Impact of Credit Risk Management on the Profitability of Licensed Banks in Sri Lanka

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ABSTRACT

This paper aims to assess the impact of credit risk management on the profitability of licensed commercial and licensed specialized banks in Sri Lanka from 2015 to 2021. Capital adequacy, Asset quality, Management efficiency, Earnings and Liquidity components are adopted to measure the credit risk and profitability is measured using Return on Equity ratio. Secondary data from a sample of 22 banks including 18 licensed commercial banks and 4 licensed specialized banks is used for the study. Panel data regression model is used for the analysis of data using STATA software. The findings reveal that asset quality and earnings variables has a significant impact on the profitability of licensed banks in Sri Lanka. Moreover, maintaining lower non-performing loan and higher returns on assets would enable the banks to achieve higher profits.

Keyword: - *Credit risk management, Licensed commercial banks, Licensed specialized banks, Capital adequacy, Non-Performing Assets, Earnings, Profitability*

1. INTRODUCTION

The banking industry is an essential sector that plays a major role in broadening the economy of every country (Singh & Sharma, 2018). The main income of banks is earned by the provision of loans to customers, and it is also the fundamental objective of a bank (Hurka, 2017). Credit risk can be considered as an important part of risks that banks encounter, taking into consideration that permitting credit is the main source of income of banks which in turn affects bank profitability. Credit risk is also the primary indicator of financial well-being. Substandard of the quality of credits and loans have caused immense bank failures (Boahene, et al., 2012). According to The Basel Committee on Banking Supervision (2000), the prime reason for prominent issues of banks is still directly associated with eased credit standards for borrowers, counterparties, and inferior risk management of loan portfolios. Proper management of credit risks is essential for banks, which in turn will contribute immensely to the growth of the economy. However, escalating credit losses could have dire repercussions for the banks as it can lead to liquidation. This is because the survival of the banks depends on income generated from credit facilities and loans to customers. Considering this, the international banking regulations organization called the Basel Committee on Banking Supervision proposed the Basel Accords, to maintain ideal capital requirements to minimize credit risk. Analyzing financial performance is mandatory for banks, and as such, various ratios have been applied to measure and assess the performance.

In Sri Lanka, licensed specialized and licensed commercial banks play a key role in accumulating and organizing financial resources for investment by extending credit to firms and investors. Credit management is critical for protecting depositors' funds as well as the capacity of the banks to operate. Similar to many other financial sectors in both developed and emerging economies, global banks too have faced difficulties in recent years predominantly due to the failure in credit risk management (Hussain, Zafar and Awan 2017).

Regardless of the issues that Sri Lankan banks encounter, loans settled past the maturity date have resulted in highly unfavorable implications as banks face challenges to maintain control over their losses (Morawakage and Perera 2016). Moreover, credit risk is a key concern since a bank's debts grow in the event of borrowing additional credit from outside sources to satisfy its demands, particularly from its clients who are forced to make cash withdrawals. Globally, when banks encountered the COVID-19 crisis they were in a better position to meet the lending

requirements of the real economy. Infectious diseases such as COVID-19 influence a country's social security and economic stability (Disemadi and Shaleh 2020). However, only a limited amount of studies have been conducted to analyze the impact of credit risk management on licensed banks' profitability in Sri Lanka using the Capital adequacy, Asset quality, Management efficiency, earnings, and Liquidity (CAMEL) model.

Most recent data, considering a period between 2015 to 2021 was utilized in measuring the impact to gain an insight into how credit risk management in licensed banks is conducted and its impact on the banks' profitability. The application of panel data analysis emphasizes the variation over the period across the banks providing more insights to the study which adds novelty to the research. The study identifies credit risk components as the independent variables and profitability as the dependent variable. To measure the independent variables the CAMEL model will be adopted whereas profitability will be measured using the Return on Equity (ROE) ratio. This study uses secondary data from the annual reports and audited financial statements of banks in Sri Lanka. A sample of 22 licensed banks is considered from a population of 30 licensed banks.

The study attempts to address the following research question in accordance with the overall objectives.

1. What is the impact of credit risk management on the licensed bank's profitability?

The study's main objective is to measure the impact of credit risk management on the profitability of licensed commercial banks and licensed specialized banks in Sri Lanka from 2015 and 2021. And the sub-objectives of the study are as follows.

1. To measure the impact of Capital adequacy on Return on Equity.
2. To measure the impact of Asset quality on Return on Equity.
3. To measure the impact of Management efficiency on Return on Equity.
4. To measure the impact of Earnings on Return on Equity.
5. To measure the impact of Liquidity on Return on Equity.

The paper will sequentially incorporate a thorough literature review, a detailed methodology section, and conclude with a comprehensive summary.

