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Does Risk Management Capability Impact on Bank Stock Returns?: Evidence from Listed Commercial Banks in Sri Lanka

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Abstract
Risk management practices of financial institutions play a significant role in financial stability and thereby strengthen the confidence of stakeholders. The purpose of this study is to examine the impact of banks' risk management capabilities on stock returns. Four basic risk management capability measures are used for this purpose. The data from the financial reports of eight listed commercial banks for the period from 2006 to 2018are used for the analysis. The Du Pont analysis of ROE calculation is used to identify four risk management variables such as interest rate risk management, bank income diversification, credit risk management, and solvency risk management. The standard market model is estimated using two different regressions as regression 01 and regression 02 to capture the impact of firm size (control variable) on the whole model. The findings of regression 01 and regression 02 reveal that market return (R_{mt})and income diversification (NNIM) are significant to predict bank stock returns. However, Interest rate risk management capability (NETIM) credit risk management capability (PROV), solvency risk management capability are insignificant variables under both models. The impact of firm size on the whole model is also insignificant and there is an insignificant positive relationship between bank stock returns and firm size (TA). Therefore, Bank managers can employ effective strategies to increase non-interest income hence it contributes to generate a higher return for the shareholders. Therefore, the study suggests shareholders purchase the stocks of banks which have increased non-interest income and to aware of the market index changes to increase their returns.

Keywords*:* Risk management capability; Bank income diversification; Stock returns

1. Background of the Study

Financial institutions are very important in any economy and their role similar to that of blood arteries in the human body because financial institutions pump financial resources for economic growth from depositors to where they required (Shamugan& Bourke, 1990). As financial intermediaries, banks are the center of a country's financial system especially in countries where capital markets are underdeveloped (Cong et al., 2013) and play an important role in the economic development of the country as a whole (Levine, 2005). The foundation of a sound economy depends on how sound the Banking sector is and vice versa. Therefore the safeness and soundness of the financial system are crucial to the economic health of a country.

In general, the banking business is regarded as a risky business. In the economy, there are two economic units, surplus units, and deficit units. These economic units prefer to use financial institutions as intermediaries to transfer the necessary funds to each other. As a result, financial intermediaries are vital to accept the deposits from surplus units under shorter maturities and issue loans under longer maturities. Even though this process is very important in the economy it poses some risks to these intermediaries since they involve maturity intermediation. Banks as an intermediary between surplus units and deficit units face different risks inherent to there business such as credit risk, interest rate risk, solvency risk, market risk, and liquidity risk so on. They face credit risk when their customers fail to repay the loans. When banks are having insufficient liquid assets to compensate for the cash needs or withdrawals from depositors, they face liquidity risk in which they finally at a solvency risk. Banks face interest rate risk since the rate of interest is determined by the market forces where it finally impacts bank income and expenses. Therefore managing such risks is an important strategic decision in their banking business.

Like other banks in the world, Sri Lankan banks are also affected by both financial and non-financial risks. These risk factors affect the efficiency of banks in the provision of banking services, banks' operations and particularly banks' performance. It is therefore imperative that there are systems in place to handle their risk exposures since the bank crisis always arises from an inappropriate identification, measurement; pricing or control of risk (Sironi &Resti, 2007). A sound banking system with good performance indicators necessitates sound risk management and regulatory frameworks. However, it should be borne in mind that banks are very fragile institutions that are built on customers' trust, brand reputation and above all dangerous leverage. In case something goes wrong, banks can collapse and failure of one bank is sufficient to send shock waves right through the economy. Because taking the risk is an integral part of the banking business, it is not surprising that banks have been practicing risk management ever since there have been banks, the industry could not have survived without it (Meyer, 2000).

The global regulators like Basel Committee on Banking Supervision and local regulators in individual countries have recognized the importance of managing risk as a major part of the financial system in the economy and the importance of the bank risk management. Therefore, the management of integrated risks in an integrated manner is essential to promote the soundness of the banking system.

Agency theory introduced by Jensen and Meckling (1976) suggests that managers should act in the best interest of shareholders by taking action that maximizes shareholder wealth because shareholders are the legal owners of the company. All traditional finance literature confirms that investors should be a rational, risk-averse individual who formally analyzes one course of action to another for maximum benefit (Hill, 2008). As a result, the investor can select the stock of a company that maximizes their wealth. Shareholders do no invest in the companies which do not address their wealth. An increase in shareholder value not only increases the confidence of existing shareholders but also attracts new investors (Arif & Anees, 2012). In other words, shareholder value is the sum of all strategic decisions that

affect the firm's ability to efficiently increase the amount of free cash flow over time which can be measured by the share price movements. Risk management is also a strategic decision which affects the earning power of the firm. Accordingly, if shareholder value is affected by the risk management capability of a bank, definitely analyze the risk management capability of the banks before making investment decisions. Therefore, it is interesting to investigate whether the risk management capability of banks contributes to generating shareholder value.

The objective of this study is to examine the impact of risk management capabilities of banks on their stock returns. Stock returns were selected as a proxy to represent shareholder value because of being a more direct and market-based measure to represent shareholder value, even though more sophisticated accounting and market-based measures have been developed. Sri Lankan listed commercial banks were selected for the study and four basic risk management capabilities of credit risk management capability, interest rate risk management capability, solvency risk management capability, and bank income diversification were identified to represent basic risk management capabilities. The standard market model was used to estimate the relationship between risk management variables and stock returns.

