

A Mini Research Report

On



**FIRM PERFORMANCE AND EXECUTIVE COMPENSATION: AN
APPLICATION OF DEA IN NEPALI COMMERCIAL BANKS**

BY

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SUBMITTED

To

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Baisakh, 2080

Certification of Authorship

We hereby corroborate that we have researched and submitted the final draft of Mini Research Project Report entitled " Firm performance and executive compensation: an application of DEA in Nepali commercial banks". The work of Mini Research Report has not been submitted previously nor has been proposed and presented as part of requirements for any other academic purposes. The assistance and cooperation that we have received during this research work has been acknowledged. In addition, we declare that all information sources and literature used are cited in the reference section of the Mini Research Report.

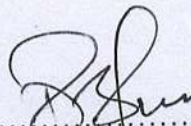
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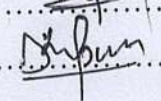
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Report of Research Committee

Assist. Prof. Dhan Bahadur Pun (Thapa), Ms. Mamata Thapa and Ms. Karuna Pun have effectively defended the Mini Research proposal entitled " Firm performance and executive compensation: an application of DEA in Nepali commercial banks". The research committee has officially approved the title for the Mini Research Report to proceed further. It is advised to adhere to the prescribed format and guidelines for the mini-research and submit the Mini Research Report for evaluation and viva voce examination.

Name of Head of Research Department

Assoc. Prof. Rajendra Lamsal

Signature.....

Mini Research Project Proposal

Defended Date: ..~~2080/01/08~~
2079/08/29

Mini Research Project Report

Submitted Date: ..2080/01/04..





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Approval Sheet

We have assessed the Mini Research Project titled "Firm performance and executive compensation: An application of DEA in Nepali commercial banks" presented by Assist. Prof. Dhan Bahadur Pun (Thapa), Ms. Mamata Thapa and Ms. Karuna Pun. We confirm that the Mini Research Report meets the required standards and is deemed acceptable.



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Abstract

The study examines the relationship between chief executive compensation and firm performance among Nepali commercial banks applying a unique method called Data envelopment analysis (DEA) for measuring the firm performance. The author has taken entire commercial banks operating in Nepal as sample for the study. This study was conducted in two stages. First the author applied DEA model to calculate firms' performance based on total factor productivity index which incorporates three output variables; earnings after tax (EAT), investment and loans and advances and four input variables; total deposits, number of bank branches, number of employees and total fixed assets as input variables. In the second stage, panel fixed effect regression model was used to evaluate the impact of firm performance on chief executive officers (CEOs) compensation for the entire commercial banks over the period of 2010-11 to 2019-20.

The findings of the study show that there is significant negative relation between firm performance and CEOs compensation. This study offers valuable insights to the policymakers and remuneration committee to determine optimal compensation to the CEOs which helps them to retained more capable CEOs, who work in line with firms' goal of wealth maximization.

Key Words: *DEA Model, CEO compensation, Firm performance*



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Abbreviation

CEO :	Chief Executive Compensation
DEA :	Data Envelopment Analysis
DMU :	Decision Making Unit
MPI:	Marginal Productivity Index
NRB :	Nepal Rastra Bank
P & L :	Property and Liability
ROA :	Return on Assets
S & P :	Standard and Poor



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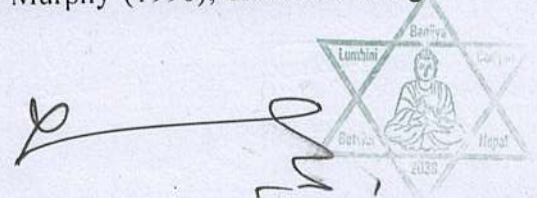
Chapter I

Introduction

Background of the Study

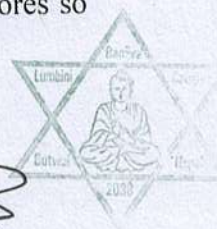
The relation between mounting CEO compensation and firm performance has been a topic of considerable controversy in academic and public spheres. There are two common thoughts about CEOs' compensation. One group argues on CEO that they get higher compensations because they have the power to set their own pay and extract rents from firms (Frydman & Jenter, 2010; Kuhnen & Zwiebel, 2009; Charles, et.al., 1988; Acharya & Volpin, 2010). In contrast, there are few arguments favoring compensation stating that the firm has a hierarchical structure and organizes jobs into career ladders, career concerns and the probability of promotion are powerful incentive devices to the workers. Since, the CEOs are placed at the top of the hierarchy there are no further possibilities of promotion, alternative incentive schemes such as pay for performance should be stronger for top executives. In the context of Nepal, the CEOs working in commercial banks get comparatively higher compensation. There is debate about CEO compensation whether it is the impact of benchmarking or firm performance. One view is that benchmarking is inefficient and it creates unhealthy competitions on pay and overlooks firm performance. The other view supports and accept the benchmarking as efficient mechanism to retain the valuable human resource (Holmstrom and Kaplan, 2003; Bizjak, Michael L. Lemmon & Naveen, 2008). But agency theory states that executive pay should be optimally based on firm's performance (Holmstrom, 1979).

Nepali Banking industry is governed by Bank and Financial Institutions (BAFIA) Act-2017 and Nepal Rastra Bank (NRB) Act-2002. BAFIA-2017 authorized to set the compensation of CEOs to the concerned board of directors with some limitations. The present study is unique in many respects. The literature witnessed vast majority of researches conducted on the topic where the firms' performance was measured in terms of ROE, ROA, Tobins Q and market price of share. For example, Murphy (1985); Smith and Watts (1992); Anderson et al. (2000); Jensen and Murphy (1990); Kato and Long



(2006); Hubbard and Pallia (1995); Luo and Jackson (2012) etc. Financial ratios provide important and useful information for firm performance but the financial indicators of firm performance incorporate all the internal and external factors affecting the firm performance such as change in market interest rate, politics, global environment, exchange rate, inflation, investor's motivations etc., which are not fully controllable by managers. For example; during fiscal year 2076/77 (2019 mid-July to 2020 mid-July) the Directors Report of bank published in annual report indicated that the performance of bank was negatively affected by the covid-19 and nationwide lock down and similar situation prevail during the year 2077/78 but the stock market index rose sharply from 1362.24 points in Mid July 2020 to 2883.38 points in mid July 2020 (NEPSE web site).

