https://doi.org/10.4038/sajf.v3i1.51

South Asian Journal of Finance

ISSN (Online): 2719-2547 | Journal Home Page: https://sajf.sljol.info/

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To cite this article: Rathnayake S. and Nanayakkkara K.G.M. (2023). Ownership Structure, Firm Size and the Operational Risk Management of Domestic Commercial Banks in Sri Lanka, *South Asian Journal of Finance*, *3*(1), 54–66.

SOUTH ASIAN JOURNAL OF FINANCE
ISSN (Online): 2719-2547
2023, VOL. 3, No. 1, 54 – 66
Journal Homepage: https://sajf.sljol.info/

Ownership Structure, Firm Size and the Operational Risk Management of Domestic Commercial Banks in Sri Lanka

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ABSTRACT

Purpose: The banking sector is a crucial player in any economy, often affected by economic and social crises. Thus, it is vital to identify the intrinsic weaknesses of banks to manage their operational risk. The recent COVID-19 pandemic also severely affects the global financial sector, irrespective of the development status. Accordingly, this study is an attempt to find out the evidence on operational risk management and its relationship with bank size and ownership structure of the banking sector in one of the developing countries in the world, Sri Lanka.

Design/Methodology/Approach: Financial data of eight out of thirteen commercial banks in Sri Lanka were analyzed over 13 years using panel data regression analysis. Sri Lankan banks' operational risk management practices are measured by excess capital (over the required minimum capital for operational risk). Deposits plus advances are used to calculate the size of a bank.

Findings: It is revealed a significant positive relationship between firm size and operational risk management. A significant relationship between the ownership and excess capital held by banks for managing operational risk is also identified. This result leads to the conclusion that the larger commercial banks hold higher excess capital over the required minimum as per Basel accords. Moreover, government-owned banks are recognized to have more excess capital for operational risk management.

Implications: Given the high amount of losses from bad loans and the central bank's implementation of Basel III regulations, the study has implications for Sri Lankan banks.

Originality: When considering Sri Lankan context there can be found only a little amount of evidence on operational risk management practices and its relationship with size and ownership.

KEYWORDS

Excess capital, Firm size, Minimum capital, Operational risk management, Ownership structure

JEL CLASSIFICATION

G18, G21, G28, G32

I. Introduction

The recent COVID-19 pandemic which is a pandemic of COVID-19 disease has raised more concern towards the minimum capital requirement that the banks hold as well as the operational risks that the banks face (Heo, Grable, & Rabbani, 2020). Over the past two decades, operational risk management (ORM) has drawn the attention of regulators and risk managers who are attempting to measure and mitigate its potentially catastrophic effects on their businesses. Since the 1990s, financial institutions started to recognize operational risk (Janakiraman, 2008).

In April, 2020 the Bank of England announced that the banks must deploy the liquidity buffers and a substantial amount from the excess capital to aid the economy. This requirement mainly arose due to the hit their economy had to face because of the coronavirus pandemic. They expect to disburse loans to struggling companies during the pandemic under a government scheme through such a deployment. The Prudential Regulation Authority (PRA) also

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Received: 04 October 2022, Accepted revised version: 04 May 2023

mentioned that the excess capital used needs to be restored gradually, yet they will allow a significant time period for the process after the end of the prevailing situation (Bank of England, n.d.). Similar actions were taken by the Central Bank of Sri Lanka (CBSL), including a debt moratorium, to back up economic activity in the situation of a low inflation environment (Central Bank of Sri Lanka, 2020). However, fitch ratings revised the sector outlook for Sri Lanka from stable to negative to reflect the medium-term risk on the bank's financial profile due to the relaxation of capital expectations and classification of loans for banks by CBSL during the Covid-19 pandemic situation (Malagala & Thalgodapitiya, 2020).

Against such a backdrop, the investigation of managing the operational risks in the Sri Lankan banking sector is timely and essential. However, the extant literature on the topic is limited. Thus, this study is conducted to observe the relationship between the operational risks of the banks with their size and ownership structure owing to the requirements of the Basel accords.