2. Literature review

2.1 Risk management and shareholder value

Many researchers have examined the impact of risk management on shareholder value in various industries. Fan and Shuffer (2004) studied the relationship between bank efficiency and risk in the US commercial banks and they concluded that credit risk and solvency risk-sensitive to profit efficiency but liquidity risk as an insignificant factor for banks' profit efficiency. Bartram (2000) found risk management at the firm level (as opposed to risk management by stock owners) means to increase firm value to shareholders in the presence of a convex corporate tax regime in corporations. Smithson and Simkins (2005) investigated the relationship between the use of risk management and the value of the firm concerning industrial firms and financial institutions and concluded risk management as a value-adding activity. Sensarma and Jayadev (2009) ascertained the sensitivity of Indian bank stocks to risk management and they concluded that risk management capabilities have been improving over time and returns on the banks' stocks appear to be positively sensitive to risk management capability of banks. They have used standard Du Pont analysis of ROE calculation to derive the risk management variables of the banks. Fathi, Zarei, and Esfahani (2012) found that no significant correlation between credit risk and ROE but interest rate risk and diversification risk have a positive significant correlation with ROE for the banks listed in the Tehran Stock Exchange (TSE). This study used standard Du Pont analysis for the identification of independent variables (credit risk, interest rate risk and diversification risk). According to the study conducted by Babi (2015) proved that the credit and solvency risks had negative and significant effects on the relationship between earnings per share and stock returns, but the effect of liquidity risk on this relationship was not significant. Saeidi and Kamali (2016) investigated the relationship between stock returns and risk management of banks listed in Tehran Stock Exchange. They found a significant relationship between capital risk and sock returns contradictory to the results of Sensarma and Jayadev (2009).

Furthermore, they concluded that credit risk management as a significant factor for stock returns and interest rate risk and natural hedging strategy as insignificance variables to the bank stock returns. Ekinci (2016) found that Credit risk and FX rate have a positive and significant effect, but interest rate has an insignificant effect on banking sector profitability and credit and market risk have a positive and significant effect on conditional bank stock return volatility in the Turkish banking sector.

2.2 Interest rate risk and shareholder value

In broad terms, Interest rate risk is the exposure of a bank's financial condition to adverse movements in interest rates. Accepting this risk is a normal part of the banking business and can be an important source of profitability and shareholder value. In the literature, researchers have paid special attention to interest rate risk and bank performance measured and analyzed using various measures.

Lloyd and Shick (1977) found a significant relationship between bank stock return and interest rate risk using two index model introduced by Stone. Lynge and Zumwalt (1980) concluded that approximately 80% of banks and half of industrial companies are sensitive to interest rates but the magnitude of bank exposures is larger than for industrial companies. Flannery and James (1984) found that common stock returns of financial institutions are correlated with interest rate changes. Booth and Officer (1985) also fund that bank stocks are sensitive to actual, anticipated, and unanticipated changes in short-term interest rates. Choi, Elyasiani, and Kopecky (1992) concluded that bank equity returns were significantly negatively related to interest rates only for the post-October 1979 period in the US. According to the Elyasiani and Mansur (2004), short term and long-term interest rates and their volatilities do exert significant and differential impacts on the bank stock returns where short term interest rate changes negatively related and long term interest rate changes positively related to stock return changes. Using the sample of daily stock returns of UK banks Joseph and Vezos (2006) observed a positive relationship between interest rate risk and bank stock returns in OLS and negative coefficient in EGRACH model.

2.3 Credit risk and shareholder value

Credit risk is the possibility of losses arising from the diminution in the credit quality of borrowers or counterparties and credit risk could arise from the banking book and the trading book and both on or off-balance sheet. The increasing variety in the types of counterparties and the ever-expanding variety in the forms of obligations (from auto loans to complex derivatives transactions) has meant that credit risk management has jumped to the forefront of risk management activities carried out by firms in the financial services industry (Fatemi & Fooladi, 2006). Therefore, credit risk played special attention to bank management to minimize possible future losses which attracted the interest of researchers for investigations. In contrast with other risks, credit risk and bank performance are considerably researched areas in Sri Lanka.

Arif, Abrar, and Afzal (2012) examined the role of credit risk in the value creation process in the banking system of Pakistan and the results show that LLP has a positive association with return on shares which mean the investors perceive that banks with high advances in their portfolio are more capable to generate value for them. The investigation of Aghababaei, Ataei, and Azizkhani (2013) in Tehran stock exchange found that Capital adequacy, the ratio of doubtful debts storage to the total loan (as credit risk variables) represent significant

negative effect to shareholder value. Further supported by Kodithuwakku (2014),non-performing loans and provisions have an adverse impact on the profitability of Sri Lankan commercial banks. Abewardhana (2015) concluded that credit risk management has a significant impact on the profitability of commercial banks' in Sri Lanka. Heydari and Abdoli (2015) realized a negative relationship of loss reserve on loans and past due credits with banks' performance. Gunathilaka (2015) concluded that all the measures of credit risk management used in the study are highly significant predictors of the financial performance of finance companies in Sri Lanka. Agusman, Monroe, Gasbarro, and Zumwalt (2009) concluded that reserves-to-gross-loans ratio has a negative and significant influence on bank stock returns. Findings of Perera and Morawakage, (2016) reveal that credit risk management has a significant effect on shareholder value in listed commercial banks in Sri Lanka and among the three credit risk management indicators; Non-Performing Loan Ratio (NPLR) has the most significant effect on the return on shares.

2.4 Solvency risk and shareholder value

Solvency refers to an enterprise's capacity to meet its long-term financial commitments. Systemic banking system solvency risk is driven by the correlated defaults of many borrowers, other market risks, and inter-bank defaults (Barnhill & Schumacher, 2011). Solvency risk is particularly important in the banking business since the default in repayments lead banks towards bankruptcy.

Nethra and Kushalappa (2015) assessed the impact of financial solvency on stock returns. They proved that the companies with sound financial position could perform better in the stock market than the stocks of financially weak companies. According to the results found in the literature (for example Altunbas, Liu, Molyneux, & Seth, 2000; Mester, 1996, Zhang, Jiang, Qu,& Wang, 2013), Capital risk has a negative impact on the value created for shareholders. The negative impact of capital risk on shareholder value indicates that banks with low capital risk performed better. Banks that are highly capitalized have relatively lower value created for shareholders.

2.5 Bank income diversification and shareholder value

Diversification is a technique that reduces risk by allocating investments among various financial instruments, industries, and other categories. The Portfolio theory argues that unsystematic risk can be eliminated by going through a diversified portfolio of asset investment. Traditionally, banks involve in accepting deposits and making loans. Greater competition has diminished the cost advantage banks have had in acquiring funds and has undercut their position in loan markets. Non-interest income is a bank and creditor income derived primarily from fees including deposit and transaction fees, insufficient funds (NSF) fees, annual fees, monthly account service charges, inactivity fees, check and deposit slip fees, and so on. The conventional view of fee income in banking is that banks offset lost margin income via increased fee income (Williams & Prather 2010).

