Sri Lankan Journal of Banking and Finance

An endeavor to share knowledge

Volume: 5 Issue: 01 June: 2022

THE EFFECT OF CAPITAL ADEQUACY REQUIREMENTS ON PROFITABILITY: AN EMPIRICAL STUDY ON LICENSED FINANCE COMPANIES IN SRI LANKA

Ranaweera Y Y

Financial Consumer Relations Department, Central Bank of Sri Lanka

yyranaweera@gmail.com

https://orcid.org/0000-0003-3440-3775

ABSTRACT

Licensed Finance Companies (LFCs) in Sri Lanka are recognized as authorized and regulated financial institutions to accept public deposits. However, with the recent collapse of a few LFCs in Sri Lanka, a serious concern has been raised about whether the LFC sector in Sri Lanka does not expose its shareholders to excessive levels of risk. Accordingly, the primary objective of this study is to examine the relationship between capital adequacy and the profitability of LFCs in Sri Lanka. This study is classified into the quantitative research approach based on secondary data of 18 LFCs in Sri Lanka from 2011 to 2020. The Core Capital Adequacy Ratio (CCAR), Total Capital Adequacy Ratio (TCAR), and LFC size (SIZE) were used as independent variables and as measures of profitability of LFCs, Net Interest Margin (NIM), Return on Assets (ROA) and Returns on Equity (ROE) were considered as dependent variables. The empirical results indicated that NIM, ROA, and ROE are positively related to CCAR, but none was significant. Further, NIM and ROA show a positive relationship with TCAR; however, only a significant relationship between ROA and TCAR was observed. Accordingly, this study recommends that since ROA would be increased in the capital adequacy level of LFC, all LFCs need to develop their

internal policies to ensure that they have a clear set of capital adequacy expectations in place.

Keywords – Capital Adequacy, Financial Performance, Public Confidence, Financial Risk management, Licensed Finance Companies

1. INTRODUCTION

Investors in finance companies take a certain level of risk; the risk level is higher than investing in banks. This is primarily due to the fact that finance companies adapt to get engaged in various activities which have higher risks compared to banks (McIver, 2005). However, this does not mean that finance companies have the capability to take undue risks. There are appropriate regulatory measures in place in order to ensure that the funds invested by deposit holders in these companies remain safe (Rottke & Gentgen, 2008). Accordingly, this should provide a set of positive results in the context of meeting expected outcomes in terms of managing required funding.

In Sri Lanka, at the end of 2020, there were 40 Licensed Finance Companies (LFCs) with authority to mobilize public deposits while the total assets of the sector stood at Rs. 1,367.6 billion, representing 5.8 per cent of Sri Lanka's financial system (Central Bank of Sri Lanka, 2020). Even though the LFC sector represents 5.8 per cent of the financial sector, these companies are willing to take higher risks than banks and mostly get engaged with people who require financial services but possess low financial literacy without the financial strength to access requirements such as collateral and other guarantees. Accordingly, it is important to identify the important role played by these companies in the Sri Lankan economy as high risk-taking financial services providers.

Since LFCs have the authority to accept public deposits, they need to maintain required capital levels; the main purpose of maintaining the capital reserves is to ensure that such companies would take risks from the equity rather than using the deposit holders 'funds. It is important to note that LFCs must manage their risks and returns in such a way that the deposit holders are not exposed to undue risk levels (Ozili, 2019). Accordingly, finance companies need to look into managing these challenges in order to meet the intended results. These companies need to adhere to regulations and maintain adequate levels of capital in order to cover the risks (Ghosh, 2017).

The Central Bank of Sri Lanka (CBSL) is the main governing body which regulates, supervises and monitors managing the risks associated with LFCs. A central bank has the ability to identify how LFCs need to manage these

risks and what action needs to be taken in order to maintain a balance between the risks and rewards (Saada, 2018). Accordingly, finance companies would be able to ensure that they safeguard the funds that have been invested in them while providing investors with a certain level of return (Bougatef, 2016). Thus, the above mentioned are some of the critical areas which require attention when the overall investment landscape associated with LFCs in Sri Lanka is concerned.

Problem Statement and Objectives of the Study

As discussed above, LFCs have a higher risk portfolio compared to banks. In Sri Lanka, the financial system has experienced LFCs collapsing due to not being able to manage the risk portfolio with the returns they generated. This shows that LFCs need to actively make sure that they would not have to face the same fate that a few of the well-known LFCs have faced in the past. Thus, these are some of the critical areas which require attention when it comes to managing challenges related to LFCs.

The main issue associated with the problem area is that there have been a few large LFCs that have collapsed. The recent cases include The Finance Company PLC (TFCP), ETI Finance Limited (ETIL) and more. As CBSL (2020) announced, TFCP was severely impacted by the failure of several financial institutions within the Ceylinco Group in 2008. Since then, the financial status of the company deteriorated gradually, leading to a severe liquidity crisis. Also, ETIL became insolvent due to various irregularities that had taken place since 2011. Accordingly, some LFCs have provided customers with attractive return schemes which are unrealistic in nature in order to attract funds. However, they have not been able to invest in suitable ventures which have provided appropriate returns in order to service the promises that have been made by the management of these finance companies to the customers (KPMG, 2021). As a result of this, these companies have filed for bankruptcy. Capital adequacy is one of the vital indicators of the financial solvency of the banking industry and it is considered as a safety valve to protect the depositors to promote stability and efficiency in the whole financial system of a country (Herath, 2015 & Ahmad & Ahmad, 2017) and this can be applied to the LFC sector as they also have depositors. Accordingly, the inadequacy of measures on capital adequacy requirement may increase the dissatisfaction of the customers who entered the transactions with LFCs and it creates many other associated problems in Sri Lanka's financial system and which will arise as economic and social problems.

As the regulatory measures are in place to make sure that finance companies have the required levels of capital to manage the required capital adequacy levels, LFCs need to identify the overall capital expectations and ensure that those are available. However, it is important that the effort these companies

take in order to maintain capital adequacy should eventually result in building customer trust and trickle down to the financial performance of the company. Accordingly, these are some of the important aspects of consideration which require attention when it comes to managing company performance aspects in the future. Hence, in this context, it is important to examine whether there is an impact of capital adequacy on financial performance of LFCs. However, it was observed that the researchers paid less attention to examine the effect of capital adequacy requirements on profitability of LFCs in Sri Lanka.

Accordingly, based on the research gap identified above, the need to empirically examine the impact of capital adequacy on profitability was identified. In order to address the research problem, this study intended to answer the research questions i.e., what is the relationship between the capital adequacy requirements and profitability of LFCs in Sri Lanka?; and what is the impact of the capital adequacy requirements on profitability of LFCs in Sri Lanka?

Accordingly, the primary objective of the study is to identify how capital adequacy of LFCs could influence their profitability. This should indicate if capital adequacy is a factor that contributes to increase the profitability of LFCs. Accordingly, the following are the objectives affiliated with the given study area.