Over the past two and half decades, operational risk management has been paid considerable attention by the related parties who are trying to calculate and mitigate the irrecoverable result of the risk in the financial industry. Financial scandals such as bankruptcy, rough trading and internal fraud in this industry in the previous few decades are the results of the failure of the banking system.

Financial institutions, such as banks, play a significant part in any economy. Banks smooth financial transactions. However, still, the majority of banks are using manual techniques for managing their risk to deal with future losses. Thus, banks must be aware of their intrinsic weaknesses and adopt advanced techniques to manage their operational risk.

The need for operational risk management was first reported in the 1990s which led to the signing of the Basel Accord in the financial industry. It serves as a universal mediator for operational risk management in banks to minimize operational risk (Janakiraman, 2008; Chernobai, Rachev, & Fabozzi, 2007).

Basel Committee Framework (2004) defines operational risk as the risk of losses arising from insufficient or failed internal processes, people and systems, or external events. This definition takes in legal risk, however, it discounts strategic and reputational risk. Further, a minimum capital requirement for managing operational risk is mentioned in its second version accord.

A bank's risk management methods and practices of capital adequacy computation directly affect the bank's capability to survive in a downside economic condition. Capital adequacy does not only prevent these types of risks, but also creates a more dependable banking system (Gardener & Ayling, 1984). Thus, the capital requirement as per the Basel norms plays a major role in managing the operational risk of the banking industry.

However, a decade after the global financial crisis, now the banking sector of the world reaches its strongest position (World Finance, 2019). Although the status of the global banking sector shows a green light, the situation is not the same for the banking sector of developing countries. Sri Lanka is also amongst these developing countries which continues to have an uncertain period in the banking sector (Joseph, 2019). The Sri Lankan financial system did not get affected much by the global financial crisis in year 2008 due to its inherent powers and better regulatory infrastructure. However, the Sri Lankan banks and financial institutions are also exposed to this type of unexpected situations in the absence of better risk management practices and prescriptions.

Seylan Bank PLC, one of the commercial banks in Sri Lanka, was unable to pay back the money to the depositors as a result of the liquidity crisis they suffered in 2008 (Hemachandra, 2011). The bank failures can have catastrophic results for the Sri Lankan

economy as the capacity of Sri Lankan financial system to face such shocks is considerably low. Also, Sri Lanka experienced a series of horrific attacks on Easter Sunday in 2019 which leads to a huge economical fall. In these types of scenarios, the country's financial intermediaries also face huge risks in short term as well as in long term. Thus, maintaining a minimum capital for the management of operations risk is important in Sri Lanka. Operational risks, technological risks and environmental risks are making the banking industry of Sri Lanka challenging (KPMG, 2019). Still, the situation of Sri Lankan banking sector has not become stable due to series of aforementioned issues such as the global financial crisis, the easter Sunday attack and the COVID-19 global pandemic.

Similar to how Sri Lankan Financial institutions address market and credit risk, they must adequately address operational risk. Because bank failure could also result from mismanagement and non-identification of operational risk. As a result, this study is significant given the limited evidence on operational risk management in the banking sector of emerging economies. Thus, by maintaining the minimum capital required by the Basel Accord for Operational Risk Control, the financial institution will be preserved from bankruptcy in the event of an economic crisis and the banking system will remain stable.

Hence, this paper investigates the operational risk management of Sri Lankan banking sector owing to the Basel accords and minimum capital requirements.

The rest of the paper is organized as follows. Section 2 presents the requirements of the Basel accords and the findings of past studies. Section 3 explains the data and methodology. In Section 4 we present findings and discussion and Section 5 concludes.

II. Review of Literature

Basel Accords and Minimum Capital Requirement

This section discusses the trajectory of Basel Accord followed by a further explanation on the minimum capital requirements for managing operational risk.