According to Stiroh (2004), increasing non-interest income on commercial banks in the USA can reduce the volatility of a bank's profit because of two factors: (1) Non-interest income has less correlation with the whole business than the traditional interest income; and (2)

The expanded product line and cross-selling opportunities related to the growth of non-interest income benefits a bank's revenue portfolio. Kohler(2013) found a significant impact from noninterest income on bank income structure. Accordingly, Teimet, Ochieng, and Away (2011), Amediku (2012), Ismail, Hanif, Choudhary, and Nisar(2015)and Wijethilaka (2015) found a positive relationship between noninterest income and bank performance considering their investigations. The opposite findings were shown by Lup (2015) that bank income diversification reduces bank performances both in Kenya and Islamic banking respectively. Morover, Mercieca, Schaeck, and Wolfe (2007) found no direct diversification benefits within and across business lines and an inverse association between non-interest income and bank performance. Craigwell and Maxwell (2006) found that increases in non-interest income are linked to greater bank profitability but also higher earnings volatility in Barbados banking system. Further, Supported by Gamra and Plihon (2011) that diversification gains are more than offset by the cost of increased exposure to the non-interest income, specifically by the trading income volatility. Dempsey, Edirisuriya, and Gunasekarage (2013) found that income diversification has a significant positive association with the market to book value and a significant negative association with return volatility.

Nguyen, Skully, and Perera (2012) concluded that banks with greater market power (in both loan and deposit markets) focus more on interest income-generating activities and thus earn less non-interest income. They also found that market power increases stability as banks diversify their income sources in both interests- and non-interest generating activities.
Hence the mix results were obtained by various researchers on bank income diversification as value-adding or non-value adding activity.

3. Theoretical framework

Frank Donaldson Brown (1885 – 1965) who introduced Du Pont analysis decomposed the ROA calculation into a product of the sales turnover ratio and the profit margin ratio (Marek, 2009). Du Pont analysis is highlighting the company's performance in three major areas: profitability, turnover, and leverage. This model is broadly used now a day by almost all industries and acts as the basic model whereby a detailed analysis of the return on equity and the factors that affect it, is made possible (Kalluci,2011).

Du Pont analysis decomposes the ROE calculation in three stages. The calculation of ROE in basically views as follows.

$$ROE = \frac{Net\ Income}{Shareholder\ Equity}$$

In the first stage, the return on equity (ROE) breaks down into two elements, i.e. the return on assets (ROA) and financial leverage (or the so-called equity multiplier - EM).

$$ROE = ROA \times EM$$

Where:

ROA = Net Income/ Total Assets. It measures bank profit per dollar of assets. Total Asset Turnover (ROA) measures the efficiency of using assets to generate sales, therefore, higher the ratio higher the efficiency.
EM = Total Assets/Total Equity. The equity multiplier is a measure of leverage. A higher equity multiplier ratio shows that an institution is relying more heavily on debt financing to obtain funds.
The second stage of ROE decomposition consists of breaking down ROA into two other components, respectively profit margin (PM) and asset utilization (AU):

$$ROA = PM \times AU$$

PM = Net income / Total Revenue. It reflects profits per dollar of sales.
AU = Total Revenue / Total Assets. It expresses sales per dollar of assets.

In the third stage, some new ratios are created, starting from the components of the numerator or the denominator of the indicators generated in the previous stages and adapted to the specific characteristics of each industry.

As quoted in Kalluci (2011), Cole was the first who adapted and applied the DuPont model for banks. Therefore in the second stage, Du Pont formula for banking institutions can be decomposed as follows.

$$ROE = ROA \times EM \qquad (01)$$

Where:
ROA = Return on Assets
EM = Equity Multiplier

$$ROE = \frac{Profit\ After\ Tax}{Total\ Assets} \times \frac{Total\ Assets}{Equity} \qquad (02)$$

The above formula could also be expanded into several components based on the composition of the net income of the respective industry. The modified version of DuPont financial ratio analysis is used by Kirikal, Sorg, and Vensel (2011) to investigate the Estonian banking sector performance. Almazari (2012) and Georgios and Georgios (2011) estimated banks' ROE to measure bank performance using Du Pont model. Sensarma and Jayadev (2009) had developed a framework to identify the four risk management variables by expanding basic ROE into four components using the composition of profit after tax of commercial banks in India. And Fathi et al. (2012) and Saeidi and Kamali(2016) used this expanded framework to identify the same risk management variables concerning Iranian banks.
According to the bank's income statement composition, the profit after tax of bank income statement mainly comprises of three components as interest income, noninterest income, and provisions for loan losses. Therefore based on such argument Sensarma and Jayadev (2009) expanded bank ROA as follows;

$$ROA = \frac{II - IE}{TA} + \frac{NONII - NONIE}{TA} - \frac{PROV}{TA} \quad (03)$$

Where:
II =Interest Income, IE=Interest Expense, TA=Total Assets, NONII=Non Interest Income, NONIE= Non-Interest Expense, PROV = Provision for Loan Losses
Accordingly, ROA can be rewritten as:

