5% level of significance. Spread to Total Assets (STA), Non-Interest Income to Total Income (NIITI) and Cash Deposit Ratio (CDR) have positive impact on Profit Efficiency which is statistically significant at 1% level of significance for Profit Efficiency. Liquid Assets to Total Assets (LATA) reveals a negative relationship and is statistically significant at 1% level of significance for Profit Efficiency. The industry variable, Size (LNTA) reveals negative relationship with Profit Efficiency scores and it is statistically significant at 1% level of significance. Time
Dummy (TD) reveals a positive and insignificant relationship with Profit Efficiency. Public Dummy (PUBD) reveals a positive relationship with Profit Efficiency and is statistically significant at 1% level of significance. Private Dummy (PVTD) also portrays positive relation with Profit Efficiency but it is insignificant. Market Share in terms of Total Assets has positive impact on Profit Efficiency but it is statistically insignificant. Inflation (INF) reveals negative relationship and is statistically significant at 1% level of significance for Profit Efficiency. Log of Gross Domestic Product (LNGDP) reveals positive relationship and is statistically significant at 1% level of significance for Profit Efficiency.

7.2.2. Testing of Hypotheses

The Panel Tobit Regression Analysis has been run to test the hypotheses. All variables i.e. bank specific, industry specific and economy specific for which the hypotheses have been tested are stated as follows:

A. Bank Specific Variables

I. As per CAMEL Framework

1) Capital Adequacy

(i) Capital Adequacy Ratio (CAR)

$H_1$: There is a positive relationship between Capital Adequacy Ratio and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Contrary to our hypothesis ($H_1$), CAR reveals a negative relationship with all the efficiency parameters in our results. This negative relation implies that banks with higher Capital Adequacy Ratio tend to have lower efficiency scores. CAR provides cushion to banks against the unexpected losses. Indian Scheduled Commercial Banks are averse to risk in nature. Due to this, on one hand, they invest in safer and low earning portfolios (Bhattacharyya et al., 1997 and Kumar and Gulati, 2009) and on the other tend to maintain a high CAR of much higher than the prescribed norm of 9%. As a result, there is disequilibrium between the inputs and outputs affecting efficiency negatively, thus leading to rejection of the hypothesis. The findings are consistent with
earlier findings of Bhattacharyya et al. (1997), Kumar and Gulati (2009) and Gulati (2011a) who found that CAR had negative relation with the efficiency scores.

(ii) **Equity to Total Assets (ETA)**

\[ H_2 \] - There is a positive relationship between Equity to Total Assets ratio and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Equity to Total Assets (ETA) reveals positive relationship with Revenue Efficiency, Cost Efficiency and Profit Efficiency suggesting that banks with higher equity tend to have higher efficiency scores. This positive coefficient of equity to total assets portrays that banks with more capital are more efficient as with their strong capital base they are able to face unexpected losses specifically as those arising from Non-Performing Assets (NPAs). They can expand their business to earn better profits. Moreover, highly capitalized banks are better capable of facing economic difficulties than thinly capitalized ones (Dietrich and Wanzenried, 2009). Our results are supported by Grigorian and Manole (2002), Pasiouras et al. (2007), Semih Yildirim and Philippatos (2007), Ioannis et al. (2008), Sufian and Noor (2009), Brack and Jimborean (2010), Sufian and Habibullah (2010), Sufian et al. (2012), Sanchez et al. (2013), Pančurová and Lyócsa (2013) and Raphael (2013) who reported the positive association of ETA with efficiency of banks, thus providing support that higher capital helps banks to be less dependent on external funding resulting in higher efficiency.