The author argues that if the performance of the CEOs is evaluated using such financial indicators the findings could become biased as in the case of 2020. To overcome this problem, the author applies Data envelopment analysis (DEA) to measure the firm performance. Using DEA has the following advantages over the traditional financial measures of firm performance. First, the firms are operated in different regions and the resources available, regulation imposed by local and central authority, level of local support may be different region wise. If the common financial ratios are used to measure the performance of the firms, the result could be biased because the firm operating in to different environment is not directly comparable. Instead, unbiased performance can be measured if the input resources absorbed by the firm are measured with the output delivered in homogenous setting over the period of time. Second, it uses specific performance indicator as input and output variables, which considers important differences across firms within an industry. Third, the efficiency scores are derived from the efficient frontier which is developed using multidimensional inputs and outputs. They ultimately offer more informative measure on firm performance than financial performance measures, which are single dimension measures (Cummins and Weiss, 2000). Fourth, the managers sometimes massage the financial statement to show their performance better, such activity can make the financial measures looks better than in real in the short run. This kind of manipulations has little effect on efficiency scores so the real firm performance can be identified.



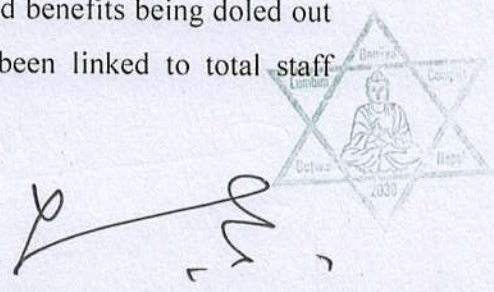
Despite the mentioned advantages of the model, the application aspect in Nepali context is very poor. The author extends the literature using Malmquist productivity index (MPI) to measure the performance. The productivity index calculated from DEA is regressed to examine the effect on CEOs compensation. Yaochen, et.al (2009) also found DEA score effective and highly significant predictor of firm performance.

In Nepali context so far, few researches have been conducted to show the impact of corporate governance on firm performance (See, Acharya, 2013; Sapkota, 2020) but interestingly the author has not found any research conducted to evaluate the impact of firm performance on CEO compensation in Nepali commercial banks. The findings of the paper could be helpful to the regulatory authorities to determine optimal compensation to the CEOs which helps them to retained more skilled CEOs which work in line with firms' goal of wealth maximization.

Statement of the Problem

In the recent decade there is a debate on what could be the fair compensation of executives. The issue of capping executives' compensation emerged after the global financial crisis during 2007-2008. According to India TV (2020, July 20) HDFC Bank Managing Director received Rs 189.2 million INR in FY 2019-20, with salary and prerequisites which is the highest in India in the year and lowest is 15.44 million INR in the same year. According to Mishel and Kandra (2020) CEOs earn 320 times as much as a typical worker and Cox (2019) found CEO pay rose by 1000 percent point since 1778 to 2019 in America. Despite the sever impact of Covid 19 in America, Equilar (2021) indicates increment in CEO pay at S&P 500 companies in 2020 by 5% and reached to median pay of \$ 12.7 million in the year, whereas the workers ways rose only by 2% in the year.

Nepal Company Act-2063 section 109 (4) had mandated the commercial banks to report the amount of remuneration, allowances and facilities paid to the directors and chief executive officer. With the aim of maintaining corporate governance, compliance of directives, NRB issued a circular on 26 November 2010 where it issued Guidelines for the first time and tried to put some restrictions on the salary and benefits being doled out to the CEOs of commercial banks. The compensation has been linked to total staff

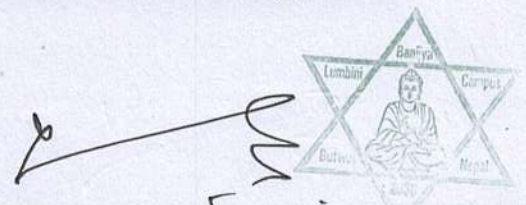


expenses and total assets of the concerned banks. NRB reasoned that the guidelines were formulated to prevent the existing tendency of CEOs to invest in risky assets and to provide loans to inferior quality borrowers just to show their better performance. The directive rose concerned over the compensations mechanism of commercial bank and lending strategy. There are some people who argue that restrictions on compensation will push it down and eventually the supply sides become lower leading to fewer skills CEOs in the firms. The inefficient CEOs increase the risk of the firms and reduce the efficiency (Vanhooose, 2010). The arguments indirectly try to justify that higher compensation leads to higher efficiency but there are some authors who argue that the pay performance is absent in CEOs compensation plans. This argument is supported by Core and Guay (2010), who identify that the executives' pay is significantly higher when the company performs poor. In addition, Wall Street Journal (2009) blamed in appropriate CEO compensation was one of the fundamental causes of world credit crisis.

This kinds of controversial findings and arguments against and for CEO compensation increases the curiosity whether the Compensation is simply the outcome of benchmarking or really based on banks performance. In Nepali banking sector, based on latest annual report, the annual compensation of a person working as a CEO range from NPR 4.7 million NPR to 47.80 million NPR per annum with standard deviation of NPR 1.05 million in 2019-20. This shows significant variation in compensation (almost 10 times) which boost the curiosity further to look over the issue.

In addition, after the compensation guide lines, NRB was criticized for being biased by the CEOs and authors. In one of the papers (Bhatta, 2012) states that the guide lines introduced by NRB to fixed CEOs compensation is fully biased and has injected personal interest in support of global financial crisis but no research paper has attempted to address the issue in Nepali context. This further has encouraged the author to undertake the research study.

There are many arguments favoring the CEOs attractive compensation such as CEOs work long hours, need to make difficult decisions, and could be fired any time when the company's performance deteriorates. In addition, some believe if the skill manpower doesn't get enough compensation for their efforts the problem of brain drains gallop high so their compensation must be linked with their performance. In the contrary, Bhatta



(2012) states that the performance-based compensation encourages the CEOs take high risk to gain short return so that their performance looks better and are compensated by bigger checks. Many scholars blame the world financial crisis of 2007-2008 as a product of unhealthy practice of providing compensation to CEOs. These kinds of incidences force not to link the CEOs performances with short term achievement rather their effort performances must be compared with long term parameters.

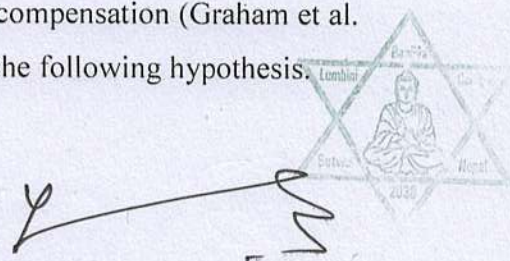
There are few research papers that empirically tried to proof that the CEOs compensation isn't performance based. For example, Core and Guay (2010), the executives normally receive significant amount of annual compensation during those years too when the company performs poor due to flawed in pay setting. In addition, Zufferey (2004), stated that the relationship between the executive and members of the board has an effect on compensation. The CEO can influence the board members to increase the compensation especially in small companies. The managers' compensation must be linked with the firm performance, if happens to be so the interest of the managers will align with the long term goal of the company (Danthine and Donaldsone, 2010). However, Bhatta (2012) States that the optimal compensation is not sufficient to achieve the long term goal of value maximization of the firm, corporate governance mechanism should be efficiently executed.