$$ROA = NETIM + NNIM - PROV \quad (04)$$

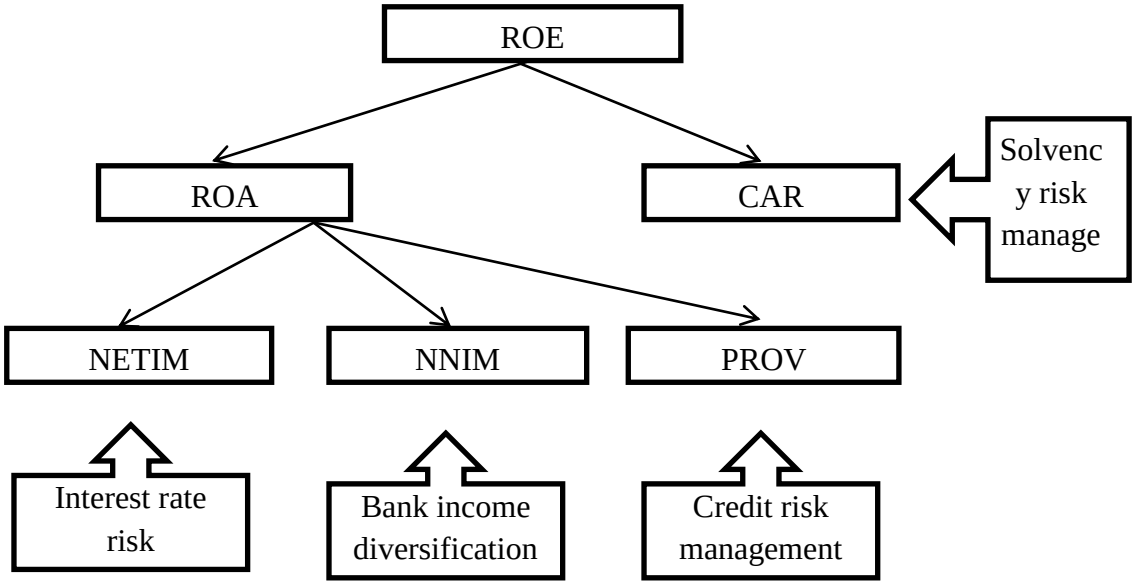
Where:
NETIM=Net Interest Margin, NNIM=Net Noninterest Margin and PROV=Loan Losses to Total Assets
Substituting equation (04) in to (01), ROE can be represented as:

$$ROE = (NETIM + NNIM - PROV) \times EM \quad (05)$$

Equation (05) shows that the banks can achieve their purpose of maximizing stockholders' wealth through maximizing NETIM, NNIM, and EM and minimizing PROV.

Finally, the Following theoretical framework was developed by Sensarma and Jayadev (2009) and followed by Fathi et al. (2012) and Saeidi and Kamali (2016) to identify four risk management capabilities. This study also used the following framework (see figure 3.1) to identify four basic risk management capabilities in terms of interest rate risk management, bank income diversification, credit risk management, and solvency risk management.

Figure 3.1: Profitability decomposition into risk management Variables



Source: **Sensarma and Jayadev (2009)**

This study also used the above framework (see figure 3.1) to identify four risk management variables of Sri Lankan listed banks and subsequently to investigate the relationship between bank risk management capability and stock returns. The theoretical justification for the operationalization of independent and dependent variables is discussed in the methodology section.

4. Research methodology

4.1 Data and sample

Eight(08) listed commercial banks that are listed in Colombo Stock Exchange were selected out of ten (10) listed commercial banks as the sample and this data was collected for the period from 2006 to 2018. Two (02)listed commercial banks were eliminated due to the unavailability of data for the sample period. Listed licensed specialized banks (LSB) and development banks were excluded from the sample since there are regulatory mismatches among them and licensed commercial banks. And also state own commercial banks were not considered since they are not listed in the CSE. The study used secondary sources of data from published bank annual reports and CSE data depositary of 2018.

4.2 Operationalization of variables

The operationalization of variables provides the identification of independent, dependent and control variables, justification for variables and measurement of variables.

4.2.1 Interest Rate Risk Management (NETIM)

In broad terms, interest rate risk is the risk that changes in the market interest rates impact the profitability of the economic value of the bank (Sironi& Resti, 2007). Bank earns income from assets and paid interest for liabilities which are having different maturities. The changes in the interest rate affect negatively or positively to net interest income based on the gap position of the bank.

Asset and Liability management approach suggests that banks which are asset sensitive (positive gap) can derive the advantage of increasing interest rate and banks which are liability sensitive may acquire losses in increasing interest rate. Banks try to maintain a positive or negative gap position as responding to the forecasted change in the interest rate using balance sheet adjustments or off-balance sheet adjustments. Thus banks attempt to mitigate the negative impact of interest rate and try to maximize the advantage of the increasing interest rate. Efficient management of falling interest rates, reduce the possibility of decreasing interest income and efficient management of increasing interest rates increases the interest income. Hence the net interest income represents the bank attempt towards the successful interest rate risk management.

Therefore net interest margin (Net Interest Income/Total Assets) shows the interest rate risk management capability of the bank. Thus, NETIM has been taken to measure the interest rate risk management capability of the bank following Sensarma and Jayadev (2009) Fathi et al. (2012), Doyran (2013) and Saeidi and Kamali (2016). When deriving NETIM the study considered all kinds of interest income from the income sources including investment in securities and derivatives contracts (off-balance-sheet products) since those are exposed to interest rate risk. The study estimated NETIM as follows:

$$NETIM = \frac{Net\ Interest\ Income}{Average\ Total\ Assets}$$

The net interest income is the figure stated in the income statement as the difference between interest income and interest expense and the average total asset was estimated by considering both year beginning and year ending total assets in the blanacesheet.

4.2.2 Credit Risk Management (PROV)

Credit risk is the possibility that an unexpected change in counterparty's creditworthiness may generate unexpected changes in the market value of the associated credit exposure(Sironi& Resti,2007). Avoiding from credit risk by banks involves both from customer perspective and bank portfolio perspective. Banks evaluate their credit risk by analyzing the historical loss rate, forecasting future expected loss rate and preparing for future losses by making loan loss provisioning. On-balance sheet strategies for managing credit risk include increasing provisions for all anticipated loan losses.

Even though the loan loss provisions reduce the bank profitability the amount of provisions shows the ability of the banks in preparing for future loan losses. Therefore provision as a percentage of total assets (Provisions/Total Assets) shows the credit risk management capability of banks, accordance with Sensarma and Jayadev (2009), Agusman et al. (2009),

Fathi at al. (2012), Aghababaei et al. (2013), Heydari and Abdoli (2015) and Saeidi and Kamali (2016).

Accordingly, PROV (loan loss provision to total asset ratio) is considered as a proxy of credit risk management capability which measured as follows.

$$PROV = \frac{Total\ Loan\ Provisions}{Average\ Total\ Assets}$$

The provisions are the figure which is stated in the income statement as the loan loss provisions and the average total assets were estimated by considering both year beginning and year ending total assets in the blanacesheet.

