

# **IMPACT OF FINANCIAL REGULATION ON PROFIT EFFICIENCY OF COMMERCIAL BANKS OF NEPAL**

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# **RECOMMENDATION FOR APPROVAL**

## **STATEMENT OF AUTHORSHIP AND ORIGINALITY**

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Date:

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## **LIST OF ABBREVIATIONS**

BAFIA= Bank and Financial Institution Act

CAR= Capital Adequacy Ratio

CCAR= Core Capital Adequacy Ratio

CCD ratio= Credit to capital and deposit ratio

CD ratio= Credit to Deposit Ratio

DEA= Data Envelopment Analysis

LLP=Loan Loss Provision

NPL= Non- Performing Loans

NRB= Nepal Rastra Bank

ROA=Return on Assets

ROE=Return on Equity

SLR= Statutory Liquidity Ratio



## EXECUTIVE SUMMARY

Governmental Standards and commands supported by sanctions that commands a natural person to carry out certain activity and refrain from undergoing others, especially related with the financial transactions are known as financial regulation. (Stewart, 2016). Banking regulation is extremely necessary for proper supervision of banks and to safeguard them from different types of crisis such as credit related, market related, etc, however; too much of such regulation will hamper the profitability of the banks and will ultimately impact the overall economic growth of the country. (Banerjee & Majumdar, 2017). Various researches have been done to analyze the impact of banking regulation on banking efficiency and mixed results have been seen in these research works. Some researchers have concluded that banking regulation helps to improve banking efficiency whereas others have concluded that it impedes banking efficiency.

This study is carried out to test the impact of banking regulation on banking efficiency of commercial banks of Nepal. This study tests four different hypotheses i.e. There is a positive impact of financial regulations on efficiency of banks in Nepal, there is a positive impact of liquidity requirements on profit efficiency of banks in Nepal, there is a positive impact of capital adequacy related requirements on profit efficiency of banks in Nepal and there is a negative impact of provisioning related requirements on profit efficiency of banks in Nepal. For conducting the study, three different categories of regulation are tested using the variables concerned with these regulations i.e. Liquidity related variables (SLR, CCR ratio and net liquidity), Capital adequacy related regulation (Capital Adequacy ratio and core capital adequacy ratio) and provisioning related variable (i.e. NPL). 27 commercial banks are used as the sample and the published quarterly data of 10 years i.e. from 2011/12 A.D. to 2020/21 A.D. Data Envelopment Analysis is used to calculate the efficiency score of commercial banks and tobit regression model is used to identify the impact of banking regulation in profit efficiency of the banks.

From this study, we have concluded that banking regulations have significant relation with the banking efficiency i.e. profit efficiency. The profit efficiency of the banks has a negative relationship with the Capital Adequacy ratio (CAR), Net Liquidity (%) and

NPL i.e. the rise in these factors will cause the profit efficiency to decrease and the fall in these factors will cause the profit efficiency to rise. Whereas, capital adequacy-related provisions do not have a significant impact on the profitability of banks.

# CHAPTER-I

## INTRODUCTION

### 1.1 Background of Study

Banking regulations are the frameworks that controls the creation, operation and liquidation of banks in any economy. The Central bank of the economy and the Finance minister of the country are responsible for creating these frameworks for monitoring the banking system of the economy. They act like the regulating supervisory authority of the banking system of the economy. (Alam,2013).

The economic growth of an economy is dependent in a stable, efficient and sustainable banking system. (Banerjee & Majumdar,2018). According to traditional economic theory, there are three main reasons related with the importance of financial regulation i.e. to decrease the use of monopoly as well as to prevent problems arising due to competition in the financial market in order to maintenance the integrity of market and to evaluate where total cost of market failure is greater than the private costs of failure and costs of regulation. (Brunnermeier, Crockett, Goodhart, Persaud, & Shin, 2009).

The financial market intermediaries help to deal with the risks and other uncertainties associated with the financial exchange. They try to solve these problems but these problems are shifted, mitigated, but not completely eliminated by financial intermediation. Therefore, Regulation and supervision of the financial market i.e. banking and financial infrastructure, is crucial to the economy. They are necessary to improve the efficiency of financial markets, which then supports economic growth of the country. Financial Market failure results especially due to the problems associated with the information and externalities. The financial regulation addresses these problems through various prudential regulations and various policies and circulars. The major goal of financial regulation traditionally is associated with protecting informed and uninformed consumers against various of market imperfections. The major goal of banking regulation and supervision is associated with prevention of credit risk due to floatation of loans to non- creditworthy creditors that would endanger the deposits of the depositors, both individual and institutional. (Heremans & Paccès, 2018).

The central bank of respective economy is responsible for the effective functioning of

the banking system in that particular economy. They are responsible for maintaining the financial stability in the nation and also assure that the banks are channeling the money of the depositors to the economy in a responsible way. Nepal Rastra Bank (NRB), the central bank of Nepal, was established with the objective to maintain stability of price and BOP (balance of payment) and stability of the entire financial sector to support sustainable development of Nepal. It was established to maintain stability in the banking and financial sector. (NRB act, 2058). The banking system of Nepal works under the strict supervision of NRB and the BFIs established in Nepal follow various rules, guidelines, directives and circulars issued by NRB.

According to Drucker (1963), efficiency is defined as the capacity of any firm to achieve optimal level of output from the minimum level of input. In other words, Efficiency is the measurement of effectiveness that results in the production of the minimum waste of skill, time, and effort. Diallo (2018) mentions that efficient banks are capable of standing against the shocks both political and economic and results in growth in the banking industry. Bank efficiency increases the growth rate various industries during the crisis as it helps in flow of loan considering the creditworthiness of the creditor. Efficiency measurement helps in identifying the efficiency score of the individual banks and also helps in the comparison of the score with other banks. There are major two types of efficiency of banks i.e. technical and allocative efficiency. Allocative Efficiency can be further divided into cost efficiency and profit efficiency. Mokhtar, AlHabashi & Abdullah (2006). This paper aims to evaluate the profit efficiency of the banking system of Nepal.

## **1.2 Statement of Problem**

There are various researches henceforward have believed that banking regulations have a positive impact on banking efficiency. Yang, Gan & Li (2019), Alam (2013), and Heremans & Paccès (2018) in their research supported the idea that banking regulation improves banking efficiency. Whereas, Chortareas, Girardone & Ventouri (2010), Barth, Lin, Yeu, Seade & Song (2013) and Pasiouras, Tanna & Zopounidis (2007) have concluded that stricter regulations impede banking efficiency. The optimal level of banking regulations can help in maintaining an efficient banking system in the nation.

The way in which a company uses its resources helps to determine the success of the

company. Taking this fact into consideration, various researchers have focused their study in evaluating the cost efficiency in the banking system. However, there have been several researches which have found that profit efficiency in the banking sector is of higher importance than the cost efficiency. The profit efficiency also considers the revenue side of the business which cost efficiency fails to incorporate. The prices in which the services are being provided to the customers are as important as the cost of the inputs but the cost efficiency fails to address this. Bad pricing policy might lead to the failure of any organization, including the financial institutions. (Maudos & Pastor, 1999). There are several literatures analyzing the impact of banking regulations on bank efficiency but most of these literatures are focused on the cost- efficiency of banks with very few focused on analyzing the impact of such regulations on profit efficiency.

In the Nepalese context, there are very few literatures which have analyzed the efficiency of banking system in Nepal and fewer literatures analyzing the profit efficiency. Gajurel (2018) in his article to analyze the cost efficiency of the banks of Nepal. There are many literatures that support that regulations have an impact in the banking system and there is literature focused on finding the determinants of profitability of Banks in Nepal however, literatures evaluating the impact of regulations on banking efficiency especially profit efficiency is very few. This paper aims to fill this research gap and find out the impact of banking regulation in profit efficiency of the banks in Nepal.

Therefore, the study deals with the following issues:

- How does the liquidity requirement influence the profit efficiency of commercial banks in Nepal?
- How does the capital adequacy-related requirement influence the profit efficiency of commercial banks in Nepal?
- How does the provisioning-related requirement influence the profit efficiency of commercial banks in Nepal?

### **1.3 Objective of the Study**

The general objective of the study is to analyze the impact of financial regulation on the commercial bank's efficiency in Nepal. The specific objectives of the study are:

- To examine the impact of liquidity requirements on profit efficiency of commercial banks in Nepal.
- To analyze the impact of capital adequacy-related requirements on profit efficiency of commercial banks in Nepal.
- To assess the impact of provisioning-related requirements on profit efficiency of commercial banks in Nepal.

## 1.4 Research Hypothesis

The following are the hypothesis used in this research paper:

### *Hypothesis: I*

Naceur and Omarn (2011) in their research article named “The effects of bank regulations, competition, and financial reforms on banks' performance” concluded that external variables such as regulatory variable and bank-specific variables seem to have an impact on bank performance. Banking regulation improves the banking efficiency. (Yang, Gan & Li, 2019; Alam ,2013; Heremans & Paccès ,2018). On the basis of these literatures first hypotheses is formulated as:

**H1: There is a positive impact of financial regulations on efficiency of commercial banks in Nepal.**

### *Hypothesis: II*

Liquidity had impact in the profitability of banks. Lukorito, Muturi , Nyangau and Nyamasege (2014) ; Moussa and Boubaker (2020) ; Bordeleu and Graham (2010) Lukorito , Muturi , Nyangau and Nyamasege (2014) have analyzed different variables that represents liquidity had positive impact on banking profitability. On the basis of these literatures another hypotheses is formulated as:

**H2: There is a positive impact of liquidity requirements on profit efficiency of commercial banks in Nepal.**

### *Hypothesis: III*

Ozili (2015) found that capital adequacy of the bank has significant impact on bank profitability. Capital adequacy had significant positive relationship with bank performance or profitability. (Ogboi & Unuafé ,2013; Pessarossi & Weill, 2013; Agbeja,

Adelakun & Olufemi

,2015; Olalekan & Adeyinka ,2013). On the basis of these literatures another hypotheses is formulated as:

**H3: There is a positive impact of capital adequacy related requirements on profitefficiency of commercial banks in Nepal.**

*Hypothesis: IV*

Loan loss provisioning hits bank profitability in two different ways. On one hand it safeguards the capital and the depositor's money and supports in stability of the banks and on the other hand higher provisioning leads to lower reported profit and has negative impact in the bank profitability. There is negative relationship between banking profitability and Loan Loss provisioning. (Alhadab & Alsahawneh, 2016; Mustafa, Ansari & Younis, 2019; Kimathi ,2014; Ahmad, Tahir & Aziz,2019; Zheng, 2019)

**H4: There is a negative impact of provisioning related requirements on profit efficiency of commercial banks in Nepal.**

### **1.5 Scope and Significance of the Study**

Governmental Standards and commands supported by sanctions that commands a natural person to carry out certain activity and refrain from undergoing others, especially related with the financial transactions are known as financial regulation. (Stewart, 2016). Banking regulation is extremely necessary for proper supervision of banks and to safeguard them from different types of crisis such as credit related, market related, etc, however; too much of such regulation will hamper the profitability of the banks and will ultimately impact the overall economic growth of the country. (Banerjee & Majumdar, 2017).

Various researches have been carried out to analyze the impact of banking regulation on Banking efficiency and mixed results have been seen in these research works. Some researchers have concluded that banking regulation helps to improve banking efficiency whereas others have concluded that it impedes banking efficiency. Banking regulation improves the banking efficiency. Stricter regulations impede the banking efficiency. Many researches have also supported that the impact of banking regulation on the

banking efficiency is mixed i.e. some regulations help to increase the efficiency while others impede the efficiency.

Different researches conducted in Nepal relating with the banking efficiency focus on the technical efficiency of the banks and neglect the profit efficiency. This research paper is focused to fill this gap by analyzing the impact of regulation on the profit efficiency of the banks.

## **1.6 Limitations of the Study**

Some of the major limitations of the study are listed below:

- The qualitative factors such as economic and political conditions that affect the financial regulation which in turn impacts the bank profitability is not taken into consideration.
- The study is carried out only among the commercial banks. There are other three categories of BFIs that this study does not cover.
- The study only analyzes the profit efficiency of the banking sector. It isn't concerned with cost efficiency, technical efficiency or scale efficiency.
- The sample size and time period taken for the study is limited so the study could not be generalized.
- Lack of relevant literature particularly in the Nepalese perspective is another limitation of this research.
- Simple techniques and models are used in the analysis.

## **1.7 Outline and Structure of the Study**

The study comprises of three main sections: preliminary sections, body of the report and supplementary section. The preliminary section consists of the title page, certificate declaration of authenticity, acknowledgement, table of contents, list of figures, abbreviations used and executive summary. The body of the report is further divided into five chapters: introduction, related literature and theoretical framework, research methodology, analysis and results and discussion, conclusion and implications. The final



section of the report comprises of bibliography, appendix. The introduction chapter under body of study consists of background of the study, problem statement, research questions, research objectives, hypotheses, limitation and structure of study.