2) **Asset Quality**

(i) **Net Non-Performing Assets to Net Advances (NPANA)**

\[ H_3 \] - There is a negative relationship between Non Performing Assets (NPA) to Net Advances and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Net Non-Performing assets to Net Advances (NPANA) reveals a negative relationship with Revenue Efficiency, Cost Efficiency and Profit Efficiency which depicts that high level of Non-Performing Assets adversely affect the efficiency of banks. Obviously non-repayment of principal and interest would bring inefficiency on Revenue, Cost and Profit side simultaneously. This sign also depicts that Indian Scheduled Commercial Banks are not managing their assets properly. Increased NPAs
lead to deterioration in the asset quality of the banks thus engulfing banks in the vicious circle of asset liability mismatch, resulting in input-output mismatch and hence creating inefficiency among banks. Our findings are consistent with earlier findings of Caner and Kontorovich (2004), Burki and Niazi (2006), Staub et al. (2010), Gulati (2011b), Garza-García (2012), and Noor and Ahmad (2012).

(ii) **Total Investments to Total Assets (TITA)**

\[ H_4: \text{There is a positive/negative relationship between Total Investments to Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.} \]

It is observed that total investments to total assets exhibit positive relationship with all three efficiency scores i.e. Cost Efficiency, Revenue Efficiency and Profit Efficiency. This positive relation depicts that Indian Scheduled Commercial Banks are required to maintain a specific proportion of their demand and time deposits in the form of gold and government approved securities. This safeguards their customer’s money as well as provides funds to government for the development of the economy. From these investments, banks get stable and consistent returns without risk. Investments help Indian Scheduled Commercial Banks to cushion themselves against bad loans and maintain high efficiency. Rather than losing their scarce resources in NPAs, it seems better for Indian Banks to invest in safer channels like government securities which generate constant returns. Our results corroborate with Ataullah and Le (2006) who reported that low risk approach of banks helps them to earn steady returns and thus maintain their efficiency. However the results contradict with Ketkar and Ketkar (2008) who reported negative association of investments to total assets with efficiency. This study belongs to a time period immediately after reforms when banks were focusing more on earning high returns by lending loans and advances rather than investing in low return channels, thus leading to contradictory results.

(iii) **Total Loans and advances to Total Deposits (TATD)**

\[ H_5: \text{There is a positive/negative relationship between Total Loans and advances to Total Deposits and Revenue Efficiency, Cost Efficiency and Profit Efficiency.} \]
Total Loans and advances to Total Deposits (TATD) reveal positive relationship with Profit Efficiency and Revenue Efficiency. This positive sign reflects that Indian Scheduled Commercial Banks are using their deposits in the most beneficial way. They are able to generate more revenues and profits from their loans and advances. Our results are in line with Niazi (2003), Burki and Niazi (2006), Ariff and Can (2008) and Raphael (2013) who also found positive relation of loans and advances to deposit ratio with bank efficiency. Contrary to this, TATD discloses negative and significant relation with Cost Efficiency. The negative relationship depicts that Indian Scheduled Commercial Banks lend more loans and advances out of their deposits but it turns into Non-performing Assets (NPAs) due to failure of repayment of loan and interest. As a result, they have to pay interest on their deposits devoid of receiving returns, therefore, leading to high cost expenditure. Moreover, banks are required to incur additional expenses in terms of seizing, maintaining and ultimately disposing of securities to deal with these Non-performing loans (Karim et al., 2010) thus escorting to negative sign.

3) Management Soundness

(i) Total Expenses to Total Income (TETI)

Hₙ- There is a negative relationship between Total Expenses to Total Income and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Total expenses to total income (TETI) have negative impact, as expected, on both the Cost Efficiency and Profit Efficiency. The results show that increase in expenses lowers both Cost Efficiency and Profit Efficiency. This suggests that efficiency of banks can be improved through expense management by controlling the redundant expenditure. The study corroborates the past research as Ataullah and Le (2006) also found negative impact of total expenses to total income on the efficiency of the banks. Although Total expense to Total Income (TETI) is hypothesised to have negative impact but it turned out be reverse in case of Revenue Efficiency suggesting that increase in expenses lead to increase in Revenue Efficiency. When banks adopt various strategies as offering high interest rates on deposits, it helps them to attract large number of customers thus resulting into positive impact on efficiency of the banks. Similarly when cost is incurred on maintenance of infrastructure, computers, software
etc, Revenue Efficiency becomes better. Molyneux and Thornton (1992) also observed a positive relationship of cost to income with the profitability of the banks suggesting that high expenditure incurred by the banks helps them to earn higher profits.