- To identify the relationship between capital adequacy and profitability of LFCs in Sri Lanka.
- To examine the effect of capital adequacy requirements on profitability of LFCs in Sri Lanka.
- To provide recommendations on capital adequacy requirement of LFCs to maintain the financial system stability in Sri Lanka.

Scope / Significance of the Study

As mentioned above the main research objective is to identify the relationship between capital adequacy ratios of LFCs in Sri Lanka and their profitability, and how such relationship impacts the overall profitability of the company. The overall profitability of a company is an indication of its financial health. This understanding can be useful to evaluate how these elements are related to each other. The study uses secondary data as the capital adequacy ratios, and the measures of financial profitability are available in the annual reports of LFCs. However, it was observed that all LFCs are not listed in the Colombo Stock Exchange of Sri Lanka (CSE) and LFCs which are not listed in the CSE are not compelled to publish their financial performance details. Therefore, the scope of the study is limited to 18 LFCs and the financial data of only 10 years of the said LFCs according to the available published data in the CSE.

In view of the importance and justification of the study on the relationship between capital adequacy and profitability of LFCs in Sri Lanka, the significance of the study can be recognized. In 2020, CBSL disclosed the LFCs that were non-compliant with the minimum capital adequacy requirement and announced that non-compliance with the minimum capital adequacy requirement of LFCs poses a significant risk to depositors. Accordingly, it is important to investigate the capital adequacy requirement and its consequences. Thus, this understanding remains critical in order to identify how LFCs are able to specifically benefit from managing these challenges in the future. Hence, the academic and timely significance of the given study area remains high. In view of the above challenges, there is a reasonable basis for the researcher to carry out this study on the capital adequacy requirement of the LFC sector in Sri Lanka. Accordingly, the findings of this research would mostly be applicable and useful to all stakeholders of the LFC sector in Sri Lanka, policymakers, and future researchers.

On the other hand, the study also needs to look into development of suitable recommendations to ensure that clear establishment of improvements associated with the financial sector can be developed. Accordingly, these are some of the important aspects of consideration and parties need to take appropriate action to ensure financial soundness through better risk management policies and practices to protect the interest of depositors and maintain public confidence in the financial system. Accordingly, the suggestions made in this study would facilitate the relevant stakeholders such as LFCs, regulators, potential investors, financial analysts in investment decision making and conducting further research. Further, the study will enable the relevant stakeholders to take precautionary actions to maintain the sustainability of LFCs, protect the financial customers and avoid the financial crises affecting the financial system in Sri Lanka.

2. LITERATURE REVIEW

The main purpose of the literature review is to discuss past studies related to the given study area to establish appropriate understanding to evaluate the nature of the relationships between the variables. Past studies can be helpful to identify whether capital adequacy levels associated with the finance companies' sector have driven profitability and other financial performance indicators. Capital adequacy of LFC is a regulatory requirement and as per the Directions related to the capital adequacy requirement of LFCs issued by CBSL, LFCs should always maintain minimum Core Capital and Capital Adequacy Ratios. However, when reviewing previous surveys already done by other researchers on the LFC sector Sri Lanka, it can be observed that the capital adequacy requirement of the LFC sector in Sri Lanka has not received

particular attention of researchers, and moreover, there are no past studies done locally on this study area. Nevertheless, a few research studies on the capital adequacy of the banking sector in Sri Lanka have been conducted (Herath, 2015; Chandrasegaran, 2020). Accordingly, other countries literatures on capital adequacy requirement of banks are also considered to develop this study.

Risks and Returns of the Transactions with Financial Institutions

LFCs need to take risks in different ways; this is primarily because they have to take money from deposit holders and invest in various ventures. Investment in these ventures has a possibility of failure; there are some ventures which have a higher risk of failure than others (Maxted, 1994). However, it is important to note that finance companies need to invest in various ventures in order to make sure that they generate adequate returns so that they would be able to service their requirements of their investors (Porat & Fine, 2009). Accordingly, LFCs need to identify investments which would provide them with the required returns and then make sure that they invest in such assets in the future.

LFCs also need sufficient understanding as to how they can mitigate the overall risks they take. This is primarily driven by the fact that finance companies need to recognize that it is possible that risks would increase if the overall returns provided by the venture also increase (Annuar, 2012). The primary focus of finance companies should be to mitigate the overall risk levels associated with investments, while increasing the returns that these ventures would generate. Thus, they must identify these issues and balance the risks and returns associated with these areas in the future (Cieleback, 2003).

Markets have certain acceptable levels of risks and returns; financial markets would work according to these accepted norms. If the risk levels are higher and the return levels are lower than the markets, it is important that these financial establishments evaluate these areas and ensure that they will be able to identify key issues affiliated with their investment strategies and develop suitable capabilities to correct them (Podder & Al Mamun, 2004). Hence, the risks and returns balance needs to be maintained so that these companies will be able to provide the required benefits to the investors over the long run. This remains a critical concern which requires attention when organizational management aspects are considered (Abaidoo, 2018).

Organizations also need to look into what critical action is required to improve their financial performance aspects. Organizations will need to manage key challenges affiliated with them (Song & Tuoriniemi, 2016). They need to find suitable investment opportunities which have minimum risks while providing maximum returns. Such investment opportunities would

provide investors with many benefits in the future. Finance companies that have these capabilities will be able to continue to develop a strong level of trust with customers and gain a larger customer base for future needs (Swamy, 2018).

Public Confidence (Investor Trust) in Investment Decision Making

In a practical context it is important that finance companies look into the development of customer trust. When there is a high degree of customer trust associated with their company, they will be able to make sure that they would benefit from attracting customers (Otašević, 2015). This is primarily because investors believe that the investments they make with the company remain safe while providing them with maximum beneficial results. The overall capabilities affiliated with building customer trust remain critical for the organization to build the required capabilities in the future (Redenius, 2016).

Investors require clear understanding as to how finance companies manage their risks and returns. Finance companies should have a clear understanding about the risks they are faced with and what action is required to minimize these risk levels and maximize the benefits related to these areas (King, 1991). This may allow them to enhance their overall performance levels and achieve the desired outcomes in terms of managing these challenges. A finance company also needs to communicate to customers that they have these capabilities and the financial strength to meet their requirements (Jacinta, 2013).

The financial strength of the finance company remains a critical indicator that would lead to customer trust levels in the future. If finance companies have developed their capabilities in order to build public confidence, they will be able to improve overall specific outcomes related to these areas and make sure that they achieve the desired results (Hoque, 2003). The building of investor trust also has to be carried out after considering the overall regulatory framework that is in place so that they will be able to develop it in line with the regulatory framework (Otašević, 2015).

Beneficial outcomes can be achieved through the development of investor trust as these companies might look into the development of long-term relationships with investors. On the other hand, investors might also look into a trusted partner for their investment needs and if finance companies have professionalism and the capability to develop services which will meet customer needs, it is likely that they will be able to meet customer expectations and develop investor trust (Gadd, 1998). Accordingly, investor trust is extremely important for a finance company for its survival in the industry; it will benefit both parties in this context.