The literature review chapter deals with findings of the previous researches related for the current study. Different research works related to financial regulation and its impact on banking efficiency i.e. profit efficiency of the banking sector is discussed in order to prepare a base for the study. Further, the chapter consists of a theoretical framework defining each dependent and independent variables based on previous literatures.

The third chapter discusses research methodology used for the study. It comprises of research design, population and sample, sources of the data of the research, data analysis and different tools used.

The fourth chapter has included analysis and result of the study. It comprises of various tables, figures intended to answer the objective and research question of the research. The last chapter deals with discussion, conclusion and implication of the study. Under the discussion part,

comparisons of previous findings and the present study are conducted. At last, conclusion and implication were drawn out.

Finally, the supplementary section comprises of references, an appendix that has been included and incorporated in the study.

## **CHAPTER II**

### **RELATED LITERATURE AND THEORETICAL FRAMERWORK**

The section below contains the review of various literature that will help to define variables that will ultimately help to obtain our objective. The literature review is divided into different sections to make it easier for understanding the variables.

#### **2.1 Related Theories**

This portion identifies various theories that are related to the banking efficiency and regulatory frame work concerning the banking efficiency.

There are two modes of regulation generally practiced in regulating the financial intermediaries. These are public interest approach and self-interest approach. The public interest approach based in the Keynesian theories that follows direct and comprehensive intervention by the governmental bodies whereas the self-interest approach focuses more Neoclassical and Austrian theories which support the ideas of self-regulating financial market. (Li, 2014)

Since the research aims to identify the impact of regulatory framework in the profit efficiency of the banks, it is important to identify how the banks generate those profits. There are three major theories that define the activities to be carried out by the banks for profit generation purpose i.e. theory of financial Intermediation, Credit creation theory and Fractional reserve theory. All these theories emphasize in the deposit collection and lending activity of the banks.

#### **The Theory of Financial Intermediation**

The theory of financial intermediation defines the roles that the financial intermediaries play in the financial market. The main function of banks is to collect deposit and provide credit. The banking sector are responsible for carrying out the activities such as mobilization of saving, identifying the investment opportunities, establishing sound corporate control, acquiring information for capital allocation, managing liquidity risk and mobilizing the capital to exploit economics of scale. Traditional theories of intermediation are based on

transaction costs and information asymmetry. However, there has been major changes in the recent years. The intermediation has increased above transaction cost and information asymmetry and moved towards risk trading and participation costs. (Allen & Santomero, 1997). The critic of the traditional financial theory argue that the work of the modern financial intermediaries is not only limited to act as a passive intermediary between ultimate savers and investors. Value addition to the customers is one of the major activity carried out by the financial intermediary. The new type of financial intermediary has been providing financial transformation services. (Scholtens & Van Wensveen, 2000). Banking efficiency depends upon the facilities that these financial intermediaries can provide. Profit efficiency of the banks depends upon how efficiently the banks earn and spend to generate profit. According to Allen & Santomero (1997), There are two factors that affect the efficiency of banks:

1. Degree of competition
2. The nature of regulation to which they should follow

### **Credit Creation Theory**

Unlike the financial intermediation theory, Credit creation theory states that banks do not need to collect deposit to provide the loans. The main function of the banks is to create credit. MacLeod (1906) said that “the business of banking is not to lend money, but to create Credit: and by means of the Clearing House these credits are now transferred from one bank to another, just as easily as a credit is transferred from one account to another in the same bank by means of a cheque.” The learning by doing models of the banks can significantly affect the cost efficiency in the total credit created by the BFIs which in turn affects the profit efficiency.

### **The Fractional Reserve Theory**

Fractional reserve banking states that the banks accept deposit from the customers and hold only a portion of those deposit and lends the other out. The loaned funds are redeposited and re-loaned creating a money multiplier effect. The banks cannot completely refund all the depositors at the same time if all of them make claim full claim of the deposit at the same time. This theory also emphasizes on the deposit collection and loan distribution

function of the BFIs.

## **2.2 Concept Definition**

Governmental Standards and commands supported by sanctions that commands a natural person to carry out certain activity and refrain from undergoing others, especially related with the financial transactions are known as financial regulation. (Stewart, 2016). All the people in the economy act as a financial market participant one way or the other. Some are depositors, others are borrowers, dealers or brokers, so on and so forth. Some only act as information providers. All of these market participants are subject to financial regulation. A financial regulator is responsible for ensuring correct behavior from the part of each of these individuals. Financial regulation governs different types of activities and conduct associated with the financial health of the nation and its nationals. It consists of the regulations governing banking sector, insurance sector, investment management, derivatives and other related sectors. Similarly, financial regulation also attempts to govern a broad range of activities, such as the sale and provision of products and services, operation and management of financial institutions, the operation of stock markets and other financial market intermediaries such as stock exchanges, Over the counter market, clearing house, etc and the activities that has negative impact in the stability of the financial system of any economy. (Pan, 2012)

There are two types of financial regulation as per its objectives i.e. Economic regulation and Social regulation. Economic regulation is concerned handling market failures such as imperfect flow of information, massive competition, monopolistic competitions, externalities, principal-agent issues, anti-competitive behavior that discourages innovations and business cycle hindrances. Similarly, Social regulation is concerned with maintaining balances in the society by ensuring that any natural entity will not disrupt the working of the society and go against the rules and regulations and hinder the judicial practices of the society. (Pan, 2012) Prudential regulation is a part of financial regulation. Prudential regulation ensures that financial intermediaries of an economy and promotes sensible behavior among these intermediaries and the society. Prudential regulations aims to protect the interest of the consumers. It also helps the financial institutions in identifying, measuring and managing different types of risks such as market risk, credit risk, operational risk, etc faced by these institutions. (GSM

Association, 2008). There are two types of prudential regulation as per the scope of operation i.e. Micro and Macro prudential regulation. Micro prudential regulation is concerned stability of individual institutions whereas, macro-prudential regulations are concerned with the entire financial system of the economy. Micro-prudential regulations ensures financial stability in individual institutions and macro-prudential regulations ensure financial stability in the economy as a whole (Brunnermeier, Crockett, Goodhart, Persaud, & Shin, 2009)

### **Importance of Banking Regulation**

Banking regulation is extremely necessary for proper supervision of banks and to safeguard them from different types of crisis such as credit related, market related, etc, however; too much of such regulation will hamper the profitability of the banks and will ultimately impact the overall economic growth of the country. (Banerjee & Majumdar, 2017). The bank-specific factors such as capital adequacy and credit risk, have a significant positive impact on profitability of the banks. They have significant positive relationship with net interest margin as well as cost efficiency. (Naceur & Omran, 2011). The prudential regulations that helps to mitigate the financial risk of the economy also promotes economic growth in the country. These regulations can act as barriers to growth at times when they act as a barrier to borrow outside a country. Cross- border borrowing can be fruitful for the growth of organizations and economy as a whole. But financial regulations need to be made tougher to reduce fraudulent activities. (Agénor, Gambacorta, Kharroubi, & Pereira da Silva, 2018). A comprehensive framework that translates various strategic objective(s) into supervisory actions offers useful guidance to the supervisory process. Different types of indicators that operate in various levels provides a clear and consistent overview of effectiveness of the supervisory regulations. (Basel Committee on Banking Supervision, 2015). Financial regulations should focus on the regulation of banks and other financial institutions, to promote and safeguard the securities market, development of appropriate corporate governance in the organization, safeguard against the bankruptcy of the financial institutions and appropriate flow of accurate information about the financial intermediaries in the market. The economic growth of an economy is dependent in the efficient functioning of the financial sector which in turn is dependent in the financial regulations for efficient functioning. (White, 1999)

Asian Policymakers have understood and appreciated the connection between macroeconomic performance and financial stability after the Asian crisis of 1997. There has been huge development in the regulatory requirements of the financial sector in the recent years. The result of these development is a healthier financial sector, particularly banking. East and south-east Asian economies have strengthened mostly in their capital position, liquidity position, and profitability of the financial sector in recent years compared to the condition on 1997. (Siregar,2011)

### **Impact of Regulation on Banking Efficiency**

Various researches have been conducted in to analyze the impact of banking regulation on Banking efficiency and mixed results have been seen in these research works. Some researchers have concluded that banking regulation helps to improve banking efficiency whereas others have concluded that it impedes banking efficiency. Banking regulation improves the banking efficiency. Stricter regulations impede the banking efficiency. Many researches have also supported that the impact of banking regulation on the banking efficiency is mixed i.e. some regulations helps to increase the efficiency while others impede the efficiency.

Banking regulation improves banking efficiency. Tighter supervision and regulation in the small or large-sized banks have resulted in higher efficiency among these institutions. (Yang, Gan, & Li, 2019). The technical efficiency of the Islamic banks has increased due to strict monitoring of operation and higher supervisory power in the management and other related authorities. But the risk-taking behavior of the Islamic banks have decreased due to higher supervisory authority and stricter prudential regulations. (Alam, 2013). Regulation and supervision of the banking and financial infrastructure are necessary to improve the efficiency of financial market and have a direct relationship with economic growth. (Paccès & Heremans, 2020).

Strict regulations impede the banking efficiency. Imposing the capital restrictions, private sector monitoring, developing restrictive banking practices and forfeiting of the supervisory powers are some of the interventionist supervisory and regulatory policies which diminishes the operational efficiency of the banks in an economy. The banks with open and democratic political system benefit more from the less restrictive supervisory

authority and prudential regulations than other economies with less democratic political system. A democratic political system helps in achieving higher level of operational efficiency. (Chortareas, Girardone, & Ventouri, 2012). Banking regulation has mixed impact in the banking efficiency. Strict capital requirements have a positive impact on cost efficiency, similarly, these have negative impact on profit efficiency of banks. Higher restrictions on the activities conducted by the banks have positive impact in the profit efficiency and negative impact in the cost efficiency of the banks. (Pasiouras, Tanna, & Zopounidis, 2009). Stricter regulations related with the capital adequacy have positive impact in the banking efficiency, however tighter restrictions on banking activities are negatively associated with banking efficiency. Moreover, higher supervisory power has positive impact in the banking efficiency of the nation's having independence in the supervisory authorities. An independent and experienced supervisory authority will enhance the efficiency of banks. Finally, higher financial transparency leads to higher efficiency level among the banks. (Barth, Lin, Ma, Seade, & Frank, 2013). Increasing efficiency of the banks in the recent years and found capital adequacy to have mixed impact in banking efficiency, loan loss provisions to have significant positive impact on banking efficiency, liquidity to have mixed impact with loan to deposit ratio having positive advance stable funding ratio to have negative and cost to income ratio to have negative impact on efficiency. Banking regulation is extremely necessary for proper supervision of banks and to safeguard them from different types of crisis such as credit related, market related, etc, however; too much of such regulation will hamper the profitability of the banks and will ultimately impact the overall economic growth of the country. (Banerjee & Majumdar, 2017). Moreover, prudential regulation different effect different banks having different size and risk level. The bank performance of the developed countries is positively affected by the prudential regulations whereas, developing countries should create prudential regulations as per the size and risk level of the financial intermediaries in the economy. The regulations related to money management also have both positive and negative impact in the banks. Tighter monetary regulations result in diminished efficiency than expansionary monetary regulations. Banking regulations can have positive or negative impact in the developing as well as developed economies. (Almah, 2020). Moreover, banking supervision and regulations

have a significant positive effect high-risk banks but do not have significant impact in the low-risk banks. (Klomba & Haan, 2011)

Dhungana (2016) in her research article “Effects of Monetary Policy on Bank Lending in Nepal” concluded that bank rate has positive impact in bank lending whereas, open market operations and cash reserve ratio have negative impact on bank lending.

## **Banking Efficiency**

Banking System has gone through notable changes in a short period of time. It won't be wrong to say that banking is a backbone of every economy and hence regulators try to maintain efficient banking system within the nation. There are different types of banking efficiency.

According to Alber, Elmofly, Walied, & Sami (2019), There are five different types of banking efficiencies. These are as follows:

1. Pure technical efficiency
2. Pure technical efficiency describes the effectiveness of generating output from a given set of inputs. Banks' technical efficiency is defined as the difference between observed and optimal quantity of input and output variables. An efficient bank can achieve a maximum output from a given level of input by reducing the waste to zero.

3. Scale efficiency

Scale efficiency is the ability of bank to generate optimal level of operational efficiency. If a bank can operate in a constant returns of scale, it is said to have generated scale efficiency.