2. LITERATURE REVIEW

Credit risk, operational risk, portfolio risk, interest rate risk, and union risk are some of the risks that banks face. Credit risk is the most critical risk that affects them, necessitating specific focus and emphasis on actions aimed at minimizing the negative impact on banks (Saeed & Zahid, 2016). Due to significant credit risk, the banking industry is prone to failure, which can sometimes result in the collapse of the entire financial system. Credit risk is considered to arise when a borrower fails to meet their obligations about future cash flows (Accornero, et al., 2017). Financial institutions perceive appropriate credit risk supervision as a crucial aspect of their growth and sustainability.

Credit risk management is defined as an organized mechanism for determining uncertainties through risk assessments, developing risk management strategies, and utilizing managerial skills for risk mitigation. Risk management strategies include transferring uncertainties to another party, avoiding risk, limiting the negative effects of risk, and welcoming some or all consequences of a specific risk (Afriyie & Akotey, 2013) The importance of credit risk management grows when credit risk becomes a determining factor in performance. According to Ekinci and Poyraz (2019), the process of good credit risk management is crucial for banks. Furthermore, banks should place a greater emphasis on credit risk management, particularly in terms of loan monitoring, and managers should prioritize current credit risk management methodologies.
Previous studies have investigated the relationship between credit risk management and the profitability of banks. According to various studies conducted by different authors, it has been determined that credit risk management is the foundation for profitability.

According to research conducted in Europe, Li & Zou (2014) have found that there is a favorable association between credit risk management and profitability of forty-seven commercial banks in Europe for the period 2007-2012. They have used CAR and NPLR to measure credit risk and applied ROA and ROE to assess profitability. The study found that the better credit risk management, the higher the profitability of commercial banks. Further, Saeed & Zahid (2016) investigated the impact of credit risk on the profitability of a sample of five large commercial banks

in the United Kingdom from 2007 to 2015. This period covers the financial crisis of 2008. Based on regression models, the study found that credit risk measures have a positive relationship with profitability. Another study was conducted by Hallunovi & Berdo (2018) to reveal the relationship between credit risk management and the profitability of commercial banks in Albania. The empirical investigation has concluded that there is a strong relationship between credit risk and commercial bank profitability. To respond properly to risk occurrences, banks must ensure that they are usually aware of the performance of their loan portfolios, as well as the weight they hold in the overall portfolio.
Moreover, empirical evidence was found in the African context. Boahene et al. (2012) researched to disclose the association between credit risk and profitability of Ghanaian banks through a panel data analysis model. The investigation had obtained data from the annual Reports of six Ghanaian banks from 2005 – 2009. The study discovered that credit risk management was positively related to bank profitability. The findings also show that bank size, growth, and debt capital all have a positive and significant impact on bank profitability.

Further, Ali and Dhiman (2019) investigated the association between credit risk and the bank's financial performance in India from 2010 to 2017 periods. The study was done using secondary sources of the top ten Indian public sector banks by considering the total asset base. A panel regression model was used to analyze the data by considering credit risk management as an independent variable measured by NPLR, LLP ratio, and CAMEL model components while ROA was used as the dependent variable. It has been concluded that measures used for managing credit risk have a significant influence on banks' financial performance. The authors have further emphasized that management quality and earnings significantly impact on profitability while capital adequacy and liquidity are statistically insignificant. Only a sample of ten banks has been selected for the research based on the highest asset base, and it is a limitation to the study as other banks are not included, which might create a different outcome to the study.

The relationship between credit risk and profitability has been studied by several studies in Sri Lanka. Rajkumar and Hanitha (2015) incorporated CAMEL components as a credit risk measure to study the impact on the financial indicators of banks owned by the public sector from 2006 to 2013. With the use of Pearson correlation analysis and multiple Ordinary Least Square (OLS) regression, a negative relationship was identified between CAMEL components and ROE which represents the financial performance. However, a positive relationship was found between earning and ROE and this relationship was also found to be significant. This study further highlighted the importance of the use of the CAMEL model and that this model can be used as a measure of credit risk management. However, this study has only utilized the state commercial banks in Sri Lanka, which includes two banks to conclude the impact between CAMEL components and profitability.

Another study was conducted in the Sri Lankan context by Rasika & Hewage (2015) especially focusing on banks that are systematically important to measure the effect that credit risk has on financial performance. This study shows that NPLR and CAR which were used as measures of credit risk have a significant negative impact on the profitability which was measured using ROE. This study showed different results compared to previous studies mentioned above stating that CAR has a positive and significant impact on profitability. However, this study was conducted for six commercial banks considering five years from 2011 to 2015 using multiple regression analysis. This study has been conducted by selecting only the significantly important banks in Sri Lanka. Further, the use of regression analyses can be seen as a limitation since the study was done from 2011 to 2015 years. Only two ratios were used to analyze the credit risk component in this study.