4.2.3 Solvency/capital risk management (CAR)

Solvency refers to an enterprise's capacity to meet its long-term financial commitments. Capital to asset ratio (reciprocal of EM) indicates the protection against the unexpected losses and also implicitly protect the depositor's confidence that the proportion of the bank's asset that is represented by shareholder's equity. But it decreases shareholder wealth by reducing the ROE. Therefore in du Pont analysis takes the reciprocal of capital to asset ratio which is called equity multiplier (EM) as an increasing function of ROE. Accordingly increasing EM may increase ROE and it shows lower capital to assets ratio which indicates higher solvency risk. It is argued that stockholders prefer low capital risk, in other words, low EM with an open view for the sustainability of dividend distribution by the bank (Anderson, 2003). Thus, the argument in the study is that shareholders prefer continuous survival of the bank at a minimum solvency risk to get continuous profit distribution. Therefore reciprocal of the EM which means capital adequacy ratio (CAR) shows the bank's attempts towards the mitigation of solvency risk.

Furthermore, in the literature Fathi et al. (2012), Olalekan and Adeyinka (2013), Saeidi and Kamali (2016) used capital to asset ratio as a measurement for capital/solvency risk. Sensarma and Jayadev (2009)measured capital risk using regulatory capital ratios in the Indian banking system.

Thus based on the above literature, a study has taken the reciprocal of EM as capital adequacy ratios to measure the solvency risk management capability. The impact of solvency risk management capability was measured using the reciprocal of EM (capital to assets ratio)using the following formula.

$$CAR = \frac{Total\ Equity}{Average\ Total\ Assets}$$

The total equity is the figure which is stated in the balance sheet as total equity and the average total assets were estimated by considering both year beginning and year ending total assets in the blanacesheet.

4.2.4 Bank Income Diversification/Natural Hedging Strategy (NNIM)

Portfolio theory argues that individual investors can avoid unsystematic risk (diversifiable risk) by investing with a diversified portfolio of assets relevant to various industries. In

general diversification of income means the expanding income bases into the verity of sources that have contradictory patterns of income generation.

Traditionally banks involve with generating net interest income through accepting deposits and making loans. Non-interest income is a bank and creditor income derived primarily from fees including deposit and transaction fees, insufficient funds (NSF) fees, annual fees, monthly account service charges, inactivity fees, check and deposit slip fees, and so on. Kohler (2013) stated that banks that generate the largest part of their income from interest may become more stable if they increase their non-interest income share as this allows them to better diversify their income structure and to offset declining interest margins. Therefore noninterest income can be considered as an income source that avoids the risk.

Hence the argument is banks can reduce overall risk by diversifying income sources from interest income generating sources into non-interest income generating bases. Thus, the amount of noninterest income shows the capability of a bank to generate income avoiding risk.

When considering the literature Kirikal, Sorg and Vensel (2011) considered the nation-interest income to total asset ratio as an increasing function of ROA and named as burden ratio for their analysis. Sensarma and Jayadev (2009) and Fathi et al. (2012), Sufian and Shah Habibullah (2014), and Saeidi and Kamali (2016) also used the noninterest income to total assets ratio (Net Noninterest Income/Total Assets) to represent the successfulness of the natural hedging strategy/bank income diversification of banks. Based on the argument that income diversification (income from other sources) as a risk management strategy, the study also used the amount of non-interest income to represent the bank attempt towards generating income avoiding from risk. The non-interest income considered in the study is the income from sources that generate income other than the interest income (i.e. deposit and transaction fees, insufficient funds (NSF) fees, annual fees, monthly account service charges, inactivity fees, check and deposit slip fees so on). The fees, commission income, and other income.

Therefore, the study used NNIM (Net Noninterest Income/Total Assets) as a proxy to represent the success of natural hedging strategy.

$$NNIM = \frac{Net\ non - Interest\ Income}{Average\ Total\ Assets}$$

The net non-interest income has been estimated by taking the sum of all the income except interest income minus expenses relating to other income bases and the average total assets were estimated by considering both year beginning and year ending total assets in the blanacesheet.

4.2.5 Market return (Rm)

In simply the market return is the return on the market portfolio. CAPM introduced by Sharpe (1964) and Lintner (1965) and market model introduced by Fama (1973) argued that return on any stock is sensitive to the return on market portfolio under the sensitiveness of the beta coefficient of a particular company. The study also considered the market return as an independent variable that theoretically effects the return of any stock. In the market model, total market index return is used when explaining the relationship between market return and individual stock returns. However, the banking industry is a highly regulated industry that differs from other industries. Therefore, the total market index return (ASPI) may not be suitable when estimating the market model for the banking industry. Therefore geometric mean of the monthly average BFI (Banking finance and insurance) sector return was employed to represent the annual market return when estimating the market model for banks.

4.2.6 Bank Stock Return (R_{it})

The main objective of a profit-seeking organization is to maximize shareholder wealth which is measured using various measures. From the shareholder perspective, shareholders expect a continuous increase in share price which is measured by stock returns. As per the signaling hypothesis, profit distribution (good news) provides positive signals which lead to an increase in the share price and if the market is efficient in a semi-strong form, the price capture the dividend value. Therefore, the log return of annual bank stock prices was used to estimate the return of stocks using the following formula according to Ahmad (2011) and O'Connor and Keane (2011).

$$R_{it} = Ln(\frac{P_t}{P_{t-1}})$$

Where:
R_{it} = Annual return of stock i at time t
P t = Price of stock at time *t*
P t-1=Price of stock at time *t-1*