4. Allocative efficiency

Allocative efficiency measures the bank's ability of choosing the most appropriate set of inputs at a given price level

5. Cost efficiency

Cost efficiency are the result of technical and allocative efficiency that ensure



optimal use of inputs without wasting any resources.

6. Scope efficiency

Scope efficiency measures the capacity of banks to operate in several locations.

### **Economic Efficiency Models**

Cost minimization, revenue maximization and profit maximization are the three main objectives of business. Considering these objectives, the economic efficiency can be broadly divided into technical and allocative efficiency which can further be divided into cost, revenue and profit efficiency. (Farrell, 1957)

1. Cost Efficiency

Cost efficiency is associated with minimizing the cost of producing a given level of output. It is concerned with the efficiency related to the input space. Banks are said to be cost efficient if they can minimize the cost of inputs at a given price levels without impairing the quality of output.

2. Revenue Efficiency

Revenue Efficiency is concerned with the output dimension. It is concerned with the optimal generation of revenue with a given output mix given the level of inputs.

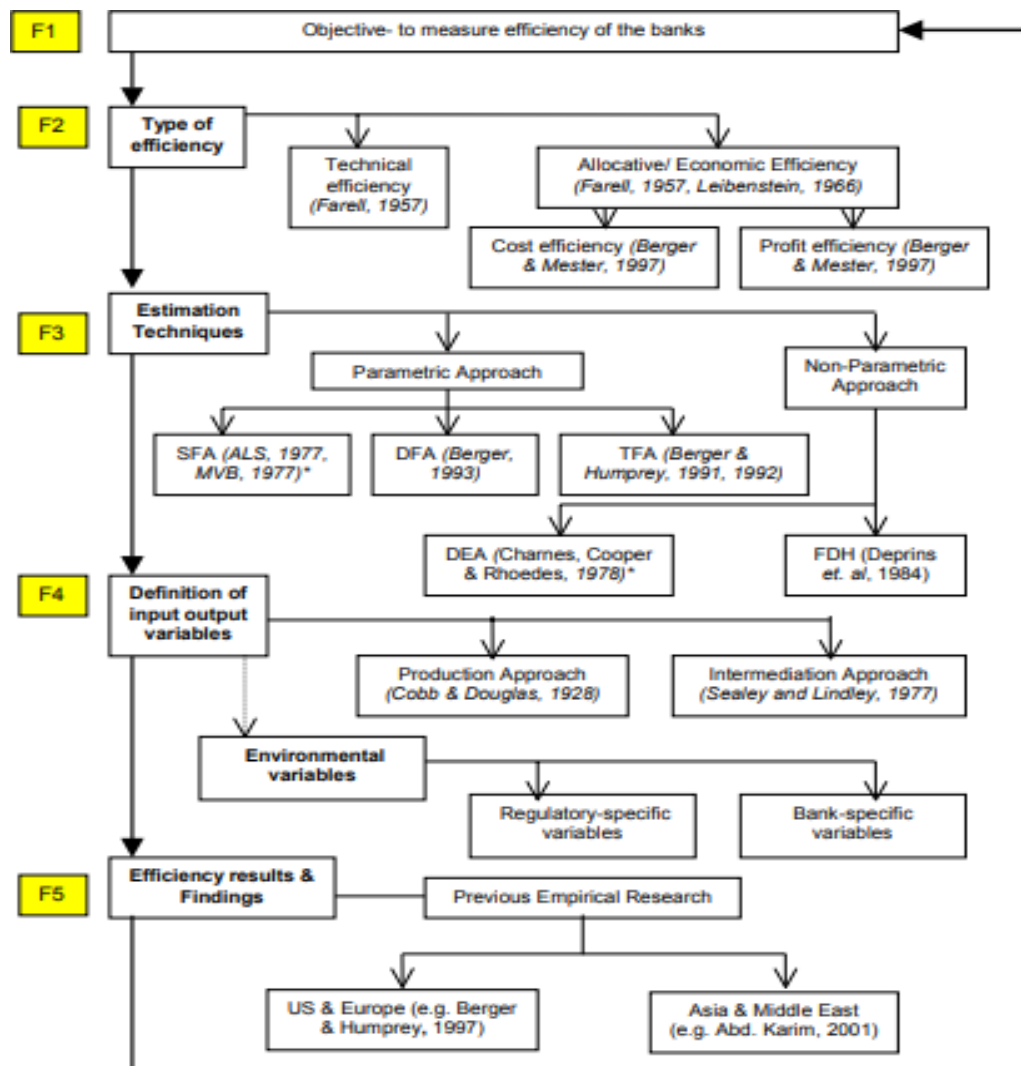
3. Profit Efficiency

Profit Efficiency studies the behavior of profit maximizers. If the observations can optimize the difference between the cost and revenue prices with optimal amount of inputs and outputs, they are said to be profit efficient.

Profit Efficiency defines as the difference between maximum profit and observed profit. Mokhtar, AlHabshi, & Abdullah (2006), gave a conceptual framework regarding the banking efficiency. The framework is shown below:

Figure 2.1

Conceptual Framework as per Mokhtar, AlHabshi, & Abdullah (2006)



Berger & Mester (1997) defined three types of efficiencies related to banks i.e Cost efficiency, standard profit efficiency and alternative profit efficiency. Cost efficiency measures how efficiency a bank manages its cost. It compares the cost of the bank with the industry’s best performer and checks the deviation. It is derived from a cost function in which variable costs depends on outputs and any freed inputs or output environmental the prices of variable inputs, the quantities of variable factors, and random error, as well as efficiency. Profit efficiency measures the capacity of the banks to produce optimal level of profit at a given a level of input and output prices and other variables. Alternatively banking efficiency i.e. profit efficiency can be measured by

measuring the capacity of the banks to generate maximum profit at given output levels rather than at given output prices.

Many researchers have focused in the cost and profit efficiency of the banking system and identified variables that have significant impact in the banking efficiency. Profit efficiency studies the capacity of a bank to generate higher profit relative to other banks with the same set and level of outputs. (Bader, 2008) Since this research paper is focused analyzing the profit efficiency of the banks, the literatures below also focuses on the profitability related factors that has impact on the profit efficiency of the banks.

Gajurel (2010) in his article to analyze the cost efficiency of the banks of Nepal found that Private banks, both foreign and domestic, are more cost efficient than the government-owned banks. The size of the banks i.e. the capital has negative impact on cost efficiency. Banks with higher capital, greater credit to deposit ratio and higher profit are more cost efficient. Cost efficient banks have less credit risk.

### **Approaches to Calculate Efficiency of Financial Institutions**

There are two main approaches to calculate the relative efficiency of financial institutions i.e. production approach and intermediation approach. This study has used both type of approach:

#### **1) Production Approach:**

Production approach is associated with the production of services by the financial institutions. This approach considers the financial institutions as the factory of producing the financial services to its customers. (Fried, Lovell, & Schmidt, 2008).

#### **2) Intermediation Approach:**

Intermediation approach considers the financial institutions as intermediaries between the sources and users of fund i.e. savers and investors or depositors and borrowers. It facilitates the transfer of deposits into loanable funds.

## **2.3 Empirical Findings**

### **Determinants of Bank Profitability**

Profitability is the capacity of banks to generate revenue in excess to cost in a regular

manner in relation to its capital. (Rijal, 2019) Different researches have concluded that both macroeconomic factors and bank specific factors have significant impact in the profitability of banks. The bank specific factors such as size of the banks, capital adequacy, quality of assets, available liquid assets and management of expenses significantly affect the bank's profitability. (Ally, 2014). The banks with higher capital i.e. stronger capital base, have significant positive impact in the profitability of banks. Other bank-specific factors affecting the profitability of banks are expense management and bank size. The bank-specific factors do have some impact in the profitability of banks but the impact that they have is comparatively lower compared to the macroeconomic factors. (Kosmidou, Tanna, & Pasiouras, 2005). There is positive relationship between the capital-assets ratio and bank profitability i.e. increase in capital assets ratio will lead to rise in bank's profitability. (Molyneux & Thornton, 1992). The macro economic factors do not have significant impact on banks profitability. (Ally, 2014).

While evaluating the banking efficiency in this research article, the variables used to measure the banking efficiency belongs to bank specific factors. The literatures further reviewed in the following section provide more support that bank profitability is impacted by capital requirements, liquidity requirements and provisioning. Since we aim to evaluate the profit efficiency of banks these literatures provide base for our research.

### **Liquidity and Bank Efficiency**

Liquidity of banks refers to their ability to fund their obligations. These obligations include their obligation towards depositors, accrued liabilities, bondholders and other lending commitments. (Amengor, 2010). Liquidity has a positive impact on bank profitability. The banks holding proper liquid assets have shown increased performance over the period of time. (Bordeleau & Graham, 2010). Liquidity has positive impact to bank's profitability. (Lukorito, Willy, Nyang'au, & Nyamasege, 2014). However, holding more than required amount of the liquid assets diminishes the bank's profitability as it hinders the ability of banks to invest to generate profit. (Bordeleau & Graham, 2010). There is an opportunity cost associated with holding liquid assets. If

these assets are hold more than necessary amount than, then there is a possibility that the banks will lose various opportunity from which they could increase their profit and enhance their efficiency. Liquidity Management is vital for the survival of the banks. (Moussa & Boubaker, 2020). The banks should manage their liquidity in such a way that there is enough liquidity available for the banks to pay back the debt when possible and that holding these assets won't cause the banks to miss any opportunities that comes through their way.

### **Capital Adequacy and Bank Efficiency**

Small banks are more profit efficient than the large banks. (Akhigbe & McNulty, 2003). Banking inefficiencies appear to be inversely correlated with capital strength i.e. larger the size of the capital more is the inefficiency in the banking system. (Girardone, Molyneux, & Gardener, 2006). However, enough capital is extremely essential banks as it helps to protect the depositor's fund. Without adequate capital, there is huge risk to the depositors' money and also has impact in the efficient operation of the banks.

Basel Framework is followed by different banks of the world which provides enough guidelines about the capital adequacy requirements and calculation. There are many literatures that have found significant impact of capital adequacy in bank profitability while some have found that capital adequacy does not have significant effect in the bank profitability. Capital adequacy has mixed impact on bank performance and profitability. Capital adequacy of the bank has significant impact on bank profitability. (Ozili, 2015) There is insignificant relationship between ROE and capital and significant relationship between ROA and capital. (kiragu, 2010)

Capital adequacy had significant positive relationship with bank performance or profitability. Many researchers have found that non-performing loan and advances have negative impact on profitability of various banks and capital adequacy and appropriate risk management techniques have positive impact in the profitability of banks. Capital requirements can improve bank efficiency. (Pessarossi & Weill). Researchers have also found significant positive relationship between capital adequacy and profitability of banks indicating that the banks that meet the capital requirement

have higher profitability since they are considered safe by the customers. The higher the capital ratio leads to higher profitability among banks. (Agbeja, Adedokun, & Olufemi, 2015). Capital adequacy plays an important role in the determination of profitability. The capital as well as the profit act as cushions against the losses not covered by the earnings and are the indicators of management efficiency. (Olalekan & Adeyinka, 2013)

However, Ozili (2015) from his research concluded that Basel capital regime had no significant effect in the bank profitability which is because of the modified prudential objective to the actual objective of the Basel framework to reduce excessive risk taking among banks. Also research work of Pervez and Bansal (2020) found capital adequacy ratio had a negative relationship with the performance of the banks.

Capitalization can impact the profitability of banks in both the direction, positive or negative. Increase in the capital can increase profit to a certain level and started decreasing the profit if the capital is above the optimal level. Banks maintaining the capital adequacy as per the regulation have higher profitability compared to those who have higher or lower capitalization. (Haris, Tan, Malik, & Ain, 2020)

### **Provisioning and Banking Efficiency**

Banking inefficiencies are positively related to non-performing loans i.e. higher level of NPL means high level of inefficiency in the banking system and lower NPL means higher level of efficiency in the banking system. (Girardone, Molyneux, & Gardener, 2006). Bad management leads to increase in non-performing loans which leads to deterioration of cost efficiency of banks. Loan loss provisioning hits bank profitability in two different ways. On one hand it safeguards the capital and the depositor's money and supports in stability of the banks and on the other hand higher provisioning leads to lower reported profit and has negative impact in the bank profitability. (Podpiera & Laurent, 2010).