Justifications for Capital Adequacy Requirement

In many instances, finance companies take various risks to generate better returns. The main benefit associated with taking of risks is that finance companies will be able to contribute something good to society (Košmrlj, et al., 2015). On the other hand, they may also play a critical role in resource allocation within the economy of the country. However, it is also important to note that due to the risk factors associated with finance businesses, finance companies might eventually face a situation where they would lose the total returns on the capital that they have invested. This is a critical issue that requires attention when organizational capabilities development is considered (Matiş & Ilieş, 2014).

Finance companies should not take undue risks when using the funds of deposit holders. Deposit holders have certain expectations when it comes to the risk levels that they are exposed to. Finance companies should not take any measures that would increase the risk levels faced by these parties (Košmrlj, et al., 2015). Thus, they need to specifically identify such issues and ensure that they will be able to achieve the desired results accordingly. Beneficial outcomes will be achieved through managing these challenges in the future (Bagloee, et al., 2016).

The above discussion clearly indicates that companies must identify that they need the required resources to meet risk related challenges they have. Risks could be aggravated to cause certain issues to finance companies and they need to maintain appropriate systems to identify how they can manage these issues so that they will be able to reduce the implications associated with these risk areas (Njeru, 2012). Accordingly, LFCs should not use only deposit holders' funds to take risks. This is the reason why the capital adequacy concept is important. While finance companies will be able to take risks in various matters it is important that they have the required capital in order to cover these risk areas accordingly (Coffman, 2018).

Capital is the money that is invested by the shareholders of the company; this means the company might not have to increase the risk levels associated with deposit holders. The capitalization of the required resources would ensure that they will be able to manage these challenges and achieve the desired results accordingly (Hans & Zuber, 2017). These are some of the critical areas which require attention to investigate the maintenance of the required levels of capital in the future. The role of capital adequacy in this context remains important and parties need to identify how they will manage these areas accordingly. Thus, the CBSL has issued Directions related to capital adequacy requirements for LFCs, and as per the said Directions LFCs should always maintain minimum Core Capital and Capital Adequacy Ratios such as Core Capital to Risk Weighted Assets and Capital Base to Risk Weighted Assets.

Financial Performance of Financial Institutions

Financial performance associated with finance companies indicates their stability. They need to evaluate their capabilities and make sure that they will be able to achieve the expected results in terms of managing these challenges (Pirgaip & Hepsen, 2018). Their financial performance needs to be appropriately managed in order to meet their intended specific results. These are some of the critical areas which require attention when the overall financial performance aspects are considered (Saada, 2018). The appropriate set of indicators has to be developed to identify how the financial performance of these companies has been. Thus, a clear understanding of the capital adequacy level could impact the overall financial performance of the given organizations (Matiş & Ilieş, 2014).

Finance companies need to consider what indicators are required to focus on managing their financial performance. One of the indicators associated with the financial performance of the company is the Net Interest Margins (NIM). NIM is a measurement comparing the net interest income a finance company generates from credit products like loans and leases, and with the outgoing interest it pays holders of savings accounts and term deposits. NIM is a comparative pressure that could be used to identify the ability of the company to generate net profits from generated revenues (Košmrlj, et al., 2015). The percentage of the revenue that eventually trickles down to the net profit level would indicate how attractive the company is for investors. This is primarily since the net profit is the share of benefits for the shareholders of the company.

The financial performance of the company can also be measured using the Returns on Assets (ROA), as well as the Returns on Equity (ROE). Finance companies need to identify how they will be able to evaluate these ratios. These ratios would also indicate how attractive these investments are for shareholders (Tohidi & Jabbari, 2012). ROA is a measure of how much profit a business is generating from its capital, and ROE is calculated by taking the amount of net income returned as a percentage of the shareholders' equity. Accordingly, companies need to look into maximization of the returns generated on shareholders' equity, as well as the returns generated on assets. These will improve the overall benefits to parties and make sure that they will be able to specifically reach the intended outcomes accordingly (Hynes & Elwell, 2016). These are critical aspects which require attention when it comes to overall improvements associated with financial performance of companies.

The financial performance of these companies would indicate whether the overall financial health associated with a given company is positive. This would assist companies to attract more investors as they would have a clear

understanding that they will be able to specifically benefit from the investments they make in these ventures (Syrma, 2017). This may allow them to improve their capabilities to meet the intended specific results and achieve the desired outcomes accordingly. Thus, these are some of the important areas that require attention when it comes to the development of the solutions affiliated with the overall financial performance (Manžuch, 2017).

Capital Adequacy and Financial Performance

Past research that has been conducted related to this area has indicated mixed results on the nature of the relationships between these variables. The primary purpose of improving the capital adequacy ratio would be to make sure that finance companies have the required capital in place (Jones, 2018). With the required capital in place, theoretically, it is likely that these companies will be able to take better risk levels. Thus, they will be able to ensure that they can increase the overall outcomes affiliated with these areas of discussion and then benefit from these areas in the future (Gobo, 2015). The right focus on enhancing capital adequacy remains a critical area of importance which requires attention.

Higher levels of capital adequacy would indicate that the company has certain measures in place in order to minimize the risks associated with customer investments. The investors would be able to identify these areas and then develop a higher level of confidence (Fernandez-Stark, et al., 2011). Accordingly, the development of a suitable set of strategies according to these requirements is important. Appropriate benefits need to be identified, and therefore, suitable strategies also need to be developed to maximize beneficial results linked with these areas. Thus, capital adequacy and financial performance may have a positive relationship in this context (Morris, 2006).

In past studies, researchers have used a theoretical linear regression model to observe the relationship between capital adequacy and profitability of financial institutions using panel data. David and Raymond (2006) have examined the relationship between capital structure and ROE for banks in the United State of America and found that there is a positive relationship between capital adequacy and ROE. Ahmad and Ahmad (2017) have conducted a study to find out the effect of capital adequacy on profitability between two banks in Saudi Arabia and the results indicate that one bank shows a low positive correlation relationship between capital adequacy and ROA and ROE, and a high positive relationship between core capital and ROA. Hope (2017) has investigated the relationship between bank capital and profitability of fourteen banks out of the twenty-eight universal banks operating in Ghana for the period from 2005 to 2015 and observed that capital is significantly and positively related to NIM and ROE. Furthermore, Mwai, Jagongo and Fredrick (2017) have examined the relationship between capital

requirement set by the Central Bank of Kenya and the financial performance of the banks in Kenya and found that capital requirements have a positive linear relationship with ROA and ROE, however insignificant for NIM.

The above discussion clearly indicates that LFCs need to play a crucial role to improve their sustainability as well as the overall trust in the financial system of the country. Thus, the role of finance companies in the context of managing risks with returns remains critical and they must manage issues effectively and provide returns in line with customer expectations (Bougatef, 2016). LFCs need to develop their capabilities according to these requirements. The role of equity in this context remains important because equity would be able to provide necessary cover in case the company has taken higher risks and fails.