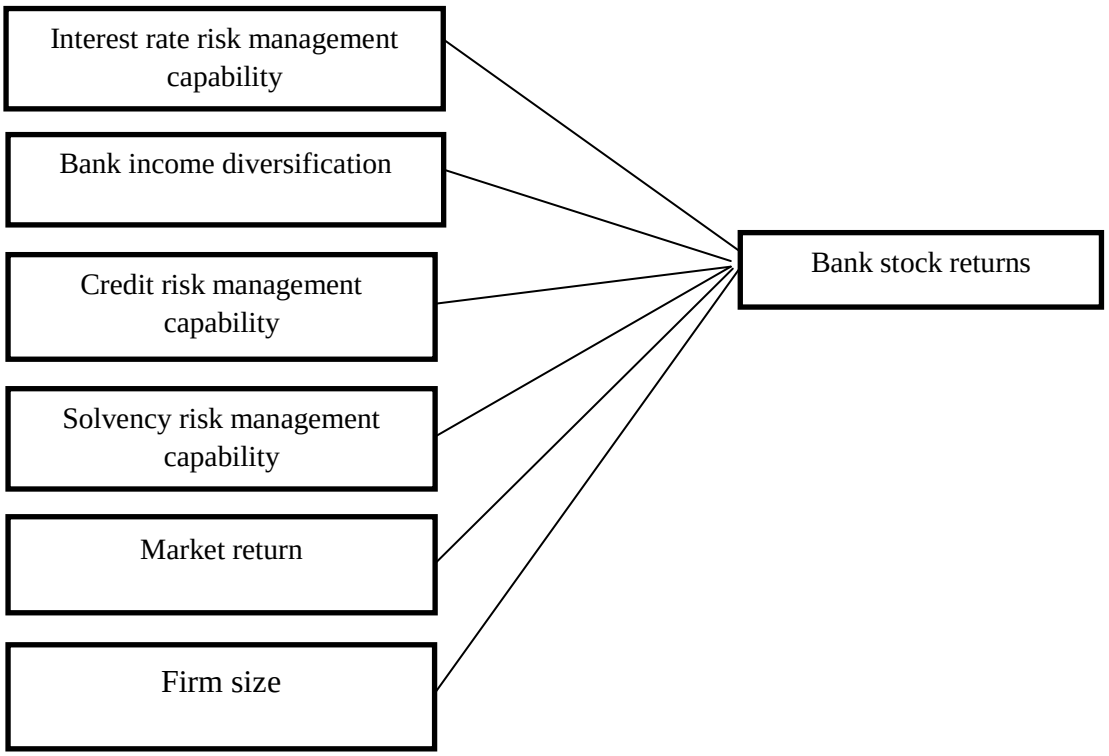
4.2.7 Control variable (TA)

In addition to risk management variables identified in the analysis, firm size is employed as a control variable in the model since risk management capability may differ from large banks to small banks. Therefore, the natural logarithm of the average total assets of banks is utilized to represent the size of the bank. Fama and French (1992)documented a significant relationship between firm size and stock returns of non-financial firms. Later Barber and Lyon (1997) investigated the relationship between firm size and stock returns for financial firms and conclude that the relationship between firm size and stock returns of financial firms is also similar to the non-financial firm. In previous studies in the literature, Kosmidou (2008), Floros and Tan (2012 a,b) and Sufian and Shah Habibullah(2014) used firm size measured by total assets as a determinant of bank performance. Craig and Diga (1998) utilized total assets as a proxy for firm size for their analysis.

4.3 Conceptual framework

Based on the theoretical framework explain in figure 3.1, the following conceptual framework is developed to ascertain the relationship between independent variables and dependent variable.

Figure 4.1 Conceptual Framework



Source: **Author**

Figure 4.1 shows the relationship between four risk management variables of interest rate risk management capability, bank income diversification, credit risk management capability, and solvency risk management capability and bank stock returns. The market return is considered as an independent variable since the study utilizes the market model to ascertain the relationship between independent and dependent variables. One control variable of firm size is used to increase the explanatory power of the model.

4.4Data analysis

To examine the sensitivity of bank risk management capabilities on bank stock returns, the standard market model is used. Besides, descriptive statistics that provide a simple summary of the sample were used to describe the basic features of the data in the study.

4.4.1 Market model

Fama (1973) introduced a model called the market model, on the argument that the market model is more reliable in the statistical sense than CAPM. In the literature Flannery and James (1984), Choi et al. (1992), Choi and Elyasiani (1996), Atindéhou et al. (2001),

Sensarma and Jayadev (2009) and many researchers used this Market model to assess the relationship between stock returns and independent variables used in their studies other than market return as predictors of stock returns. This study also used the market model to analyze the impact of risk management variables on stock returns. Following multiple regression model was estimated to find the relationship between risk management variables and bank stock returns.

$$R_{it} = \alpha + \beta_1 R_{mt} + \beta_2 NETIM_{it} + \beta_3 NNIM_{it} + \beta_4 PROV_{it} + \beta_5 CAR_{it} + \beta_6 TA_{it} + \varepsilon_{it}$$

Where :

R it = annual return of stock *i* at time *t*

β1 Rmt =market return (BFI) at time *t* and the corresponding coefficient of β1 implies the systematic risk which controls for the individual bank stock return

β2 NETIM it = net interest income to total asset ratio of the bank *i* at time *t* and the corresponding coefficient

β3 NNIM it =net noninterest income to total asset ratio of bank *i* at time *t* and the corresponding coefficient

β4PROV it = loan loss provision to total asset ratio of bank *i* at time *t* and the corresponding coefficient

β5 CAR it =capital to asset ratio of bank *i* at time *t* and the corresponding coefficient

$\beta_6 TA_{it}$ = average total assets of bank *i* at time *t* and the corresponding coefficient (control variable)

ε_{it} = random error term

4.4.2 Descriptive Statistics

Descriptive statistics are used to describe the basic features of the data in the study sample. Accordingly, the descriptive statistics of the four risk management variables considered for the study could be illustrated inTable 4.1 below.