Many researchers have concluded that there is negative relationship between bank profitability and Loan Loss provisioning i.e. higher the loan loss provisioning lower will be the profitability of the banks. Alhadab and Alshawneh concluded that loan loss provision has a negative impact on the profitability commercial banks in Jordan. The

banks with higher loan loss provisioning have lower profitability compared to those banks with lower loan loss provisioning. The researchers also suggested that Jordan banks had to change their level of LLP due to several reasons that caused several negative consequences ultimately resulting in reduced profitability. Return on assets (ROA) and return on equity (ROE) are employed as a proxy of the profitability in this study. Profitability of the banks are highly affected by the loan loss provisions. Any bank with higher profitability will have a lower loan loss provision which is a result of better and experienced management. (Mustafa & Ansari, 2012). There exists a negative relationship between loan loss provision and profitability of deposit taking banks in Nairobi. (Kimathi, 2014). A well-established bank is supposed to be having less loan loss provision and higher profitability. (Ahmad & Tahir, 2014) and Zheng, Perhiar, Gilal, and Gilal, (2019) also concluded that LLP has negative impact on banking profitability.

Loan Loss Provisioning (LLP) has impact in bank solvency. The use of LLP in banks helps the banks to cover the expected future loan losses that may amplify the credit fluctuations. (Bouvatier & Lepetit, 2008). LLP has a vital role in maintaining stability in the banks. (Ahmed & Tahir, 2014) However, capital adequacy ratio and government securities are insignificant to LLP. (Zheng, Perhiar, Gilal, & Gilal, 2019)

Shrestha (2020) in his research concluded that bank specific factors have significant impact on financial performance of Nepalese commercial banks. Finally, this study concludes that management efficiency, asset quality and organizational efficiency have significant positive impact in the financial performance of the banks and Credit risk has negative impact on the financial performance of Nepalese commercial banks. Similarly, Neupane (2020) in his research concluded that bank profitability Nepalese commercial banks measured in terms of return on equity is significantly affected by bank specific factors as well as other macroeconomic factors. The macro-economic factors are measured in terms of concentration ratio, banking sector development, GDP growth, inflation and exchange rate have significant negative impact in the profitability of banks. The bank specific factors such as bank size, capital base, loans, deposits, number of branches, etc also have significant impact in the banking profitability. Capital adequacy, inflation rate and number of branches have significant impact in the net

interest income of the banks. Also, Budhathoki and Rai (2020) concluded that assets quality, operating efficiency, and capital adequacy ratio have significant affect in banks' profitability. This study helps policymakers to take effective action in order to improve banks' profitability. It also helps the bankers to improve their actions to improve their profitability.

Pokhrel and Pokharel (2019) found that cash reserve ratio and capital adequacy are positively correlated with return on assets whereas, higher loan loss provisioning are inversely correlated with return on assets. Cash ratio is inversely correlated to return on equity i.e. higher cash holding will result in diminished profitability but cash reserve ratio, loan loss provisioning and capital adequacy are positively correlated with return on equity. The research concluded that there is significant relationship between liquidity ratios with profitability. Ojha (2018) also concluded that there is significant influence of return on assets, return on equity and non- performing on liquidity of the bank. Pradhan and Shrestha, (2016) found that increment in the bank performance can be seen through the increment in the capital and investment ratio.

Koju, Koju, and Wang (2018) showed that non-performing loans have significant positive relationship with bank specific factors such as efficiency and loan size and negative relationship with bank specific factors such as capital adequacy. Further, the research also shows that NPL have significant negative impact with macroeconomic factors such as export to import ratio and a negative relationship with factors such as GDP growth rate and inflation. Bhattarai (2016) revealed that non- performing loan ratio has negative effect on overall bank profitability (ROA) whereas, non- performing loan ratio has positive effect on shareholders' return (ROE).

Paudel and Khanal (2015) suggests that core determinants of capital adequacy ratio for the Nepalese cooperatives are credit to deposit ratio, net interest margin and types of cooperative in positive direction, whereas assets utilization ratio, size and return on equity in negative direction.

## **2.4 Banking Laws and Regulation**

This section of the literature review consists of various rules, regulations and acts that



guide the Nepalese banking system.

### **The Regulator**

Nepal Rastra Bank (NRB) regulates the banking system in Nepal and also functions as the government's bank. As a regulator, NRB controls foreign exchange; supervises, monitors, and governs operations of banking and non-banking financial institutions; determines interest rates for commercial loans and deposits; and also determines exchange rates of foreign currencies. As the government's bank, NRB maintains all government income and expenditure accounts, issues Nepali bills and treasury notes, as well as loans to the government, and determines monetary policy. NRB is responsible for formulation of various policies, circulars, directives and regulations that the banks of Nepal are obligated to follow. NRB act provides full authority to NRB to act as the central bank of the nation and to use appropriate measures to maintain the financial stability in the nation.

### **The Monetary policy**

Monetary policy is one of the major policies made by NRB to maintain the flow of money in the financial system. There is expansionary monetary policy which enhances the supply of money in the economy and contractionary monetary policy that contracts the supply of money in the economy. NRB publishes monetary policy once a year and amends the policy in each quarter considering the monetary situation of the country. CCD ratio, CD ratio, CRR ratios and SLR, are some of the major tools used by NRB to regulate the flow of money in the market.

### **Bank and Financial Institution Act (BAFIA)**

Commercial banks of Nepal are also governed by Bank and Financial Institutions Act (BAFIA), 2017. The Commercial Bank Act, 1974 and the Finance Company Act, 1985 also governed the conduct of commercial banks before the introduction of BAFIA. BAFIA specifies the various areas of activities of commercial banks of Nepal.

### **Circulars and Directives**

NRB publishes two major types of directives one for the A, B and C class banks and another for the D class banks. A class banks means the commercial banks, B class banks means the development banks and C class banks mean the Finance companies. D class banks means the microfinance institutions. NRB mentions various dos and don'ts that these BFIs have to follow through the directives and circulars. Generally, NRB publishes directives once a year and circulars wherever it deems necessary.

## 2.5 Summary of Empirical Findings

The table below provides summary of the various research papers which support or contradict the hypothesis of this research paper:

**Table 2.1**

*Summary of Empirical Findings*

<b>S.N.</b>	<b>Title of the Article</b>	<b>Year</b>	<b>Author</b>	<b>Findings</b>
1	The Effect of Bank regulation on The Banks' performance: A literature review approach	2020	Simeneh Almaw	Monetary regulation effect the bank is performance negatively. Structural regulations can have both positive and negative effect in that bank performance.
2	Determinants of Financial Performance of Nepalese Commercial Banks: Evidence from Panel Data Approach	2020	Purna Man Shrestha	Bank specific factors such as Managerial efficiency, liquidity, Credit risk, Asset quality and operational efficiency have major impact in the performance of banks.
3	The Effect of Specific Factors on Bank Profitability: Evidence from Nepalese Banks	2020	Prem Bahadur Budhathoki and Chandra Kumar Rai	Asset quality, operational efficiency and capital adequacy ratio significantly affect the bank's profitability.

4	A Study on the Impact of Capitalization on the Profitability of Banks in Emerging Markets: A Case of Pakistan	2020	Muhammad Haris , Yong Tan, Ali Malik 4 and Qurat Ul Ain	Increase in capital of banks helps to increase profitability to a certain level after that increase in profitability will result in the decrement of profitability.
5	Profitability determinants of Nepalese commercial banks	2020	Bishnu Prasad Neupane	Profitability of the Nepalese banks are significantly affected by the external factors such as macroeconomic factors, political factors, regulatory factors, etc.
6	Loan Loss Provision and Risk-Taking Behavior of Commercial Banks in Pakistan: A Dynamic GMM Approach	2019	Changjun Zheng , Shumaila Meer Perhiar, Naeem Gul Gilal Faheem Gul Gilal	Loan Loss provisions have capacity to predict credit risk of the companies in emerging companies.
7	Role of Bank Regulation on Bank Performance: Evidence from Asia-Pacific Commercial Banks	2019	Zhenni Yang , Christopher Gan and Zhaohua Li	Tighter regulation and supervision are significantly related to higher efficiency for small and large sized banks.
8	Impact of liquidity on profitability in Nepalese Commercial Bank	2019	Shiva Prasad pokherel and Bishnu prasad Pokhrel	CRR and Investment in government securities in current assets are positively related with return on Assets. Current ratio is negatively related with the return on equity.
9	Capital Adequacy, Risk and Bank Performance: Evidence from India	2019	Dr. Asif Pervez and Dr. Rohit Bansal	Capital adequacy has negative impact in the bank performance and NPA has negatively influenced profitability and productivity.
10	The Effects of Prudential Regulation, Financial Development, and Financial Openness on Economic Growth	2018	Pierre-Richard Agénor,Leonardo Gambacorta,Enisse Kharroubi,and Luiz A. Pereira da Silva	The economic growth of the country is supported by the prudential regulations. They help in mitigating the financial risks of the economy.

11	Determinants of Loan Loss Provision of Commercial Banks in Nepal	2018	Dr. Bishnu Prasad Bhattarai	Non-performing loans and loan to deposit ratio have significant impact in the Loan Loss provisions. Loan Loss provisions have negative impact in that bank's profitability.
12	The impact of loan loss provisioning on bank capital requirements	2018	Steffen Krugera , Daniel Roscha and Harald Scheuleb	The provisioning rules impact the capital requirements of the banks.
13	Applying Data Envelopment Analysis in Measuring the Efficiency of Chinese Listed Banks in the Context of Macroprudential Framework	2018	Huichen Jiang and Yifan He	The macro prudential regulation applied in China has helped the Chinese banks from falling into financial risk and helped them to realize an steady growth.
14	Macroeconomic and bank-specific determinants of non-performing loans: Evidence from Nepalese banking system	2018	Laxmi Koju, Ram Koju and Shouyang Wang	Efficient management and effective financial policies are required for stable financial system in Nepal.
15	Does Financial Regulation Influence Bank Efficiency? A Study on UAE Banking Sector	2017	Rachna Banerjee and Sudipa Majumdar	Financial regulations have significant impact in the profit efficiency of banks.
16	Impact of Capital Adequacy and Cost Income Ratio on Performance of Nepalese Commercial Banks	2017	Radhe Shyam Pradhan and Pratikshya Parajuli	Return on Assets is negatively related to cost income ratio, capital adequacy, equity capital and liquidity ratio.
17	Loan Loss Provision and the Profitability of Commercial Banks: Evidence from Jordan	2016	Mohammad Alhadab and Saba Alshawneh	Loan Loss provisions have negative impact in the profitability of banks.

18	Effect of non-performing loan on the profitability of commercial banks in Nepal	2016	Yuga Raj Bhattarai	NPL has negative impact in the banking profitability and positive impact in the shareholder's return.
19	Impact of liquidity on bank profitability in Nepalese commercial banks	2016	Prof. Dr. Radhe S. Pradhan and Deepa Shrestha	Profitability is positively affected by the capital fund and negatively by the liquidity.
20	Effects of monetary policy on bank lending in Nepal	2016	Neelam Timsina Dhungana	Increasing the liquidity related requirements such as Cash reserve ratio have negative impact in the bank lending and profitability of banks.
21	Capital Adequacy Ratio and Bank Profitability in Nigeria: A Linear Approach	2015	Agbeja, O. (Ph.D.), Adelakun, O.J. and Olufemi, F. I.	Capital Adequacy has significant positive impact in the banking profitability. Banks with higher capital have higher profitability.
22	Report on the impact and accountability of banking supervision	2015	Basel Committee on Banking Supervision	Financial regulations should be supported by the banking supervision to maintain stability in the banking system of the country.
23	Impact of Loan Loss Provision on Bank Profitability in Pakistan	2014	Farooq Ahmad, Safdar Hussain Tahir and Dr. Bilal Aziz	Banks with less loan loss provisions have higher profitability
24	Determinants of Banks' Profitability in a Developing Economy: Empirical Evidence from Tanzania	2014	Zawadi Ally	Macroeconomic factors do not have significant impact in that bank profitability whereas, the bank specific factors have significant impact.
25	The effect of loan loss provisioning on profitability of deposit taking SACCO societies in Nairobi country	2014	Gitonga Jacob Kimathi	Higher provisioning leads to decreased profitability. Proper management can reduce provisioning and lead to

higher profitability.

26	Assessing the effect of liquidity on profitability of commercial banks in Kenya.	2014	Sarah Nabalayo Lukorito, Willy Muturi , Andrew S. Nyang'au and Dennis Nyamasege	Liquidity has statistically significant and positive relationship with banking profitability.
27	Impact of banking regulation on risk and efficiency in Islamic banking	2013	Nafis Alam	Banking regulations and the strict monitor in and supervision of the banking operation increases the technical efficiency of Islamic banks.
28	Do bank regulation, supervision and monitoring enhance or impede bank efficiency?	2013	James R. Barth, Chen Lin, Yue Ma, Jesús Seade and Frank M. Song	Tighter regulations have negative impact in the banking efficiency.
29	Do capital requirements affect bank efficiency? Evidence from China	2013	Pierre Pessarossi and Laurent Weill	Capital requirements can improve the banking efficiency.
30	Understanding Financial Regulation	2012	Eric J. Pan	Regulators make tighter and lenient regulations before and after financial crisis to maintain efficiency in the banking activities.
31	Bank supervision, regulation, and efficiency: Evidence from the European Union	2012	Georgios E. Chortareas , Claudia Girardone and Alexia Ventouri	Interventionist supervisory and regulatory policies results in banking inefficiency .