Capital adequacy ratios are the measures which would indicate if these LFCs have the required level of capital to face a critical situation. If these companies have the required capability to meet the expectations of markets, they will be able to achieve desired results in the future (Pirgaip & Hepsen, 2018). Thus, taking the right measures and benefitting from these areas are some important considerations which require attention. These are critical to improve the trust associated with customers and achieve the desired long-term results (Porat & Fine, 2009). Using panel data of the banks in Sri Lanka for the period from 2008 to 2019, Chandrasekaran (2020) has conducted a study on capital adequacy requirement and bank profitability and results show insignificant relationships between capital adequacy and ROA and NIM. Based on the results, Chandrasekaran (2020) has recommended that banking regulators should ensure that the gains of the banking reforms processes are sustained, the CBSL should take more significant measures aimed at tightening the risk management of the banking industry of Sri Lanka.

The above discussion clearly indicates that LFCs need to improve their capital adequacy position so that their overall risk-taking capability would increase. This would also enhance the overall trust associated with the potential customers. Hence, all these areas would eventually improve the overall public confidence related to LFCs. This could contribute to enhancing the customer base resulting in increased levels of profitability. However, it is also worth observing the fact that this might not necessarily mean that LFCs would be able to specifically benefit from achieving the desired results in terms of managing these challenges. Even though the above literature contributes to identify the relationship between capital adequacy and financial performance, when considering previous research related to the topic of this study, it can be observed that no researchers have directly focused on the LFC sector in Sri Lanka. As the role of the capital adequacy of LFCs is an important topic which requires special attention in view of the recent collapse of several LFCs

in Sri Lanka, this research developed the conceptual framework and methodology to examine the relationship between the capital adequacy and financial performance of LFCs in and effect of the capital adequacy requirements on profitability of LFCs in Sri Lanka in order to fill the research gap identified above.

3. METHODOLOGY

This section discusses what research data was collected and used for conducting the research, and which research approach and methodology are applied to assess the collected data in order to achieve the objectives of the study.

Research Data and Sources

This research is carried out based on the secondary data relating to 18 LFCs in Sri Lanka. As per the CBSL Annual Report 2020, as at end of 2020, there were 40 LFCs under the purview of CBSL. However, only 18 LFCs were selected as the sample for the study due to the following reasons: data related to LFCs are available only in CSE in Sri Lanka; even CBSL does not publish such data. However, all LFCs are not listed in CSE; hence, data availability of LFCs in CSE is limited. Further, a few LFCs have been listed in CSE during the period that is considered for the study. Accordingly, the data was collected from the annual reports published by the said 18 LFCs which were publicly available in CSE in the 10 years period from 2011 to 2020 and research data was limited to 18 LFCs. However, when considering the size of the selected LFCs, the sample represents about 64.88% of the total assets of the LFC industry in Sri Lanka. Table 1 shows the percentage of the total assets of the selected 18 LFCs from total assets of all LFCs for each year of the selected period. Accordingly, it is expected that the selected LFCs represent at least a majority of the total population dealing with LFCs in Sri Lanka.

Table 1: percentage of the total assets of the selected 18 LFCs from total assets of all LFCs in Sri Lanka

Year	Sample representation of Total Assets of LFCs (%)
2011	46.61
2012	55.74
2013	57.85
2014	64.30
2015	61.47
2016	66.72
2017	69.25
2018	70.83
2019	74.41
2020	81.61
10 Year Average	**64.88**

Source: *Compiled by author* based on data published by Central Bank of Sri Lanka

Variables and Hypothesis of the Research

Variables of the Research

(i) Dependent Variables

After considering past empirical studies conducted by Chandrasegaran (2020), Mwai, Jagongo and Fredrick (2017), Ahmad and Ahmad (2017), and Hope (2017), the three extensively tested dependent variables of NIM, ROA and ROE were selected to measure the profitability of LFCs.

NIM quantifies the difference between the interest income collected on loans less interest expenses paid on deposits and borrowings.

ROA, the accounting ratio calculated as net profit after tax divided by total assets of LFC, is considered as one of the most popular measures of profitability in LFCs. ROA also illustrates how well the management employs total assets of a LFC to make profits.

ROE, the ratio of net income after taxes divided by total equity capital, represents the rate of return on the funds invested in the LFC by stockholders.

(ii) Independent Variables

Capital adequacy ratios i.e., core capital adequacy ratio and total capital adequacy ratio are mainly considered as independent variables in this study and the size of LFC is also used as an independent variable.

Capital Adequacy Ratio is the ratio of equity to total assets and acts as a safety net during adverse conditions, while the capital adequacy ratio enables LFCs to absorb unexpected losses. As per the Finance Business Act Directions (Capital Adequacy Requirement) No. 3 of 2018, the core capital adequacy ratio represents the core capital of a LFC representing shareholders ' equity and reserves, while the total capital adequacy ratio represents supplementary capital such as instruments containing characteristics of equity and debt, revaluation gains and general impairment allowances.

LFC Size is considered to capture the fact that larger LFCs are better placed than smaller ones in taking advantage of economies of scale in transactions to the plain effect that they will tend to enjoy a higher level of profits since LFCs with a larger asset base are preferred as large LFCs are expected to be highly efficient with low cost due to higher operating economies of scales.

The variables which are used in the study are summarized in the following table.

Table 2 – Explanation of the Selected Variables

Category	Variable	Notation	Measure	Expected Relationship	Sources of Information
Dependent Variables	Net Interest Margin	NIM	Net Interest Income / Total Assets	-	Annual reports published by selected LFCs (2011 – 2020)
	Return on Assets	ROA	Profit after Tax / Total Assets	-	
	Return on Equity	ROE	Profit after Tax / Total Equity	-	
Independent Variables	Core Capital Adequacy Ratio	CCAR	Tier 1 capital / Total Risk **Weighted** Amount	Positive	
	Total Capital Adequacy Ratio	TCAR	Total capital / Total Risk Weighted Amount	Positive	
	LFC Size	SIZE	Log value of total assets	Positive	

Hypotheses of the Research

The following hypotheses are developed based on the literature review as a follow-up to the research questions and objectives of the study.

H0: There is no significant relationship between the capital adequacy and the profitability indicators of LFCs in Sri Lanka.

HA1: There is a significant positive relationship between the core capital adequacy ratio and the net interest margin of LFCs in Sri Lanka.

HA2: There is a significant positive relationship between the core capital adequacy ratio and the return on assets of LFCs in Sri Lanka.

HA3: There is a significant positive relationship between the core capital adequacy ratio and the return on equity of LFCs in Sri Lanka.

HA4: There is a significant positive relationship between the total capital adequacy ratio and the net interest margin of LFCs in Sri Lanka.