Objectives of the Study

The study focuses on executive compensation and commercial banks performance in Nepal. The paper examines the relation between chief executive officer (CEO) compensation and firm performance in commercial banks listed in Nepal stock exchange (NEPSE).

Hypothesis of the Study

The change in technology and product market demand has increased demand of skillful CEOs and the skillful CEOs demand more compensation (Gabaix & Landier, 2008). When competition increases, the firms are compelled to perform better than their peers and this force to recruit better CEOs paying higher compensation. One argument is that the CEO with higher ability to perform better receive higher compensation (Graham et al. 2009). With the above arguments in mind, the author argues the following hypothesis.

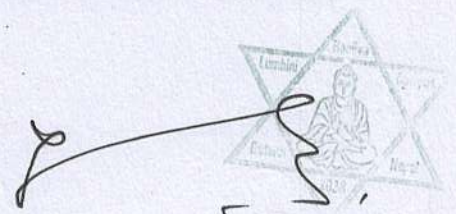


H1: Higher firm performance leads to higher CEOs compensation.

The paper by Garvey and Milbourn (2006) revealed the ratio of payment when company performs well, is quite larger than the payment made during bad performance. This indicates the firm performance partially affect the compensation. Raithatha and Komera (2016) examine the relationship between executive compensation and firm performance among Indian firm. They found positive effect of performance on compensation on bigger firms but the absence of pay performance relationship among the smaller sample firms and business group affiliated firms. They cast doubts over the performance-based executive compensation practices of Indian business group affiliated firms. Brunello, Graziano & Parigi (2001) studied the pay performance relationship in Italian context and found that the firm performance has affected the executive pay positively. Considering these different empirical findings, the following conceptual frame work is developed.

Rationale of the Study

The study basically has policy implication. The study can be helpful to design CEO compensation to improve bank performance and, consequently, advance economic growth. A reliable non-parametric technique for assessing decision-making units' effectiveness is called DEA. By taking into consideration a variety of input and output variables, its use in this study enables a thorough evaluation of how well CEO salary translates into business performance. Compared to conventional linear models, this methodological approach can provide a more nuanced insight of the efficiency dynamics in Nepali banks. Making educated judgments requires stakeholders, like as executives, board members, and shareholders, to comprehend how remuneration and performance interact. With the use of practical findings from this study, remuneration packages that drive optimal performance and draw in and retain competent executives may be designed, assuring the long-term viability and competitiveness of Nepali commercial banks. The majority of the material that currently exists on executive salary and business performance is concentrated in developed economies. This study intends to close a large gap in the literature by examining this link in the context of Nepali commercial banks,



providing new insights and advancing the conversation on corporate governance worldwide.



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Chapter II

Litterateur Review

Theoretical Review

Theories of Compensation

There are hundreds of papers in economics, finance and management but there is no consensus about the existence of principal-agent theory. A number of theories on motivation were developed few decades ago, researchers and authors started linking few of them with compensation. For example, Vroom's expectancy theory, Adam's equity theory and Stephen Ross and Barry Mitnick agency theory are important and frequently connected with performance and compensation. Vroom (1964) stated that the individuals are motivated to perform the task efficiently only if they believe that their additional performance is recognized and rewarded. The theory states that effort leads to performance and performance leads to a specific outcome/reward. If this theory is taken into consideration, the companies which based the compensation of the employees with the performance of the company can achieve higher efficiency. In the contrary, the equity theory by Adams (1963), claims that motivation is not solely, the function of individual rewards. This theory states that there must be uniformity in pay structure among the employees doing similar work. They compare their benefits and contributions with the benefits and contributions of their colleagues to assure that they are being treated fairly. If they find themselves under rewarded, they either reduce the effort on the job or request to increase the pay. If the employer is not able to restore the equity, the workers leave the job (Skiba & Rosenberg 2011). Further, they seek for external equity as well, the employee should feel the fairness in what they are being paid is in line with what other players in the same industry are paying to their employees for the same kind of job.

In finance yet another theory which is very popular is agency theory introduced by Ross and Mitnick (1973). Ross originated the economic theory of agency, and Mitnick the institutional theory of agency but the basic concepts of these two approaches are similar. The agency theory states that both the employer and the employee are the stakeholders of



the company but they are guided by their own interest. The employer tries to reduce benefits to be given to managers and the managers try to increase them. The academic literatures states that this kind of conflict give rise to agency costs (Jensen & Mecklinng, 1976). The theory states that the benefits should be decided in such a way that the interest of both the parties can be aligned. This is only possible when the performance-based compensation is installed.

Empirical Review

CEO Compensation and Firm Performance

In one of the papers Yaochen, et. al,(2009) examine the performance of CEOs applying DEA model for US banks and thrifts using yearly data from 1997 to 2004. The result suggests that the best performing CEOs with DEA Score one was rewarded with higher compensation. They found DEA model highly efficient and significant to explain the CEOs compensation. In slightly different context Wei and Huang (2013) studied the CEOs compensation and firm performance proxied by efficiency estimated from DEA model in US property-liability (P&L) insurance industry taking the data from 200- to 2006. They found the firms' efficiency is positively and significantly associated with firm performance. In contrast to this Raithatha and Komera (2016) examines the relationship between CEOs compensation and firm performance considering all listed Indians firm during 2002 to 2012. The findings suggest that firm performance measured by accounting (ROA and ROE), as well as market-based measures (Tobins Q), significantly affects executive compensation but the same paper found the absence of pay-performance relationship among the smaller sample and business group affiliated firms. The authors raised the doubt on pay performance relationship in Indians firms.

Ozkan (2011) examined the CEO pay and firm performance using panel data of 390 UK non-financial firms for the period 1999-2005 and found the pay performance elasticity for UK CEOs lower elasticity and the CEOs compensation is not closely connected with the firm performance.