(ii) Operating Expenses to Total Expenses

H7- There is a negative relationship between Operating Expenses to Total Expenses and Efficiency.

As expected, Operating Expenses to Total Expenses (OETE) has negative impact on both Revenue Efficiency and Profit Efficiency suggesting that an increase in operating expenses decreases the efficiency of the banks to a large extent. Our results commensurate with Sufian (2009), Sufian and Habibullah (2010), Garza-García (2012), Sufian et al. (2012a), Raphael (2013) and Sufian and Kamarudin (2015) who reported that operating expenses to total assets had negative and significant impact on the efficiency. Although operating expenses to total expenses has positive relation with Cost Efficiency but it is insignificant. Perhaps banks employ highly qualified and professional staff on higher remuneration to compete in the market and try to squeeze efficiency out of them which leads to positive impact on the efficiency of the banks. Das and Ghosh (2006), Sufian and Noor (2009) and San et al. (2011) also found positive and significant impact of expenses on efficiency of the banks.

(iii) Business per employee (BPE)

H8- There is a positive relationship between Business per Employee and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Business per employee (BPE) has positive impact on Cost Efficiency and Profit Efficiency hence depicting that productivity of the workforce is important to improve the efficiency of banks. Banking services are personalised in nature. Banks offer services to customers through their employees only. Employees can create a direct impact on the minds of the customers and effect banking business. Good customer dealing increases business and brings efficiency. The findings of our study are consistent with Bala and Kumar (2011), but in our results, Business per Employee (BPE) has negative impact on the Revenue Efficiency, thus representing that increase in
Factors Affecting Revenue Efficiency, Cost Efficiency and Profit Efficiency of Indian Scheduled Commercial Banks

BPE will lead to decline in the Revenue Efficiency. This negative sign seems due to the fact that no doubt bank employees are generating more business, but due to the loans turning into bad ones and becoming Non-performing Assets (NPAs) revenues are lost, hence, showing depressing impact on banks’ efficiency. Also, Indian Scheduled Commercial Banks are not focusing on the customer perceived measures of quality i.e. reliability, responsiveness, assurance, tangibles and empathy which negatively affect the Revenue Efficiency (Bhatia and Mahendru, 2014). Our results are in coherence with studies like Kumar and Gulati (2009) and Gulati (2011a) that found negative relation of BPE with the efficiency of banks.

4) Earning Quality

(i) Return on Assets (ROA)

H$_{0}$- There is a positive relationship between Return on Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Return on Assets (ROA) reveals a negative relationship with all the efficiency parameters. This negative sign depicts that bank managers focus on earning maximum profits, but they ignore the efficiency of banks in totality. In order to compete with the rivals, bank managers are given the profitability targets. Managers get pre-occupied in the accomplishment of short term profit oriented targets. The vision of achieving efficiency by balancing between inputs with the outputs is lost. Our results are supported by Chauhan and Pal (2009), Gulati (2011a), Gulati (2011b) and Raina and Sharma (2013) who found negative association of ROA with Indian Banks’ efficiency. Contrary to our results, Hassan (2005), Sufian and Noor (2009), Pančurová and Lyócsa (2013), Sanchez et al. (2013) and Raphael (2013) support a positive association with the efficiency of the banks. The contradiction perhaps is attributable to the differences in the sample size and countries.

(ii) Spread to Total Assets (STA)

H$_{10}$- There is a positive relationship between Spread to Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.
Spread to Total Assets has positive impact on the Revenue Efficiency and Profit Efficiency suggesting that spread definitely affects efficiency of banks positively. Spread is a primary source of banks’ revenue. It highlights the success of banks from its primary activities. It also represents that banks are managing their Asset-Liability match well. Our results are supported by Raphael (2013) who reported that Net Interest Income had positive impact on the efficiency of banks. Contrary to the hypothesis, Spread to total assets (STA) has negative impact on Cost Efficiency but it is insignificant.