HA5: There is a significant positive relationship between the total capital adequacy ratio and the return on assets of LFCs in Sri Lanka.

HA6: There is a significant positive relationship between the total capital adequacy ratio and the return on equity of LFCs in Sri Lanka.

HA7: There is a significant positive relationship between the LFC size and the profitability indicators of LFCs in Sri Lanka.

Research Approach

The below conceptual framework clearly indicates that the capital adequacy is the independent variable, and the financial performance should be the dependent variable. The capital adequacy needs to be in line with the regulatory requirements that are specifically in place. However, it is possible that the capital adequacy levels could change depending on the situation that is in the discussion.

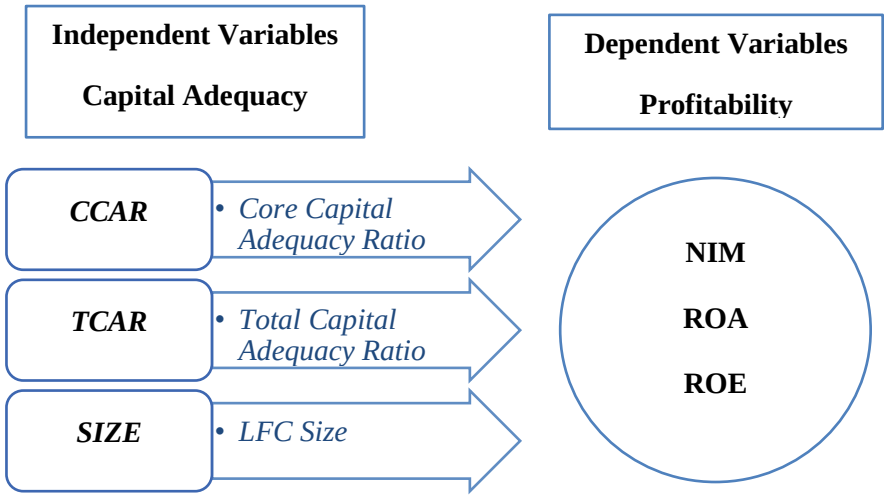

Figure 1 – Conceptual Framework

As depicted in figure 1 above, this study primarily aims at assessing the degree of correlation between the profitability of LFCs and capital adequacy requirements such as the core capital adequacy ratio, total capital adequacy ratio and LFC size. Therefore, this study is classified into the quantitative research approach.

Specification of Econometric Model

In order to identify the nature of the relationships between the variables, the study employs a theoretical linear regression model as depicted in the equation under the section on the Theoretical Regression Model. The theoretical model displays an extraction of the real world by compositing basic characteristics of an economic phenomenon where it is applied using the existing information of LFCs in Sri Lanka.

The economic models specified under the section **Empirical Regression Model** are derived from the theoretical model and past empirical studies. Each of the three regression models (ROA, ROE and NIM) is initially estimated. The regression models, in most past literature, were conducted based on either the Fixed Effects estimation or the Random Effects estimation. The Fixed Effects estimation assumes that the intercept of the regression model is consistent across different cross section units (LFCs). Hence, partial regression coefficients are assumed to exist across the different LFCs. Under the Random Effects estimation, it is assumed that a common mean exists for the intercept, while the error term portrays the effect of cross-sectional differences in the intercept values. Empirical studies have observed minor differences in the parameter values under the Fixed Effects estimation and the Random Effects estimation when the number of cross-sectional units is less while the number of time series is high. As the study is focused on panel data with 18 cross sectional units over 5 years, the Hausman test is conducted to select the most appropriate regression method i.e., the Fixed Effects estimation or the Random Effects estimation in order to derive the coefficient of the empirical econometric model.

Theoretical Regression Model

Based on the literature review, the statistical relationship between the profitability of LFCs and LFC capital adequacy variables can be expressed as follows:

$$\text{Profit} = f(\text{LFC Capital Adequacy}) \quad (1)$$

The above theoretical model is extended in the following manner to exhibit the linear regression equation:

$$Yit = C + \Sigma bXit + uit \quad (2)$$

Where:

Yit : Observation on profitability (NIM, ROA and ROE) for the LFCi for the period t

C : The intercept

Xit : The X^{th} capital adequacy characteristics of the LFCi for the period t

bi : Beta coefficients

uit : Error term

Accordingly, Equation (2) is estimated with Fixed Effects, where it is assumed those differences in characteristics of the LFCs are taken into account by differences in the constant term (intercept).

Empirical Regression Models

To apply the real data of the sample for the study, the theoretical linear regression model is transformed into the following three empirical models to reflect each dependent variable (NIM, ROA and ROE) and those three linear functional forms are adopted in this study as specified below:

(i) Model 1 - NIM:

$NIM_{it} = C + b1\ (CCAR)it + b2\ (TCAR)it + b3\ (SIZE)it + u\ it\ (3)$

(i) Model 2 - ROA:

$ROA_{it} = C + b1\ (CCAR)it + b2\ (TCAR)it + b3\ (SIZE)it + u\ it\ (4)$

(i) Model 3 - ROE:

$ROE_{it} = C + b1\ (CCAR)it + b2\ (TCAR)it + b3\ (SIZE)it + u\ it\ (5)$

Where;

ROAit	: Return on Assets for LFC i at time t
ROEit	: Return on Equity for LFC i at time t
NIMit	: Net Interest Margin for LFC i at time t
CCARit	: Core Capital adequacy ratio of LFC i at time t
TCARit	: Total Capital adequacy ratio of LFC i at time t
SIZEit	: Size of LFC i at time t
C	: Constant
b	: Factor coefficient
t	: 2011 - 2020
uit	: Error term

4. RESULTS AND DISCUSSION

The primary focus of the discussion is maintaining capital adequacy levels in LFCs in Sri Lanka. Capital adequacy level maintenance is important to make sure that LFCs have the ability to take risks without using shareholder funds. This is important to mitigate the exposure of shareholders to risks associated with investments. LFCs generally take higher risks in comparison to banks, and it is important that deposit holders are not exposed to undue risk levels accordingly. Right action needs to be taken to manage these challenges and meet the intended specific targets in terms of achieving maximum results. These are critical aspects which require attention when the overall findings of the study are considered.

LFCs and Capital Adequacy

LFCs have different capital adequacy ratios; the main justification is maintaining enough capital, since these companies have two main sources of funding for financing their operations. One is investor capital while mobilizing deposits from the public. Investors, on one hand, are exposed to high levels of risks; deposit holders should not be exposed to such high levels of risks. This is primarily since they earn a fixed level of return, and they should not be exposed to a risk level beyond the established fixed level of returns. However, if the profitability of a LFC is continuously decreasing, deposit holders may be exposed to high levels of risks since continuous losses affect LFCs 'sustainability. Accordingly, a clear understanding about capital adequacy levels has to be developed so that companies can make the right decisions. LFCs need to maintain a certain level of capital which is above the regulatory requirements directed by CBSL to ensure that they have met the required capital level to cover up the exposure of the risks associated with the different parties. Thus, LFCs are required to comply with the regulatory requirements of CCAR and TCAR to meet the intended targets and achieve the expected results in the future. Right action has to be taken to maintain the capital adequacy levels by LFCs by maintaining the adequacy capital level.