Furthermore, a similar study was conducted by Bandara et al. (2021) for the banking sector of Sri Lanka. This study was conducted using a panel regression model by using ROA to measure profitability and four ratios including capital adequacy ratio, non-performing loan ratio, Loan to Deposit Ratio (LDR), and Net Charge Off Ratio (NCOR) to measure credit risk. Here the author has included data for eight years from 2000 to 2010 involving thirteen banks in Sri Lanka. Similar results can be seen where NPLR and ROA have a significant inverse relationship with the profitability of the banks. However, the other two indicators were concluded to be insignificant.

Based on the literature available, most researchers have focused on investigating the relationship or the impact of credit risk management on financial profitability for banks. However, they have concluded with conflicting findings. In addition, limited research has been conducted considering both licensed commercial banks and licensed specialized banks in Sri Lanka. Similarly, insufficient research has been conducted on the recent impact of credit risk management on the profitability of Sri Lankan licensed banks as well. Consequently, this creates a research gap

to confirm the findings of previous studies and investigate the recent impact. Incorporating the CAMEL model to assess the impact was studied before, however, only limited research has been used to confirm that the model could be used as an indicator of credit risk. Therefore, our study will use the model to test this by using the whole population of licensed commercial and specialized banks in Sri Lanka. The impact of credit risk management on profitability is a significant study that needs to be thoroughly investigated as it sequentially impacts the economy.

3. METHODOLOGY

The study uses the illustrated conceptual framework in Figure 1 to assess the influence of credit risk management on licensed specialized and licensed commercial banks profitability. The purpose of this section is to examine the link between dependent and independent variables by considering the credit risk and profitability of licensed specialized and licensed commercial banks to the test.

3.1 Hypothesis Development

Hypothesis 1: Capital adequacy has a significant impact on Return on Equity.

Capital adequacy which represents the minimum amount of capital that a bank needs to maintain, can be identified as an important factor that can impact profitability. This variable can be identified as a significant component in determining a bank's credit risk. Most researchers have identified that capital adequacy has a significant impact on a bank's profitability. According to the research conducted by Hamza (2017), it showed that the regression coefficient is positive, indicating that CAR and ROE have a strong positive association. The results indicated that when CAR increases by 100%, ROE increases by 0.078624%. This demonstrates how capitalization improves a bank's profitability and risk-absorbing capabilities. The rise in CAR will boost banks' profitability and reinforce the assumption that banks with strong capital positions are better equipped to withstand credit risk losses (Hamza, 2017). Further, a study was investigated by Olalekan (2013) in Nigeria between 2006 and 2010, and it was discovered that capital adequacy had a major influence on the determination of profitability. In addition to that, a significant and negative relationship was identified by a study done by Boateng (2019) on banks' profitability and capital adequacy, which showed that 1% decline in capital adequacy results in a 59.5 percent drop in bank ROE. Based on the literature, this hypothesis was used to test the impact of CAR on ROE.

Hypothesis 2: Asset quality has a significant impact on Return on Equity.

The quality of assets is a critical criterion for determining financial strength. The effectiveness of a bank's lending choices and investment policies and procedures is reflected in asset quality (Boateng, 2019). According to Mishra & Aspal (2012) determining the percentage of non-performing assets in total assets is important to determine asset quality. Asset quality can be measured using various ratios and one of the most common ratios based on previous research is using the non-performing loan ratio. This expresses the number of loans that are non-performing and have defaulted for more than 90 days. NPLs are considered an important measure in determining credit risk and this is said to have a significant impact on the profitability of banks. According to past studies, Rasika & Hewage (2015) found that the Non-Performing Loan Ratio has a -0.922 coefficient at the 0.000 significant level, according to study conducted in Sri Lankan state banks. Because the significant value is smaller than 0.05, this finding concludes that NPLR has a negative effect on ROE. Further, it was identified that asset quality has a significant negative relationship with profitability. A 1% increase in loan impairment charges will result in a 13.5 percent drop in bank ROE (Boateng, 2019). However, a different result was found by a study implemented by Boahene, et al. (2012). These research findings showed that NPLs are strongly and positively associated with profitability of banks. The study also revealed that the NPLR is the most important indicator of a bank's profitability. So, based on these studies, the hypothesis 2 was developed.

1.4.3: Hypothesis 3: Management efficiency has a significant impact on Return on Equity.
Management efficiency is another component of the CAMEL model that can have an impact on the profitability of banks. The efficiency of the management depends on various factors such as the capacity to plan and adapt to changing environments, as well as the bank's leadership and administrative capabilities (Mishra & Aspal, 2012). Studies conducted to find the impact of credit risk management using the CAMEL model highlight the importance of management efficiency. A study by Ali & Dhiman (2019) depicts that management efficiency has a positive relationship and that the relationship is significant. This reflects that management adheres to numerous internal and external bank laws efficiently and effectively while performing well. The management parameter is shown to be