Table 4.1

Descriptive Statistics

Variable	Mean	Std.dev	Max.	Min.	Skewness	Kurtosis
$\mathbf{R_{it}}$	0.031446	0.438723	1.119890	-1.15541	0.338026	3.733571
$\mathbf{R_{mt}}$	-0.157021	0.564700	0.447427	-1.451428	-1.466244	3.826779
NETIM	0.044005	0.010600	0.084086	0.005161	-0.481505	6.771162
NNIM	0.019818	0.013461	0.137265	0.000887	6.492024	57.22791
PROV	0.004862	0.004004	0.015619	-0.002688	0.645666	2.963519
CAR	0.114555	0.100416	0.654116	0.045016	3.502420	15.91094
TA(log)	19.04623	1.039450	20.98831	16.04650	-0.458117	3.044469

Source:Author

As per the descriptive statistics, the mean stock return (R_{it}) of Sri Lankan listed banks is around 3.145 % which is significantly higher than R_{mt}(mean market return of banking finance and insurance sector return)of -15.7%. But the standard deviation of bank stock returns is43.87 % which is slightly lesser than the standard deviation of the market return of 56.5%.

The mean value of capital adequacy ratio is (CAR)11.46% in Sri Lankan listed banks. However, the mean value of NETIM is 4.4% which is higher than the mean value of 1.98% of NNIM and it indicates that Sri Lankan banks earning lesser income from non-interest income sources than interest income. The highest standard deviation is reported by TA and $R_{it}$and R_m reported the second and third highest standard deviation respectively in the sample. The normal distribution of three variables (R_m, NETIM, and TA)shows negative Skewness which indicates that the tail of the left side of the distribution is longer.

4.4.3 Pearson correlation analysis

It measures the strength of a linear association between two variables separately. Following table 4.2 represents the correlation coefficient among the dependent variable and each independent variable in the study.

Table 4.2
Pearson Correlation Analysis

	R_{mt}	NETIM	NNIM	PROV	CA	TA
R_{it}	-0.646865	0.266651	0.196664	0.12984	0.013093	-0.07518
Prob.	0.0000*	0.0062**	0.0454**	0.1890	0.8950	0.4482

p<0.01,p<0.05*
Source: Author

According to the Pearson correlation analysis, there is a strong negative (-0.646865) relationship between bank stock returns (R_{it}) and the market return (R_{mt}) since the probability value is significant at a 99% confidence level. Indeed, market return movement is a significant predictor of bank stock returns, supporting Sharp (1965), Linter (1965), Black, Jensen, and Scholes (1972) and Fama and Macbeth (1973).

Other than the coefficients of R_{mt} and TA, all other variables are positively associated with R_{it}in different degrees. The positive coefficients of NETIM and NNIM are significant under 5% levels of significance. Indeed, increasing interest rate risk management capability and

bank income diversification course to increase the bank stock returns. However, the other coefficients are not significant under any level of significance.

According to the correlation analysis, the relationship between market return (R_m) and bank stock returns (R_{it}) has the strongest association of -64.79% compared to other variables.

4.4.4 Panel regression analysis

The market model for the Sri Lankan listed banks is estimated using pooled regression model to assess the relationship between four risk management variables (including control variable i.e. firm size)on bank stock returns. Thus, Table 4.3 and Table 4.4 show the statistical findings of pooled regression models. Table 4.3 illustrates the findings of the pooled regression which is estimated without considering the impact of the control variable (firm size) and Table 4.4 illustrates the finding which considers the impact of the control variable (firm size).

Table 4.3

Regression 01

Pooled Regression(without considering the control variable)

Variable	Coefficient	Std.Error	t-statistic	Prob.
C	-0.297164	0.142753	-2.081672	0.0400
R_m	-0.483447	0.05984	-8.079035	0.0000*
NETIM	3.639588	3.376545	1.077903	0.2837
NNIM	5.376853	2.511129	2.141209	0.0347**
PROV	0.164109	8.420996	0.019488	0.9845
CAR	-0.129358	0.334821	-0.386349	0.7001
R-squared	0.458222			
Adjusted R-squared	0.43058			
S.E. of regression	0.33106			
F-statistic	16.57718			
Prob(F-statistic)	0.0000*			
Sum squared residual	10.74086			
Durbin-Watson stat	2.432943			

p<0.01,p<0.05*

Source: Author

Table 4.4
Regression 02
Pooled Regression(considering the control variable)

Variable	Coefficient	Std.Error	t-statistic	Prob.
C	-0.526059	0.679828	-0.773812	0.4409
R_m	-0.484124	0.060143	-8.049586	0.0000*
NETIM	3.861639	3.452552	1.118488	0.2661
NNIM	5.55187	2.573164	2.157605	0.0334**
PROV	-0.12546	8.500792	-0.014759	0.9883
CAR	-0.13350	0.336552	-0.396671	0.6925
TA(log)	0.011416	0.033143	0.344445	0.7313
R-squared	0.458884			
Adjusted R-squared	0.425413			
S.E. of regression	0.332559			
F-statistic	13.70985			
Prob(F-statistic)	0.0000*			
Sum squared residual	10.72774			
Durbin-Watson stat	2.438456			

p<0.01,p<0.05*
Source: Author

4.4.4.1Findings

When considering the individual variables explanatory power, market return (R_{mt}) and bank income diversification (NNIM) are significant under conventional levels of significance in regression 01 and regression 02 (See Table 4.3 and Table 4.4)**.** The negative coefficients of market return (-0.483447 and -0.484124 in regression 01 and regression 02 respectively)are highly significant under 1% levels of significance in both regressions than other independent variables. Findings are complying with Sensarma and Jayadev (2009), Fathi et al. (2012), and Saeidi and Kamali (2016). Thus, market return (R_m) being a highly significant independent variable than other independent variables, supports to the systematic risk argument of Sharpe (1964), Linter (1965) and Fama (1973) that market return is a predictor of individual stock returns.

Income diversification (NNIM) which generates income by avoiding risk as a natural hedging strategy also shows a significant variable to predict bank stock returns according to the results of regression 01 and regression 02 (see Table 4.3 and Table 4.4). In both models, NNIM shows a positive coefficient and it indicates that increasing NNIM leads to increase return for shareholders. Further, banks that generate income from non-interest income

sources would actively involve bank income diversification and could be able to increase the return for shareholders. The findings of NNIM are contradictory to the results of Saeidi and Kamali (2016) for the banks listed on Tehran Stock Exchange. Saeidi and Kamali (2016) found positive and insignificant relationships for NNIM with bank ROE. And the study findings onNNIM are also contradictory to the findings of Sensarma and Jayadev (2009) relating to Indian listed banks where they found an insignificant impact. Furthermore, findings complying with Teimet et al. (2011), Amediku (2012), Ismail et al. (2015) and Wijethilaka (2015) where they found a positive relationship between noninterest income and bank performance

The positive relationship between NETIM and bank stock returns as per the findings of both regressions (see Table 01 and 02) are an insignificant predictor of bank stock returns. But the result of interest rate risk management capability (NETIM) is contradictory with Fathi et al. (2012) where they found a positive and significant coefficient for NETIM with bank ROE. However, the findings are complying with Saeidi and Kamali (2016) and Sensarma and Jayadev (2009).