In different context, Lilienfeld-Toal and Ruenzi (2014) examined whether managerial ownership impacts stock market returns for the period of 1988 to 2010 and found that the CEO with high ownership stocks have performed better and their compensation is



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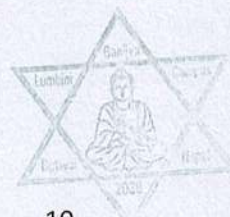
significantly associated with stock market performance in comparison to CEOs without significant firm ownership stakes. The findings indicate that the firms with stock-based compensation can have higher performance. Unfortunately, the author can't test this in the paper due to lack of explicit data on stock compensation.

In one of the recent paper by Cheng, Hong and Scheinkman (2015) found riskier firm paying more compensation to their CEOs. The findings was achieved using the data set of financial firms from 1992 to 2008, where they had used lagged firm risk and its origin risk to capture the exogenous and permanent component of firm risk. The authors based their argument on principal agent theory which predicts that the riskier firms have to pay more to risk adverse managers to attract in the job in comparison to less risky firm.

Review on DEA Model

DEA also called frontier analysis was proposed by Charnes, Cooper and Rhodes in 1978. It is a nonparametric method commonly use in operations research to estimate the efficient frontier (Seiford & Thrall, 1990). It is used to measure the production efficiency of decision-making units (DMUs). Charnes, Cooper, and Rhodes (1978) described DEA as a 'mathematical programming model applied in manufacturing and nonprofit organizations to measure different form of efficiencies. The model was built from the earlier seminal work of Farrell (1957), who developed the concept of DEA for the first time. Farrell (1957) explained two technical efficiency measures; input-oriented efficiency measures and output-oriented efficiency measures. The first one is based on scaling inputs of inefficient units with the common scaler projecting the point in the efficient frontier without changing output level. The second one is based on scaling outputs of inefficient units with the common scaler projecting the point in the efficient frontier without changing input level.

Considering these different empirical findings, the following conceptual frame work is developed.



Chapter III

Research Methodology

This section deals with the systematic process that is followed while conducting the research. Especially, it explains about research design, population and sample, data collection procedure, analysis tools and the models used for the study. The main purpose is to extend the guidelines for the further process.

Research Design

This study follows quantitative approach. The research design chosen is descriptive in nature hence it follows descriptive and causal research design. The study covers the data from 2010-2011 to 2019-2020 for 10 years so it is longitudinal study.

Population and Sample

The study considers all commercial banks operating in Nepal as the sample for the study as of July 2020. Since it considers all commercial banks it uses census method. The Report of NRB (2022) indicates that the commercial banks captures around 54 percent of aggregate financial system, so it makes sense of taking data from all commercial banks to get meaningful insight on research issue. The data are collected from 2010-2011 to 2019-2020.

Sources and Data Collection Procedure

The study primarily uses the data from the annual report of concerned banks. In addition, a few data points are sourced from the NRB website, particularly banking and financial statistics issued by the NRB. Understanding the significance of a huge data set, the author attempted to capture the maximum number of years of observation. So the study collected data for 10 years, from 2010-2011 to 2019-2020.



Data Analysis Tools and Model

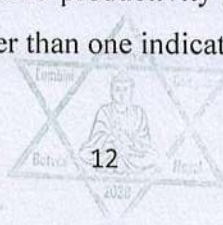
In the study DEA is to measure the performance of decision-making units (DMU's) in organizations. This method helps to identify the relative efficient units from the set of available data and would define all other inefficient units that are below the efficiency frontier. A DMU is an entity that produces outputs and uses up inputs, in this study, each bank constitutes a DMU. Applying DEA to measure the performance is relevant at least for CEOs because they hold the ultimate decision-making power in a firm. The board provides CEO, the sole authority to utilized the input resources to generate output.

There are several ways of measuring productivity of under DEA model. In order to measure productivity change, we must first specify a model of bank production. The literature treats banks as going concern that combine labor, capital, and various financial inputs to produce financial outputs. One approach, termed the production approach, measures output by the number of deposit and loan accounts served by the bank. The more common intermediation approach views banks as financial intermediaries, with outputs measured in Rupee value with labor, capital, and various funding sources treated as input.

The paper applies the panel data hence, Malmquist total factor productivity index is used to measure productivity change and it is decomposed in to technical change and technical efficiency change. Fare et al (1994) specifies an output-based Malmquist productivity change index as follows;

$$M_0(y_{t+1}, x_{t+1}, y_t, x_t) = \left[\frac{d_0^t(x_{t+1}, y_{t+1})}{d_0^t(x_t, y_t)} \times \frac{d_0^{t+1}(x_{t+1}, y_{t+1})}{d_0^{t+1}(x_t, y_t)} \right]^{1/2} \dots\dots\dots (1)$$

In equation, is Malmquist MPI indices, which uses one index of period t and the other period t+1. M indicates Malmquist productivity output-oriented index and subscript o indicates output. x_{t+1} , y_{t+1} represent the production in period t+1 and x_t , y_t represent the production in period t. The relative productivity greater than one indicates positive growth in total productivity and lower than one indicates decline in productivity.



The commercial banks in Nepal are working in highly competitive environment so constant returns to scale technology is applied to calculate the productivity index.

$d_0^t(x_t, y_t)$ are calculated as below;

$$\begin{aligned} [d_0^t(x_t, y_t)]^{-1} &= \max_{\phi, \lambda} \phi, \\ \text{st } -\phi \gamma_{it} + Y_t \lambda &\geq 0, \\ x_{it} + X_t \lambda &\geq 0, \\ \lambda &\geq 0, \dots\dots\dots (2) \end{aligned}$$

The remaining three LP problems are simple variants of this.

$$\begin{aligned} [d_0^{t+1}(x_{t+1}, y_{t+1})]^{-1} &= \max_{\phi, \lambda} \phi, \\ \text{st } -\phi \gamma_{i,t+1} + Y_{t+1} \lambda &\geq 0, \\ x_{i,t+1} - X_{t+1} \lambda &\geq 0, \\ \lambda &\geq 0, \dots\dots\dots (3) \end{aligned}$$

$$\begin{aligned} [d_0^t(x_{t+1}, y_{t+1})]^{-1} &= \max_{\phi, \lambda} \phi, \\ \text{st } -\phi \gamma_{i,t+1} + Y_t \lambda &\geq 0, \\ x_{i,t+1} + X_t \lambda &\geq 0, \\ \lambda &\geq 0, \dots\dots\dots (4) \end{aligned}$$

$$\begin{aligned} [d_0^{t+1}(x_{t+1}, y_{t+1})]^{-1} &= \max_{\phi, \lambda} \phi, \\ \text{st } -\phi \gamma_{i,t} + Y_{t+1} \lambda &\geq 0, \\ x_{i,t} - X_{t+1} \lambda &\geq 0, \\ \lambda &\geq 0, \dots\dots\dots (4) \end{aligned}$$



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where $1 \leq \phi < \infty$, and $\phi - 1$ is the proportional increase in outputs that could be achieved by the i -th DMU holding input quantities constant. In the equation $1/\phi$ defines a TE score which varies between zero and one. The banking industry of Nepal is competitive so constant return to scale technology is assumed. The productivity indexes calculated from equation (1) are used as the proxy of firm performance while running OLS in the later stage.