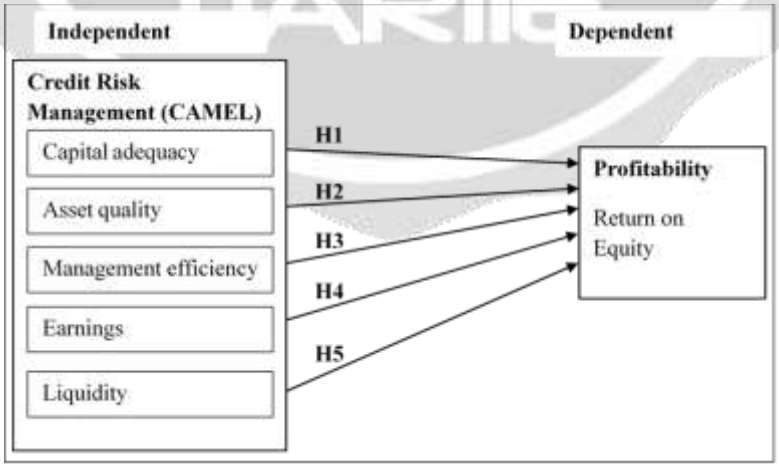
extremely significant and significantly associated with profitability, indicating that management skill plays an important role in the efficient and effective operation of banks. Furthermore, Boateng (2019) showed that there is a positive and significant association between management efficiency and bank performance. The results of this study showed that when management efficiency increases by one unit, it will lead to a 51.5 percent increase in ROE. However, Rajkumar & Hanitha (2015) stated that there exists a negative relationship between management efficiency and return on equity. Based on these studies the following hypothesis 3 was developed.

Hypothesis 4: Earnings have a significant impact on Return on Equity.

Earnings are another critical measure in determining bank profitability. If the bank can earn more, this will result in higher profitability for banks. The ability to earn mainly determines the profitability of banks which leads to their long-term growth and survival (Mishra & Aspal, 2012). According to Ali & Dhiman (2019), the earnings ability variable and profitability are found to have a positive connection. It indicates that higher earnings are more likely to result in higher bank profitability which reveals a bank's capacity to generate profit regularly as well as its potential for future expansion. Further, research conducted by Boateng (2019) showed that earnings and performance have a favorable and substantial relationship. An increase of one unit in bank earnings will result in an increase of 82.5 percent in bank performance. As a result, this study indicated that earnings are one of the most significant variables that can impact profitability. According to these studies, hypothesis 4 was developed.

Hypothesis 5: Liquidity has a significant impact on Return on Equity.
Liquidity is an important factor to consider since it represents a bank's capacity to satisfy its financial commitments. Liquidity risk is one of the most crucial credit risk factors that may have a negative impact on a bank's financial performance. A bank is said to be liquid if it has an acceptable liquidity position where the bank can obtain enough liquid funds by expanding liabilities or converting its assets into cash quickly to fulfill its working capital requirements (Mishra & Aspal, 2012). Liquidity and profitability have been demonstrated to have a statistically significant and favorable association. This indicates that banks with a stronger liquidity position are more likely to be profitable (Ali & Dhiman, 2019). The results of a study performed by Boateng (2019) show that liquidity and profitability had a significance level of 0.021 and a coefficient of 0.110. This indicates that liquidity and financial performance have a positive and substantial relationship. It suggests that increasing the liquidity by one unit will enhance the ROE by 11%. As a result, the hypothesis that liquidity has a significant impact on return on equity was included in this study.

Figure 1: Conceptual framework



Source: Author's compilation.

For the study, the conceptual framework is developed based on the literature review. The components of CAMEL will be used as independent variables to measure credit risk and Return on Equity will be used as the dependent variable to measure the profitability. These variables are selected based on past researches. Even though, CAMEL is used as a profitability measure, studies done by Ali & Dhiman (2019) and Rajkumar & Hanitha (2015) have confirmed that CAMEL could be used as a proxy for credit risk.

3.2 Sources of data

In order to measure the impact of credit risk management on the profitability of licensed banks in Sri Lanka, secondary data from annual reports of banks and audited financial statements was used. According to the Central Bank of Sri Lanka, the Sri Lankan banking sector was comprised of 30 banks as mentioned in the table 1 in the appendix as of 30th September 2021, including 24 licensed commercial banks and 6 licensed specialized banks. From a total population of 30 banks, 22 licensed banks including 18 licensed commercial banks and 4 licensed specialized banks was used. Due to data inaccessibility, unavailability, and inadequacy, 8 banks were excluded from the study.

Capital adequacy

The amount of capital necessary to absorb any potential risk that a bank may face is referred to as capital adequacy. This can be calculated using the Capital Adequacy Ratio which refers to the amount of capital (Tier 1 and Tier II) against its risk-weighted assets. In order to calculate this ratio, capital should be categorized as Tier 1 and Tier II. Tier 1 capital includes owners' equity and reserves whereas Tier II capital includes all the banks subordinated debts (Gupta & Verma, 2008). This ratio is important to make sure that banks have adequate capital to protect depositors' funds from any form of unexpected losses (Gupta & Verma, 2008). All licensed banks in Sri Lanka are required to maintain a minimum capital of 12.5% which is referred as the Total capital ratio (Central Bank of Sri Lanka, 2019).

