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## **EFFECT OF CAMEL MODEL ON BANK PERFORMANCE: WITH SPECIAL REFERENCE TO LISTED COMMERCIAL BANKS IN SRI LANKA**

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### **ABSTRACT**

*The banking sector has become a rapidly growing sector in the world recently and its financial soundness and performance are essential to the stable and sustainable economic growth of a country. This study investigated the effect of CAMEL parameters on both market-based performance and accounting-based performance of eight listed commercial banks in Sri Lanka for the period 2014-2019. This study has used secondary data from audited annual financial statements of the listed commercial banks. CAMEL model is the most popular method that calculates and evaluates a bank's performance and it includes Capital Adequacy, Assets Quality, Management Efficiency, Earning ability, and Liquidity status. Return on Equity (ROE) is used as an accounting-based performance indicator and Tobin's Q ratio is used as a market-based performance indicator. The finding reveals that Capital adequacy, Assets quality, and Liquidity status have a positive significant impact on market-based performance while other CAMEL indicators have an insignificant impact on market-based performance. Furthermore, Management efficiency is negatively related to accounting-based performance, and earning ability is positively related to accounting-based performance at a significant level while other CAMEL indicators have an insignificant impact on the accounting-based performance of commercial banks in Sri Lanka. The finding of this study is helpful to the stakeholders of the commercial banks in making appropriate managerial decisions efficiently and effectively.*

**Key Words:** Assets quality; CAMEL model; Capital adequacy; earning ability; Liquidity status; Management efficiency

## 1. Introduction

### 1.1 Background of the Study

The financial sector is a fast-growing sub-sector in the Sri Lankan economy. The financial system in Sri Lanka consists of a wide range of financial service providers such as Commercial and Specialized Banks, Finance Companies, Cooperatives, Community Based organizations (CBO), Non-Government Micro Finance Institutions(NGO-MFIs), Self-Help Groups(SHG), and government programs like Samurdhi, Divinaguma, etc. Those financial service providers are regulated by the Central Bank of Sri Lanka (CBSL), Institute of Bankers of Sri Lanka (IBSL), Department of Cooperatives, Companies act, Societies ordinance, and specialty acts. CBSL is responsible for maintaining financial system stability in Sri Lanka (CBSL, 2018).

The banking system in Sri Lanka dominates over Rs. 10 trillion assets of the financial system and accounts for around 60 percent of the total assets in the financial system. The banking sector continually expands over the last decades while there was a challenging global and domestic market condition (CBSL, 2018). A healthy banking system is essential to the economic development of the country because it ensures the optimum allocation of scarce national resources (Desta, 2016). The financial soundness and performance of the banking system are being paramount in the achievement of stable and sustainable economic growth (Roman & Sargu, 2013). Moreover, the banking sector acts as an intermediary to all industries such as agriculture, construction, manufacturing, textile, etc. (Rostami, 2015).

The Sri Lankan banking system is monitored by the CBSL. There are 26 licensed commercial banks and 7 licensed specialized banks in Sri Lanka in March 2018. The licensed commercial banks consist of 13 domestic banks and 13 foreign banks. The banking sector has represented 60.3 percent of the total assets of the financial sector at the end of 2017 (CBSL, 2018). Commercial banks gather savings from surplus economic units and make them available to deficit economic units as loans and advance to manipulate the economic development of the country. (Desta, 2016). Commercial banks are recognized as drivers of economic growth, job creation, and reduction of poverty. Therefore it is vital to measure the performance of the commercial banks regularly (Sathyamoorthi et al., 2017).

For the evaluation of bank performance, researchers have used different approaches such as ratio analysis, data envelopment analysis, analytic hierarchical process, balanced scorecard, and benchmarking. (Dhaigude & Chatterjee, 2018). Under the ratio analysis past researchers have used different types of accounting ratios and market ratios to measure firm performance (Masa'deh et al., 2015). Furthermore, past studies have measured firm performance by using hard performance measures and soft performance measures. Hard performance measures are the financial outcome of the firm such as ROA, ROE, market share, sales, and other financial ratios. On the other hand, studies have used objective measures which relied on financial data and subjective measures which depend upon managerial assessments about the firm performance (Masa'deh et al., 2015).

The bank's soundness must be evaluated to ensure a stable, healthy, and solid banking sector (Roman & Sargu, 2013). CAMEL framework is the most popular method for analysis and evaluation of the financial soundness of banks (Roman & Sargu, 2013) and it is the latest model of financial analysis in the banking sector (Mohiuddin, 2014). It consists of key determinants of banks financial performance such as Capital adequacy, Management efficiency, Assets quality, Liquidity status, and Earning ability. Hence, major decisions of the management heavily depend on those CAMEL parameters (Erol et al., 2014). The past empirical studies suggest contradictable arguments about the impact of CAMEL indicators on a bank's performance. Therefore still there is no universally accepted theory. Hence this topic is still researchable.

## **1.2 Research Problem**

CAMEL model and bank performance are some of the most studied concepts in the world. However, most of the studies have considered the only accounting-based performance of the banks (Sathyamoorthi et al., 2017; Munir & Bustamam, 2017; Jha & Hui, 2012; Weersainghe & Perera, 2013; Zagherd & Barghi, 2017; Roman & Sargu, 2013). There are only a few studies that have considered the market-based performance of the banks (Rostami, 2015; Saif- Alyousfi, Saha, & Md-Rus, 2017). Furthermore, most of the studies have been conducted based on foreign countries and sufficient facts about the CAMEL model and bank performance in the Sri Lankan context are unavailable.

The analysis of literature has been providing conflicting results about the impact of the CAMEL model on bank performance. Menicucci & Paolucci (2016) have revealed that bank size and capital ratio have a significant impact on bank profitability while the liquidity status has a negative impact on bank profitability in the European banking sector. Zagherd & Barghi (2017) have performed research on the Iranian banking industry and found that capital adequacy, assets quality, management efficiency, and liquidity status have a significant impact on bank performance. Furthermore, Saif- Alyousfi, Saha, & Md-Rus (2017) have found the same result by evaluating the performance of conventional banks in Saudi Arabia. However, they have stated that capital adequacy and assets quality has an insignificant impact and management efficiency and liquidity have a significant impact on the performance of Islamic banks in Saudi Arabia.

On the contrary, Ongore & Kusa (2013) have revealed that all the CAMEL ratios have an insignificant impact on bank performance by evaluating the performance of commercial banks in Kenya. Sathyamoorthi et al. (2017) have argued that only assets quality, management efficiency, and earning ability have an insignificant impact on bank performance and capital adequacy and liquidity status have a significant impact on the performance of listed commercial banks in Botswana. Ali & Puah (2018) have argued that capital adequacy, assets quality, and bank size have a significant impact on bank performance while liquidity statuses have an insignificant impact on bank performance in Pakistan. Furthermore, Weersainghe & Perera (2013) have stated that earning ability has a significant impact on the performance of commercial banks in Sri Lanka. While Zagherd & Barghi (2017) have indicated earning ability has no impact on bank performance.

Because of those contradictable arguments, the impact of CAMEL parameters on a bank's performance is still a researchable area. Thus, this study aims to fill this knowledge gap through effective analysis.

### **1.3 Research Question**

This study attempted to address the following research question.

- Do CAMEL parameters affect both accounting-based and market-based performance of Listed Commercial Bank in Sri Lanka?

### **1.4 Objectives**

The objective of this study is,

- To identify the impact of the CAMEL parameters on the performance of Domestic Listed Commercial Bank in Sri Lanka.

### **1.3 Methodology**

The purpose of this study is to examine the impact of CAMEL parameters on the performance of Listed Commercial Banks in Sri Lanka over the recent period of 2014 to 2017. This study focused on the evaluation of both market-based performance and accounting-based performance of listed commercial banks. Therefore, only commercial banks listed in the Colombo Stock Exchange (11 Banks) are the population of the study. The sample is composed of all commercial banks listed in CSE excluding only DFCC Bank plc. Amana bank plc. and Cargill's bank plc. due to insufficiency and unavailability of data. Secondary data has been used for the empirical analysis of this study. Data has been obtained from Audited annual financial statements of the recent consecutive years from 2014 to 2017 and the data is analyzed using multiple regression techniques.