The Basel Committee on Banking Supervision (BCBS) published three versions of Basel accord namely (1) Basel I, (2) Basel II and (3) Basel III. Basel I, which was published in 1988 includes a set of minimum capital requirements for managing risks in banks. This consisted of credit risk and market risk. Basel II was published in 2004 with the international standard for regulators in the banking sector. This includes a set of minimum capital requirements for managing different types of risks faced by the bank. This consists of three types of risks, namely, (1) operational risk, (2) credit risk and (3) market risk. In 2013, Basel III was introduced and it publishes the regulations on bank capital adequacy, market liquidity and stress testing. It is developed to make a healthy relationship between banks' capital requirements, bank liquidity and decreasing bank leverage.

Enhancing minimum capital requirement will help to implement Basel III framework in Sri Lanka to strengthen the resilience of banks and may lead to consolidation in the banking sector (Bank Supervision Department, 2017). Thus, new banks which are to be established or incorporated in Sri Lanka are needed to meet these capital requirements.

Minimum capital requirement

According to Basel Accords, there are three methods in calculating the minimum capital charge for operational risk management in a series of growing risk sensitivity and sophistication. These three methods are the Standardized Approach (TSA), Advanced Measurement Approach (AMA) and Basic Indicator Approach (BIA) (Central Bank of Sri Lanka, 2014). In normal operations, the banks are allowed to execute the TSA or BIA while for others AMA is implemented. Depending on the method of calculating the risk charge, operational risk can be selected as a bottom-up approach or the top-down

approach. In bottom-up approach, banks use the estimations from internal operational risk assessments to utilize TSA and BIA approaches, whilst the top-down approach utilizes the financial data obtained from financial statements (Sharifi, Haldar, & Rao, 2016)

(i) The Basic Indicator Approach (BIA)

In the Basic Indicator approach, banks take 'gross income' as an exclusive proxy in computing the total operational risk vulnerability. Under this method, the minimum capital requirement is computed as a percentage (15%) of the average gross income of the prior three years. If the years consist with a negative gross income, they are excluded from the calculations. Gross income is taken as the summation of net non-interest income and net interest income (Basel Committee, 2006)

(ii) The Standardized Approach

This approach is a more advanced approach in calculating the minimum capital required. In this method, the bank's actions are categorized into particular business lines. Every business line consists with a financial indicator which is a proxy in computing the amount of operational risk for every business line.

Then, by multiplying this financial indicator by the beta factor, the minimum capital held for the operational risk is calculated. The beta is used as a proxy to indicate the relationship of the financial indicator and operational loss experience in a particular business line (Basel Committee, 2006).

(iii) Advanced Measurement Approach (AMA)

Advanced Measurement Approach is also used in computing operational risk. This approach considers internal measurement process which pave the way to initiate a reliable internal loss database in banks. According to AMA, risk measure given by the bank's internal operational risk measurement system is used in the computation of the regulatory capital charge. There are four types of data used by an AMA for the computation of capital requirements of operational risk in banks. They are, External data; Internal loss data; Business environment and internal control factors (BEICFs) and Scenario analysis (Basel Committee, 2011).

It is commonly accepted that the BIA as the most sophisticated approach used in calculating operational risk capital amount held within the firm. Thus, we use BIA as the method of calculating operational risk capital in the current study.

Empirical findings of past studies

The Basel Committee outlined Banking Supervision (2004) with a diversity of operational risk. It is a specified activity. Further, it is unprecedented about the unwanted product of business operation. Basel Committee also highlighted that there could be losses due to operational risk. It especially has an effect on having no improvement in return rates based on capital and assets. According to Lewis and Lantsman (2005), unilateral operational risk estimate losses and the bank losses always do not affect operations of other banks. These losses can be categorized considering operational risks unilaterally.

According to Hull (2012), distinguishing the characteristics of lost proportion of risk is considerably difficult and the policymakers of an organization maintain excess capital charges due to several reasons.

According to Hassan (2009), Pakistan banks faced many challenges after the third financial crisis. Thereby they have taken reasonable and strong actions to save insecure time and affect to increase the performance. There are negative shocks and sustain financial stability. Hassan (2009) further emphasized the importance of recognizing the factors which may affect to

overall excess capital held by banks for risk management.