(iii) **Non-Interest Income to Total Income to Total Assets (NIITI)**

**H11- There is a positive relationship between Non-Interest Income to Total Income and Revenue Efficiency, Cost Efficiency and Profit Efficiency.**

It is observed that Non-Interest Income to Total Income exhibits positive relationship with all three efficiency scores i.e. Cost Efficiency, Revenue Efficiency and Profit Efficiency. This positive relation describes that Indian Scheduled Commercial Banks are diversifying their activities to allied portfolios and non-interest income sources and thus enhance their efficiency scores. Rather, Non-interest income is more stable and less risky as compared to interest income which varies due to variation in the interest rates (Ariff and Can, 2008). Our findings are in line with Sufian (2009), Gulati (2011b) and Raphael (2013) who found positive effect of Non-Interest Income on efficiency of banks.

5) **Liquidity Management**

(i) **Cash Deposit Ratio**

**H12- There is a positive/negative relationship between Cash Deposit Ratio and Revenue Efficiency, Cost Efficiency and Profit Efficiency.**

Cash Deposit Ratio (CDR) reveals a positive relationship with Cost Efficiency, Revenue Efficiency and Profit Efficiency. The positive association with efficiency implies that optimal amount of cash maintained with banks helps them to manage their business efficiently as they are able to fulfil the cash need of depositors timely.

(ii) **Liquid Assets to total Assets (LATA)**
H\textsubscript{13}- There is a positive/negative relationship between Liquid Assets to Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Liquid Assets to total Assets (LATA) reveals a negative relationship with Cost Efficiency and Profit Efficiency which implies that banks with more liquid assets are not able to manage these. Excess liquidity mars profitability which affects efficiency. Our results are supported by Ghosh (2009) who reported that liquid assets had negative impact on the efficiency of banks. However in our study, LATA has positive impact on Revenue Efficiency though the same is insignificant. This positive sign depicts that liquid assets perhaps help banks to meet unexpected withdrawals and thus help to sustain Revenue Efficiency. Our results are similar to Das and Ghosh (2009) who also found positive and significant impact of liquid assets to total assets on efficiency.

II. As per Control Variables

1) Size (LNTA)

H\textsubscript{14}- There is a positive/negative relationship between Size and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Size (LNTA) reveals negative relationship with all the efficiency scores. The negative sign indicates that the larger banks tend to exhibit lower efficiency scores. Larger banks are able to enjoy economies of scale by reducing their cost but extending their size beyond a point creates diseconomies (Eichengreen and Gibson, 2001 and Tariq and Arfeen, 2012). Indian Banks are going in for excessive expansion for larger coverage. Such an extent of decentralisation results in losing control with respect to administrative issues leading to inefficiency. It becomes difficult for the management to keep a close eye on the activities of banks. Large banks have problem of administration and management due to large numbers of complex operations (Pasiouras and Kosmidou, 2007). Our finding is consistent with previous studies, as Chauhan and Pal (2009), Sufian and Habibullah (2010) and San \textit{et al.} (2011) who also found negative impact of size on the efficiency of banks.

2) Time Dummy
H₁₅- There is a positive/negative relationship between time dummy and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Time Dummy reveals a positive relationship with all the efficiency parameters. This depicts that Indian Scheduled Commercial Banks (SCBs) exhibit higher Cost, Revenue and Profit Efficiency Scores in Reformatory Era as compared to Post Reformatory Era. This suggests that reforms improved the performance of banks. Reforms provided banks with a liberalised environment which perhaps aided banks in adjusting their inputs and outputs in an optimum way. But in the Post Reformatory Era, banks seemed to have disturbed the inputs and output equilibrium by investing instantly and exorbitantly in the upgradation of technology without a proportionate generation of returns, leading to deteriorated efficiency during these years. In addition, the global financial crisis became a contributing factor in decelerating the performance of banks in the Post Reformatory Era.