### **1.4 Significance of the Study**

This study has filled the gap in past literature reviews by providing facts on the effect of the CAMEL parameters on market and accounting-based performance in the Sri Lankan banking sector. There was no sufficient literature available which have been undertaken by considering both market and accounting-based performance in foreign as well as the Sri Lankan banking sector. Therefore the finding of this study is useful to the management of the whole commercial banks in making appropriate managerial decisions and formulate relevant control policies efficiently and effectively.

The banking industry is dynamic and competitive. Therefore management should evaluate the bank activities regular basis to ensure an efficient and effective banking system. The result of the study has provided the basis for the management and policymakers to get appropriate managerial decisions and make effective policies. It enables management of the banks to handle losses arising from certain risks such as credit risk, market risk, and operational risk and manage obligation to customers without disturbing its normal operation. The decisions and policies about adequate capital level, solvency, operating efficiency, and level of liquid assets directly impact bank performance. According to the literature, CAMEL indicators are a major determinant of both accounting-based and market-based performance of the banks.

Further, the findings of this study assist both investors and shareholders to make an appropriate decision on their investments in banks in Sri Lanka. The investors and shareholders are able to get a good appreciation of the performance of commercial banks in Sri Lanka by understanding the earning ability of banks and the security of their investments. The analysis of the bank's performance provides vital information to investors and shareholders than what they draw from the financial statements. Based on that information, they enable to make an effective decision about investing their money in commercial banks to get a higher rate of return.

## **2. Literature Review**

### **2.1 Bank Performance**

The banking system is essential to the economic development of the country. It is impossible to imagine the commercial, industrial and agricultural development of a country without an efficient banking system. Further, the banking system ensures optimum allocation of scarce national resources and mobilizing funds to create attractive business opportunities (Jha & Hui, 2012). The banking sector is a more complex and fastest-growing sector. Its financial soundness and performance are important to depositors, shareholders, employees as well as the whole economy. Therefore evaluating financial soundness and performance in the banking sector is a challenging task (Mohiuddin, 2014).

The banking industry is dynamic and competitive. Therefore they have to perform novel and specialized financial services instead of traditional banking activities because of dynamic customer needs (Kumar & Alam, 2018). Therefore it should be assessed continuously (Dhaigude & Chatterjee, 2018). Academic researches and National and International Regulatory and Supervision Authorities give more attention to assess the soundness and performance of the banking sector (Roman & Sargu, 2013). The banking industry has been shown rapid growth in recent years. However, there are still limited empirical studies have conducted based on an evaluation of the bank performance (Erol et al., 2014).

There are a diversity of measures for assessing firm performance (Masa'deh et al, 2015). Studies have used the Market Power (MP) model or the Efficiency Structure (ES) model to evaluate bank's performance in the early 1990s and the late 1980s (Mensi & Zouari, 2010). Also for the evaluation of bank performance, researchers have used different approaches such as balanced scorecard, ratio analysis, data envelopment analysis, analytic hierarchical process, and benchmarking (Dhaigude & Chatterjee, 2018).

According to Masa'deh et al. (2015), a single measure cannot capture the overall performance of the firm effectively. Therefore both accounting-based measures and market-based measures should be used to capture firm performance effectively. Accounting performance can be measured using Return on Investment (ROI), Return on Equity (ROE), Return on Assets (ROA), Return on Sale (ROS), and Return on Capital Employed (ROCE). That Profitability (Accounting) ratio shows how much profit the firm made on sales and how much the firm has earned for a particular period. Market performance can be measured using the Price to earning ratio, Market to book value ratio,

Tobin's Q Ratio, and Cash flow per share. The market (Investment) ratio shows how the firm performs in relation to the price of a share, dividends, and the number of issued shares achieve success.

## **2.2 CAMEL Model**

When assessing the performance of the banking sector, reliability, profitability, and liquidity factors are critical and in that context, CAMEL Model can be taken as a reliable tool to evaluate the performance in the banking sector (Ghasempour & Salami, 2016). CAMEL model was built and introduced first in the Federal Financial Institution Examination in the USA in March 1979 for internal monitoring purposes and now it is used for both internal and external monitoring purposes (Rostami, 2015). According to Salhuteru & Wattimena (2015) CAMEL model can be used to evaluate bank performance accurately and to predict the failure rate.

CAMEL model is adopted by bank credit analysts for analysis and estimate of bank creditworthiness. Regulatory authorities have used the CAMEL model as a bank supervision instrument (Hays, De Lurgio, & Gilbert, 2009). Jha & Hui (2012) have stated that ROE and ROA are influenced by CAMEL parameters and it improves bank performance. Olweny & Shipho (2011) have used bank-specific factors that came out from the CAMEL model to measure the bank profitability in Kenya and found that the CAMEL model has a statistically important effect on the bank profitability.

Rostami (2015) has evaluated the effect of each category of the CAMEL model on the market-based performance of Iranian banks for the period of 2005 to 2014 and stated that significant impact between each category of the CAMEL model and Tobin's Q ratio. Munir & Bustamam (2017) have examined the influence of CAMEL analysis on the profitability of 10 Malaysian banks and 9 Indonesian banks for the period of 2010 to 2015 and stated that CAMEL analysis has a significant impact on the bank profitability.

### **2.2.1 Capital Adequacy**

Capital Adequacy is a major determinant of banking activities. Banks must maintain an adequate capital level to face adverse market conditions (Karim et al., 2014). Its enables bank to handle losses arising from certain risks such as credit, market, and operational risk and manage obligation to customers without disturbing its normal operation. The higher value of this ratio shows organizational strength (Mohanty D., 2017). The minimum capital requirement of the bank is first introduced by the Bank of International Settlements in 1996 to protect banks and their depositors by maintaining adequate capital reserves (Karim et al., 2014).

Banks regulators direct banks to maintain the minimum capital requirement to reduce systemic risk and probability of failure. The Basel Committee on Banking Supervision (BCBS) proposed Basel III the proposal which indicates there should be six present core capital levels maintain in the banks to strengthen the resilience of the banking industry. This Basel III proposal is fully supported by the US Board of Governors of the Federal Reserve System (El-Sood, 2015). The capital adequacy ratio shows how well the bank is capitalized and it is used to measure bank capital strength and to analyze the financial power of the banks (Menicucci & Paolucci, 2016).

The banks should have a sound capital level to gain more business opportunities and deal with problems more flexibly. Sound capital means to keep sufficient reserves as a buffer against adverse shocks and unexpected losses. Therefore high-risk banks need more capital cushion to absorb a risk (Karim et al., 2014). Higher capitalized banks can gain lower cost of financial distress, higher interest margin on assets and face to low predicted bankruptcy situation and finally, it will be turned into profitability. On the other hand, higher capitalized banks reduced the need for external funding. Therefore it will reduce the cost of capital and such advantages will be turned into profitability. Banks that have weak capital structures will fail to bear losses and mitigate risk (Menicucci & Paolucci, 2016).

To determine minimum capital requirements banks should consider the nature of their activities. If the depositors invest for a short period, banks should also invest that money in short-term securities. If banks invest funds in long-term securities then maturity mismatch will occur. Therefore banks must implement proper capital management through four categories of banks capital to maintain an optimal combination of capital. Those are Funding capital (which is provided by shareholders with the aim of gaining a return on their capital), Risk capital (capital maintain to absorb unexpected losses), Economic capital (investment of shareholders), Regulatory capital (capital available to protect depositors when the losses occur from loan failure) (Karim et al., 2014).

Zagherd & Barghi (2017) suggest that capital adequacy has a significant impact on the ROA of the Iranian banks. Menicucci & Paolucci (2016) reveals that adequacy has a significant impact on the ROE of the European banks. Inversely past studies also indicate that the impact of capital adequacy on bank performance is insignificant (Munir & Bustamam, 2017; Sufian, 2012; Weersainghe & Perera, 2013). Capital adequacy can be measured by using some proxies such as Capital Adequacy Ratio, Debt to Equity Ratio, and Advance to Assets Ratio (Ab-Rahim et al., 2018). Most of the studies have used the Capital to Risk-Weighted Assets Ratio for the measurement of capital adequacy (Roman & Sargu, 2013).