Asset quality

The risk position of an asset and a bank's financial strength are both represented by asset quality. This can be calculated using various ratios. According to past studies, various authors have incorporated ratios such as non-performing loan ratio, Loan Loss Provision (LLP), NPLs to total equity, Allowance for loan loss, Net NPA to total advances, Net NPA to assets, etc. in order to calculate the asset quality of a bank. However, in this research asset quality will be calculated by using the ratio of Non-performing loan ratio.

Management efficiency

Management efficiency is measured using Cost Income Ratio which is a commonly used ratio in the financial sector. This can be measured as a ratio of total operating cost to total operating income. This indicates the banks total income that is used to pay its operating cost. This provides information about how a bank efficiently manage its cost related to the income generated (Rajkumar & Hanitha, 2015). So, data was extracted from the income statement of the banks by taking the total operating income and the total operating expenses to calculate the cost income ratio.

Earnings

The ability of a bank to earn sufficient profits from its assets is critical to its long-term survival. The earning potential of a bank helps it to raise funds, create capital, and stay competitive. Earnings is measured by the ROA, which can be calculated as a ratio of Net income to total assets which represents the ability of a bank to generate a return using its assets (Rajkumar & Hanitha, 2015).

Liquidity

A bank's liquidity is defined as its ability to satisfy short-term obligations while remaining solvent. This ratio is measured as a percentage of liquid assets to total assets. This shows the ability to pay a bank's liability using its liquid assets which includes cash in hand and money at the call of a bank (Rajkumar & Hanitha, 2015). These liquid assets are important for a bank's day-to-day operations and the more liquid assets, the better banks will be able to manage day-to-day transactions and remain solvent (Kaur, et al., 2015).

Profitability Indicator

The bank's profitability will be measured based on Return on Equity. ROE is measured as the ratio of net income to equity. The return on equity is a key indication of a bank's profitability since it measures the bank's efficiency in

generating profits (Rajkumar & Hanitha, 2015). Therefore, to calculate the profitability of the licensed banks ROE was directly derived from the secondary sources. Following table 1 shows the ratios used in the study.

Table 1: Summary of Variables

Variable Type	Variable	Ratios used
Independent	Capital Adequacy (C)	Measured using Capital Adequacy Ratio; Tier 1 Capital + Tier II Capital/ Total Assets
	Asset Quality (A)	Measured using Non-performing Loan Ratio; Non-performing Assets or loans/ Total loans
	Management Efficiency (M)	Measured by Cost income ratio; Total Operating Cost/ Total Operating Income
	Earnings (E)	Measured by Return on Asset Ratio; Net Income/ Total Assets
	Liquidity (L)	Measured by Liquidity Coverage Ratio; Liquid Assets/ Total Assets
Dependent	Profitability	Measured by Return on Equity Ratio; Net Income/Total Equity

Source: Authors' compilation based on Ali and Dhiman (2019a) and Rajkumar and Hanitha (2015).

3.3 Data analysis model

The panel data regression model was used in this investigation. Based on the dependent and independent variables identified in the study, the panel regression model was developed as mentioned in equation 1;

$$ROE = \beta_0 + \beta_1 C_{it} + \beta_2 A_{it} + \beta_3 M_{it} + \beta_4 E_{it} + \beta_5 L_{it} + \varepsilon_{it} \quad (1)$$

Where;
β0 = Constant
β1, β2, β3, β4, β5 = Regression Coefficients
C = Capital adequacy
A = Asset quality
M = Management efficiency
E = Earnings
L = Liquidity
ε = Error term

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

The table 2 below shows the results of descriptive statistics including mean, standard deviation, minimum and maximum of 22 licensed banks covering periods from 2015 to 2021.

Table 2: Descriptive statistics

Variable	Observation	Mean	Standard deviation	Minimum	Maximum
C	154	0.2035175	0.1143853	0.0927	0.6681
A	154	0.0430264	0.0498962	0.00001	0.3304

M	154	0.4655727	0.2504741	-0.4952	1.8167
E	154	0.0155058	0.0132011	-0.0313	0.0649
L	154	0.3908623	0.2888507	0.1684	1.7403
ROE	154	0.120761	0.072632	-0.0714	0.3392

Source: Results were generated using statistical software.