Behavior of the Employed Variables

When considering the behavior of the employed variables based on the data collected in the selected LFCs, Figure 2 indicates that although CCAR and TCAR exhibit a stable pattern, the variables NIM, ROA and ROE show a decreasing trend. Meanwhile, the Size of LFCs tends to increase.

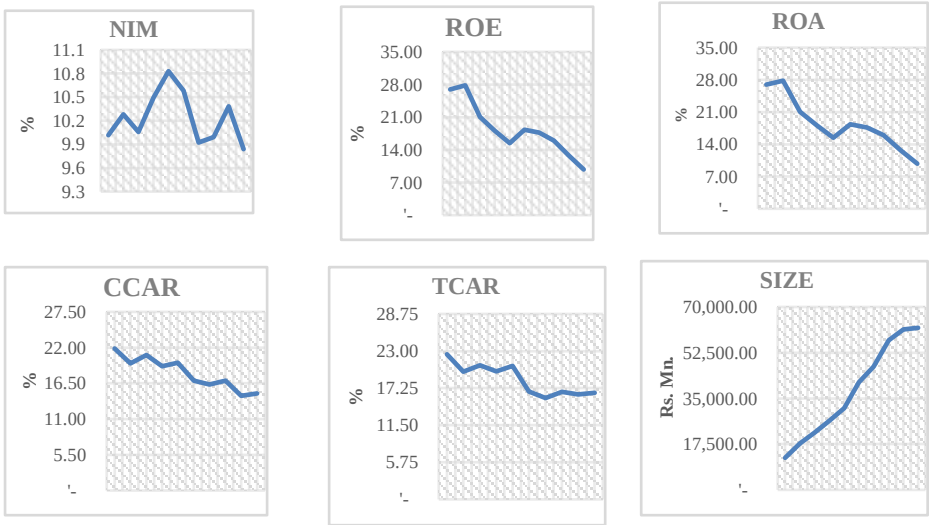

Figure 2 - The Behavior of the Employed Variables over the Period 2011-2020

Figure 4.1 above clearly shows that the LFC Size has aggressively increased over the ten-year period from 2011 to 2020 while ROA and ROE of LFCs have gradually decreased during the same period, and NIM has shown volatility over the period. The LFC industry has seen a decline of the capital adequacy levels over the past few years until 2019, and CBSL has intervened and carried out certain changes to the sector in order to reduce the structural deficiencies and the risk levels of the sector. The decline of capital adequacy might expose deposit holders to higher levels of risk. Thus, this is a main concern.

Descriptive Statistics

The descriptive statistics of the variables are presented in Table 3 NIM, ROA and ROE all have positive mean values i.e., 10.24, 3.56 and 18.38, respectively, with standard deviations of 3.92, 3.01 and 13.14 respectively, indicating that the data is relatively homogeneous. Variations in standard deviation of the variables reflect the behavior of the LFC sector profitability variables and their capital adequacy along the period of study. Low standard deviations of these variables imply the consistency of the data set i.e.; their values are close to their mean values.

Table 3 - **Descriptive Statistics**

Statistics	**Dependent Variables**			**Independent Variables**		
	NIM	**ROA**	**ROE**	**CCAR**	**TCAR**	**SIZE**
Mean	10.24	3.56	18.38	18.08	18.55	10.24
Max	19.31	26.23	69.78	49.92	49.92	11.32
Min	5.06	-3.13	-14.61	2.91	-0.72	8.74
Std. Dev.	3.92	3.01	13.14	8.04	7.84	0.60
Obs.	180	180	180	180	180	180

Source: Compiled by author

The mean values of CCAR and TCAR indicate that the LFC sector complies with the regulatory requirement of capital adequacy as the said means are above the required minimum level of capital adequacy. However, the minimum values of CCAR and TCAR i.e., 2.91 and -0.72 respectively show that there were LFCs which were below the required minimum level of capital adequacy during the period.

Relationship Analysis

In this instance, the independent variable of the study is the capital adequacy level; the capital adequacy level is evaluated in terms of the likelihood of its impact on the overall performance of the company in terms of measuring the overall profitability levels. When the overall outcomes related to these areas are analyzed, it can be ascertained that with the increase of capital adequacy, the overall trust factor related to these organizations would improve and because of this, the return generating capability of these companies would improve as well. The purpose of identifying the nature of the relationships between these variables is to evaluate if these relationships really exist in the context of Sri Lanka.

The relationships between the variables used in the model are also examined using correlations, and the correlations between the LFCs capital adequacy and the profitability of LFCs are shown Table 4 below.

Table 4 **- Correlation Analysis**

	CCAR	***TCAR***	***SIZE***	***NIM***	***ROA***	***ROE***
CCAR	1					
TCAR	0.8948	1				
SIZE	-0.3506	-0.3120	1			
NIM	0.2909	0.2694	-0.0382	1		
ROA	0.3847	0.3649	-0.1027	0.3267	1	
ROE	-0.1642	-0.1504	0.1874	0.2243	0.4613	1

Source: Compiled by author

According to Table 4 above, the correlation analysis shows that NIM and ROA have a positive and significant relationship with CCAR as well as TCAR. However, it is worth noticing that ROE is negatively related to CCAR and TCAR and it can be identified there is no relationship between ROE and capital adequacy ratios. Furthermore, it is observed that SIZE has a positive relationship only with ROE, while SIZE is negatively associated with NIM and ROA.

The above analysis clearly indicates that when the relationship between the capital adequacy ratios and each of the profitability measures were considered, they provided different scores as the outcomes affiliated with the study areas. Thus, the right measures need to be taken in order to identify how these areas are related to each other. The appropriate insights have to be gained in these areas specifically

NIM and Capital Adequacy: When NIM, CCAR and TCAR capital adequacy levels are considered, the overall scores received are 0.29 and 0.26 respectively; while this can be considered as weak scores, they still indicate

that there are modest positive relationships between CCAR, TCAR and NIM. The nature of the relationship is such that with the increase of capital adequacy levels associated with the given LFCs, the overall NIM levels would also increase. Accordingly, the organizations would have the ability to announce NIMs by increasing the capital adequacy ratios.

ROA and Capital Adequacy: The organizational capabilities to generate returns based on the assets remain another key area of importance which requires attention when organizational activities are considered. Right action is required to be taken to manage these specific areas and meet the desired results in the future. The ability to generate returns on assets is an important area which requires attention when overall capital adequacy is considered, and the scores of CCAR and TCAR have reached as 0.38 and 0.36, indicating a moderate relationship between these variables. Thus, while the relationship exists, the strength of the relationship can be considered low. However, it can be considered that with the increase of the capital adequacy levels, the return generating capability of the assets would increase.