### **2.2.2 Assets Quality**

Assets quality is a major indicator of the risk of financial institutions. It measures the strength of the bank and the bank's assets risk situation (Roman & Sargu, 2013). It shows that instability of the banks' solvency due to disrupted bank assets are affected by high non-performing loans (Munir & Bustamam, 2017). Assets quality measures the return on assets that are impacted by an increase in non-performing loans (Munir & Bustamam, 2017). Roman & Sargu (2013) have revealed that capital adequacy is directly linked with the quality of assets. Because in most of the cases depreciation of assets caused solvency risk. However past studies usually used loan loss provision to measure assets quality. The loan loss provision is part of credit risk. Bank's profitability is largely attributable to credit risk. Primarily quality of bank assets depends on its loan portfolios. Because loans granted by banks are represented in the assets side of the balance sheet and it represents the significant share of total assets. Therefore high non-performing loans represent low credit quality and finally, it converts into lower profitability.

Assets quality represents the assets risk situation of the banks and measurement of assets quality uses to assess the current and future viability of banks. Poor quality assets affect the profitability of banks in two ways. Those are reducing the income of interest and increasing the cost of provision (Ali & Puaah, 2018). It shows the health of banks against their assets impairment. Poor assets quality is another reason for bank failure. Therefore banks need to assess the level of non-performing assets, distribution of assets, and adequacy of the provision to ensure the sound assets quality (Ghasempour & Salami, 2016).

Non-performing loans are affected by the size and duration of loans, level of assets diversification, lending policies, related lending parties, and quality of collateral backing for each loan (Zagherd & Barghi, 2017). According to Aspal & Dhawan (2016) banks measure the quality of the asset with the purpose of determining the level of non-performing loans as a part of credit risk. Banks should keep non-performing loans at a low level. Because it affects bank profitability directly. On the other hand, written off high non-performing loans losses against capital lead to reduce earning capacity of the banks. Weersainghe & Perera (2013) have measured the quality of the asset using non-performing loans to total assets ratio and revealed that assets quality has a positive insignificant impact on ROE in commercial banks in Sri Lanka. Chowdhury & Rasid (2017) has evaluated the quality of the asset using loan loss provision to total loan ratio and suggest a significant negative impact on the performance of Islamic banks in GCC countries. Furthermore, Ali & Puaah (2018) have measured the quality of the asset using the total loans to total assets ratio and revealed that it has a significant impact on bank performance in Pakistan.

### **2.2.3 Management Efficiency**

Management efficiency is an important factor to ensure the health, stability, and growth of the banks but it is difficult to measure because it is a primarily qualitative factor (Keshar, 2005). It considers as an indicator of administrative efficiency. Efficiency is a vital element of the bank's success because high efficiency indicates the high performance of the firm. Ghasempour & Salami (2016) have revealed that management efficiency indicates the ability of management and board of directors to capture, measure, and control the risk associated with banking activities to ensure sound banking operation. Aspal & Dhawan (2016) suggest that management efficiency depends on prescribed norms of management, management capabilities to respond to changing the environment, administrative capabilities, and leadership. Measurement of management efficiency is the hardest and unpredictable task because it relates to subjective judgments and strategies of bank managers which creates using their capabilities and expertise (Roman & Sargu, 2013).

Dash (2017) have used management efficiency as a parameter to evaluate the management quality of the banks by allocating premium for sound managed banks and discounting unsound managed banks. Sound management quality shows how banks minimize their cost, increase profits, and prevention of possible bank failures. Sound management practice represents a stable profit. According to Zagherd & Barghi (2017), sound management practice depends on professional competencies, a high standard of integrity, and quality of service. Therefore measurement of management quality indicates the level of effectiveness of bank management.



Management efficiency creates high non-productive operating costs that can result in lower profits. Therefore operating cost has a negative effect on the profitability of banks (Rashid & Jabeen, 2016). However, Weersainghe & Perera (2013) suggest that banks that have the market power to pass operating costs to their customers are able to gain more profits. Therefore operating cost and bank profitability have a positive correlation. They evaluated management efficiency using the efficiency ratio and suggest a significant negative impact on the performance of commercial banks in Sri Lanka.

Munir & Bustamam (2017) evaluated the management efficiency using cost to income ratio and revealed that negative insignificant impact on bank performance in Malaysia and Indonesia. The same findings were indicated by Chowdhury & Rasid (2017) by analyzing management efficiency using net interest expense to total assets ratio. Moreover Operating Expenses to Total Assets, Deposits Interest Expenses to Total Deposits, Non-Interest Expenses to Net Interest Income and Non-Interest Income, Personal Expenses to Average Assets Ratios can be used as a proxy of the management quality (Roman & Sargu, 2013).

#### **2.2.4 Earning Ability**

Earning ability is a significant parameter that expresses the current and future activities of a bank in relation to the enhancement of its earning capabilities. The degree of cover for all potential losses and capability of dividend distribution can be determined by assessing the earning ability (Sathyamoorthi et al., 2017). Earning ability is the ability of a bank to gain capital and refund assets for future expansion (Munir & Bustamam, 2017). The income of the commercial bank has two components. Those are interest income and non-interest income. Banks earn interest by supplying loans to the third party and it represents a large share of its income. Therefore it has a significant impact on a bank's profitability. However, a bank that has more diversified income is more profitable than banks that heavily depend on interest income. Therefore non-interest income also has a significant impact on a bank's profitability (Salike & Ao, 2017). According to Dash (2017) earnings performance indicates the way that banks earn their profit and explain future growth in earning and sustainability.

Zagherd & Barghi (2017) measured the earning ability of Iranian banks' earning expenses to total income ratio and suggest that it has a significant impact on bank performance. Munir & Bustamam (2017) evaluated the earning ability of Islamic banks in GCC using ROE and findings indicate that earning ability has a significant negative impact on return on investment. Furthermore, it can be measured by using some proxies such as Operating Profit to Total Assets, Net Profit to Total Assets, Interest Income to Total Income, and Net Interest Margin to Total Assets (Kumar & Alam, 2018).

#### **2.2.5 Liquidity Statues**

Liquidity is a vital element that has a significant impact on the operational performance of the banks (Roman & Sargu, 2013). Banks have been performed varied nature of functions to develop new industries, increase employment and enhance economic growth. These functions create liquidity risk. Liquidity risk is which restrict banks' ability to meet short term obligation. On the other hand, it limits the banks' ability to meet new

loans demand (Talbi & Bougatef, 2018). According to Ghasempour & Salami (2016), liquidity represents banks' ability to hold the accepted level of cash and cash equivalent to meet the demand of borrowers and depositors as well as increase public confidence. The adequate liquidity level is a significant factor that determines bank investments and regular cash flow. Therefore banks need to mitigate the gap between liabilities and assets maturities by maintaining an efficient and effective assets and liability management system. Aspal & Dhawan (2016) have stated that liquidity refers to the capability of banks to fulfill their obligation towards depositors. It represents the fund availability of the banks to repay short-term borrowing without incurring unexpected losses. Zagherd & Barghi (2017) have defined liquidity as an ability of a bank to repay loans and liabilities and meet withdrawals of depositors without delay.

In the past banks did not pay much attention to liquidity risk. However, after various crises in the economy and banking sector, bankers have given much more attention to liquidity risk management. Due to the high uncertainty of the economy banks tend to maintain high liquid assets. Therefore they will face low liquidity risk. As a result of their net profit margin will be reduced. However, banks used to retain cash and cash equivalent to face immediate deposit withdrawals and new loan demands. The bank should keep a sound liquidity arrangement because it affects the performance of the banks as well as the reputation of the banks. Depositors' confidence may lose when banks failed to provide a fund to them in a timely. Also, banks are liable for penalties passed by regulators (Talbi & Bougatef, 2018).

Banks can maintain a sound liquidity level by converting bank's assets into cash or cash equivalent or increasing current liabilities (Aspal & Dhawan, 2016). Unsound liquidity management leads to a decrease in the bank's performance. Because they have to borrow emergency loans and short-term funds at a higher interest rate to meet the short-term financial obligation in an unsound liquidity situation (Zagherd & Barghi, 2017). On the other hand, holding more liquid assets leads to an increase in the opportunity cost of higher returns. Therefore banks need to execute a proper liquidity risk management system by balancing both the assets side and liability side of the balance sheet (Weersainghe & Perera, 2013).