According to the results in table 2, the data set consist of 154 observations which includes data from 22 licensed commercial banks and licensed specialized banks for a period of seven years from 2015 to 2021. C variable represents the capital adequacy component of the CAMEL model measured using capital adequacy ratio. CAR shows a minimum of 0.09 and a maximum of 0.67. It also depicts a mean of 20.35%, which indicates that most of the licensed banks are financed by 20.35% of equity. This also reflects that on average licensed banks in Sri Lanka has maintained a CAR of more than 12.5% which is the minimum requirement set by the Central Bank of Sri Lanka. According to the collected data, it shows that all licensed banks have adhered to this policy.

A variable in table 2 represents asset quality measured by non-performing loan ratio. This ratio provides information of the percentage of loans issued by banks that have been defaulted. In Sri Lanka, loans which are not paid back for a period of more than three months are considered as defaulted and will be categorized under non-performing loans. The results show that a higher percentage of 33% of NPLR has existed among Sri Lankan banks which can be a serious problem. Further, this also reflects that an average amount of licensed banks has maintained a non-performing loan ratio of 4.30%.

M variable reflects the management efficiency variable measured using the cost to income ratio. This variable depicts a mean of 46.56% where it varies from a minimum of -49.5% to 181.67%. This shows that most licensed banks in Sri Lanka have maintained their operational expenses poorly compared to the operating income. A higher cost to income ratio is achieved when the banks have incurred more on operational expenses. However, some licensed banks have achieved a higher operating income compared to operating expenses which is reflected by a negative cost to income ratio.

The E variable of table 2 reflects earnings measured by return on assets ratio. According to the results of descriptive statistics, the average of Sri Lankan licensed banks has maintained an earnings ability of 1.55% ranging from -3.1% to 6.5%. This shows that a lower percentage of earnings were achieved by most of the licensed banks in Sri Lanka and some banks were incurring losses during the past seven years.
The L variable of table 2 represents liquidity measured using the liquidity coverage ratio. According to the results, the means shows 39.09% which reflects that on average most licensed banks in Sri Lanka have maintained a liquidity coverage ratio of 39.09% which is above the minimum statutory liquid asset ratio of 20% requirement. However, liquidity varies among the different banks due to higher standard deviation. The liquidity of the licensed banks has varied from a minimum of 16.8% to a maximum of 174%. This shows that most banks in Sri Lanka have maintained a good liquidity within the banks which will enable the banks to meet short term liquidity requirements of the banks.

ROE represents the dependent variable which represents profitability of the banks. According to table 2, licensed banks have earned an average of 12.08% return on equity with a standard deviation of 7.26%. However, this has also can ranged between -7.14% to 33.92% which represents that some banks were not profitable. All the independent variables that is consisting of CAMEL components and ROE have indicated positive average figures. However, the highest standard deviation could be seen in management efficiency and liquidity variables. This indicates that management efficiency and liquidity of various licensed banks in Sri Lanka was highly dispersed during 2015 to 2021-time period.

4.2 Diagnostic tests for panel data

The collected data was tested against multicollinearity and heteroskedasticity problems that can arise in panel data. Multicollinearity arises when one independent variable is highly correlated with another independent variable. This was tested using Variance Inflation Factor (VIF) test. The collinearity results of the VIF test show that all the independent variables maintain a VIF values less than 10. This means that multicollinearity does not exist between the independent variables. Therefore, all these variables can be used for the analysis. Heteroskedasticity exists when the variance of the distribution of error terms changes for each observation or range of observations. Although the existence of heteroskedasticity does not bias the coefficient of estimate, it could cause the estimate of standard of

error to be biased leading to unreliable hypothesis testing. To identify heteroskedasticity in the panel data model, the Breusch-Pagan / Cook-Weisberg test was applied which provided a chi-square value of 2.36 with a p value of 0.1248. Therefore, the alternative hypothesis can be rejected since the p value is greater than 0.05 stating that there is no heteroskedasticity in the data set.

Further, the Hausman test was used to select between fixed effect model (FEM) and random effect model (REM). The results shows a chi-square value of 30.40 at five degrees of freedom with a p-value of 0.00. According to this result, the null hypothesis which states that the REM is preferred was rejected at 5% significance level by accepting the FEM.

4.3 Panel data analysis

Table 3: Results of panel regression using FEM

ROE	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
C	.048	.081	0.59	.558	-.113	.209	
A	-.632	.129	-4.88	0	-.888	-.376	***
M	.026	.02	1.28	.204	-.014	.067	
E	4.071	.543	7.50	0	2.997	5.145	***
L	.004	.035	0.12	.902	-.064	.073	
Constant	.061	.029	2.10	.038	.004	.119	**

Mean dependent var	0.121	SD dependent var	0.073
R-squared	0.424	Number of obs	154
F-test	18.733	Prob > F	0.000
Akaike crit. (AIC)	-627.913	Bayesian crit. (BIC)	-609.691

*** p<.01, ** p<.05, * p<.1

Source: Results were generated using STATA.