Studies carried out worldwide found size of the firm to be an important determinant of operational risk management. Fontonouvelle, Dejesus-Rueff, Jordan, and Rosengren (2006) indicate that operational losses are an important source of risk for large banks, and more capital is required in operational risk management than to manage market risk. Laeven and Levine (2008) report that as the banks size increases, it pursues complex business activities. Further, their organizational arrangement become more confusing which make agency problem and ultimately enhancing operational risk.

In contrast, Shih, Samad-Khan and Medapa (2000) reveal that relationship of size with operational losses is not linear and shows a clear weakening association of the firm size and the losses magnitude. The reason for weak relationship could be due to factors such as inherent difference in risks, management competence and the effectiveness of internal control management. Supporting that, Beck, Asli, and Ouadra (2010) argue that the small banks as compared to large banks are more exposed to market risk and are likely to uphold additional capital. In comparison, large banks are likely to uphold a small amount of additional capital for operational risk management.

Sapienza (2004) also demonstrates that Italian state-owned banks follow political objectives in their lending policies. Barth, Capiro and Levine, (2001) concluded that government ownership of banks is generally associated with less well-developed and less efficient financial systems.

In contrast to studies suggesting higher efficiency in stock-owned banks, Aluntas, Berry-Stolzle, and Hoyt (2011) conclude that government owned German savings banks have high efficiency than that of private banks.

Firm size and excess capital

The expectation of this study is that there is a significant relationship between the size of a bank which is measured by the comparative value deposits and advances, and the excess capital held for the management of operational risk. Larger banks are expected to hold a higher excess capital because of they carry higher risk. Smaller banks are expected to hold lower excess capital since they carry a lower risk. Moreover, we can expect larger banks to hold higher excess capital since they have diversified investments, assets and loans and also require more sophisticated and better skills and systems in managing operational risk (Laeven & Levine, 2008). Further, due to limited resources smaller banks cannot afford such mechanisms for sophisticated internal control. Therefore, the first hypothesis of this study is developed as;

H1: There is a significant relationship between the firm size and operational risk management of Commercial banks in Sri Lanka.

Ownership structure and excess capital

The other expectation of this study is that government banks keep a larger excess capital for operational risk management than the banks which are privately owned. The government owned banks get capital from the budget of the Sri Lankan government. They are not expected to have a rational earning as private banks where the lenders of the capital expect greater returns (Iannotta, Nocera, & Sironi, 2013).

However, we can also declare that government owned banks may also own some networks, clout and resources with regulators. Therefore, there are no such strict regulations for the excess capital they held. Owing to that, the second hypothesis developed is,

H2: There is a significant relationship between the ownership structure and operational risk management of Commercial Banks in Sri Lanka.

III. Data and Method

The secondary data needed for the analysis is taken from the Central Bank database, the Colombo stock exchange and from Commercial Banks' annual publications. The data set includes 13 years (2005-2018) and eight commercial banks (cross-section).

In Sri Lanka, the commercial banking system consists of 26 banks, thirteen of which are domestic commercial banks and thirteen of which are branches of foreign commercial banks. Among the population, eight commercial banks have been selected for this study excluding thirteen foreign Banks and five non-listed banks.

Foreign licensed commercial banks were excluded from the study because of several reasons. First is the difference in the banking operation and accounting format compared with the domestic commercial banks mainly due to multicurrency transactions. Second is the unavailability, reliability and accuracy of the financial data.

The dependent variable of the study is Operational Risk Management (ORM). This Research engaged the basic indicator approach (BIA) for the calculation of minimum capital requirement as advocated by the Basel II standards (Archer & Abdullah, 2007). The excess capital is obtained as the actual capital held by banks minus the minimum capital required for operational risk management. While, gross income is obtained from the annual financial reports of the banks. The observations are to be calculated in log form to ensure normality of the data.

$$EKGI_{i,t} = \%\left(\frac{excess\ capital}{gross\ income}\right) \qquad (i)$$

Where,

$EKGI = \%\ of\ excess\ capital\ to\ gross\ income\ set\ for\ operational\ risk\ management$

$Excess\ Capital\ (EC) =$ (Actual capital for operational risk – minimum capital required)

$Minimum\ capital = 15\%\ x\ Average\ positive\ gross\ income\ of$ preceding 3 years

(Archer & Abdullah, 2007).