In the second stage, multiple regression model is used. The following equation is proposed for the study.

$$\ln Y_{it} = \alpha + \beta_1 \text{MPI}_{it} + \beta_2 Z_{it} + \varepsilon_{it} \dots\dots\dots (5)$$

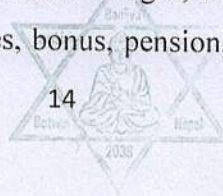
Equation (5) is used to evaluate the impact of firms' performance in CEOs compensations. In the equation, Y_{it} is the managers' compensation taken in natural log form. MPI is the MPI used as the proxy of firm performance. Z is a vector of other firm specific variables that affect executive compensation, which are controlled in the study. ε_{it} is the error term.

This study is completely based on secondary data. There are 27 commercial banks operating in Nepal which comprise the sample for the study. The data about CEO compensation, number of bank branches and number of employees are collected from annual reports of concerned banks and the other financial data are collected from NRB bank supervision report. The study is based on ten years data i.e. from mid-July 2011 to mid-July 2020.

Research Framework

Executive Compensation

The executive compensation most often contains many components. Most of the common components includes salary, allowances, bonus, pension, stock based compensation and retirement benefits. In addition they also receive the facility of corporate car(s) and fuels, apartment, medical insurance, communication charges, house keeper etc. In the study, the author considers only salary, allowances, bonus, pension, stock based compensation and



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retirement benefits. There is no uniformity in disclosure about additional benefits and the value for such facility is not explicitly mentioned in the annual reports hence data couldn't be collected.

Firms Performance

The firms' performance is measured by Malmquist productivity index (MPI). The MPI and total factor productivity (TFP) are used synonymously in the rest of the paper. The MPI is calculated using several output and input variables which are explained in chapter III.

Controlled Variables

While evaluating impact of firm performance on CEOs compensation two firms' specific variables; firms' size and ROA are controlled.

Firms Size

The study measures the firm size using total assets and applies log of total assets in analysis. Doucouliagos, Graham, and Haman (2012) investigated the dynamics and convergence in CEO pay among Australian's large corporations and found that firm size, as one of the factors affecting the compensation. The larger firms have more assets and the CEOs have to spend more efforts and time to manage it, their compensation should be higher.

Return on Assets

The return on assets is one of the most popular variables used as proxy to measure the firms' performance in the literature. In the paper by Nicolous (2012), the ROA can affect the CEOs compensation. The higher the ROA, greater will be the CEOs compensation. The ratio of earnings after tax and total assets of the firms yields return on assets.



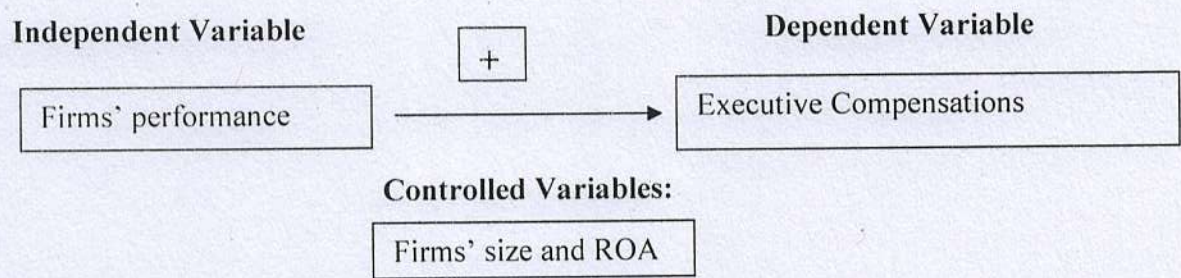


Figure 1: Research Frame Work



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Chapter IV

Results, Discussion, Conclusion and Recommendation

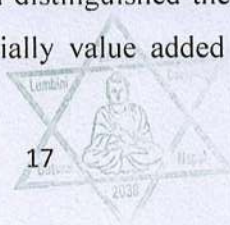
Measuring the Output and Input

As Frisch (1965, p.8) defines production as, "By production in the economic sense we mean the attempt to create a product which is more highly valued than the original input elements" Though, in production theory the output is measured in physical units, in case of financial firms the output is measured in terms of rupee value which is analogous to the physical units of output of the non-financial firm (Horvitz, 1964).

There is no common consensus about what is called output in financial institutions. Berge and Humphrey (1992) identifies three alternative approaches to select the financial firms' output. They are assets base approach, user cost approach and value-added approach. The assets-based approach considers the entire balance sheet and argues that all the liabilities have some characteristics of input because they are used to create the loanable fund. In the same way, all the assets have the characteristics of output as they are used for generating revenues for the firms. The financial firms simply process them and work as intermediaries. This approach doesn't incorporate the various service costs incurred while transferring the inputs to output.

The user cost approach differentiates whether the product is input or output based on their contribution in the firm's revenue. Under this approach, if the return on the assets is greater than cost of acquiring them or the actual cost of liabilities is less than opportunity costs, they are treated as output. Aly et al. (1990), Hancock (1991), and Fixler and Zieschang (1992) adopt this method to classify the outputs and inputs. Though, this approach is comparatively better, following this approach creates problem in defining outputs and inputs as there are many implicit revenue and cost which are cannot be easily disentangled. Further, this method requires opportunity cost to be adjusted for each category of investment and deposits. In practice making adjustments is not possible so this method can produce bias inputs and outputs (See Berger & Humphrey, 1992).

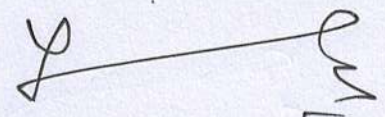
The third approach is value added which distinguished the inputs and outputs based on value added. The items having substantially value added are considered as important



output. (Berger, Hanweck, and Humphrey, 1987) identified the major deposits (demand, saving and time) and major loans (real estate, commercial, installment) as important outputs as they are the main source that add significant value to the financial institutions with labor, capital, and purchased funds classified as inputs. Though the process is different the user cost approach and the value-added approach provide similar classifications of bank inputs and outputs (Wheelock & Wilson, (1999).