The finding of credit risk management capability (PROV) differs in regression 01 and regression 02. PROV shows a positive coefficient in regression 01(see Table 4.3) and a negative coefficient in regression 02 (see Table 4.4), but both relationships are insignificant. The positive relationship in regression 01(0.164109)implies that increasing provisions leads to decreases credit risk management capability and finally increases the bank stock returns (i.e the argument in the study is increasing PROV course to decrease ROE thereby decreases the credit risk management capability). Therefore, such finding is contradictory to the Du Pont argument which provides the theoretical justifications for PROV as an independent variable in the study. However, the result on PROV in regression 01 is conforming with Sensarma and Jayadev (2009) and Saeidi and Kamali (2016) where they also found positive coefficients for PROV. According to the findings of regression 02 (see Table 4.4) the coefficient of PROV is negative (-0.12546), which implies that decreasing provisions course to increase credit risk management capability and ultimately to increase the bank stock returns complying with the Du Pont argument. The coefficient of PROV become negative in regression 02 due to introduction of controlling variable of firm size (TA) to the model which leads to increase in the model explanatory power and make the analysis more reliable.

The coefficient of solvency risk management capability measured by capital to assets ratios (CAR) in regression 01 and regression 02 is also insignificant. However, both regressions show negative coefficient values (-0.129358 and -0.13350 respectively in regression 01 and regression 02) for CAR. Indeed, increasing solvency risk management capability decreases the return for shareholders, supporting the Du Pont argument that the higher capital to assets ratio (lower equity multiplier) reduces ROE thereby decreases the return for shareholders. However, Sensarma and Jayadev (2009) found a positive significant coefficient between CAR and bank stock returns in Indian listed banks. Saeidi and Kamali (2016) also found a positive significant coefficient between solvency risk management capability (CAR) and ROE.

According to the results of regression 02 which controlled for the firm size impact, the positive coefficient of TA (0.011416) is also an insignificant variable to predict bank stock returns. Such contradictory findings to Barber and Lyon (1997) may be due to the use of a small sample of 08 banks (due to the unavailability of required data for the sample period). Moreover, the introduction of TA(firm size) as a control variable to the regression does not highly impact the original results given in Table 4.3, regression 01. Indeed, none of the independent variables which previously became insignificant in regression 01 become significant in regression 02. According to the findings of regression 01 and 02, market return (R_{mt}) and NNIM (bank income diversification) are the only variables which are having significant association with bank stock returns. However, the coefficient of PROV become negative in regression 02 which was explained in the previous paragraphs.

According to the findings of regression 01(see Table 4.3) and regression 02 (see Table), the p-value of F-statistics is significant under 1% levels of significance as complying with Sensarma and Jayadev (2009), Fathi et al. (2012) and Saeidi and Kamali (2016). Indeed, as a whole model, the combined explanatory power of all the independent variables on bank stock returns is highly significant in both regressions. Accordingly, market return (Rm), bank income diversification (NNIM), credit risk management capability (PROV), solvency risk management capabilities (CAR), interest rate risk management capability (NETIM) and firm size (TA) collectively impact to bank stock returns.

5. Implications and conclusion

The objective of this study is to examine the impact of risk management capability of the bank on bank stock returns which measure the shareholder wealth. Four risk management capabilities of interest rate risk management (NETIM), bank income diversification (NNIM), credit risk management (PROV), and solvency risk management (CAR) are identified using standard Du Pont analysis by decomposing ROE calculation. The study compounded mentioned risk management variables and stock return for eight listed commercial banks for the period from 2006 to 2018.

Two separate regression was estimated to analyze the impact of the control variable of firm size (TA) on the overall model. The regression 01 was estimated without considering the firm size impact and regression 02 was estimated considering the impact of firm size.

According to the findings of the study, market return (R_m) and bank income diversification (NNIM) were significant predictors of bank stock returns in regression 01 and regression 02. The impact of market return on bank stock returns was highly significant supporting the systematic risk argument of Sharpe and Linter (1965) and Fama (1973). Furthermore, bank stock returns are negatively related to the market return and bank income diversification is positively related to the bank stock returns. The impacts of interest rate risk management capability (NETIM), credit risk management capability (PROV) and solvency risk management capability (CAR) are not significant to determine bank stock returns.

The introduction of firm size into the regression 02 did not make a significant impact on the results under regression 02. However, the positive coefficient of PROV in regression 01

became a negative coefficient in regression 02. The negative coefficient value of PROV in regression 02 supporting to the theoretical argument of Du Pont analysis that increasing provisions decrease the credit risk management capability thereby decreasing the return for shareholders. The positive relationship between firm size and stock returns was also insignificant.

This study contributes to the literature of the Sri Lankan banking industry by employing standard Du Pont analysis to banks' financial statements. Also, this provides several implications for bank managers and shareholders.

Bank managers can employ effective strategies to increase non-interest income hence it contributes to generating a higher return for the shareholders. Expanding the income-generating sources such as fees, insufficient funds (NSF) fees, annual fees, monthly account service charges, inactivity fees, check and deposit slip fees and other income other interest income will generate a higher return for shareholders. The study suggests to shareholders to purchase the stocks of banks which have increased non-interest income and to concentrate on the market index changes to increase their returns.

The future researchers can extend the study by identifying other risk management capabilities using Du Pont analysis. Furthermore, researchers can use an alternative technique to measure the risk management capabilities of banks other than using ratio analysis. The major drawback of the study is considering only eight listed commercial banks since the unavailability of data required for the study.

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