Whilst bank size and ownership structure are regressed on the operational risk management, effects from leverage, return on assets and loans are controlled in the model.

Bank size is selected as the independent variable. Majority of the past studies used log of sales and log of assets as indicators for bank size. When considering specifically for banks, assets are usually consisting of deposits and advances made in the form of loan. Therefore, this study engaged log of deposit plus advance as a proxy for bank size following Sharifi et al. (2016).

$$LSIZE = \log(deposits + advances)\ (ii)$$

Due to the unavailability of the exact proportion of ownership structure holding in the banks which are selected for the study, we use a binary variable to proxy for the ownership structure as in Sharifi et al. (2016). Thereby, the government owned bank is denoted by "1" while the private owned bank is denoted by "0".

ROA is calculated as a ratio of net income to total assets. The impact of ROA on bank's operational risk is ambivalent. Further, this research controls the effect of operating leverage on the bank risk by using the ratio of total equity to total assets. This ratio is expected to affect in a positive way to bank risk. Controlling of this variable is significant (Hasan & Dridi, 2010; Srairi, 2010).

Nonetheless, loans can also impact on risk of the banks, as a result the impact of loans on risk and profits is uncertain (Iannotta et al., 2013). Thus, the ratio of loans to total assets is taken to control the loans in the model.

The study uses panel data regression to examine the relationship between Operational risk Management, Firm size and ownership structure. With the use econometric/statistical data analysis tool,

STATA SE – 64 (2013) data analysis software package the collected data were analyzed.

Econometric Identification

Equation (1) and (2) depict the two models of the study. Panel regression model is used to analyze data.

$$EKGIi,t = \beta 0 + \beta 1LSizei,t + \beta 3Levi,t + \beta 4ROAi,t + \beta 5Loansi,t + \varepsilon i,t \quad (1)$$

$$EKGIi,t = \beta 0 + \beta 2Owni + \beta 3Levi,t + \beta 4ROAi,t + \beta 5Loansi,t + \varepsilon i,t \quad (2)$$

Where,

$EKGI_{i,t}$ = % (Excess Capital/Gross Income) for bank i in period t, $LSize_{i,t}$ = Log Size for bank i in period t, $Own_{i,}$= Ownership structure Dummy for bank i in period t, $Lev_{i,t}$ = Leverage for bank i in period t, $ROA_{i,t}$ = Return on Assets for bank i in period t, $Loansi,t$ = Loans for bank i in period t and $\varepsilon_{i,t}$ = Random error term.

Both models were tested for the presence of random effect or fixed effect. The Breuch and Pagan Lagrangian multiplier test for random effects was ran to select between the Pooled OLS model and Random effect model. Results depict probability of 1.000 for model 1 and a probability of 0.2571 for model 2 which are greater than 5%. Thus, we reject the alternative hypothesis of random effect model suitability and accept the null hypothesis which means that the Pooled OLS model is preferred than random effect model.

Fixed effect model is also tested with pooled OLS method. F test value has a probability of 0.2792 for model 1 and 0.1144 for model 2 which leads to accept the null hypothesis. These results indicated that the Pooled OLS model is better than fixed effect model.

IV. Findings and Discussion

This section focuses on findings and the discussion on the results comparing with the literature. The analysis provides findings on the impact of firm size and the ownership structure on ORM.

Analysis

Table 01 depicts the descriptive statistics for model 1, which explains the relationship between Firm size and excess capital whereas Table 02 shows the descriptive statistics for model 2 which explains the relationship between ownership structure and excess capital.