Weersainghe & Perera (2013) measured the liquidity status of commercial banks in Sri Lanka using liquid assets to total assets ratio and suggest a significant negative impact on bank performance. Most of the past studies used total loans to customer deposits ratio to measure the liquidity status of the commercial banks in different countries and finding of the studies reveals that it has a significant impact on bank performance. However, Chowdhury & Rasid (2017) evaluated the liquidity status of Islamic banks in GCC using total loans to total assets ratio and indicated that positive insignificant impact on bank performance. Liquidity Statues can be measured by using some proxies such as Customer Deposits to Total Assets, Total Loans to Customer Deposits, Investment to Deposits, Liquid Assets to Deposits, Liquid Assets to Total Assets and Total Securities to Total Assets (Mohiuddin, 2014; Desta, 2016).

### 2.2.6 Bank Size

Bank size is a major indicator of bank performance because it is a proxy for economies of scale. Banks with larger sizes are able to gain more profit by raising capital at a lower cost (Jara-Bertin, Moya, & Perales, 2014). Larger banks take advantage of economies of scale using their power to control market forces through their strong brand image and regulatory protection. Then ultimately their profit will increase (Ali & Puah, 2018). Larger banks expect to gain more production than small banks. Therefore they are able to cost reduction and risk reduction by increasing operational efficiency and market power (Menicucci & Paolucci, 2016). Because of that reason past literature has argued that bank size has a significant impact and is positively related to bank performance (Chowdhury & Rasid, 2017; Jara-Bertin, Moya, & Perales, 2014; Ali & Puah, 2018; Menicucci & Paolucci, 2016).

Past studies have argued that a bank with better technology and management practice in the industry gain more profit than a bank with a larger bank size (Jara-Bertin, Moya, & Perales, 2014). When considering the economics of scale there is a positive relationship between bank size and performance. But large size banks are more diversified, which will lead to higher risk, and finally, it will be converted to a negative effect between bank size and performance (Chowdhury & Rasid, 2017). Cok & Košak (2008) suggest that larger banks gain diseconomies of scale due to management inefficiencies. Therefore bank size and performance have a negative relationship.

Inversly Caporale et al., (2017) have argued that banks size has no impact on bank performance. The literature shows a mixed relationship between bank size and performance. However, some literature shows a U-shaped relationship between bank size and performance (Chowdhury & Rasid, 2017). The ratio of bank assets to total assets of the banking industry is used as a proxy to measure the bank size (Simanjuntak & Francis, 2016; Weersainghe & Perera, 2013). Other past literature has used a Natural log of assets to measure the bank size (Chowdhury & Rasid, 2017; Ali & Puah, 2018).

### 2.3 Empirical Evidence on CAMEL Model and Bank Performance

Saif- Alyousfi, Saha, & Md-Rus (2017) have examined the effect of the CAMEL model on shareholders' value measured by Tobin's Q ratio and ROE of the Islamic and conventional banks in Saudi Arabia over the period 2000-2015. The finding of this study has revealed that capital adequacy, assets quality, liquidity status, and bank size have a negative significant relationship with shareholders' value in conventional banks and capital adequacy and assets quality in Islamic bank has a negative and insignificant relationship with shareholders' value and management efficiency and bank size has a negative and significant relationship. But liquidity has a positive significant relationship with shareholders' value.

Ongore & Kusa (2013) have examined the impact of the CAMEL model on the profitability of 37 commercial banks in Kenya for the period from 2001 to 2010. The finding has revealed that capital adequacy, assets quality, and management efficiency have a significant impact on ROA, ROE, and NIM while liquidity has an insignificant impact on bank profitability. Menicucci & Paolucci (2016) have evaluated the profitability in the European banking sector using bank-specific characteristics over the period 2009-2013.

The findings of the study have revealed that bank size and capital ratio have a significant impact on bank profitability and the liquidity status has an insignificant impact on bank profitability.

Simanjuntak & Francis (2016) have evaluated both the accounting and market performance of the biggest banks in Indonesia; BMRI, BBRI, BBKA, and BBNI for the period from 2011 to 2015 using the CAMELS model. They have measured accounting performance using ROE and ROA and have measured market performance using Tobin's Q ratio. The finding of this study has revealed that the CAMELS ratio of those banks shows good performance and the market performance of those banks is undervalued. Talbi & Bougatef (2018) have examined the bank performance using external and internal determinants of banks in the Middle East and North African countries over the period from 1999 to 2014. The internal determinants represent the CAMELS indicators and found that the bank's performances exclusively depend on internal determinants.

Jara-Bertin, Moya, & Perales (2014) have examined the effect of bank-specific factors which are come from the CAMELS model on the Latin American banks' performance for the period from 1995 to 2010. The study has stated that capital ratio and bank size are significantly impacted by bank performance and liquidity risk, credit risk, and management inefficiency are negatively related to a bank's performance. Zagherd & Barghi (2017) have evaluated the Iranian banking industry through the CAMELS framework for the period from 2007 to 2015. The result of the study has stated that return on assets of the banks have a direct and significant impact from capital adequacy, management quality, assets quality sensitivity to market risk indicators, and liquidity quality while there is no impact of earning quality on the return on assets.

Ali & Puah (2018) have used CAMELS indicators to evaluate the commercial bank's performance in Malaysia over the period from 2007 to 2015. The result of the study has indicated that credit risk, bank size, and fund risk have a statistically significant impact on bank performance while liquidity risk has a statistically insignificant impact on performance. However, Arif & Anees (2012) have examined the impact of liquidity risk on Pakistani bank's profitability during the period 2004-2009. The result of the study has shown a significant relationship between liquidity risk and profitability.

Chowdhury & Rasid (2017) have conducted a study to identify major determinants of the Islamic bank's performance in GCC (Gulf Cooperation Council) countries. The study has revealed that capital adequacy and bank size are a significant positive impact on the profitability of banks while management efficiency is insignificantly impacted with ROA. Sathyamoorthi et al., (2017) have evaluated the financial performance of 3 listed commercial banks in Botswana for the period from 2011 to 2015 by using the CAMEL model. The finding of this study indicates that financial performance of the bank has a significant positive correlation with liquidity ratio and has a significant negative correlation between leverage ratio and equity capital to assets ratio while other CAMEL ratio has no a significant relationship with bank financial performance.

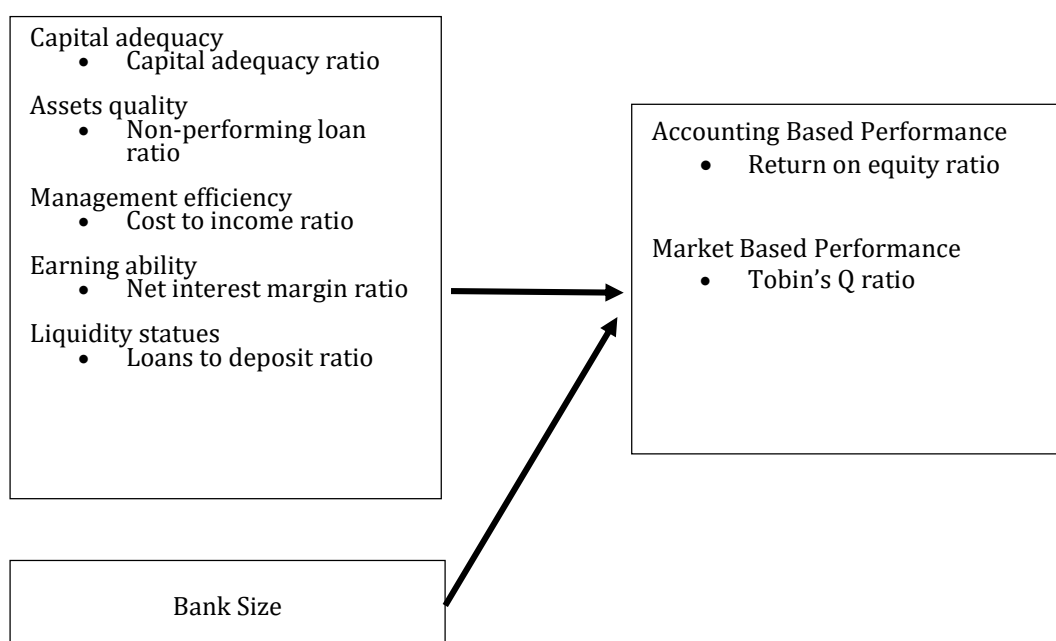
Weersainghe & Perera (2013) have evaluated the impact of CAMEL indicators on return on assets and return on equity of commercial banks in Sri Lanka between 2001- 2011.