ROE and Capital Adequacy: The relationships that have been identified between ROE and CCAR, TCAR remain -0.16 and -0.15 respectively and can be considered as there is no relationship between the variables. Thus, the above scores that have been recognized clearly indicate that the set ROE might not have been impacted by the capital adequacy levels associated with LFCs. Even though the overall pattern over the past ten years has been similar to the changes associated with the capital adequacy levels and the NIMs, the above analysis clearly indicates that capital adequacy levels might not be able to predict the overall return generating capability on the equity.

While the results in the above discussion clearly indicate that there could be a relationship between the variables, further investigation is required in order to establish them clearly. This would indicate if there were clear relationships between the variables and what action should be taken in order to manage these issues effectively. These are some of the important areas of consideration which require attention when capital adequacy levels of LFCs are considered.

Empirical Analysis

After estimating using the Pooled Ordinary Least Square method, panel regression was estimated in the Hausman test to select an appropriate method between random effect and fixed effect (Hausman test tables are given in appendices, p. 35). The Hausman specification test is commonly employed for selecting between the Fixed and Random Effects estimators for panel data. The Random Effects estimator is based on the assumption that there is zero correlation between the regressors and the error term, a situation that should

be considered the exception rather than the rule. It is therefore not surprising that this null hypothesis is frequently found not to withstand empirical scrutiny (Frondel, Vance, and Essen, 2009). In the case of panel data used, it is important to select the results of which one of the two methods i.e., Random Effect and Fixed Effect is appropriate. Basically, if the p-value is greater than 0.05, the null hypothesis is accepted, and then Random Effect is applied. If the p-value is less than 0.05, the null hypothesis is rejected, and Fixed Effect is considered. Accordingly, in this study, based on significance level, Random Effect was selected for NIM as p-value is 0.3995, and Fixed Effect was selected for ROA and ROE as p-values are 0.0001 and 0.0000, respectively. Further, in the ROA model, the heteroscedasticity problem arose. However, this problem was resolved using robust standard errors. Accordingly, the tables below present the regression estimation for NIM, ROA and ROE respectively. Each of the regression models represents a regression of one of the independent variables against the dependent variable.

Capital Adequacy against NIM: Table 5 below shows the regression estimates of capital adequacy ratios and NIM.

Table 5 – Regression Results on NIM

Dependent Variable: NIM; Method: Random Effect			
Sample: 2011-2020; Periods included: 10; Cross-sections included: 18; Total panel observations: 180			
Explanatory Variable (Expected sign)	**Coefficient**	**Std. Error**	**Prob.**
Constant	0.6521	6.3030	0.918
CCAR (+)	0.0110	0.0679	0.871
TCAR (+)	0.0668	0.0576	0.246
SIZE (+)	0.7954	0.5792	0.170

Source: Compiled by author

Accordingly, the result reveals positive relationships between CCAR, TCAR and NIM, which are according to our expectations. However, the p-values of CCAR and TCAR (0.871 and 0.246 respectively) were not statistically significant. Accordingly, these results tell us that the NIM does not directly explain the capital adequacy ratios of LFCs in Sri Lanka.

Capital Adequacy against ROA: Table 6 indicates the results of regression analysis on ROA. Accordingly, the results suggest a statistically significant and positive relationship between TCAR and LFCs ROA since the reported coefficient of TCAR has p-values of 0.001 and it is in line with expectations. Even though a positive relationship between CCAR and ROA was found it was insignificant as the p-value of CCAR is 0.697.

Table 6 – Regression Results on ROA

Dependent Variable: ROA; Method: Fixed Effect			
Sample: 2011-2020; Periods included: 10; Cross-sections included: 18; Total panel observations: 180			
Explanatory Variable (Expected sign)	**Coefficient**	**Std. Error**	**Prob.**
Constant	34.0236	5.2513	0.000
CCAR (+)	0.0251	0.0634	0.697
TCAR (+)	0.0923	0.0231	0.001*
SIZE (+)	-3.1851	0.4920	0.000*
R – squared		0.0198	
P – Value of the overall model		0.0000	

Note:* indicates statistical significance at 5%

Source: Compiled by author

Capital Adequacy against ROE: Table 7 below demonstrations the regression estimates of capital adequacy ratios and ROE.

Table 7 – Regression Results on ROE

Dependent Variable: ROE; Method: Fixed Effect			
Sample: 2011-2020; Periods included: 10; Cross-sections included: 18; Total panel observations: 180			
Explanatory Variable (Expected sign)	**Coefficient**	**Std. Error**	**Prob.**
Constant	176.3336	28.6548	0.000
CCAR (+)	0.0169	0.2827	0.952
TCAR (+)	-0.2120	0.2283	0.354
SIZE (+)	-15.066	2.6399	0.000*
R – squared		0.2885	
P – Value of the overall model		0.0000	
F statistic		11.5	

Note:* indicates statistical significance at 5%

Source: Compiled by author

According to the regression results on ROE as shown in the following table 4.5, a positive relationship between CCAR and ROA is observed, and it is also consistent with our expectations. However, the p-value (0.952) is not statistically significant—this does not reject the null hypothesis that the variable CCAR has no influence on ROA of LFCs in Sri Lanka. Also, a negative and insignificant relationship between TCAR and ROE was observed in LFCs of Sri Lanka as the reported p-value is 0.354, which does not confirm a direct relationship between these two variables. This is also in conflict with our prior expectation

LFC Size against Profitability: When considering the regression results on ROA and ROE, there exists a negative relationship between LFC Size and profitability in Sri Lanka, and the SIZE variable is statistically significant in terms of ROA and ROE with the p-value of 0.000. Also, a positive but insignificant relationship between SIZE and NIM was observed. These results clarify that SIZE does not explain the profitability of LFCs in Sri Lanka, and it is not in line with our expectations as we anticipated a positive relationship because empirical literature has proclaimed an indeterminate relationship between SIZE and profitability.

Discussion on Hypotheses Testing Outcomes

The study set out to establish the outcomes related to their hypotheses testing in order to evaluate how these relationships are constructed. Thus, these are some of the important aspects of consideration when it comes to the development of capital adequacy levels.