B. Industry Specific Variables
I. Ownership Dummy

H₁₆- There is a positive/negative relationship between Public Dummy and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

H₁₇- There is a positive/negative relationship between Private Dummy and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Public Dummy reveals a positive relationship with all the efficiency parameters. The positive coefficient of public dummy depicts that Public Sector Banks are better than Foreign Sector Banks throughout the study time period. Their long existence has been a major contributing factor in their performance as compared to their counterparts. Private Dummy also portrays positive relation with Revenue Efficiency and Profit Efficiency. The positive coefficient of private dummy depicts that Private Sector Banks are better than Foreign Sector Banks throughout the study time period although the differences are significant at 10% level of significance. Thus recommending that, to some extent, Private Sector Banks are earning better revenues due to their quality services. Alternatively, Private Dummy has negative but insignificant relation with the
Cost Efficiency though it is insignificant. This certainly depicts that in relation to Private Sector Banks, Foreign Sector Banks are better in controlling their cost.

II. Market Share in terms of Total Assets

H_{18} - There is a positive relationship between Market Share in terms of Total Assets and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Market Share in terms of Total Assets has positive impact on the Revenue Efficiency and Profit Efficiency. The positive sign implies that banks with larger market share are more efficient while those with smaller proportion of the market lag behind in terms of efficiency score. Our results show a negative sign of Market Share with the Cost Efficiency depicting that when banks expand their market it involves them extra costs thereby lowering the Cost Efficiency. Garza-García (2011) also found mixed results with Market Share in terms of Assets as the study found that it had positive relation with Technical Efficiency whereas negative association with Pure Technical and Scale Efficiency.

C. Economy Specific Variables

I. Inflation (INF)

H_{19} - There is a negative relationship between Inflation and Revenue Efficiency, Cost Efficiency and Profit Efficiency.

Inflation reveals negative relationship for all the three models. It highlights that inflation is unanticipated in Indian Economy. Indian Scheduled Commercial Banks are slow in adjusting their interest rates as per inflation trends. It results in increase in their costs more than their revenues, thus leading to negative impact on the efficiency parameters. Our results are in line with Grigorian and Manole (2002), Jaffry et al. (2005), Brack and Jimborean (2010), Sufian et al. (2012), Pančurová and Lyócsa (2013), Sanchez et al. (2013) and Sufian and Kamarudin (2015) who also reported that inflation had negative and significant impact on efficiency.

II. Gross Domestic Product (LNGDP)

H_{20} - There is a positive relationship between Gross Domestic Product and Revenue Efficiency, Cost Efficiency and Profit Efficiency.
Log of Gross Domestic Product reveals positive relationship with Revenue Efficiency, Cost Efficiency and Profit Efficiency. Consequently the positive sign proposes that demand for financial services tends to grow more when economy expands and the living standard of people in the society increases. The favourable economic conditions prevailing in an economy helps banks to earn better returns from their loans and advances. Grigorian and Manole (2002), Jaffry et al. (2005), Sufian and Noor (2009), Sufian et al. (2012a) and Sufian and Kamarudin (2015) support our results.

The results of above discussion are presented in a capsule form in Table: 7.3 as follows:
Table: 7.3 Summary of Expected and Actual signs of the explanatory variables