The finding of this study reveals that banks that enjoy economies of scale showing more profit than banks that have a higher capital ratio. Furthermore, liquidity status, management efficiency, and earning ability are significantly impacted by a bank's profitability. In sum, based on the literature analysis, the relationship between CAMEL indicators and bank performance is remaining inconclusive and requires further investigation.

### 3. Methodology

#### 3.1 Conceptual Framework

The conceptual framework explains the path of the research and describes the relationship between the main concepts of a study to make research findings more meaningful and ensures generalizability (Adom, Hussein, & Agyem, 2018). The following conceptual framework (Figure 3.1) is showing the relationship between the independent variable and dependent which is created based on the previous studies.



**Figure 3.1: Conceptual Framework**

CAMEL model has five parameters comprising capital adequacy, assets quality, management efficiency, earning ability, and liquidity statuses are taken as independent variables while banks size is taken as a control variable and accounting-based performance and market-based performance are taken as dependent variables.

### 3.2 Measuring the key variables

This section presents the measurements of dependent, independent, and control variables that are selected to analysing the impact of the CAMEL model on the performance of listed commercial banks in Sri Lanka.

#### 3.2.1 Dependent Variables

This study used two dependent variables to measure accounting-based performance and market-based performance of the listed commercial banks in Sri Lanka. The accounting based performance is measured by using the ROE ratio which the return made by the firm to its shareholder investments.

$$\text{ROE} = \frac{\text{Net profit after tax}}{\text{Total equity}}$$

The market-based performance is measured by Tobin's Q Ratio which is derived by James Tobin to evaluate the market-based performance of the banks. He has defined Tobin's Q ratio as a ratio of the market value of all outstanding shares and all debt of the firm to the replacement value of its assets (Rostami, 2015). However, calculating Tobin's Q ratio is a difficult task because it requires more data and more computational effort. On the other hand availability of accurate and timely data required to calculate Tobin's Q ratio is limited when compared with the data requirement of other financial ratios.

Therefore Chung & Pruitt (1994) have developed a more theoretically accurate model for the Tobin's Q ratio which explained at least 96.6% of the total variability of Tobin's Q ratio. This approximation of Tobin's Q ratio has overcome the practical issues in the calculation of the original Tobin's Q ratio. Past studies have used approximate Tobin's Q Ratio to measure the market-based performance of banks (Masa'deh *et al.*, 2015; Li, 2013; Ali, Mahmud, & Lima, 2016). Therefore this study has taken approximate Tobin's Q Ratio for the measurement of market-based performance of banks.

$$\text{Approximate Tobin's Q} = \frac{\text{MV (OS)} + \text{BV(PS)} + \text{BV(TD)}}{\text{BV(TA)}}$$

In this equation, MV = market value, BV = book value, OS = ordinary shares, PS = preference shares, TD = total debt and TA = total assets.

#### 3.2.2 Independent and Control variable

Table 3.1 indicates proxies which are developed to measure the independent and control variable based on the academic literature and those proxies are selected which most of the past studies used.

**Table 3.1: CAMEL Parameters and Measurement**

CAMEL Parameter	Ratio	Formula	Source
Capital Adequacy	CAR	$\frac{\text{Equity}}{\text{Risk-weighted assets}}$	Chowdhury & Rasid (2017) Menicucci & Paolucci (2016) Salike & Ao (2017)
Assets Quality	NPLR	$\frac{\text{NPL}}{\text{Total loans}}$	Chowdhury & Rasid (2017) Saif- Alyousfi <i>et al.</i> , (2017) Sufian (2012)
Management Efficiency	CIR	$\frac{\text{Operating Expenses}}{\text{Total income}}$	Munir & Bustamam (2017) Salike & Ao (2017) Sufian (2012)
Earning Ability	NIM	$\frac{\text{Net interest}}{\text{Average earning assets}}$	Sufian (2012) Zagherd & Barghi (2017) Rostami (2015)
Liquidity Statues	LDR	$\frac{\text{Total loan}}{\text{Total deposits}}$	Saif- Alyousfi <i>et al.</i> , (2017) Salike & Ao (2017) Menicucci & Paolucci (2016)
Bank Size	LTA	Log of total assets	Ali & Puah (2018) Menicucci & Paolucci (2016) Chowdhury & Rasid (2017)

### 3.3 Hypotheses Development

The following hypothesis has developed based on the previously outlined arguments.

$HA_1: \beta_i \neq 0$

$HA_1$ : CAMEL parameters have a significant impact on commercial banks' market-based performance

$HA_0: \beta_i = 0$

$HA_0$ : CAMEL parameters have no significant impact on commercial banks' market-based performance

$HB_1: \beta_i \neq 0$

$HB_1$ : CAMEL parameters have a significant impact on commercial banks' accounting based performance

$HB_0: \beta_i = 0$

$HB_0$ : CAMEL parameters have no significant impact on commercial banks' accounting based performance.

### 3.4 Population and Sample

This study has focused on the evaluation of both market-based performance and accounting-based performance of listed commercial banks in Sri Lanka for the period from 2014 to 2019. Therefore, only commercial banks listed in the Colombo Stock Exchange (11 Banks) are in the population of the study. The sample was composed of all commercial banks listed in the CSE excluding only 3 listed commercial banks due to insufficiency and unavailability of data. Cargills bank plc was incorporated in 2014. Therefore the audited annual reports were not available for some of the years selected for the analysis. DFCC bank plc has been excluded from the sample as they have used a different year of assessment to prepare a financial statement for some of the years between 2014 and 2019. Amana bank plc has eliminated from the sample as they showed outliers by experiencing significant losses in some years. The final sample of this study has comprised 8 listed commercial banks in Sri Lanka which have own 53.80% of the total commercial banking assets.

### 3.5 Data Sources and Collection Method

This study has used secondary data to evaluate the impact of the CAMEL model on the performance of commercial banks in Sri Lanka for the period of 2014 to 2019. The data has used to measure CAMEL indicators and bank performance was extracted from the Comprehensive income statement, Balance sheet, and other ratio analysis in notes of the financial statement. Therefore, Audited Financial Statement of the commercial banks has been obtained from commercial banks databases and CSE database. In addition to this website of CBSL, academic journals and relevant textbooks have considered conducting this study.

### 3.6 Data Analysis

This study has carried out descriptive statistical analysis, correlation analysis, and multiple regression analysis to explore the impact of CAMEL parameters on the performance of commercial banks in Sri Lanka. The descriptive statistical analysis has provided an overview of every variable's behaviour and depicted the mean, standard deviation, minimum value, and maximum value of each variable. The correlation analysis has indicated the relationship between the independent and dependent variables. Moreover, the multiple regression analysis was used to measure the impact between independent and dependent variables. Following multiple regression models have been used to analyse the impact between CAMEL indicators and both accounting and market-based performance of the commercial banks in Sri Lanka.

$$AP = \alpha^{\circ} + \beta_1 CA_{it} + \beta_2 AQ_{it} + \beta_3 ME_{it} + \beta_4 EA_{it} + \beta_5 LS_{it} + \beta_6 BS_{it} + \varepsilon_{it}$$

$$MP = \alpha^{\circ} + \beta_1 CA_{it} + \beta_2 AQ_{it} + \beta_3 ME_{it} + \beta_4 EA_{it} + \beta_5 LS_{it} + \beta_6 BS_{it} + \varepsilon_{it}$$

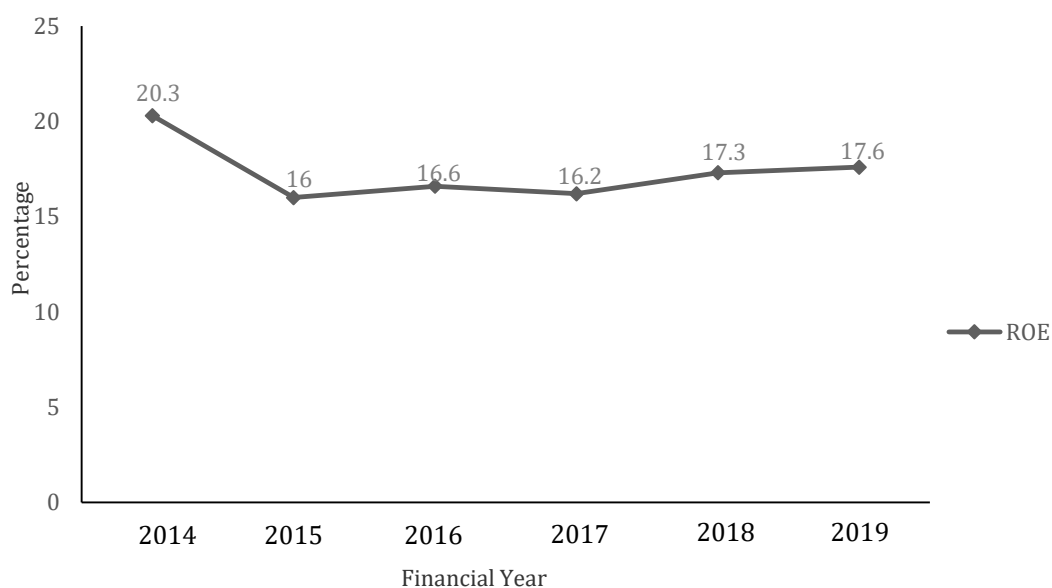
In this equation, AP= Accounting based performance, MP= Market based performance,  $\alpha^{\circ}$  =Intercept, CA= Capital adequacy, AQ= Assets quality, ME= Management efficiency, EA= Earning ability, LS= Liquidity statuses, BS=Bank size,  $\varepsilon$  = Error term,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ ,  $\beta_5$  and  $\beta_6$  are the coefficient of variables.