Table 3 shows the panel regression results obtained from STATA using the FEM for 22 licensed banks in Sri Lanka from 2015 to 2021. The results show that the p value of F statistics is 0.00, which is less than the 5% level of significance. As a result, this model qualifies as appropriate and well-fitting. Furthermore, an R square of 0.424 reveals that independent factors stated using CAMEL variables influence ROE. In other words, approximately 42.45% change in ROE is explained by the independent variables.

5. DISCUSSION OF RESULTS

The results of table 3 shows that capital adequacy has a positive impact on the licensed bank's profitability in Sri Lanka. The capital adequacy ratio reflects the amount of capital held by a bank to withstand credit risks. The higher the CAR, the more profitable the bank will be. Therefore, banks should maintain an appropriate amount of capital in order to remain solvent and withstand negative circumstances. The results shows that 1% increase in capital adequacy will increase the profitability of licensed banks by 0.048%. It is important for the banks to maintain an adequate amount of capital adequacy ratio in both licensed commercial and licensed specialized banks. When analyzing data collected, it was found that most licensed banks have maintained a higher CAR while adhering to the minimum capital requirement of 12.5% imposed by the CBSL. It is recommended for the banks to maintain the CAR at higher levels at future years as well.

Asset quality measured by NPLR was identified to have a negative impact on ROE. This shows that higher non-performing loans can result in lower banks' profitability. The results show that a 1% increase in NPLR will reduce the profitability of the banks by 0.63%. This result shows how important it is for the banks to manage their non-performing loans. Banks need to ensure that the NPLR is maintained at the lowest possible rate. For this, banks need to impose rigid credit risk management measures. NPLs of a bank will increase when the loans are getting defaulted by the customers. In Sri Lanka, loans that are not paid back within 90 days will be categorized under non-performing. Therefore, banks need to impose credit recovering measure to make sure that customers payback the loans within the provided credit period and the loans are not getting defaulted. Moreover, banks need to follow a

rigid policy when providing loans to customers. Factors such as credit history of customers, credibility, financial capabilities, etc. need to be highly focused. Further, this result was significant since the p value is less than 0.05. Therefore, the results in table 3 reflects that non-performing loans are a significant determination of banks' profitability.

Further, according to table 3, M variable which represents management efficiency depicts a positive and insignificant impact on the profitability of licensed banks in Sri Lanka. Management efficiency represents the management capacity in carrying out banking activities in an effective and efficient manner. In this study, this variable was calculated as a ratio of total operating cost to total operating income. Managers are advised to maintain lower operating expenses as it can affect the profitability of banks. Most banks in Sri Lanka were found to have higher cost income ratio. This shows that licensed banks in Sri Lanka are not properly managing their operating expenses compared to operating income. Therefore, managers should ensure that the banks are managed efficiently since it has a positive impact on profitability. Further, management efficiency was identified to have a positive impact based on past research conducted by Ali & Dhiman (2019); and Boateng (2019); using the CAMEL model.

Earnings ability measured by ROA was found to have a positive impact where the impact on profitability was statistically significant. This result further shows that a one percent increase in ROE will increase the profitability by 4.07 percent. The profitability and future growth potential of banks are demonstrated by their earnings. Therefore, banks need to maximize their earnings to generate a higher profit. According to the results, it can be depicted that higher ROA will enable a company to generate more earnings which in turn will affect the profitability of banks. Licensed banks in Sri Lanka should focus more on improving their earnings ability as it significantly impacts the profitability of the banks.

Liquidity represents the ability of a bank to settle its short-term requirements. Therefore, maintaining a high liquidity ratio will enable a bank to stay profitable. According to the results of table 3, it shows a positive impact on ROE. The results depict that a 1% increase in liquidity will increase the profitability by 0.004%. Maintaining a higher liquidity is also important for banks in order to ensure that banks have enough assets that can be converted into cash immediately to meet short-term requirements. However, this result was found to be insignificant.

5.1 Hypothesis Testing

To answer our research question, we have established five hypotheses. Based on the results of fixed effect model, the results of the hypotheses will be discussed in the following subheadings.

Hypothesis 1

As per the table 3, the regression results show a p value of 0.558. According to this result, we fail to reject the null hypothesis since the p value is higher than 0.05. Therefore, the hypothesis that capital adequacy does not have a significant impact on ROE can be accepted. This result was consistent with previous research conducted by Afriyie & Akotey (2013); Ali & Dhiman (2019); and Gupta & Sikarwar (2020).

Hypothesis 2

According to the results of table 3, it shows a p value of 0.00. According to this result, the null hypothesis can be rejected since the p value is less than 0.05. Therefore, the alternative hypothesis that asset quality has a significant impact on ROE can be accepted. Equivalent results can be found in research done by Bandara et al. (2021); Ekinci & Poyraz (2019); Hallunovi & Berdo (2018); Liyanage et al. (2021); Rajkumar & Hanitha (2015); and Rasika & Hewage (2015).