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Expected Signs</th>
<th>Actual Signs</th>
<th>Reasons for Deviations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Revenue Efficiency</td>
<td>Cost Efficiency</td>
</tr>
<tr>
<td>Framework</td>
<td>Symbol</td>
<td></td>
<td></td>
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<tr>
<td>Capital Adequacy</td>
<td>CAR</td>
<td>+</td>
<td>-*</td>
</tr>
<tr>
<td></td>
<td>ETA</td>
<td>+</td>
<td>+*</td>
</tr>
<tr>
<td>Asset Quality</td>
<td>NPANA</td>
<td>-</td>
<td>-*</td>
</tr>
<tr>
<td></td>
<td>TITA</td>
<td>+/-</td>
<td>+*</td>
</tr>
<tr>
<td></td>
<td>TATD</td>
<td>+/-</td>
<td>+</td>
</tr>
<tr>
<td>Management Soundness</td>
<td>TETI</td>
<td>-</td>
<td>+**</td>
</tr>
<tr>
<td></td>
<td>OETE</td>
<td>-</td>
<td>-*</td>
</tr>
<tr>
<td></td>
<td>BPE</td>
<td>+</td>
<td>-*</td>
</tr>
<tr>
<td>Earning Quality</td>
<td>ROA</td>
<td>+</td>
<td>-*</td>
</tr>
<tr>
<td></td>
<td>STA</td>
<td>+</td>
<td>+**</td>
</tr>
<tr>
<td></td>
<td>NIITI</td>
<td>+</td>
<td>+**</td>
</tr>
<tr>
<td>Liquidity Management</td>
<td>CDR</td>
<td>+/-</td>
<td>+*</td>
</tr>
<tr>
<td></td>
<td>LATA</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Bank Size</td>
<td>LNTA</td>
<td>+/-</td>
<td>-*</td>
</tr>
<tr>
<td>Time</td>
<td>TD</td>
<td>+/-</td>
<td>+**</td>
</tr>
<tr>
<td>Industry Specific</td>
<td>PUBD</td>
<td>+/-</td>
<td>+*</td>
</tr>
<tr>
<td></td>
<td>PVTD</td>
<td>+/-</td>
<td>+**</td>
</tr>
<tr>
<td></td>
<td>MSTA</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Economy Specific</td>
<td>INF</td>
<td>-</td>
<td>-*</td>
</tr>
<tr>
<td></td>
<td>LNGDP</td>
<td>+</td>
<td>+*</td>
</tr>
</tbody>
</table>

*, ** and *** significant at 1%, 5% and 10% level of significance respectively
Factors Affecting Revenue Efficiency, Cost Efficiency and Profit Efficiency of Indian Scheduled Commercial Banks

7.3. Conclusion

The results of factors affecting Revenue Efficiency, Cost Efficiency and Profit Efficiency of Indian Scheduled Commercial Banks are summarised as follows:

- Several banks, industry and economy specific variables affect the efficiency of Indian Scheduled Commercial Banks. Specifically, CAMEL Framework highlights that it significantly influences the efficiency of banks.
- Capital Adequacy Ratio (CAR), Net Non-Performing Assets to Net Advances (NPANA), Return on Assets (ROA), Size (LNTA) and Inflation (INF) reveal a negative relationship with all the efficiency scores.
- Equity to Total Assets (ETA), Total Investments to Total Assets (TITA), and Non-Interest Income to Total Income (NIITI), Cash Deposit Ratio (CDR), Time Dummy (TD), Public Dummy (PUBD) and Log of Gross Domestic Product (LNGDP) disclose positive relationship for all the three models of efficiency.
- Total Loans and advances to Total Deposits (TATD) reveals positive relationship with Profit Efficiency and Revenue Efficiency, but negative relation with Cost Efficiency.
- Total Expenses to Total Income (TETI) has negative impact on both the Cost Efficiency and Profit Efficiency however its impact in case of Revenue Efficiency is positive.
- Operating Expenses to Total Expenses (OETE) has negative impact on both Revenue Efficiency and Profit Efficiency while it has positive relation with Cost Efficiency.
- Business per Employee (BPE) has positive impact on Cost and Profit Efficiency while it has negative impact on the Revenue Efficiency.
- Spread to Total Assets (STA) has positive impact on the Revenue Efficiency and Profit Efficiency. Contrary to this, Spread to Total Assets (STA) is expected to have positive impact but it turned out be reverse in case of Cost Efficiency.
Liquid Assets to Total Assets (LATA) reveals a negative relationship with Cost and Profit Efficiency though it has positive impact on Revenue Efficiency.

Private Dummy (PVTD) also portrays positive relation with Revenue Efficiency and Profit Efficiency. On the other hand, it has negative and insignificant relation with the Cost Efficiency.

Market Share in terms of Total Assets has positive impact on the Revenue Efficiency and Profit Efficiency while it has negative relation with Cost Efficiency.