## 4. Results/Analysis and Discussion

### 4.1 Bank Performance in Sri Lanka

The banking sector in Sri Lanka consists of the central bank, 26 licensed commercial banks and 7 licensed specialized banks. It pertains 69.8% share of total assets of the financial system in Sri Lanka. The profit after tax of the banking sector gradually increased from 82.3 billion in 2014 to 138.9 billion in 2019 (CBSL, 2018). Figure 4.1 illustrates the changes in ROE of the banking sector in Sri Lanka from 2014 to 2019. ROE has shown a noticeable decrease from 20.3% in 2014 to 16% in 2015. It was slightly increased by 0.06% in 2016 and decreased to 16.2% in 2017. However, it was gradually increased to 17.3 and then 17.6 in 2018 and 2019 respectively by indicating a favorable situation in banking sector performance.



**Figure 4.1: ROE Ratios of Banking Sector**

*Source: Author Constructed*

### 4.2 Descriptive Analysis

The descriptive statistic has described the basic characteristics of the variables. It consists of mean, standard deviation, minimum value and the maximum value of the selected variables which has presented in Table 4.1.

**Table 4.1: Descriptive Statistics**

	Minimum	Maximum	Mean	Std. Deviation
TQR	93.68	132.98	102.81	6.54
ROE	0.69	44.69	15.73	7.44
CAR	11.40	40.93	15.81	4.56
CIR	31.00	82.50	55.39	11.16
NPLR	1.31	15.25	4.05	2.80
LDR	80.49	119.00	94.78	8.05
NIM	2.63	5.80	4.09	0.81

LTA	10.49	12.06	11.40	0.41
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Source: Author constructed

According to the descriptive statistics mention in Table 4.1, the mean value of TQR was 102.81% with the 6.54% standard deviation. The minimum value of TQR was 93.68% and the maximum value was 132.98% over the 6 years selected period. This substantial amount provides evidence that listed commercial banks in Sri Lanka were able to gain the highest market profit. The mean value of ROE was 15.73% over the period 2014-2019. That demonstrates the unremarkable performance of the listed commercial banks because the minimum profitability was 0.69% and maximum profitability limited to 44.69%. The standard deviation from the mean was 7.44%.

CAR has shown the weak mean value of 15.81% with a standard deviation of 4.56% due to the minimum value of 11.40% and a maximum value of 40.93%. It indicated the inability of the listed commercial banks to handle losses arising from certain risk. The mean value of the CIR was 55.39% with the standard deviation of 11.15% over the period 2014-2019. Also, the maximum value of 82.50% depicted the management inefficiency of the selected listed commercial banks. LDR was reported 80.49% minimum value and 119% maximum value over the last 6 years. That indicates selected listed commercial banks has maintained minimum liquid assets.

The NPLR of the selected listed commercial bank has shown remarkable level by the 4.04% of mean value. The standard of the mean was 2.80% and the minimum and the maximum value of NPLR was 1.31% and 15.25% respectively. It indicates the sound assets quality of the commercial banks over the period 2014-2019. The mean value of NIM was 4.09% with a standard deviation of 0.81% due to the minimum value of 2.63% and the maximum value of 5.80%. These values provide evidence for the weakness profitability of the selected listed commercial banks.

**Table 4.2: Correlations Statistics**

	TQR	ROE	CAR	CIR	NPLR	LDR	NIM	LTA
TQR								
PC	1	-.180	.319*	.173	.663**	-.047	.148	-.078
Sig.		.220	.027	.241	.000	.750	.314	.596
ROE								
PC		1	-.391**	-.761**	-.400**	.113	.175	.448**
Sig.			.006	.000	.005	.443	.234	0.001
CAR								
PC			1	.393**	.157	.088	.106	-.397**
Sig.				.006	.285	.554	.474	.005
CIR								
PC				1	.457**	-.197	-.038	-.666**
Sig.					.001	.179	.799	.000
NPLR								
PC					1	-.509**	.357*	-.407**
Sig.						.000	.013	.004

LDR				
PC	1	-.507**	.111	
Sig.		.000	.451	
NIM				
PC		1	.095	
Sig.			.523	
LTA				
PC				1

Note: PC denotes Pearson Correlation. The symbol (\*) and (\*\*) indicate statistically significant at 5% and 1% level (2-tailed).

Source: Author constructed

### 4.3 Correlation Analysis

Correlation analysis has presented the degree of association between the independent and dependent variable separately. Therefore collected data was analysed to present the Pearson correlation coefficient. The significant level was set at 5% with a 2-tailed test. According to correlation statistic has mentioned in Table 4.2, the TQR was positively correlated with CAR, CIR, NPLR and NIM how even only CAR and NPLR are at a significant level. Inversely TQR negatively correlated with LDR of the listed commercial banks. Furthermore, ROE was positively correlated with LDR and NIM. On the other hand, ROE negatively correlated with CAR, CIR and NPLR at a significant level.

### 4.4 Regression Analysis

This study has selected multiple linear regression model to achieve the objective of the study. The statistical impact between CAMEL parameters and performance of listed commercial banks in Sri Lanka was evaluated through a regression analysis. Two regression model was applied because of the two dimensions of the bank performance. The model 01 evaluated the impact of CAMEL parameters on market-based performance and model two evaluated the impact of CAMEL parameters on accounting-based performance. Table 4.5 summarized the regression analysis result.

**Table 4.3: Model Summary**

	Model 01	Model 02
R Square	0.701	0.664
Adjusted R Square	0.658	0.615
F Change	16.045	13.527
Sig. F Change	.000	.000
Durbin-Watson	2.089	1.868
Dependent Variable	TQR	ROE

Source: Author constructed

The model summary (Table 4.3) indicates that five independent variables address 70.1% of the variation in TQR ( $R^2 = .701$ ,  $F = 16.045$ ,  $P < .05$ ,  $DW = 2.089$ ). Moreover results indicate that five independent variables address 66.4% of the variation in ROE ( $R^2 = .664$ ,  $F = 13.527$ ,  $P < .01$ ,  $DW = 1.868$ ). The Durbin Watson value of model 01 was 2.094 and

model 02 was 1.852. Both Durbin Watson values were in the accepted range of 1.5 to 2.5, indicating that observation of both models was not autocorrelated.

**Table 4.4: ANOVA**

	Model 01	Model 02
F Value	16.045	13.527
Sig.	.000 <sup>b</sup>	.000 <sup>b</sup>
Dependent Variable	TQR	ROE

*Source: Author constructed*

As illustrated in Table 4.4, the F value of the model 01 was 16.045 at the 1% significant level and F value of model 02 was 13.527 at the 5% significant level. This has indicated that both model 01 and model 02 are accepted as the statistical significant model at the 1% significant level.

#### 4.4.1 Model 01

Table 4.5 has presented the impact of CAR, CIR, NPLR, LDR and NIM on TQR. The result indicates that TQR would be 3.223 when the five independent variables remain zero (B = 3.223, P > 0.05). CAR has significant impact on TQR (B = .49, P = .002). Similarly NPLR has significant impact on TQR (B = 2.386, P = .000). Moreover LDR has significant impact on TQR (B = .25, P = .01). CIR has no significant impact on TQR (B = -.076, P = .298). Moreover TQR was not impacted by NIM significantly (B = -1.097, P = .218). Therefore it is evident that, as a level of CAR, NPLR and LDR increase, TQR is increased.