32	Does the loan loss provision affect the banking profitability in case of Pakistan?.	2012	Ahmed Raza ul Mustafa, Riaz Hussain Ansari and Muhammad Umair Younis	A well-managed bank has less provisioning leading to higher profitability.
33	Macro-prudential approaches to banking regulation: Perspectives of selected Asian central banks	2011	Reza Siregar	Macro prudential regulations have major impact in the banking efficiency.
34	Accounting Discretion, Loan Loss Provisioning, and Discipline of Banks' Risk-Taking	2011	Robert M. Bushman and Christopher D. Williams	The discretion over loan loss provisioning can have beneficial or negative real consequences for discipline of bank risk-taking.
35	Banking risk and regulation: Does one size fit all?	2011	Jeroen Klomp and Jakob de Haan	Banking regulation has effect in the highly risky banks and does not have significant effect in the low risk banks.
36	The effects of bank regulations, competition, and financial reforms on banks' performance.	2011	Sami Ben Naceur and Mohammed Omran	Macroeconomic indicators do not have significant impact in the bank performance but regulatory indicators have significant impact in the bank performance.
37	Cost efficiency of Nepalese commercial banks.	2010	Dinesh Prasad Gajurel	External factors particularly regulatory factors are result in technical an cost inefficiencies in Nepalese commercial banks.
38	The relationship between profitability and capital adequacy of commercial banks in Kenya	2010	Chris Maina Kiragu	There is insignificant relationship between the capital and the banking profitability.

39	Banking regulations, cost and profit efficiency: Cross-country evidence	2009	Fotios Pasiouras, Sailesh Tanna and Constantin Zopounidis	Higher Supervisory power increase both cost and profit efficiency and strict regulation have negative impact in profit efficiency but positive in cost efficiency.
40	The Fundamental Principles of Financial Regulation	2009	Markus Brunnermeier, Andrew Crocket, Charles Goodhart, Martin Hellwig, Avinash D. Persaud and Hyun Shin	Macro prudential regulations concerning capital and liquidity are necessary for proper functioning of Banking system.
41	Cost, revenue, and profit efficiency of Islamic versus conventional banks: International evidence using data envelopment analysis.	2008	Mohammed Khaled I. Bader, Shamsher Mohamad, Mohamed Ariff and Taufiq Hassan	There is no significant differences between efficiency levels of the conventional and Islamic banks.
42	Banks' procyclical behavior: Does provisioning matter?	2006	Vincent Bouvatier and Laetitia Lepetit	Poorly capitalized banks have constrained to expand credit.
43	Analyzing the determinants of bank efficiency: the case of Italian banks	2004	Claudia Girardone	Cost and profit efficiencies of banks are inversely related to the capital adequacy and positively related to the non-performing loans.
44	The profitability of European banks: a cross-sectional and dynamic panel analysis.	2004	John O. S. Wilso	Capital Adequacy ratio has positive relationship with banking profitability.
45	The profit efficiency of small US commercial banks	2003	Aigbe Akhigbe and James E. McNulty	Structure performance factor, relationship development factors and expense preference play important role in determining the banking efficiency.



46	Regulations of banking and financial Market	2000	Dirk Hereman	The world is eventually moving towards global prudential regulations diverting from market.
47	Do capital adequacy requirements reduce risks in banking?	1999	Jurg Blum	Raising additional equity has significant positive impact in the banks.
48	The role of financial regulation in a world of deregulation and market forces	1999	Lawrence J. White	There is a substantial role of financial regulation for sustainability of banking system.
49	Inside the Black Box: What Explains Differences in the Efficiencies of Financial Institutions?	1997	Allen N. Berger and Loretta J. Mester	Banks in US are inefficient. There is more cost efficiency in banks than the profit efficiency.
50	Determinants of European bank profitability: A note	1992	Philip Molyneux and John Thornton	Banking profitability are positively associated with banking regulations.
51	Bank branch operating efficiency: Evaluation with Data Envelopment Analysis	1985	H.David Sherman and Franklin Gold	DEA techniques are beneficial for finding the efficiency of banks than other techniques.

## 2.6 Research Gap

There are various researches which have believed that banking regulations have a positive impact on banking efficiency. Yang, Gan & Li (2019), Alam (2013), and Heremans & Paccès (2018) in their research supported the idea that banking regulation improves banking efficiency. Whereas, Chortareas, Girardone & Ventouri (2010), Barth, Lin, Yeu, Seade & Song (2013) and Pasiouras, Tanna & Zopounidis (2007) have concluded that stricter regulations impede banking efficiency. The optimal level of banking regulations can help in maintaining an efficient banking

system in the nation.

The way in which a company uses its resources helps to determine the success of the company. Taking this fact into consideration, various researchers have focused their study in evaluating the cost efficiency in the banking system. However, there have been several researches which have found that profit efficiency in the banking sector is of higher importance than the cost efficiency. The profit efficiency also considers the revenue side of the business which cost efficiency fails to incorporate. The prices in which the services are being provided to the customers are as important as the cost of the inputs but the cost efficiency fails to address this. Bad pricing policy might lead to the failure of any organization, including the financial institutions. (Maudos & Pastor, 1999).

There are several literatures analyzing the impact of banking regulations on bank efficiency but most of these literatures are focused on the cost- efficiency of banks with very few focused on analyzing the impact of such regulations on profit efficiency.

In the Nepalese context, there are very few literatures which have analyzed the efficiency of banking system in Nepal and fewer literatures analyzing the profit efficiency. Gajurel (2018) in his article to analyze the cost efficiency of the banks of Nepal. There are many literatures that support that regulations have an impact in the banking system and there is literature focused on finding the determinants of profitability of Banks in Nepal however, literatures evaluating the impact of regulations on banking efficiency especially profit efficiency is very few. This paper aims to fill this research gap and find out the impact of banking regulation in profit efficiency of the banks in Nepal.

## **2.7 Theoretical Framework**

The Commercial banks of Nepal are required to report the key financial highlights to Nepal Rastra Bank the central bank of Nepal. These highlights include information relate with core capital, total capital fund, CAR%, CCAR%, total deposit, Total loan, LCY loan, CCD ratio, Net Liquidity (%), SLR, NPL (%) and

information related to priority sector lending. Among these the variables selected for the evaluation of the impact of banking regulation on banking efficiency are SLR, CCD and net liquidity (%) for liquidity requirement, CAR% and CCAR% for capital adequacy requirement and NPL (%) for provisioning related requirement. The provisioning related requirement uses one more variable which is provision coverage ratio which was also used in the article written by Banerjee & Majumdar (2018) to find out the profit efficiency of UAE banking sector. NRB requires to maintain CAR% i.e. 8.5% minimum and CCAR% 6% minimum as per the basel III framework for commercial banks in Nepal, CCD ratio of 80%(monthly average), SLR of 10%(minimum requirement) and Net liquidity of 20%.NRB categorizes the Non-Performing loan and requires the BFs of Nepal to maintain provisioning as per the NRB directive which is as follows:

**Table 2.2**

*Loan classification*

<b>Types of Loan</b>	<b>Provisioning</b>
Pass Loan	1%
Watch list loan	5%
Substandard loan	25%
Doubtful loan	50%
Loss loan	100%

Previous literatures have supported the fact that the financial regulation have impact in the banking profitability. Moreover, they also provide support that liquidity of the bank, capital related requirements and non-performing loans have impact in the bank’s profitability.

Banerjee & Majumdar (2018) in their article named “Does Financial Regulation Influence Bank Efficiency? A Study on UAE Banking Sector” studied the influence of the profit efficiency of the banks UAE. While carrying out this research, the researchers have used Liquidity related requirement (Loan to deposit ratio, Advances to stable resources and Cost to income ratio, Capital adequacy related

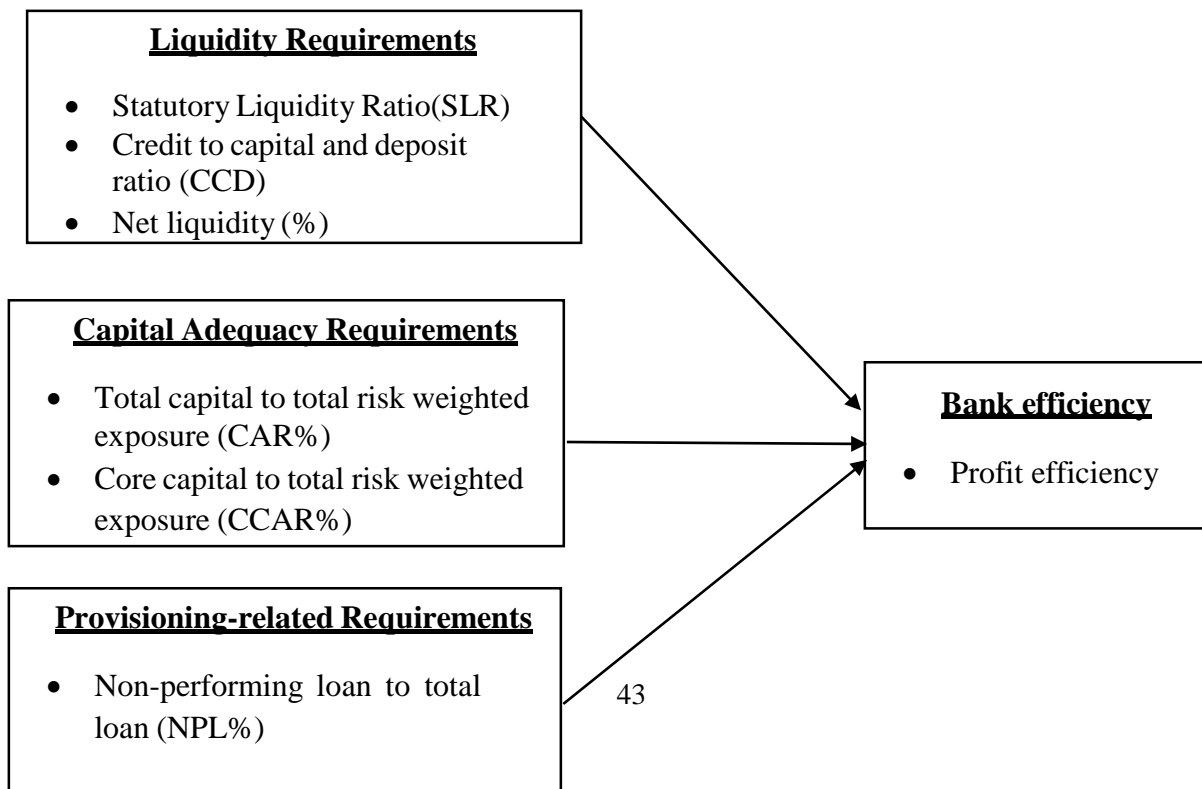
requirement (Capital adequacy ratio and tier 1 capital) and Provisioning related requirement (Non- performing loan coverage ratio and loan loss provisions) as the basis for financial regulation.

The Profit efficiency was calculated by using the DEA method. For this deposit and fixed assets were used as input variables and investment in securities and Loans were taken as the output variables. This model is adopted in this study as well. The Components of the DEA model is later explained in the methodology section.

The Commercial banks of Nepal are required to report the key financial highlights to Nepal Rastra Bank the central bank of Nepal. These highlights include information relate with core capital, total capital fund, CAR%, CCAR%, total deposit, Total loan, LCY loan, CCD ratio, Net Liquidity (%),SLR, NPL (%) and information related to priority sector lending. On the basis of the pervious literatures, model used by Banerjee & Majumdar (2018) and the regulatory requirement put forth by Nepal Rastra Bank, the theoretical of the study is highlighted below:

Figure 2.2

*Theoretical Framework*



## **Independent Variables**

## **Dependent Variable**

*Note:* Adapted from Article by Banerjee & Majumdar (2018)

## **2.8 Operational Definitions**

This section contains the operational definitions of the variables used in the research.

### **Independent Variables:**

The theoretical framework defines three basic criteria i.e. Liquidity related requirements, Capital Adequacy related requirements and Provisioning related requirements on the basis of which the dependent variable i.e. the banking efficiency in terms of profit efficiency will be evaluated.