The papers by Sealy and Lindley, 1997; Aly et al., 1990; Delis et al., 2011, follow the intermediation approach which combines both user cost and value-added method. However, Sealy and Lindley argued that the output of economic production must be highly valued than original input and explicitly measurable in terms of market price. They used earnings assets as output and loanable fund borrowed from customers and serviced by the firm with the use of capital, labor and material as inputs. For the purpose of present study, the earning assets are taken as output (Sealy and Lindley, 1997) that includes loan and advances and investments. The earning assets are the major sources of generating revenues to commercial banks, so CEOs are more concern efficient utilization of it. Another output variable is earnings after tax (EAT). EAT is taken as output variable by Chena et al. (2009) and Howland and Rowse (2006) as well to measure the performance. Since, the CEOs compensation tie with the earnings of the banks, they are more concerned in increasing the profit. The financial firms convert deposits into earnings assets by spending significant amount for providing services to depositors, lenders and borrowers. The service includes check clearing and deposit service, electronic banking service, book keeping service, etc. The input used for the study includes number of labors, total fixed asset, number of bank branches and total deposits (Luintel, Selim, & Bajracharya, 2014). The labor is measured by the total full-time and contract employees of the bank at the end of each fiscal year, total fixed assets are measured by the all types of fixed assets shown in balance sheet and total deposit incorporating time, fixed and call deposits.

The paper analyzes the issue in two stages. In the first stage, DEA model is used to calculate total factor productivity of each sample banks, which is widely used model to measure the performance (Chang & Chen, 2008; Cummins and Weiss, 2000; Sun, Wei. & Huang, 2013).



A bank is considered fully efficient if its actual input usage equals optimal input usage for given output quantities and input prices. A bank is considered inefficient if its actual input usage exceeds optimal input usage. The productivity ratios calculated from stage first are used as CEOs performance in regression model in the second stage.

The descriptive statistics in table 1 shows the mean and standard deviations of input and output variables chosen for the study along with their minimum and maximum value during the 10 years period for entire commercial banks operating in Nepal.

Table 1

Input and Output Variables (Rs are in Millions)

Variables	Observations	Mean	Std. Dev.	Minimum	Maximum
Output Variables					
Investment	270	10,713	8,954	259	74,770
EAT	270	1,263	1,020	-805	5,328
Loan and Adv.	270	50,081	34,388	1,175	189,389
Input variables:					
Deposits	270	63,676	42,220	1,359	230,828
Fixed Assets	270	950	1,333	69	12,008
Employees	270	949	727	52	3,472
Branches	270	80	62	3	326

The table reports the descriptive statistics of output and input variables 27 commercial banks from 2010-11 to 2019-2020. Investment includes investment in securities, subsidiaries and properties, EAT indicates earnings after tax, loan and advances includes long term and short-term loan to customers, Deposit includes fixed, saving and call deposit, employees includes total number all fulltime permanent and contract employees and branches indicates the total number of branches opened.



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Table 2*Banks CEO Compensation (In rupees by year)*

Year	Average	Minimum	Maximum	Std.	Ave. growth rate
2010-11	8,700,352	860,000	19,500,500	5,152,970	-
2011-12	9,729,279	880,000	19,412,000	5,114,622	11.83
2012-13	9,069,378	920,000	19,441,736	4,766,535	-6.78
2013-14	11,148,694	999,000	20,585,000	5,076,148	22.93
2014-15	11,099,486	2,600,200	21,135,789	4,879,594	-0.44
2015-16	11,537,734	2,600,200	21,258,874	4,879,951	3.95
2016-17	13,655,222	3,560,000	23,627,000	5,130,423	18.35
2017-18	15,126,848	4,051,120	41,170,630	7,213,220	10.78
2018-19	17,638,865	4,065,405	46,636,405	8,818,913	16.61
2019-20	18,567,523	4,696,306	47,780,170	9,042,300	5.26

The table reports the descriptive statistics of CEOs compensation for the period of 2010-11 to 2019-2020. The compensation includes salary, allowances, bonus, pension, stock based compensation and retirement benefits.

Table 2 shows the CEOs compensation statistics by year. This indicates that the compensation of CEOs has increase significantly over the study period. The maximum increment is found in the year 2013-14 and in 2016-17 but in the year 2012-13 and 2014-15 the compensation has decreased. During the study period the compensation of CEOs have increased by 13.19%, 7.96% and 9.72% per year on average for government bank, joint ventures banks and private banks respectively. The average growth rate of CEOs compensation for the industry is 9.16%, which is very impressive.

Results and Analysis

The DEAP version 2.1 computer program was run to measure the Malmquist productivity index. The output of the program is shown in the table 4. It indicates the largest productivity increase for Nepal Bangladesh bank in the year 2011-12, whereas, the Machhapuchre Bank has suffered with the largest productivity decline in the same year.

In the year, the industry has suffered with significant productivity decline of 5.54% reaching to productivity index 0.946 in the year. In year 2019-20 Rastriya Banijya Bank has achieved greatest productivity followed by Nepal bank Limited with MPI of 1.293 and 1.203 respectively. The Citizen Banks international has the highest productivity decline with the MPI of 0.729. However, the overall MPI has decline by only 5% in the year. The decline in productivity may be due to the impact of Covid-19 and nationwide lock down. The average productivity has decline in most of the year during the observation period. For example; the author observe productivity increase in year 2012-13, 2014-15, 2015-16 and 2018-19 but in rest of the year the productivity has declined. This indicates that the performance of commercial banks has not increase significantly. We can separate the MPI to government banks, joint venture banks and private banks. In the table 4, the first three are government banks, the next seven are joint ventures banks and the rest are private banks. As we evaluate the performance separately, we can observe the average productivity growth over the study period is 1.008, 1.001, and 1.004 respectively. The average productivity shows no significance difference in the three types of banks. The empirical result shows average productivity of the banks has not increased significantly over the period of time.



