

YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF COMMERCE
MASTER OF BANKING AND FINANCE PROGRAMME

**THE EFFECT OF ASSET LIABILITY MANAGEMENT ON THE
PERFORMANCE OF AYA BANK**

HSU HTET LIN
MBF (DAY) 1ST BATCH

DECEMBER, 2019

**THE EFFECT OF ASSET LIABILITY MANAGEMENT ON THE
PERFORMANCE OF AYA BANK**

A thesis submitted as a partial fulfillment towards the requirements for the degree of
Master of Banking and Finance (MBF)

Supervised by

Daw Cho Mar Lwin

Lecturer

Department of Commerce

Yangon University of Economics

Submitted by

Hsu Htet Lin

Roll No. 18

MBF (Day) 1st Batch

2017-2019

ACCEPTANCE

Accepted by the Board of Examiners of the MBF Programme, Department of Commerce, Yangon University of Economics, in partial fulfillment for the requirement of the Master Degree, Master of Banking and Finance (MBF).

BOARD OF EXAMINERS

Prof. Dr. U Tin Win

(Chairman)

Rector

Yangon University of Economics

DECEMBER, 2019

ABSTRACT

The objective of the study is to investigate the effect of asset-liability management (ALM) activities on the performance of AYA Bank by CAMELS framework. This study employed a correlation analysis on secondary data of AYA Bank, finding that there are positive relationships between financial performance, measured as Returns on Assets, of the Bank and Capital Adequacy, Asset Quality, Management Efficiency, Earnings, and a negative relationship between Bank's performance and Liquidity. With all of them having the conceptually logical correlation relationships, the study concludes that ALM activities under the CAMEL framework have positive impacts on bank performance. This study also finds that good management of the Bank's Balance Sheet based on the maturity profile minimizes any potential loss due to market volatility and also enhances profitability. Based on these findings, the study suggests that banks develop and refine their ALM strategies, specifically under the guidance of an Asset Liability Committee as is international best practice. Study also suggests the regulatory authority to adopt the CAMELS framework as the economy and its banks become more exposed to risks. Further studies can be conducted on financial statements of other local banks if they become available, and regression analysis can be run when more data points are available for AYA Bank.

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to the following great people who contributed and lecturing us during these period studies. First of all, I would like to say my heart full thanks to Yangon University of Economics, for allowing me towards the Master Degree of Banking and Finance.

Secondly, I am deeply beholden to Rector of Yangon University of Economics Prof. Dr. Tin Win and Prof. Dr. Daw Soe Thu, Program Director of the MBF Program and Head of Department of Commerce, Yangon University of Economics for her patience, motivation, enthusiasm and immense knowledge and thank her love, support me to successfully accomplish my study in many ways.

Especially, I am highly appreciated to my supervisor Daw Cho Mar Lwin, lecturer, Department of Commerce, Yangon University of Economics for her extensive and constructive suggestions, and comments to complete this thesis. I am heartily grateful for her guidance, advice and encouragement in preparing to complete this study successfully.

I would like to express my sincere gratitude to all the teachers, and visiting lecturers who have made their grateful efforts in rendering knowledge sharing of MBF Programme during these two years. I would like to express my heartfelt indebtedness to all of the professors, associate professors and lecturers who provided supervision and fortitude to help me achieve the goals set out for this study.

Finally, I would like to express my gratitude to my beloved parents, family, and friends from MBF 1st Batch, the management of AYA Bank and colleagues, Okkar and Thiha Aung for their continuous support and patience throughout the course of my study.

TABLE OF CONTENTS

	page
ABSTRACT	i
ACKNOWLEDGEMENTS	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF ABBREVIATIONS	vii
CHAPTER I INTRODUCTION	1
1.1 Rationale of the Study	2
1.2 Objectives of the Study	4
1.3 Scope and Methods of the Study	4
1.4 Organization of the Study	4
CHAPTER II LITERATURE REVIEW	5
2.1 Importance of Assets and Liability Management	5
2.2 Asset Liability Management	6
2.3 Asset liability Management and Financial Performance	8
2.4 CAMELS Framework	9
2.5 Empirical Studies	12
2.6 Conceptual Framework of the Study	14
CHAPTER III ASSET LIABILITY MANAGEMENT PRACTICES OF AYA BANK	15
3.1 AYA Bank's Profile	15
3.2 AYA Bank's Performance Diagnostic	17
3.3 Asset Liability Management Practices of AYA Bank	21

CHAPTER IV ANALYSIS ON THE EFFECT OF ASSET LIABILITY MANAGEMENT ON THE PERFORMANCE OF AYA BANK	26
4.1 Research Design	26
4.2 Analysis on CAMEL	29
4.3 Analysis on Asset Liability Management Strategies	32
CHAPTER V CONCLUSION	44
5.1 Findings	44
5.2 Suggestions	44
5.3 Needs for Further Study	45
REFERENCES	47
APPENDIX	50

LIST OF TABLES

Table No.		Page
4.1	Summary of the CAMEL Variables	27
4.2	Descriptive Statistics	27
4.3	Analysis on CAMEL	28
4.4	Correlation Matrix	31