Hypothesis 3

As per the table 3, the regression results show a p value of 0.204. According to this result, we fail to reject the null hypothesis since the p value is higher than 0.05. Therefore, the hypothesis that management efficiency has no significant impact on ROE can be accepted. However, Ali & Dhiman (2019); and Boateng (2019); have found a positive and significant impact on the profitability of banks.

Hypothesis 4

According to the results of table 3, it shows a p value of 0.00. According to this result, the null hypothesis can be rejected since the p value is less than 0.05. Therefore, the alternative hypothesis that earnings has a significant

impact on ROE can be accepted. This result was consistent with studies performed by Ali and Dhiman (2019); Boateng (2019); and Rajkumar & Hanitha (2015).

Hypothesis 5
As per table 3, the regression results show a p value of 0.902. According to this result, we fail to reject the null hypothesis since the p value is higher than 0.05. Therefore, the hypothesis that liquidity has no significant impact on ROE can be accepted. Most research including Ali & Dhiman (2019); and Boateng (2019); has also found the impact of liquidity on profitability to be insignificant at a 5% significance level.

6 EMPIRICAL FINDINGS AND CONCLUSION

The empirical findings reflect that credit risk management has a significant impact on the profitability of banks. Specifically, asset quality and earnings components of the CAMEL model has a significant impact on the profitability of banks whereas capital adequacy, management efficiency and liquidity variables were found to be insignificant. Further, according to the results CAR is positively related to ROE. This shows that the banks can achieve a higher profitability by maintaining adequate amounts of capital. Maintaining higher amount of capital will enable a bank to absorb any adverse impacts and remain solvent which will in turn be beneficial to earn higher profits. Additionally, asset quality measured by non-performing loan ratio was found to have a negative and significant impact on profitability. This shows that by maintaining lower non-performing loans, banks will be able to achieve higher profits. Management efficiency was found to have a positive impact on profitability. This reflects that good management of banks by using proper management of operating expenses and operating income will tend to result in higher profits for banks. Moreover, earnings were found to have a positive and significant impact on the profitability of licensed banks. This shows that maintaining higher returns on assets will enable the banks to achieve higher profits. Finally, liquidity variable was also found to have a positive impact on banks' profitability which means maintaining a higher amount of liquid assets will result in higher profitability. These results suggest that the independent variables have a significant impact on the profitability of licensed banks during the period from 2015 to 2021. Furthermore, banks should properly maintain their credit risk, since this profoundly determines and affects the profitability of banks, which will further increase the banks' service quality (Kuruppu, 2016). Also, by focusing mainly on maintaining lower default risks and achieving higher earnings, a bank will be in a position to achieve higher profitability.

6.1 Policy Implications

According to the findings of this study, higher capital requirements for credit risk and the presence of a strong credit management mechanism could enable a bank to achieve higher profitability. Furthermore, management is advised to implement a new credit risk mitigation plan. Banks should be cautious about their expansion since it may be both beneficial and detrimental to their businesses. In order for Sri Lankan banks to generate increased and sustained profitability from interest revenue, proper credit risk methods from loans and advances must be implemented. As a result, when faced with a loan request, the banks need enough and reliable information from both internal and external sources in order to analyze the credit risks they face. To adequately manage credit risk, banks should design and implement a solid credit policy. This can be performed by imposing a credit limit and providing proper credit terms for the customers and businesses. And also, banks need to implement an effective method to recover the outstanding payments from the customers. In addition, banks can monitor the application of credit policies and standards that are consistent with regulatory requirements and the overall goals of the financial institution. Moreover, it is suggested that banks should also focus on sustainability-related disclosures as well as it will further add a positive public notion towards the banks and their performance (Weerarathna et al., 2021).

7. CONCLUSION

Banks should manage their assets, liabilities, and capital effectively in order to maximize the wealth of their shareholders. Credit policy should include the bank's lending philosophy as well as procedures and methods for monitoring credit operations (Shrestha, 2017). This study was conducted to fulfil the objective of identifying the impact of credit risk management on the profitability of licensed banks in Sri Lanka. As a measure of credit risk management, the CAMEL model was utilized for the study. CAMEL is a theoretical framework used as a rating model for banks, and research has stated that this model can be used to measure the credit risk of banks. To achieve this objective, secondary data was collected from licensed banks using the official websites provided by the Central Bank of Sri Lanka. This study investigated the credit risk management of 22 licensed banks in Sri Lanka from 2015 to 2021 and discovered that credit risk management plays an important and dynamic role in the Sri Lankan banking

sector. According to the results, the CAMEL components explain 42.45% of the dependent variable measured by ROE. The study revealed that asset quality has a significant and negative impact, and earnings have a positive and significant impact on the bank's profitability. The results of this study suggest that bank managers in Sri Lanka should focus on the earnings ability of banks while reducing NPLs by applying credit risk management procedures and tactics.

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