Table 8 - Hypotheses Testing Outcomes

Hypotheses	Correlation analysis outcome	Regression analysis outcome	Eventual outcome
H_{A1}: There is a significant positive relationship between CCAR and NIM of LFCs in Sri Lanka.	Accepted	Rejected	Rejected
H_{A2}: There is a significant positive relationship between CCAR and ROA of LFCs in Sri Lanka.	Accepted	Rejected	Rejected
H_{A3}: There is a significant positive relationship between CCAR and ROE of LFCs in Sri Lanka.	Rejected	Rejected	Rejected
H_{A4}: There is a significant positive relationship between TCAR and NIM of LFCs in Sri Lanka.	Accepted	Rejected	Rejected
H_{A5}: There is a significant positive relationship between TCAR and ROA of LFCs in Sri Lanka.	Accepted	Accepted	Accepted
H_{A6}: There is a significant positive relationship between TCAR ROE of LFCs in Sri Lanka.	Rejected	Rejected	Rejected
H_{A7}: There is a significant positive relationship between the LFC size and the profitability indicators of LFCs in Sri Lanka.	Rejected	Rejected	Rejected

The above analysis indicates the nature of the relationships between the variables and the hypotheses are accepted and rejected based on the findings of the study. Accordingly, CCAR and TCAR and profitability i.e., ROA have a positive relationship but only TCAR has a significant relationship. Thus, hypothesis HA5 is in line with the study's expectations while HA2 is rejected. Although past studies on capital adequacy and profitability of LFCs in Sri Lanka were not available, when considering other studies on the same, but with regard to banks, Mathuwa (2009), Ahmad and Ahmad (2017), Mwai, Jagongo and Fredrick (2017), Asikhia and Sokefun, (2013), and Agbeja, Adelakun and Olufemi (2015) have found a positive and significant relationship between capital adequacy ratios and ROA of banks. However, Chandrasekaran (2020) has observed no significant positive relationship between capital adequacy ratios and profitability of banks in Sri Lanka, and the finding of this study discussed above is in contradiction to other researchers, Aruwa and Naburgi (2014), Rufo and John (2017), and Pasaman (2017), who have found that capital adequacy ratios have an insignificant relationship with ROA.

The capital adequacy of LFCs does not significantly influence NIM and ROE of LFCs in Sri Lanka. Hence, hypotheses HA1, HA3, HA4, and HA6 were not supported. Like many other researchers, Chandrasekaran (2020) has found an insignificant relationship between NIM and capital adequacy of banks in Sri Lanka and Abugamea (2018) has observed the same. However, Hope (2017) has observed that capital adequacy ratios are significantly and positively related to NIM and ROE, and the results of the study conducted by Mathuwa (2009) show that ROE is positively related to capital adequacy ratios.

5. CONCLUSION AND RECOMMENDATIONS

In this paper, an empirical framework was specified to investigate and examine the capital adequacy requirements that influence the financial profitability indicators of LFCs in Sri Lanka over the period 2011 – 2020. Accordingly, two main capital adequacy ratios i.e., Core Capital Adequacy Ratio (CCAR) and Total Capital Adequacy Ratio (TCAR) and size of LFCs were identified as independent variables, and using these three variables, measures of profitability of LFCs i.e., Net Interest Margin (NIM), Return of Assets (ROA) and Return of Equity (ROE) were investigated. According to the results of the study, capital adequacy indicators of LFCs in Sri Lanka i.e., CCAR and TCAR were found to have a direct and significant influence on only ROA, while the other two variables of profitability of LFCs i.e., NIM and ROE did not show any direct relationship with CCAR and LFC, which is the main innovation of the study relating to the LFC industry in Sri Lanka.

The results of the study suggest that in general, LFCs which maintain their capital adequacy levels well contribute towards increasing their profitability. A LFC with well-maintained ROA is expected to have higher safety of its stakeholders and this superiority would increase investor confidence and contribute to the long-term sustainability of LFCs. Since ROA of LFCs would be increased in capital adequacy, all LFCs need to develop their own internal policies to ensure that they have a clear set of capital adequacy expectations in place. Also, CBSL needs to take more significant measures and appropriate actions on capital adequacy requirements for long-term sustainability of LFCs in Sri Lanka.

Policy Recommendations

Based on the results and discussion of the study, it can be recommended that LFCs need to focus on improving their capital adequacy levels since capital adequacy would reduce the risks associated with the investments of these LFCs as ROA would be increased in capital level of LFCs. Therefore, LFCs need to maintain strong capital adequacy levels and an acceptable risk portfolio so that they would be able to attract investors / customers and retain them in the long run. Also, while CBSL directs to the regulatory required levels of capital adequacy, all LFCs need to develop their own internal policies to ensure that they have a clear set of capital adequacy expectations in place, and long-term customer trust would be developed accordingly. Thus, this is an important area that needs to be prudently considered in terms of risk management aspects of the LFCs in Sri Lanka.

Furthermore, to maintain financial system stability in Sri Lanka, regulatory authorities are recommended to:

- enhance the existing rules for mitigating risk within the LFC sector in Sri Lanka considering the international regulations designed on capital requirement, since LFCs in Sri Lanka also mobilize public deposits like banks;

- improve the prevailing laws and regulations focusing on strategic monitoring, supervision and evaluation on capital adequacy requirements for long-term stability of LFCs, especially assessing the impact of the COVID-19 pandemic;

- encourage and facilitate research on determinants of capital adequacy of LFCs to take more significant measures and appropriate actions aimed at tightening the risk management of LFCs in Sri Lanka as CBSL has sufficient financial data of LFCs; and,

- expedite the publication of important financial information of each LFC in a timely manner for the benefit of all stakeholders and usage of further research with a special focus on LFCs in Sri Lanka.

Limitations of the Study

This study is conducted in the absence of local literature on capital adequacy and profitability of LFCs in Sri Lanka, and the scope of the study is limited to 18 LFCs with the financial data of the said LFCs related to only a 10-year period due to the lack of published data about LFCs. Hence, further research on this study area is needed to investigate and examine the relationship between capital adequacy and profitability of LFCs in Sri Lanka by incorporating further variables and increasing the sample size and number of observations using appropriate econometrics methods. Those would help to add more value to the LFC regulatory framework and build investors 'trust in the LFC sector in Sri Lanka.

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APPENDICES

Appendix 01: Hausman Test Tables

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                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |    NIM_FE       NIM_RE       Difference          S.E.
-------------+----------------------------------------------------------------
    CORECAR  |  -.0180184     .0110662      -.0290847        .0271427
   TOTALCAR  |   .0818629     .0668248       .0150381        .0129187
      LOGTA  |    .972024     .7954925       .1765315        .3625345
-------------+----------------------------------------------------------------
                          b = consistent under Ho and Ha; obtained from xtreg
           B = inconsistent under Ha, efficient under Ho; obtained from xtreg

   Test:  Ho:  difference in coefficients not systematic

                 chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                         =        2.95
               Prob>chi2 =      0.3995
```

```
                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |    ROA_FE       ROA_RE       Difference          S.E.
-------------+----------------------------------------------------------------
    CORECAR  |   .0251477     .0903477          -.0652        .0382611
   TOTALCAR  |   .0923686     .0697554        .0226132        .0074622
      LOGTA  |  -3.185177     -.549472       -2.635705        .5221675
-------------+----------------------------------------------------------------
                          b = consistent under Ho and Ha; obtained from xtreg
           B = inconsistent under Ha, efficient under Ho; obtained from xtreg

   Test:  Ho:  difference in coefficients not systematic

                 chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                         =       20.72
               Prob>chi2 =      0.0001
               (V_b-V_B is not positive definite)
```