#### 4.4.2 Model 02

Table 4.5 has presented the impact of CAR, CIR, NPLR, LDR and NIM on ROE. Results indicate that ROE would be 81.393 when the five independent variables remain zero (B = 81.393, P < .05). CIR has significant impact on ROE (B = -.479, P = .000). Similarly NIM has significant impact on ROE (B = 2.571, P = .014). CAR does not have significant impact on ROE (B = -.318, P = .069). Similarly NPLR does not have significant impact on ROE (B = -.580, P = .084). Moreover ROE is not impacted by LDR significantly (B = .026, P = .793). Therefore the result evident that, the level of CIR increases lead to decrease ROE and the level of NIM increases lead to increase ROE.

**Table 4.5: Regression Statistics**

	Model 01			Model 02		
	B	t	Sig.	B	t	Sig.
Constant	3.223	0.121	.904	81.393	2.529	.015
CAR	0.49	3.386	.002	-0.334	-1.915	.062
CIR	-0.076	-1.055	.298	-0.476	-5.449	.000
NPLR	2.386	8.879	.000	-0.559	-1.726	.092
LDR	0.25	2.714	.01	0.054	0.49	.627
NIM	-1.097	-1.25	.218	2.713	2.565	.014
LTA	5.895	3.017	.004	-4.208	-1.786	.082

Dependent Variable	TQR	ROE
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*Source: Author constructed*

#### 4.5 Hypothesis Testing

Hypotheses have tested based on the results of the regression analysis.

**Table 4.6: Hypothesis Testing**

	Hypothesis	Accepted/ Rejected
HA <sub>0</sub>	CAMEL parameters have no significant impact on commercial banks' market-based performance	Rejected
HB <sub>0</sub>	CAMEL parameters have no significant impact on commercial banks' accounting based performance	Accepted

*Source: Author constructed*

#### 4.6 Discussion

The analysis of the regression model 01 reveals the impact of CAMEL parameters on the market-based performance of listed commercial banks. The result of the regression analysis indicates capital adequacy, assets quality and liquidity statues have a significant impact on the Tobin's Q ratio. Saif- Alyousfi, Saha, & Md-Rus (2017) has evaluated the market performance of the conventional bank in Saudi Arabia and revealed that capital adequacy, assets quality and liquidity statues have a significant impact on Tobin's Q ratio. Furthermore, the same result is indicated by Rostami (2015) analyzing the market performance of the Iranian bank using the CAMEL model.

Regression model 02 analyze the impact of CAMEL parameters on the accounting-based performance of the listed commercial bank. The result of the study reveals that earing ability, management efficiency has a significant impact on profitability. The result is supported by past literature (Weersainghe & Perera, 2013; Zagherd & Barghi, 2017; Saif- Alyousfi, Saha, & Md-Rus, 2017). Inversely result of the regression model 02 indicates that capital adequacy, assets quality and liquidity statues do not have a significant impact on the profitability of commercial banks. Also, literature proves this insignificant impact of capital adequacy, assets quality and liquidity statues on bank profitability (Saif- Alyousfi, Saha, & Md-Rus, 2017; Ongore & Kusa, 2013; Weersainghe & Perera, 2013; Zagherd & Barghi, 2017).

### 5. Conclusion and Implications

#### 5.1 Summary of the Study

The banking sector is a rapidly growing sector and it is a backbone of the financial system of the country because the banking sector facilitates optimum utilization of financial resources. However, the banking sector in Sri Lanka has been shown light crisis in recent years. Therefore it is important to increase focus on bank supervision activities to ensure a healthy banking system. CAMEL model plays a vital role in the process of evaluating the soundness of the bank's performance and provides direction to mitigate potential risk which may lead to bank failures. The analysis of the literature indicated that contradictable arguments about the impact of the CAMEL model on bank performance. On the other hand, past studies mainly focused on accounting-based performance, and

less attention was given to market-based performance. Moreover, there are limited facts about the Sri Lankan context.

This study was conducted to fill this research gap by analyzing the impact of the CAMEL model on both accounting and market-based performance of listed commercial banks in Sri Lanka over the period 2014-2017. Therefore 11 commercial banks listed in the Colombo Stock Exchange have been taken as the population of the study and 8 listed commercial banks have been taken for the evaluation. This study has used secondary data collected through the audited financial statement of listed commercial banks. The basic behavior of both independent and dependent variables was described using descriptive statistical analysis. Correlation analysis has indicated the relationship between independent and dependent variables. The impact of the CAMEL parameters on bank performance is analyzed through regression analysis.

## 5.2 Conclusion

The study made a conclusion based on the regression analysis result. The findings of the regression analysis of the CAMEL model and market-based performance revealed that capital adequacy, assets quality, and liquidity status have a positive significant impact on the market-based performance of the listed commercial bank. While the other two CAMEL parameters of management efficiency and earning ability have an insignificant negative impact on market-based performance. Finally regression model 01 result concluded that CAMEL parameters have an impact on market-based performance at a significant level by accepting the HA1 hypothesis.

Based on the finding of the regression analysis of CAMEL model and accounting-based performance revealed that management efficiency has a negative significant impact on the accounting-based performance of the listed commercial banks while earning ability has a positive impact on the accounting-based performance of the listed commercial banks at the significant level. However capital adequacy and assets quality have an insignificant negative impact while liquidity statutes have an insignificant positive impact on the accounting-based performance of listed commercial banks. Therefore finding of the regression model 02 analysis indicated that CAMEL parameters do not have a significant impact on the accounting-based performance of listed commercial banks in Sri Lanka by accepting the HB0 null hypothesis.

## 5.3 Limitations of the Study

The Sri Lankan banking system consists of 26 licensed commercial banks and 7 licensed specialized banks. The licensed commercial banks consist of 13 domestic banks and 13 foreign banks. This study has evaluated only domestic commercial banks which are listed in CSE and excluded 2 state banks; Bank of Ceylon and Peoples Bank because their market stock prices are not available. Further, this study has been limited to the recent 6 years (2014-2017).

The past empirical studies have reported the impact of external factors on a bank's performance such as exchange rate, inflation, interest rate, GDP growth rate, etc. However, this study has only evaluated the impact of internal factors of the commercial banks on their performance. Also, some of the studies have used CAMELS models which

have six parameters to conduct their research. However, this study adopted the CAMEL model as an independent variable which has five parameters, thus excluding only the firm size element due to the inability to obtaining realistic information from commercial banks.

#### **5.4 Implications**

The finding of this study reveals that capital adequacy has a positive significant impact on the market-based performance of the listed commercial banks. Therefore the increase in capital adequacy leads to an increase in market-based performance. Banks enable to handle losses arising from credit risk, market risk, and operational risk by maintaining adequate capital levels. Therefore management of the banks should give much more attention to ensure adequate capital level. Also, regulatory authorities should monitor the minimum capital levels of commercial banks.

Sometimes higher Tobin's Q ratio has presented in financial statements mislead the stakeholder by indicating a more favorable situation. The finding of the study provides vital information to all stakeholders than what they draw from the financial statement. Tobin's Q ratio is positively impacted by assets quality and liquidity status at a significant level. The assets quality and liquidity status are measured using a proxy of non-performing loan ratio and loans to deposit ratio and an increase of those ratios leads to an increase in Tobin's Q ratio because of the reduction of the total assets.

The finding suggests that management efficiency has a negative significant impact and earning ability has a positive significant impact on ROE. Banks can increase profit by implementing strategies to achieve high efficiency by reducing non-value-added activities and operations. Investors can gain a better understanding of the strength and weaknesses of the banks and that will help to make a precise and timely decision of their investments. As well as findings provide a signal to policymakers about key determinacies of bank performance which should regulate to ensure a sound banking system.

#### **5.5 Recommendations**

The study focused on the impact of the CAMEL model on the performance of listed commercial banks in Sri Lanka. However, specialized banks, finance companies, cooperatives, microfinance institutions, etc. are important to the financial system stability in Sri Lanka. Therefore future studies can cover those areas and extend the finding to the whole financial system. Furthermore, this study considers only internal determinants when assessing the performance of the listed commercial banks excluding the external determinant such as inflation, exchange rate, GDP growth, etc. Therefore future studies should be conducted to find out the impact of both internal and external determinants on the performance. Finally, an extended period of investigation and multiple measurements of the variable are recommended for future studies to obtain more meaningful findings.