Table 1. Descriptive Statistics – Model 1& Model 2

Variable	Mean	Std Dev	Min	Max
ORM	0.7273	0.5286	0.1017	3.9997
Bank Size	2.4331	0.5504	1.1505	3.5044
Govt.	0.1250	0.3322	0.0000	1.0000
ROA	1.7056	1.2293	0.1900	12.3000
Leverage	0.1003	0.0577	0.0415	0.3446
Loans	0.6675	0.1837	0.3324	1.8903

As Table 01 depicts, the excess capital held for ORM range from 0.102 to 4.000, which interpret an average value of the excess capital held for ORM is lying between 0.102 and 4.000 with a standard deviation of 53%. From the observations in the table, the excess capital held for ORM (EKGI) under the Basic Indicator Approach is consisted with a mean value of 0.727. The banks size is the log of the summation of deposits and advances of the banks consist of a mean value of 2.433. The banks' ownership structure which is taken as private and government consist of a mean value of 0.125.

The existence of multicollinearity in two models is tested using the VIF test for multicollinearity. As the VIF values are

lower than 2.5, the probability of having even weak multicollinearity is very low (refer to Appendix 01 and Appendix 2 for VIF statistics of the two models respectively).

The existence of autocorrelation in the two models is tested using the Wooldridge test for autocorrelation. The estimated value is 0.0003 for model 1 and 0.001 for model 2. This shows the existence of autocorrelation. Further, the existence of heteroscedasticity is also tested for two models using the Breush-Pagan/ Cook Weisberg test for Heteroscedasticity. Test results show a probability of 0.0000 for both models which is less than 5% confirming the existence of heteroscedasticity.

To address the problem of autocorrelation and heteroscedasticity, panel cluster option has been used. After obtaining the cluster output, the final output was derived in Table 02 for model 1 and Table 03 for model 2.

Table 2. Coefficient estimates under Pooled OLS model for Model 1

Dependent variable: ORM				
Variables	**Estimates (1)**	**p-values (2)**	**Standard errors (3)**	**t-values (4)**
Bank size	0.1328	0.0030	0.0300	4.43
ROA	-0.0405	0.0000	0.0064	-6.35
Leverage	9.2589	0.0000	0.2176	42.55
Loans	-0.0290	0.2150	0.0213	-1.36
No. of groups	28			
No. of observations	112			
P-value	0.0000			
R-squared - within	0.5329			
R-squared –between	0.9841			
R-squared - overall	0.8310			

Table 02 shows the results derived of the regression of excess capital and bank size. This model is significant at 95% confidence level. Also, the R^2 value shows that the variables in model 1 explains the ORM by 83%. Results depict in the Table 02 suggest that there is a significant positive relationship between excess capital held for ORM and the bank size. Therefore, the first hypothesis of this study: There is a significant relationship between the firm size and operational risk management of Commercial banks in Sri Lanka can be accepted.

Table 3. Coefficient estimates under Pooled OLS model for Model 2

Dependent Variable: ORM				
Variables	**Estimates (1)**	**p-values (2)**	**Standard errors (3)**	**t-values (4)**
Govt	0.1200	0.0120	0.0354	3.39
ROA	-0.0375	0.0060	0.0097	-3.86
Leverage	8.9544	0.0000	0.1699	52.71
Loans	0.0787	0.1300	0.0459	1.72
No. of groups	28			
No. of observations	112			
P-value	0.0000			
R-squared - within	0.4991			
R-squared –between	0.9888			
R-squared - overall	0.8205			

Table 03 shows the results derived of the regression of ownership structure and excess capital. This model is also significant at 95% confidence level. Also, the model explains the ORM by 82%. Results depict in the Table 03 suggest that there is a significant positive relationship between excess capital held for ORM and the ownership structure of banks. Therefore, the second hypothesis of this study: There is a significant relationship between the ownership structure and operational risk management of Commercial Banks in Sri Lanka can be accepted.

Thus, it can be concluded that both firm size and ownership structure significantly affect the operational risk management of Commercial banks in Sri Lanka.