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Table 3*Malmquist Productivity Index by Year*

Commercial banks (DMUs)	2011-12	2012-13	2013-14	2014-15	2015-16	2015-17	2017-18	2018-19	2019-20	Average
Agriculture Dev. Bank	0.811	0.976	0.873	1.228	0.872	0.959	1.061	1.043	0.843	0.963
Nepal Bank	0.884	1.210	1.178	0.908	1.142	0.967	0.947	0.855	1.203	1.033
Rastriya Banijya Bank	1.096	1.127	1.002	1.114	0.892	0.935	0.788	1.009	1.293	1.028
Himalayan Bank	0.989	1.047	1.017	0.989	1.081	1.053	0.821	1.070	0.890	0.995
Nabil Bank	1.081	1.049	1.027	1.127	1.119	1.016	0.667	1.120	0.995	1.022
Standard Chartered Bank	0.971	1.082	0.939	1.064	1.287	0.854	0.654	1.472	0.844	1.019
SBI Bank	1.041	1.039	0.785	0.945	1.083	0.968	0.749	0.991	0.924	0.947
Nepal Bangladesh Bank	1.333	0.988	0.813	1.022	1.138	0.998	0.882	1.108	0.848	1.014
Everest Bank	1.019	1.091	1.025	0.948	1.123	1.09	1.016	1.204	1.065	1.065
NMB Bank	0.903	1.035	1.015	1.029	1.049	1.04	0.993	1.045	0.944	1.006
Bank of Kathmandu	0.920	1.057	1.012	0.969	1.122	0.956	1.006	1.102	0.96	1.012
Nepal Investment Bank	0.956	1.061	1.012	1.022	1.162	0.995	0.796	0.96	0.967	0.992
NIC Asia Bank	0.892	1.058	1.015	1.008	1.096	0.933	0.956	0.991	1.047	1.000
Machhapuchhre Bank	0.816	1.101	1.039	1.004	1.086	1.061	0.954	1.018	0.983	1.007
Kumari Bank	0.953	1.000	1.023	1.049	1.048	1.021	1.157	0.974	0.926	1.017
Laxmi Bank	0.923	1.042	0.963	1.064	1.077	1.039	0.989	1.001	0.974	1.008

Siddhartha Bank	0.958	1.057	0.988	1.059	1.059	0.992	1.211	1.179	0.914	1.046
NCC Bank	1.008	1.004	1.033	1.025	1.116	0.876	1.053	1.008	0.959	1.009
Civil Bank	0.850	0.960	1.024	1.013	0.986	1.089	1.095	0.92	0.904	0.982
Century Bank	0.866	0.931	1.033	1.018	1.085	1.031	1.071	0.966	0.94	0.993
Global IME Bank	0.865	1.048	1.059	1.028	1.046	0.92	1.042	1.001	0.952	0.996
Citizen Bank International	0.884	1.084	0.98	1.001	1.066	1.051	0.979	0.978	0.729	0.972
Prime Commercial Bank	0.941	1.066	1.152	0.954	1.120	1.011	1.030	1.029	0.853	1.017
Sunrise Bank	0.896	1.061	1.012	1.154	1.016	0.988	1.017	1.051	0.952	1.016
Prabhu Bank	0.922	0.957	1.085	0.856	1.058	1.029	0.901	1.118	1.066	0.999
Megha Bank	0.978	1.071	0.978	1.005	1.09	1.004	0.986	1.062	0.926	1.011
Sanima Bank	0.919	1.054	0.969	1.046	1.08	0.984	0.935	1.101	0.906	0.999
Average	0.951	1.046	1.002	1.024	1.078	0.995	0.954	1.051	0.956	1.006

The table demonstrates the Malmquist productivity index realized from DEAP version 2.1 computer programs for the period of 2011-12 to 1019-20. The bottom row shows the annual average of MPI for 27 commercial banks and column at the right side shows the average MPI for each commercial bank for the whole study period.

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Table 4*Statistics of Productivity Index, by Year*

Commercial banks (DMUs)	2011-12	2012-13	2013-14	2014-15	2015-16	2015-17	2017-18	2018-19	2019-20
Less than 0.90	9	0	3	1	2	2	7	1	7
0.90 – 1	12	5	6	6	1	12	9	7	15
1 – 1.10	5	20	16	16	15	13	9	12	3
Above 1.10	1	2	2	4	9	0	2	7	2
Total DMUS	27	27	27	27	27	27	27	27	27
Mean	0.951	1.046	1.002	1.024	1.078	0.995	0.954	1.051	0.956
Max	1.333	1.210	1.178	1.228	1.287	1.090	1.211	1.472	1.293
Min	0.811	0.931	0.785	0.856	0.872	0.854	0.654	0.855	0.729
Std. dev.	0.103	0.056	0.081	0.074	0.077	0.057	0.134	0.111	0.109

The table 4 shows the productivity summary by year from 2011-12 to 2019-20. Out of 27 commercial banks most of the banks are found in between 0.90 to 1.1 range during the study period. This indicates that the productivity of the commercial bank has neither improved nor worsen during the study period with some exceptions. In the year 2011-12, 9 commercial banks productivity was below 0.90 and 7 banks in 2017-18 and 2019-20. The table indicates there are few banks which performs better and have productivity above 1.10. In fact, 9 commercial banks have achieved the productivity above 1.10 in the year 2015-16 otherwise in most of the year, the productivity was hovering around 1. In addition, the mean productivity index is around one in each year.

Table 5*Correlation Matrices of Research Variables*

	Ln Com	MPI	ROA	Ln TA
Ln Com	1.0000			
MPI	-0.0187	1.0000		
ROA	0.0409	0.0844	1.0000	
Ln TA	0.2107	0.0447	0.3610	1.0000

The table shows results of correlation matrix of dependent, independent and controlled variables. Where Ln Com indicates the natural log of CEOs compensation, MPI indicates total factor productivity (a proxy of firm performance), ROA indicates return on assets and Ln TA indicates natural log of total assets.

Table 5 gives information about the correlation coefficient of the variables under study. The result indicates the correlation between firm performance and the CEO compensation is -0.0187. This indicates that there is very low degree of negative correlation between the variables.

Table 7 is the outcome of fixed effect regression model. The dependent variable was CEOs compensation and the independent variable was firm performance proxied by MPI. In additional two controlled variables firms' size proxied by log of total assets and ROA were also used. The total number of observations decline to 256 firm's year observations only due to unavailability of compensation data¹. The model has been accepted as the Durbin Wu Hausman (DWH) test was found significant, preferring fixed effect model.

Table 7

Regression Output Using Fixed Effect Model

Ln Com	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
MPI	-.3207	.2596	-1.24	0.218	-.8324	.1908
ROA	.0531	.0461	1.15	0.251	-.0378	.1441
Ln TA	.4029	.0372	10.80	0.000**	.3294	.4763
Cons	11.9685	.4745	25.22	0.000	11.0335	12.9035

The table shows regressions results of fixed effects model panel data for commercial banks from July 2010 to June 2020. Statistical significance at the 1%, and 10% level is indicated by ** and * respectively.