#### **1. Liquidity related requirements:**

There are three major variables evaluated under liquidity related requirements. These are Statutory Liquidity Requirement, Credit to Capital and Deposit ratio (CCD ratio) and Net Liquidity (%). These variables are described below:

##### **i. Statutory Liquidity Ratio (SLR)**

The ratio of liquid assets to net demand and time liabilities (NDTL) is called statutory liquidity ratio (SLR). (Economic times, n.d.). SLR is a provision of reserve requirements set by the central bank to its bank and financial institutions for maintaining some liquidity in the form of cash, government bonds or other convertible assets. At present, NRB has provisioned 10% SLR for commercial banks. (Nepal Bankers Association, n.d.) This ratio ensures that there is enough liquidity in the BFIs.

##### **ii. Credit to Capital and Deposit Ratio (CCD ratio)**

CCD ratio is calculated by dividing the total credit mobilized by the BFIs by the sum of the total capital of the BFIs and the total deposit. The capital includes both primary and secondary capital i.e. the shareholder's equity, different types of reserves and debentures issued by the BFIs. Nepalese BFIs need to maintain the CCD ratio of 80% (monthly average) as per the monetary policy.

**iii. Net Liquidity (%)**

Net liquidity is the measure of the near term liquidity position of the banks. This ratio shows whether or not the banks are capable of maintaining the near term liquidity requirements.

**2. Capital Adequacy related requirement**

Two major ratios are evaluated under capital adequacy related requirement. These ratios are CAR% and CCAR%. Nepal follows Basel framework III for calculating and maintaining these ratios. These ratios are described below:

**i. Total Capital to Risk Weighted Exposure (CAR%)**

The Basel Framework divides total capital into Core capital (Tier 1 Capital) and Supplementary capital (Tier 2 capital). Then the capital is divided by the risk weighted exposure of the bank. The risk weight of a type of asset is defined in the Basel framework. Nepal follows Basel III framework for capital adequacy which was effective since July 2016. As per the capital adequacy framework, the minimum CAR% that a bank should maintain is 8.5%.

**ii. Total Core Capital to Risk Weighted Exposure (CCAR%)**

CCAR% is the total core capital of the BFIs divided by the risk weighted exposure. The risk weight of a type of asset is defined in the Basel framework. Nepal follows Basel III framework for capital adequacy which was effective since July 2016. As per the capital adequacy framework, the minimum CCAR% that a bank should maintain is 6%.

**3. Provisioning related requirement**

The ratio evaluated under provisioning related requirement is NPL%. The ratio is described below:

**i. Non-performing Loan to total Loan (NPL%)**

Non-performing loans are those loan amount in which the borrower has defaulted and has not made the payment of the scheduled payment of interest or principle to the lender. Higher the number of NPL in the banks means higher default rates. NPL% is the ratio of the non-performing loan to the

total loan and it shows what portion of the total loan goes to default.

### **Dependent Variables:**

#### **Banking Efficiency**

Banking efficiency is measured in terms of profit efficiency. Profit efficiency is the method for the banks to generate higher and regular profit. Data envelopment Analysis is done for calculating the profit efficiency of the banks.

#### **Data Envelopment Analysis**

Data envelopment analysis provides a means of calculating efficiency levels of a group of organizations. It is a linear programming model. It is calculated by comparing with the industry best performer. It is a non-parametric mathematical model (Kočišová, 2014). The basic DEA model developed by Charnes, Cooper, & Rhodes (1978) which was based on the assumption of constant returns to scale. Later Banker, Charnes, & Cooper (1984) developed a model for variable returns to scale. Sherman & Gold (1985) were the one to use DEA to calculate the banking efficiency for the first time. DEA can be used to calculate cost efficiency, revenue efficiency and profit efficiency of the banks.

Further explanation related with the use of DEA to compute the profit efficiency is done in the methodology section.

The following are the reasons supporting the use of DEA in this study:

- DEA reflects the multiple aspect of the organization,
- DEA does not require priority weight of performance measure,
- DEA deals with multiple input and output of different units of measurement which generally difficult to combine while measuring efficiency,
- DEA can be applied to any organization with any number of decision alternatives method is free from distribution as it is a non-parametric tool,
- DEA does not require any form of function,
- DEA allows comparison with best performance rather than average performance,
- Multiple inputs and outputs can be used in DEA.

- DEA does not require implementation of a specific functional form in any model.
- DEA allows comparison among the firms through efficiency score in terms of cost, revenue and profit efficiency. (Olasupo, Afolami, & Shittu, 2014)



## **CHAPTER III**

### **RESEARCH METHODS**

This chapter provides information related with the research design used in the study, information related to the population and sample, nature of the data and various tools used in the data analysis process.

#### **3.1 Research Design**

Research design provides a framework various methods and techniques used by the researcher while conducting research work. The study is conducted to analyze the impact of the financial regulation on the bank's efficiency. Thus the study follows descriptive research design and casual comparative research design. The research design that is used to describe various variables used and analyze their impact to answer the questions like what, where, whom, why etc is known as descriptive research design where as a causal research design is used to find the cause and effect relationship between the dependent and independent variables. The Study initially calculates the Profit efficiency of the banks using various variables like deposit, loan, deposit price and loan price. Therefore, initially the study determines how these factors influence the profit efficiency and hence uses the descriptive research design. The study further aims to find the whether or not the regulations impact the banking efficiency. The provisions related to SLR, CCD ratio, NPL, CAR, CCAR and net liquidity are the provisions taken into consideration. Since we aim to find the impact of these variables in the profit efficiency of the banks, causal comparative method is used in the research. Therefore, casual comparative research design and descriptive research design are the best fitted research design for the purpose of this study.

#### **3.2 Population and Sample**

All the financial institutions regulated by the Nepal Rastra Bank are the population of the study. As of mid- April 2020, there are 161 financial institutions in Nepal, 27 commercial banks, 23 development banks, 22 finance

companies and 89 microfinance companies. (Nepal Rastra Bank, 2020). Among them all 26 commercial banks are considered as the sample for the study. Commercial Banks are provided with high level of flexibility in terms of operation and scope of activity that they can conduct. They collect the highest amount of deposits and distribute the highest amount of loan compared to the other regulated bodies i.e. development banks, finance companies and microfinance institutions. Also, they have the highest paid-up capital among the regulated institutions. RBB has been excluded from the study as NRB does not provide quarterly data of the bank. Therefore, Commercial banks are considered in this research report as a sample.

### **3.3 Nature and Source of Data**

This research is based on the secondary data and is entirely based on the information published by BFIs on a quarterly basis.

Secondary data is collected from the quarterly reports of the banks, bank websites and the data published by the central bank. For the purpose of analysis, the data from past 10 years i.e. from F/Y 2011/12 to F/Y 2020/21 will be taken into account. Bank and financial institutions have seen some major changes in capital adequacy, liquidity and provisions related requirement in the past 10 years. This research aims to accommodate these changes in the analysis. NRB published the information related with the regulatory ratios of the BFIs. Different ratios used to analyze the impact of financial regulation on profit efficiency of the banks is extracted from the very report published by NRB. This period is used for analysis because major regulatory changes were seen in this period in the history of banking sector.

### **3.4 Data Analysis Tools**

The study has used the following analytical tools for the analysis of the data collected:

- i. Data Envelopment Analysis (DEA)**

DEA is used to measure the profit efficiency of the banks. DEA constructs an efficient frontier of the most efficient decision making units (DMU). The DEA toolbox computer software will be used for the further analysis of the data to obtain the efficiency scores. The input and output selected for the analysis using DEA are:

**Table 3.1**

*Inputs and Outputs of DEA*

<b>Inputs</b>	<b>Outputs</b>
Customer deposit	Loans

**Input Prices:**

$$\text{Customer deposit} = \text{interest expense}/\text{deposit}$$

**Output Prices:**

$$\text{Loans} = \text{Interest income}/\text{Loans}$$

The input and output selected for the research is based on the model selected by Banerjee & Majumdar (2017).

**Calculating Profit Efficiency through DEA**

Profit efficiency can be calculated after having knowledge about the price of the input and output variable. The profit maximization DEA problem is specified as follows (Coelli, Rao, O'Donnell & Battese, 2005):

max

$$\sum_{r=1}^s p_{rq} y_{rq}^* - \sum_{i=1}^m w_{iq} x_{iq}^*$$

s.t.

$$\sum_{j=1}^n y_{rj} \lambda_j \geq y_{rq}^* \quad r = 1, 2, \dots, s,$$

$$\sum_{j=1}^n x_{ij} \lambda_j \leq x_{iq}^* \quad i = 1, 2, \dots, m,$$

$$\sum_{j=1}^n \lambda_j = 1 \quad 50$$

$$\lambda_j \geq 0 \quad j = 1, 2, \dots, n.$$

Where  $y_{rq}$  and  $X_{iq}$  refer to the output quantities and input quantities respectively whereas  $p_{rq}$  and  $w_{ip}$  refers to the output price and input price respectively.  $y^*_{rq}$  and  $x^*_{iq}$  are the most efficient output and input quantities.

The overall profit efficiency (PEq) can be defined as the ratio of observed profit to maximum profit for the DMUq (Coelli, Rao, O'Donnell, & Battese, 2005):

$$PE_q = \frac{\sum_{r=1}^s p_{rq} y_{rq} - \sum_{i=1}^m w_{iq} x_{iq}}{\sum_{r=1}^s p_{rq} y^*_{rq} - \sum_{i=1}^m w_{iq} x^*_{iq}}$$

However, this measure need not be bounded by zero and one. It could be negative if a profit is negative, or it could be undefined if maximum profit is zero. (Coelli, Rao, O'Donnell, & Battese, 2005). The value of overall profit efficiency can be interpreted as potential profit increasing that can be achieved if the production unit uses the inputs and outputs in optimal combination.

## ii. MATLAB Software

MATLAB Software is used for Data Envelopment Analysis. Using this Software, Profit efficiency of each commercial bank is calculated which is later used in the tobit regression as a dependent variable.

## iii. Tobit Regression Model

After calculating the efficiency score of the banks, regression analysis is carried out to see the impact of the regulatory provisions in the efficiency score.

Regression analysis is a statistical tool which is used to find out the functional relationship between the dependent and independent variable. This tool helps to identify the causal relationship between the dependent and independent variable. Tobit model is a censored regression model. The dependent variable can be left or right censored. The dependent variable in our regression model will hold a value between 0 to 1.

Tobit regression model is used for analyzing the impact of various regulations on profit efficiency of banks in Nepal since the efficiency is measured using the

DEA model and it will provide the value of efficiency between 0 to 1. Regression is conducted by using the MATLAB software. The model used is (also used by Banerjee & Majumdar, (2017)):

$$Y_i = X_1 + SLR X_2 + CCD X_3 + NL X_4 + CAR X_5 + CCAR X_6 + NPL X_7$$

Where,

$Y_i$  = Profit Efficiency

SLR = Statutory Liquidity Ratio

CCD = Credit to Capital and Deposit Ratio

NL = Net Liquidity

(in percent)

CAR = Capital

Adequacy Ratio

CCAR = Core Capital

Adequacy Ratio

NPL = Non Performing Loan to  
total Loan

#### iv. Scatter Plots

Scatter Plots are dotted representation of the dependent and independent variables. We can observe relationship between the variables using the scatter plot. Scatter plots is used in the research to show the efficiency of various banks at different time periods.

## CHAPTER IV ANALYSIS AND RESULTS

Data analysis is an important stage of the research process. The purpose of analyzing the data is to change it from to an understandable presentation. Raw data convey little information as such. It must, therefore, be compiled, analyzed, and interpreted carefully before its full meaning and implications can be understood. Thus, analysis is the examination and interpretation of data to draw conclusions.

This chapter deals with the empirical analysis of the secondary data to understand the impact of input and output variables in profit efficiency. This section is divided into two sections i.e. Profit efficiency calculation and regression analysis.

### 4.1 Efficiency

Table below presents the average efficiency score of the four quarters of the past ten years.