Discussion

The results of the study are robust with the prior studies on firm size and ORM. Laeven and Levine (2008) and Adnan et al., (2018) suggested that as the bank size increases, the excess capital held for ORM increases. This is because when bank size increase, organizational arrangements become confusing as they follow more complex enterprise activities. This ultimately leads to an agency problem and eventually increase operational risk. The findings prove that the priori prediction of larger banks holding relatively higher excess capital as they have more investment portfolios and complex systems. Due to limited resources, smaller banks cannot afford to invest in many portfolios and thereby, they face relatively lower risk and they hold lower amount of excess capital.

Thus, the risk managers and governors have to contemplate with this when estimating the capital requirements. To allocate the capital requirement, they can perform in-depth analysis for the identification of possible risks.

The results of the study also suggest that there is a significant relationship between ownership structure (private and government) and the excess capital held for operational risk management. Thus, it suggests that the government banks hold more excess capital for operational risk than the private banks. In other words, we can advocate that government owned banks consist with a better operational risk management practice. These findings align with related literature and findings by Adnan et al., (2018). In contrast, according to Sharifi et al. (2016)there is no significant relationship between the ownership structure and the excess capital held for operational risk. Regulatory differences prevailing within the countries could be the main reason for such contradictions.

V. Conclusion and Implications

Operational risk management is one of the most complex functions for banks and is at core in the banking sector of the world. Regulations such as Basel Accords, direct the banking institutions to identify and manage such risks associated with the operations of the banks. Thereby, having a sound operational risk management is vital for any banking institution. Although the ORM plays a key role in the banking operations irrespective of the development grade of the country, banks in the developing countries are highly exposed to operational risks compared to developed countries. Thus, we investigate the ORM of banking sector companies in Sri Lanka in terms of excess capital held using the basic indicator approach (BIA) for the calculation of minimum capital requirement as supported

by the Basel II standards (Archer & Abdullah, 2007). Bank size and ownership structure were regressed on excess capital to gross income in order to identify their effect on ORM.

The relationship between the bank size and the operational risk management is significant and positive. This means when the bank size increases the excess capital held for ORM also increase and when the banks size decrease, the excess capital held for ORM also decrease. The conclusion can be derived as that the larger banks keep more excess capital than the smaller banks.

The relationship between the ownership structure and the operational risk management also become significant and positive. This means that the government banks hold a higher excess capital for ORM than private banks. This implies that government banks are more reliable for customers because they are supported by better ORM.

Both models in this study explain the operational risk management more than 80% and can conclude that both firm size and ownership structure are equally important for operational risk management.

This study has implications not only for Sri Lankan banks, but also for banks in developing countries. This is because of the higher level of losses they face due to non-performing loans and poor liquidity management. Implementation of Basel accords is also needed as a regulatory requirement. Specially, since banks tend to lend money, they need to meet the required minimum capital to manage operational risk. Moreover, this study could be of valuable use for any financial system where a large percentage household savings is utilized in deposits with banks and other financial institutions.

There is also a possibility that the executives in the bank propose appropriate measures that would support more sophisticated techniques of the Basel Accords to bring a true change in the existing banking system. Thereby, the financial institutions can guarantee the accomplishment of two goals; to minimize operational losses and to avoid losing a competitive position due to an excessively high capital charge.

The main limitation of the study is not considering foreign banks that are operating in Sri Lanka in the sample. Then the analysis could've further developed by taking ownership structure as public, private and foreign. Another limitation is, excluding non-listed banks of Sri Lanka from the sample as we're unable to derive reliable and accurate data for the analysis. Further research could be carried out by taking the role of corporate governance in mitigating operational risk into consideration.

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Annexures

Appendix 01. Testing of Multicollinearity – Model 1

Variable	VIF	1/VIF
Bank size	1.25	0.797944
Leverage	1.78	0.5672
ROA	1.59	0.628535
Loans	1.09	0.915801
Mean VIF	1.43	

Appendix 02. Testing of Multicollinearity – Model 2

Variable	VIF	1/VIF
Govt	1.19	0.838608
Leverage	1.72	0.58175
ROA	1.59	0.627303
Loans	1.09	0.916795
Mean VIF	1.40	