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¹The annual report of Nepal SBI bank has not disclosed the CEO compensation in any year indicating that the salary and allowance paid by SBI under technical services agreement and Everest Bank Limited has disclosed total compensation to key management personnel from year 2017 to 2020, but separate compensation to CEO is not disclosed. This has reduced the year observation from 270 to 256.

Table 7 presents the finding of equation (5) where Ln Com indicates log of CEOs compensation, MPI indicates the firm performance, ROA indicates return on assets and Ln TA indicates the log of total assets size of commercial banks. In the first stage no Significant relationship is found between MPI (firm performance) and CEOs compensation. The p value was found more than 10%. However, the model was significant with F stat 42.27 and p value 0.00.

In addition, the author checked the heteroskedasticity of error term for the selected fixed effects model. For the purpose, the assumptions made were; the error terms are heteroskedastic. For the purpose the square of residuals were regressed with the predictors. The result is found significant indicating there was the problem of heteroskedastic. To overcome the problem, the author run robust fixed affect model. The result of the model is shown in table 8.

Table 8

Regression Output Using Robust Fixed Effect Model

LnCom	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
MPI	-.3207	.1767	-1.82	0.081*	-.6847	.0431
ROA	.0531	.06466	0.82	0.419	-.0800	.1862
lnTA	.4029	.07101	5.67	0.000 **	0.2565	.5492
_Cons	11.9685	.8479	14.11	0.000 *	10.2221	13.7145

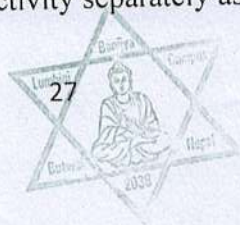
*The table shows regressions results of robust fixed effects model panel data for commercial banks from July 2010 to June 2020. Statistical significance at the 1%, and 10% level is indicated by ** and * respectively*



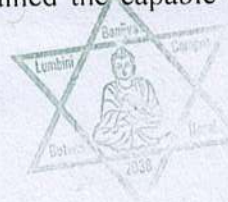
Table 8 shows the output of robust fixed effect regression model. The model was significant with F stat. 13.86 with zero p value. The p value of firm performance is only significant at 10% level. The result helps to claim that 91.90% of the time, the firm performance affects the CEO compensation. However, the outcome is surprising. The initial hypothesis was higher firm performance leads to higher CEOs compensation but the result is just opposite. We expect to get positive coefficient of the firm performance but the coefficient is found negative, which indicates that increase in firm performance actually decrease the CEOs compensation. Telling the other way, decrease in firm performance, increase the CEOs compensation. Though, the relation is significant, the direction is not as expected. The above result indicates that 1 percent increase in productivity index decreases the CEOs compensation by 0.32 percent. The result is consistent with the findings of Core and Guay (2010), who blamed flawed pay setting as the main cause.

Discussion and Conclusion

The productivity is the ratio of output and input. There are three conditions to increase the productivity; increase the level of out keeping the level of inputs constant, decrease the level of inputs keeping the level of output constant or increase the ratio of output relative to the ratio of inputs. In the context of Nepali commercial banks, the trading volume has increase but the productivity remains almost constant. For example, the average amount of loans and advances, investment, net profit after tax have increased by 21.15%, 16.90% and 17.28% respectively during last decade. This shows remarkable growth in banks output indicators but this is the decade when NRB has forced banks and financial institutions to go through mergers and acquisitions. This result significant increase in input variables as well. For example; the main input indicators deposits, number of employees, fixed assets and number of branches have also increased by 19.97%, 17.97%, 9.36% and 14.31% respectively. This result indicates the growth in output has been neutralized by corresponding increase in banks inputs leaving average geometric growth of productivity to only 0.45% over the last decade with significant standard deviation. We have classified the banks into government, joint ventures and private banks and tried to see the productivity separately as well. The result indicates that



the productivity of three categories is similar. For example; the average productivity increase for government banks, joint ventures banks and private banks is 0.80%, 0.97% and .46% respectively. This indicates that the productivity growth is a major concern for commercial banks in Nepal. The findings are evident that the size and scope of commercial banks have increased during the last decade but the productivity is stagnant. However, the average compensation of CEOs has increase at an impressive rate of 9.46% over the last ten years. The average compensation increment for government banks, joint ventures banks and private banks is 13.18%, 7.95% and 9.73% respectively. The reason of such significant increment could be impact of industry deregulation. The number of banks sharply increases after the financial liberalization and deregulation after 1990s and has increased competition in banking sectors. Aauthors Cunat & Guadalupe (2009); Crawford, Ezzell, and Miles (1995) have also stated that when the industry becomes deregulated the competitions increased. This could have forced the compensation committee to pay more to their CEOs to retain them. Throughout the study, the rate of inflation is not considered but this could have forced the compensation committee of concerned banks to increase the compensation. The author has considered the rate of inflation during the same period and found the average rate of inflation was 7.35%. The higher inflation rate could be the reason to increase the compensation of the CEOs. The empirical findings suggest that there is negative relationship between pay and performance in Nepali commercial banks. The increase in compensation in Nepali commercial banks could be the result of benchmarking. Nepal is underdeveloped country and the country has suffered with the problem of brain drain. According to DiPrete, et. al, (2010, p. 1673) "Small and shifting fraction of CEOs have regularly been able to "leapfrog" their compensation benchmarks by moving to the right tail of the benchmark distribution and get larger than normative compensation increases, even after taking job mobility and executive performance into account. These events produce subsequent "legitimate" pay increases for others and potentially explain an important fraction of the overall upward movement of executive compensation." The statements indicate the benchmarking practices have an effect on CEOs compensation and in Nepali context it seems the strongest reason in addition to inflation. The commercial banks want to retained the capable manpower and in result,



they are forced to pay more compensation. But there is always a question, whether the CEOs should demand their compensation based on their performance?

In addition, the lack of good governance may be another factor responsible for setting irrelevant pay. In the recent paper Dahal (2020) states the corporate governance practices in Nepali firms is poor due to ineffective supervision and prevailing malfunctions. Several empirical studies have shown that high managerial power and weak governance structures are correlated with higher levels of CEO compensation (Armstrong, Ittner, and Larcker 2008; Gabaix and Landier 2008). Adherents of managerial power theory perceive the capping CEOs compensation as an evidence of enlarging rent extraction from the corporation which are poorly governed. The compensation committee is formed in commercial banks to design the compensation to key management personnel and an optimal policy can be formed only if they work in the best interest of the company. Due to lack of corporate governance, the fair compensation practice looms in shadow.



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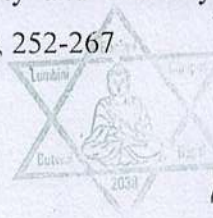
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