**Table 4.1**

*Average Efficiency of past 10 years*

<b>Banks</b>	<b>Profit Efficiency</b>	<b>Allocative Cost Efficiency</b>	<b>Technical Efficiency</b>
ADBL	0.21	0.16	0.05
BOKL	0.28	0.24	0.04
CBL	0.24	0.92	0.08
CCBL	0.68	0.45	0.08
CZBIL	0.21	0.16	0.05
EBL	0.24	0.17	0.06
GBIME	0.70	0.63	0.07
HBL	0.31	0.23	0.08
KBL	0.56	0.48	0.08
LBL	0.31	0.25	0.06
MBL	0.22	0.17	0.05
MEGA	0.97	0.94	0.06

NBB	0.25	0.17	0.08
NBL	0.30	0.17	0.13
NCCB	0.51	0.43	0.08
NIB	0.17	0.11	0.07
NICA	0.73	0.34	0.07
NMB	0.46	0.43	0.06
PCBL	0.31	0.24	0.07
PRVU	0.37	0.31	0.05
SANIMA	0.61	0.55	0.04
SBI	0.51	0.35	0.16
SBL	0.52	0.46	0.06
SCB	0.43	0.26	0.17
SRBL	0.28	0.22	0.07
NABIL	0.50	0.41	0.10

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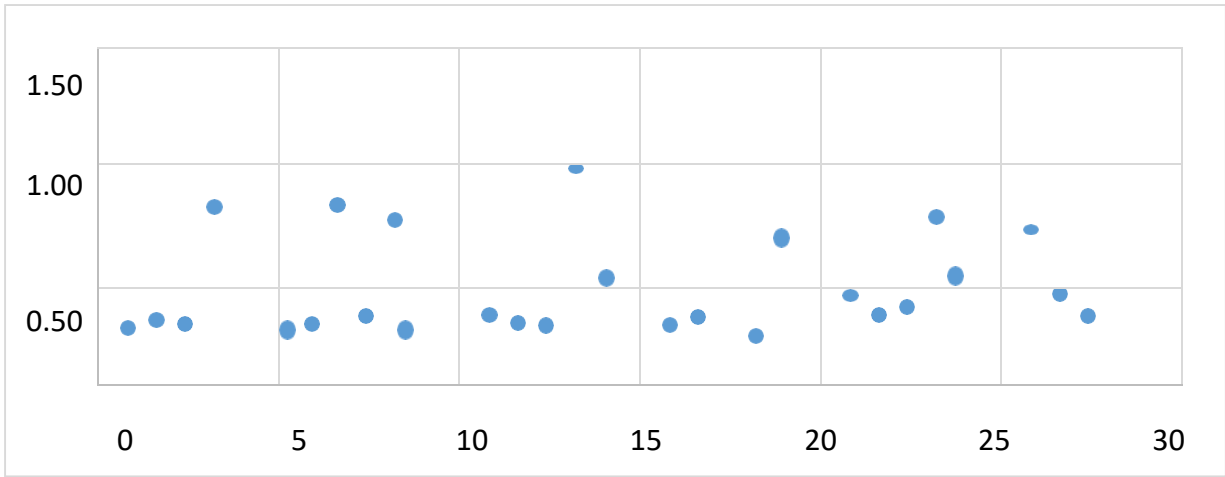
From table 4.1, we can observe three different types of efficiency score of 27 banks. We can see that mega bank has the highest profit efficiency score i.e.0.97 and Nepal Investment Bank(NIB)

i.e. 0.17 has the lowest profit efficiency score. Similarly, Mega Bank also has the highest cost efficiency score i.e. 0.94 and NIB has the lowest cost efficiency score i.e.0.11. Finally, Standard Chartered Bank(SCB) has the highest technical efficiency score i.e. 0.17 and Sanima Bank (SANIMA) has the lowest technical efficiency score i.e. 0.04. The profit efficiency of all the banks seems to be more than the cost efficiency and the technical efficiency score and all the efficiency score are between 0 and 1.

### Efficiency Scatter Plot

Figure 4.1

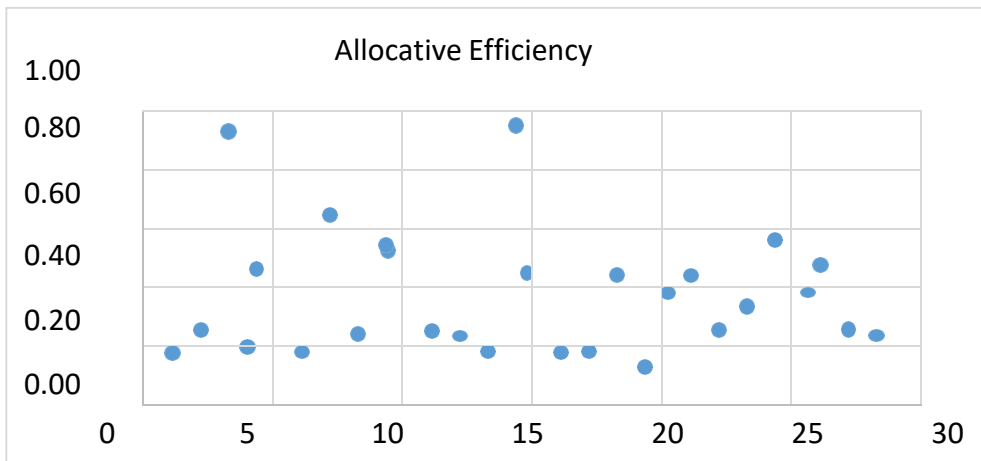
*Profit Efficiency*



In figure 4.1, we can see the scatter plot of the profit efficiency score of the commercial banks. We can observe that the profit efficiency score lies between 0 to 1. We can also observe that most of the banks have the efficiency score between 0.2 to 0.6. It suggests that only a few banks are able to efficiently generate profit.

**Figure 4.2**

*Allocative Efficiency*



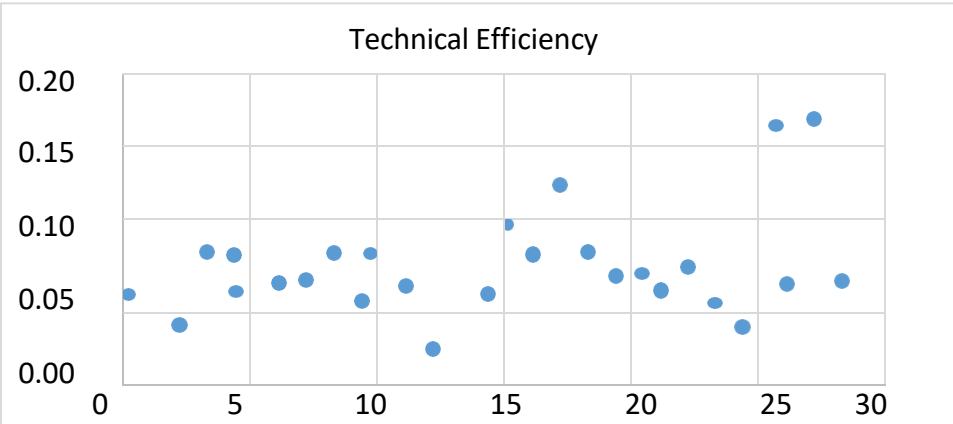
In figure 4.2, we can see the scatter plot of the cost efficiency score of the commercial banks. We can observe that the cost efficiency score lies between 0 to 1. We can also



observe that most of the banks have the efficiency score between 0.1 to 0.5. It suggests that only a few banks are able to efficiently handle cost.

**Figure 4.3**

*Technical Efficiency*



From figure 4.3, we can see the scatter plot of the technical efficiency score of the commercial banks. We can observe that the technical efficiency score lies between 0 to 1. We can also observe that most of the banks have the efficiency score between 0.05 to 0.10. Only profit efficiency will be used in further analysis in the report.

**4.2 Annual Efficiency of Banking sector**

The table below gives the annual efficiency of the entire banking sector in each of the ten years.

**Table 4.2***Average Efficiency of Commercial Banks*

DMU	Deposit (X)	Loan (Y)	Xprice	Yprice	TechEff	AllocEff	ProfEff
1	560,316,727	438,341,113	0.013	0.016	0.000	0.308	0.308
2	701,145,421	512,412,154	0.017	0.016	0.049	0.011	0.060
3	879,335,520	658,539,160	0.017	0.016	0.052	0.020	0.072
4	1,055,963,011	802,510,355	0.017	0.015	0.055	0.037	0.092
5	1,330,427,407	1,006,088,994	0.035	0.093	0.067	0.634	0.700
6	1,642,989,763	1,317,328,816	0.029	0.082	0.045	0.424	0.470
7	1,879,698,469	1,620,847,415	0.042	0.096	0.014	0.216	0.229
8	2,302,771,790	1,992,914,588	0.060	0.116	0.016	0.783	0.095
9	2,600,380,087	2,337,971,165	0.066	0.124	0.000	0.028	0.028
10	3,143,964,347	2,733,133,643	0.061	0.114	0.000	0.000	0.000

From table 4.2, we can observe that, the entire banking sector had the highest technical, Allocative and Profit Efficiency in the 5<sup>th</sup> year i.e. 72/73. The technical, Allocative and Profit efficiency for the 5<sup>th</sup> year is 0.06, 0.63 and 0.70 respectively for the F/Y 72/73. The technical, Allocative and Profit efficiency for the 5<sup>th</sup> year is 0.06, 0.63 and 0.70 respectively for the F/Y 72/73.

The technical, Allocative and Profit efficiency for the 1<sup>st</sup> year is 0.00, 0.30 and 0.30 respectively. The technical, Allocative and Profit efficiency for the 2<sup>nd</sup> year is 0.04, 0.01 and 0.06 respectively. The technical, Allocative and Profit efficiency for the 3<sup>rd</sup> year is 0.05, 0.02 and 0.07 respectively. The technical, Allocative and Profit efficiency for the 4<sup>th</sup> year is 0.05, 0.03 and 0.09 respectively. The technical, Allocative and Profit efficiency for the 6<sup>th</sup> year is 0.04, 0.42 and 0.46 respectively. The technical, Allocative and Profit efficiency for the 7<sup>th</sup> year is 0.01, 0.21 and 0.22 respectively. The technical, Allocative and Profit efficiency for the 5<sup>th</sup> year is 0.01, 0.07 and 0.09 respectively. The technical, Allocative and Profit efficiency for the 9<sup>th</sup> year is 0.00, 0.02 and 0.02 respectively. The technical, Allocative and Profit efficiency for the 10<sup>th</sup> year is 0.00, 0.00 and 0.00 respectively. The table also suggests that the banking efficiency was the least in the FY 77/78.

## Annual Efficiency of Banks

The table below shows the annual efficiency score of 27 commercial banks for past 10 years.

**Table 4.3**

### *Annual Efficiency of Banks*

<b>Banks</b>	<b>68/69</b>	<b>69/70</b>	<b>70/71</b>	<b>71/72</b>	<b>72/73</b>	<b>73/74</b>	<b>74/75</b>	<b>75/76</b>	<b>76/77</b>	<b>77/78</b>
ADBL	0.2	0.23	0.08	0.14	0.42	0.27	0.15	0.07	0.03	0.03
BOKL	0.85	0.13	0.1	0.09	0.54	0.14	0.14	0.06	0.04	0.03
CBL	0.14	0.13	0.28	0.27	0.5	0.45	0.24	0.08	0.04	0.05
CCBL	0.3	1.35	0.98	0.38	0.66	0.53	0.13	0.08	0.001	0.04
CZBIL	0.48	0.13	0.17	0.19	0.64	0.36	0.18	0.07	0.07	0.02
EBL	0.13	0.16	0.15	0.16	0.62	0.42	0.22	0.12	0.02	0.02
GBIME	1.35	0.53	0.12	0.11	1.21	1.13	0.68	0.35	0.23	0.03
HBL	0.76	0.2	0.64	0.46	0.53	0.38	0.21	0.11	0.06	0.05
KBL	2.24	0.1	0.37	0.12	1.04	1.05	0.42	0.21	0.07	0.001
LBL	0.08	0.16	0.27	0.16	0.64	0.45	0.22	0.12	0.04	0.03
MBL	0.06	0.14	0.13	0.16	0.64	0.49	0.28	0.13	0.07	0.02
MEGA	1.45	0.2	0.19	0.61	1.95	1.14	0.59	0.22	0.12	0
NABIL	1.41	0.74	0.52	0.16	0.77	0.65	0.41	0.18	0.08	0.04
NBB	0.07	0.26	0.23	0.31	0.61	0.41	0.25	0.13	0.06	0.03
NBL	0.27	0.31	0.27	0.51	0.58	0.45	0.3	0.22	0.06	0.03
NCCB	0.18	0.4	0.16	0.34	0.85	0.8	0.25	0.13	0.06	0.05
NIB	0.09	0.15	0.15	0.2	0.51	0.32	0.14	0.08	0.06	0.03
NICA	-	-	0.11	0.17	1.05	0.69	0.37	0.17	0.08	0.04
NMB	0.69	0.13	0.23	0.16	1.25	0.52	0.33	0.15	0.08	0.01

Table 4.3 shows that the profit efficiency score of 27 commercial banks from F/Y 2068/69 B.S. to F/Y 2077/78. The banks that went in merger in this time period is not included while calculating the efficiency score. We can see blank spaces in the efficiency score of some banks as they were not fully operational in the particular F/Y. The efficiency score of all the banks seems to have fallen down in the end of the review period when compared to that of the beginning of the review period. SANIMA (2.57), CCBL (1.35), CCBL (0.98), HBL (0.46),

NMB (1.25), MEGA (1.95), MEGA (1.14), GBIME (0.68), GBIME (0.35), GBIME (0.23) and SCB (0.08) are found to have highest profit efficiency score from 2068/69 to 2077/78 respectively. Similarly, NIB(0.09), KBL (0.10), ADBL (0.08), BOKL (0.09), ADBL (0.42), BOKL (0.14), BOKL and NIB (0.14), BOKL (0.06), CCBL (0.001) and KBL (0.001) are found to have lowest profit efficiency score from 2068/69 to 2077/78 respectively.