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## References

- Ab-Rahim, R., Kadri, N., Ee-Ling, A.-C., & Dee, A. A. (2018). CAMEL Analysis on Performance of ASEAN Public Listed Banks. *International Business Research*, 96-105.
- Ali, M., & Puah, P. C. (2018). The internal determinantsof bank profitabilityandstability AninsightfrombankingsectorofPakistan . *Management Research Review*.
- Almazari, A. (2013). Capital adequacy, cost income ratio and the performance of Saudi banks (2007-2011). *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 3(4), 284-293.
- Almumani, M. (2013). The relative efficiency of Saudi banks : Data envelopment analysis models. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 3(3), 152-161.
- Arif, A., & Anees, A. N. (2012). Liquidity risk and performance of banking system. *Journal of Financial Regulation and Compliance*, 20(2), 182-195.
- Aspal, P. K., & Dhawan , S. (2016). Camels Rating Model For Evaluating Financial Performance of Banking Sector: A Theoretical Perspective. *International Journal of System Modeling and Simulation*, 1, 10-15.
- CBSL. (2018). *Central Bank of Sri Lanka Annual Report*. Central Bank of Sri Lanka.
- Chowdhury, M. A., & Rasid, M. E. (2017). Determinants of Performance of Islamic Banks in GCC Countries: Dynamic GMM Approach. *In Advances in Islamic Finance, Marketing, and Management*, 49-80.
- Dash, M. (2017). A Model for Bank Performance Measurement Integrating Multivariate Factor Structure with Multi-Criteria PROMETHEE Methodology. *Asian Journal of Finance & Accounting*, 9, 310-332.
- Desta, D. S. (2016). Financial Performance of "The Best African Banks": A Comparative Analysis Through CAMEL Rating. *Journal of Accounting and Management*, 6(1), 1-20.
- Dhaigude, S. A., & Chatterjee, D. (2018). Calibrating the factors of management quality in banking performance: a mixed method approach. *Measuring Business Excellence*.
- El-Sood, H. A. (2015). Are regulatory capital adequacy ratios good indicators of bank failure? Evidence from US banks. *International Review of Financial Analysis*, 1-33.
- Erol, C., Baklaci, F. H., Aydoğan, B., & Tunc, G. (2014). Performance comparison of Islamic (participation) banks and commercial banks in Turkish banking sector. *Performance comparison of Islamic (participation) banks and commercial banks in Turkish banking sector*, 9, 114-128.
- Flamini, V., McDonald, C., & Schumacher, L. (2009). The determinants of commercial bank profitabilityinSub-SaharanAfrica. *IMF Working Papers Series*, 1-32.



- Ghasempour, S., & Salami, M. (2016). Ranking Iranian Private Banks Based on the CAMELS Model Using the AHP Hybrid Approach and TOPSIS. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 52-62.
- Hays, F., De Lurgio, S., & Gilbert, A. (2009). Efficiency Ratios and Community Bank Performance. *Journal of Finance and Accountancy*, 1.
- Jara-Bertin , M., Moya , J. A., & Perales, A. R. (2014). Determinants of bank performance: evidence for Latin America. *Academia Revista Latinoamericana de Administracion*, 27(2), 164-182.
- Jha, S., & Hui, X. (2012, June 27). A comparison of financial performance of commercial banks: A case study of Nepal. *African Journal of Business Management*, 6(25), 7601-7611.
- Karim, M. A., Hassan, M., Hassan, T., & Mohamad, S. (2014). Capital adequacy and lending and deposit behaviors of conventional and Islamic banks. *Pacific- Basin Finance Journal*, 58-75.
- Keshar, J. (2005). Health Check-up of Commercial Banks in the Framework of CAMEL: A Case Study of Joint Venture Banks in Nepal. *The Journal of Nepalese Business Studies* , 41-55.
- Kumar, D., & Alam, M. (2018). Analysis of The Performance of Selected Public Sector Banks using Camels' Approach. *International Journal of Management Studies*, 145-153.
- Masa'deh , R. (., Tayeh, M., Al-Jarrah, M. I., & Tarhini, A. (2015). Accounting vs. Market-based Measures of Firm Performance Related to Information Technology Investments. *International Review of Social Sciences and Humanities*, 9, 129-145.
- Menicucci, E., & Paolucci, G. (2016). The determinants of bank profitability: empirical evidence from European banking sector. *Journal of Financial Reporting and Accounting*, 14, 86-115.
- Mensi, S., & Zouari, A. (2010). Efficient Structure versus Market Power: Theories and Empirical Evidence. *International Journal of Economics and Finance*, 2(4), 151-166.
- Mohanty, D. (2017). Financial Performance Measurement of Selected Commercial Banks Based on CAMEL Rating System. *Journal of Management Sciences and Technology*, 4(3), 10-24.
- Mohiuddin, G. (2014). Use of CAMEL Model: A Study on Financial Performance of Selected Commercial Banks in Bangladesh. *Universal Journal of Accounting and Finance*, 151-160.
- Mulualem, G. (2015). *Analysing Financial Performace of Commercial banks in Ethiopia: CAMEL approach*.
- Munir, M. B., & Bustamam, U. S. (2017). CAMEL Ratio on profitability banking performance (Malayasia versus Indonesia). *International Journal of Management, Innovation & Entrepreneurial Research*, 30-39.

- Olweny, T., & Shipho, T. (2011). Effects of banking sectoral factors on the profitability of commercial banks in Kenya. *Economics and Finance Review*, 1(5), 01-30.
- Ongore, V., & Kusa, G. (2013). Determinants of financial performance of commercial banks in Kenya. *International Journal of Economics and Financial Issues*, 3(1), 237-252.
- Rashid, A., & Jabeen, S. (2016). Analyzing performance determinants: Conventional versus Islamic Banks in Pakistan. *Borsa Istanbul Review*, 16(2), 92-107.
- Rhoades, S. (1985). Market share as a source of market power: implications and some evidence. *Journal of Economics and Business*, 37, 343-363.
- Roman, A., & Sargu, A. C. (2013). Analysing the Financial Soundness of the Commercial Banks in Romania: An Approach Based on the Camels Framework . *Procedia Economics and Finance* , 703-712.
- Rostami, M. (2015, Oct). Determination of Camels model on bank's performance. *International Journal of Multidisciplinary Research and Development*, 2, 652-664.
- Saif- Alyousfi, Y. A., Saha, A., & Md-Rus, R. (2017). Shareholders' Value of Saudi Commercial Banks: A Comparative Evaluation between Islamic and Conventional Banks using CAMEL Parameters. *International Journal of Economics and Financial Issues*, 7(1), 97-105.
- Salhuteru, F., & Wattimena, F. (2015). Bank Performance with CAMELS Ratios towards earnings management practices In State Banks and Private Banks. *Advances in Social Sciences Research Journal*, 2(3).
- Salike, N., & Ao, B. (2017). Determinants of bank's profitability: role of poor asset quality in Asia. *China Finance Review International*.
- Sathyamoorthi, C., Mapharing, M., Ndzinge, S., Tobedza, G., & Wally-Dima, L. (2017, Oct 25). Performance Evaluation of Listed Commercial Banks In Botswana: The Camel Model. *Archives of Business Research*, 5, 142-159.
- Simanjuntak, D., & Francis, M. (2016). Bank Financial Performance Using Camel Ratio and Market Value Tobin's Q of Banking Sub-Sector Listed at Indonesian Stock Exchange. *Procedia Economics and Finance* 6 , 17-22.
- Talbi, D., & Bougatef, K. (2018). The internal and external determinants of the intermediation margin of banks across MENA countries. *EuroMed Journal of Business*.
- Tan, Y., & Floros, C. (2012). Bank profitability and GDP growth in China. *Journal of Chinese Economic and Business Studies*, 10(7), 267-273.
- Weersainghe, V., & Perera, T. R. (2013). Determinants of Profitability of Commercial Banks in Sri Lanka. *International Journal of Arts and Commerce*, 2(10), 141-170.
- Zagherd, M. K., & Barghi, M. (2017). Performance Evaluation of Iranian Banking Industry through CAMELS Framework. *Journal of Accounting & Marketing*, 6(2), 1-7.