### 4.3 Tobit Regression

The table below gives the summary of the regression analysis:

**Table 4.4**

*Tobit Regression*

Particulars	Estimate	SE	tStat	pValue
(Intercept)	0.478	0.36799	1.2989	0.19432
CCAR	0.096043	0.018418	5.2146	2.32E-07
CAR	-0.11544	0.018012	-6.4092	2.43E-10
CCD Ratio	0.0032555	0.0046495	0.70019	0.484
Net Liquidity	-0.00033627	0.0045191	-0.074411	0.9707
SLR	0.0054737	0.0049324	1.1097	0.26743
NPL	-0.023623	0.013381	-1.7654	0.077851
(Sigma)	0.45434	0.011366	39.972	0

Table 4.4 shows the regression result with intercept as the constant term, Core Capital Adequacy Ratio (CCAR), Capital Adequacy Ratio(CAR), Credit to Capital and Deposit ratio(CCD), Net Liquidity, Statutory Liquidity Ratio (SLR) and Non-Performing Loan (NPL) as the independent variables and profit efficiency as the dependent variable. The results from the tobit regression suggests that the profit efficiency of the banks have negative relationship with Capital Adequacy ratio (CAR)Core Capital Adequacy Ratio (CCAR), Net Liquidity (%) and NPL. Similarly, Profit efficiency has positive relationship with Credit to Capital and Deposit ratio (CCD)and statutory Liquidity Ratio(SLR).

9.6% change in CCAR will cause the profit efficiency of the banks to change by 1%.

11.54% change in CAR will cause the profit efficiency of the banks to change by

1%.0.3% change in CCD ratio will cause the profit efficiency of the banks to change by 1%. 0.03% change in netliquidity ratio will cause the profit efficiency of the banks to change by 1%. 0.5% change in SLR will cause the profit efficiency of the banks to change by 1% and 2.3% change in the NPL will cause the profit efficiency of the banks to change by 1 %. The sigma of in the regression model gives similar interpretation to that of the Root Mean Square Error (RMSE) in a OLS regression. The lower the RMSE the better.

The p-value of CAR, CCAR, CD ratio, Net liquidity, SLR and NPL is  $2.3168e^{-07}$ ,  $2.427e^{-10}$ , 0.484,0.9407, 0.26743 and 0.077851 respectively. The p-value of CAR and CCAR is below

0.05 indicating that there is insignificant relationship between capital adequacy ratio and profit efficiency. Similarly, the p-value of the other independent variables i.e.CD ratio, Net Liquidity, SLR and NPL is more than 0.05 indicating that there is significant relationship between these variables and profit efficiency of the banks.

#### **4.4 Major Findings**

From the above mentioned data, following inferences can be drawn:

- Mega bank has the highest profit and cost efficiency score and Nepal Investment Bank(NIB) has the lowest profit and cost efficiency score. Finally, Standard Chartered Bank(SCB) has the highest technical efficiency score and Sanima Bank (SANIMA) has the lowest technical efficiency score. This means that Mega bank has most efficiently generated profit throughout the 10 years of observation.
- The profit efficiency score all the banks lie between 0 to 1. Most of the banks have the efficiency score between 0.2 to 0.6. It suggests that only a few banks are able to efficiently generate profit.
- Most of the banks have the cost efficiency score between 0.1 to 0.5. It suggests that only a few banks are able to efficiently handle cost and most of the banks have the technical efficiency score between 0.05 to 0.01
- The efficiency score of all the banks seems to have fallen down in the end of

the review period when compared to that of the beginning of the review period.

- SANIMA, CCBL, HBL, NMB, MEGA, GBIME, GBIME, GBIME and SCB are found to have highest profit efficiency score from 2068/69 to 2077/78 respectively. Similarly, NIB, KBL, ADBL, BOKL, ADBL, BOKL, BOKL and NIB, BOKL, CCBL and KBL are found to have lowest profit efficiency score from 2068/69 to 2077/78 respectively.
- The profit efficiency at the beginning of the review period is higher than the efficiency at the end of the review period.
- The efficiency score of the banks has increased in the F/Y 72/73.
- Core Capital Adequacy Ratio (CCAR) and Capital Adequacy Ratio (CAR) does not have significant effect in the profit efficiency of banks.
- Credit to Capital and Deposit ratio (CCD), Net Liquidity, Statutory Liquidity Ratio (SLR) and Non-Performing Loan (NPL) have significant effect in the profit efficiency of the banks.
- The profit efficiency of the banks has negative relationship with Capital Adequacy ratio (CAR), Net Liquidity (%) and NPL i.e. the rise in these factors will cause the profit efficiency to decrease and the fall in these factors will cause the profit efficiency to rise.
- Profit efficiency has positive relationship with CCAR, CCD ratio and SLR i.e. the rise in these factors will cause the profit efficiency to increase and the fall in these factors will cause the profit efficiency to decrease.
- The capital Adequacy ratio has the highest impact in the profit efficiency of the banks. But since the impact of CAR is proven to be insignificant, the variable with highest positive significant in banks' profit efficiency is SLR, whereas, net liquidity has least significant impact in the profit efficiency among the defined variables.

## **CHAPTER V**

### **DISCUSSION, CONCLUSION AND IMPLICATION**

This chapter presents the discussion of the results and findings which has been obtained from data analysis, conclusion and implications that could be drawn from the study. The chapter has been divided into three segments. The first segment is driven towards discussing which involves comparison of the findings of this study and to give answer for the research question to meet the objective of the research. Likewise, the conclusion is also drawn in the first segment from the result obtained from the data analysis inferred in the study whereas an implication of the study is in the second segment. The third segment provides the recommendation.

#### **5.1 Discussion**

Governmental Standards and commands supported by sanctions that commands a natural person to carry out certain activity and refrain from undergoing others, especially related with the financial transactions are known as financial regulation. These regulations are put in place by Central Banks and finance ministries and the control is usually exerted through monitoring carried out by specialized banking supervisory authorities.

The general objective of the study is to analyze the impact of the financial regulation on the commercial bank's efficiency in Nepal. The specific objectives of the study are to analyze the impact of liquidity requirements on profit efficiency of commercial banks in Nepal, to analyze the impact of capital adequacy related requirements on profit efficiency of commercial banks in Nepal and to analyze the impact of provisioning related requirements on profit efficiency of commercial banks in Nepal.

Since the study aims to find the whether or not the regulations impact the banking efficiency, casual research design and cross sectional research design are the research design for the purpose of this study to satisfy the research objectives. All the financial institutions regulated by the Nepal Rastra Bank are the population of the study. Among them 27 commercial banks will be considered as the sample for the

study. For the purpose of analysis, the data from past 10 years i.e. from F/Y 2011/12 to F/Y 2020/21 will be taken into account. DEA is used to measure the profit efficiency of the banks. Tobit regression model is used for analyzing the impact of various regulations on profit efficiency of banks in Nepal. CAR, CCAR, net liquidity, SLR and NPL are used as the independent variables and their impact in their profitefficiency is studied in the study.

This study has used three different liquidity related variables i.e. CCD ratio, SLR and net liquidity. The data analysis shows that Profit efficiency of the banks have a significant positive relationship with SLR and CCD ratio, whereas the profit efficiency of the banks has a significant negative relationship with net liquidity which means that increasing the CCD ratio and SLR will lead to higher sustainable profitability in banks whereas increasing the net liquidity ratio will lower the sustainable profitability of the banks. Lukorito, Muturi, Nyanga , Nyamasege (2014); Moussa & Boubaker (2020); Bordeleu & Graham (2010) used different variables that represents liquidity and came to a conclusion that it had positive impact with bank profitability. These findings contradict the finding of this research paper.

Similarly, this study has used capital adequacy ratio and core capital adequacy ratio as the variables to represent capital adequacy of the banks. This study shows that capital adequacy ratio has negative relationship with profit efficiency and core capital adequacy ratio has positive relationship with the banks' profit efficiency. However, the relationship between the capital adequacy and profit efficiency of the banks is not significant. Therefore, changes in capital adequacy ratios does not significantly the profitability of a bank for a longer period of time. Contradictorily, Ozili (2015) found that capital adequacy of the bank has significant impact on bank profitability. The findings of this study also contradicts with the findings of Ogboi and Unuafe (2013); Pessarossi and Weill (2013) ; Agbeja , Adalakun and Olufemi (2015); Olalekan and Adeyinka (2013) which conclude that capital adequacy had significant positive relationship with bank performance or profitability.

Loan loss provisioning hits bank profitability in two different ways. On one hand it safeguards the capital and the depositor's money and supports in stability of the



banks and on the other hand higher provisioning leads to lower reported profit and has negative impact in the bank profitability. The study shows that there is significant negative relationship between NPL and the profit efficiency of the banks which means that the loan loss provisioning related regulations that causes such provisions to increase will negatively affect the sustainable profitability of the banks. Alhadab and Alshawneh, 2016; Mustafa, Ansari and Younis, (2019); Kimathi, (2014); Ahmad, Tahir and Aziz (2019); Zheng (2019) have also found that there is negative relationship between bank profitability and loan loss provisioning. The findings of these researchers align with the finding of this research paper.

## **5.2 Conclusion**

This study was conducted to analyze the impact of banking regulation on profit efficiency of commercial banks in Nepal. There is many research conducted to analyze the impact of the financial regulation in the bank. Furthermore, there are researches that have identified the components that impact the profitability of banks. Researchers conclude that both bank specific factors and other external factors are responsible for the profitability of banks in Nepal. Similarly, there are researches about the banking efficiency. However, there are very limited researches that study in the profit efficiency of banks. This study focuses to analyze the impact of financial regulation in the profit efficiency of banks. The objective of the study was to identify whether liquidity related regulations, capital adequacy related regulations and provisioning related regulations have significant impact in the profit efficiency of banks.

Using different tools like DEA and Tobit regression this relationship was explored in this study. The study was conducted by using the quarterly data of past 10 years published by NRB among the commercial banks of Nepal.

After the analysis of the results we can observe that increasing the CCD ratio and SLR will lead to higher sustainable profitability in banks and increasing the net liquidity ratio will lower the sustainable profitability of the banks. Also, CAR and NPL has negative relationship with profit efficiency. However, the study shows that the relationship between CAR and profit efficiency of the bank is not significant and hence, it cannot

cause significant impact in profit efficiency.

Banking regulations have significant relation with the banking efficiency i.e. profit efficiency. The profit efficiency of the banks has negative relationship with Capital Adequacy ratio (CAR), Net Liquidity (%) and NPL i.e. the rise in these factors will cause the profit efficiency to decrease and the fall in these factors will cause the profit efficiency to rise.

### **5.3 Implications**

The result of this study can be utilized in various sectors. This study mainly provides a basis for understanding the determination of financial efficiency and social efficiency in Nepal. The finding of this study can be implied in various sectors discuss below:

#### **Implications to Banks**

This study has determined the regulatory related factors that hit the profit efficiency of the banks. Banks cannot operate for long without attaining the profit efficiency. The banks which can efficiently generate profit are trusted by the shareholders and other stakeholders. With the help of this research they can identify the liquidity related, provisioning related and capital adequacy related factor that have impact in their profitability. The central bank regularly monitors the banks and changes different provisions. Banks can make appropriate policies to adapt with the changes considering the factors and the ways in which these factors can impact the profit efficiency of the banks.

#### **Implication to Regulators**

The major focus of this study is to draw conclusions regarding the impact of the banking regulations in the profit efficiency of the banks. Banks are the backbone of the financial system of the country. Significant decrease in profit of such an important part of the system may lead to the crash of the financial system as a whole as it hits the trust of various stakeholders over the system. While making policies, the regulator should properly analyze the impact of such policies in the profit efficiency of the banks. This study helps the regulator to do the same.

#### **Implication to Academicians**

This is a unique study on this DEA model to check the efficiency of Banks. The contents of this study provide detail information regarding banking regulation, profit efficiency, relationship of various factors with profit efficiency of banks, impact of regulation in banking profitability and mainly the DEA model and its input and output variables. So this study serves as a source literaturereview for those who want to gain knowledge regarding banking efficiency.

### **Implication to Future Researchers**

This study has been undertaken calculation of profit efficiency of banks using DEA model and the impact of financial regulation in the banking efficiency. It has taken sample of 27 commercial banks only and studied 5 major variables. So this study has opened a pathway forfuture research regarding the impact of regulatory provisions and larger sample.

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# APPENDICES