LIST OF FIGURES

Figure No.		Page
2.1	Conceptual Framework of the Study	14
3.1	AYA Bank's Deposit Growth	18
3.2	AYA Bank's Loan Growth	19
3.3	AYA Bank's Balance Sheet as at September 2018	19
3.4	AYA Bank's Loan to Deposit Ratio	20
3.5	Asset Liability Committee (ALCO) at AYA Bank	22
4.1	Average Earning Rate and Cost of Funds	34
4.2	Average Income Spread	35
4.3	AYA Bank's ALM Profile as of September 30 th , 2018	37
4.4	AYA Bank's Maturity Mismatches as of September 30 th , 2018	38
4.5	Average Income Spread and ALM Profile	39
4.6	USD/MMK Exchange Rate	42

LIST OF ABBREVIATIONS

ALCO	Asset Liability Committee
ALM	Asset-Liability Management
ASEAN	Association of South-East Asian Nations
ASQ	Asset Quality
ATM	Automated Teller Machine
AYA	Ayeyarwady Bank
CAGR	Compounded Annual Growth Rate
CAMEL	Capital, Asset quality, Management efficiency, Earnings, Liquidity
CAMELS	Capital, Asset quality, Management efficiency, Earnings, Liquidity, Sensitivity
CAP	Capital
CAR	Capital Adequacy Ratio
CBM	Central Bank of Myanmar
CSR	Corporate Social Responsibility
EAR	Earnings
FX	Foreign Exchange
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
LIQ	Liquidity
MME	Management Efficiency
MMK	Myanmar Kyat
MRR	Minimum Reserve Requirement
NPL	Non-Performing Loans
O/N	Overnight
OCC	the Office of the Comptroller of the Currency
ROA	Return on Assets
SME	Small Medium Enterprises
SR	Senior
STD. DEV.	Standard Deviation
USD	United States Dollar

CHAPTER I

INTRODUCTION

As the service sector continues to grow in today's economy, the financial services sub-sector is also experiencing rapid growth accompanied by increased demand for good asset and liability management. The changes in the financial markets in recent years as foreign players have gained access to the domestic market, risks associated with the operations of banks have become complex and also the competition within the banks has increased. Banks invest with each other through the inter-bank market, which implies that failure of one bank can have a significant negative impacts on the entire financial sector. The volatile interest rates and exchange rate have put the pressure on the banks to design their asset liability portfolios in such a way that the risk in the portfolio is minimized. Hence banks need an ALM framework which enables them to combat these risks and help them to optimize the performance of the banks.

Asset-Liability Management (ALM) is concerned with strategic management of assets (uses of funds) and liabilities (sources of funds) of banks, against risks caused by changes in the liquidity position of the bank, interest rates, and exchange rates, and against credit risk and contingency risk (Mihir, Venkatesh, & Bhargav B. D., 2011). Traditionally, ALM is the process of risk management and strategic planning. ALM process is not only about offering solutions to mitigate or hedge the risks arising from the mis-matches between assets and liabilities but is also focused on the long-term perspective: success in the process of maximizing assets to meet complex liabilities may increase profitability. The effective modern ALM process includes the allocation and management of assets, equity, interest rate and credit risk management including risk overlays, and the calibration for optimization and management in the local regulatory and capital environment to stabilize the short-term profits, the long-term earnings and the long-run sustenance of the bank.

Since Myanmar began to open up in 2010, the government has introduced a number of different reforms to its economic policy in order to effect market-oriented structural changes, economic growth and high hopes for millions of low income households. A stable and inclusive financial sector is a precondition for sustainable economic development. As per GIZ's Myanmar Banking Report 2018, in March 2016 the banking sector still held 92%

of total financial sector assets (about 42.4 trillion MMK). The remaining 8% was comprised of Insurance, Securities, Finance Companies and Micro Finance Institutions. As the banking sector is the biggest portion of the financial sector, significant reforms can be found in the Myanmar's banking sector in 2017.

Central bank of Myanmar (CBM) issued the "four regulations" (capital adequacy, asset classification and provisioning, large exposure and liquidity ratio) on 7th Jul 2017. Due to those regulatory requirements, there has been a huge shift in the profile of the borrowers, the profile of the industry, and the structure of the interest rate for deposits and advances, and etc. This has been accompanied by increased volatility of markets, diversification of bank product profiles and intensified competition between banks, all adding to the risk exposure of banks in Myanmar. Therefore, banks increasingly need to match the maturities of the assets and liabilities, balancing the objectives of profitability, liquidity, and market risk by maintaining the new regulatory requirements.

The success of banking sector depends on the appropriate asset liability management framework which in turn depends on the effective policies, governance and risk management practices. This study will discuss how asset and liability management of the bank affects one of the private banks' performance in Myanmar.

1.1 Rationale of the Study

After the Myanmar banking crisis in 2003, CBM imposed various restrictions on the banking sector. Due to the severe directive No (1/2005), loans were required to be secured by strong collaterals and limiting the maturity of the term loan to one year to prevent any maturity mismatch between deposit and loans without considering the local business's needs for long-term financing. As the maturity of asset and liability was perfectly matched, ALM was not that important to control liquidity risk till 2017.

CBM issued directive No. (7/2017) and allowed banks to convert their outstanding overdraft facilities as at July 7, 2017 into term loans with up to a maximum maturity of three (3) years. As the maturity profile of assets and liabilities does not correspond, creates maturity mis-match situation which will lead to the liquidity risk if the proper ALM process was not implemented. And also banks are required to submit their asset liability

management framework to CBM showing how liquidity risk arising from longer term lending will be managed. ALM has gained significance in the banking sector in recent years due to the regulatory requirement changes.

The stability of the financial sector is of paramount importance for the well-being of a country and its people. Anjichi, (2014) stated that as an important segment of an economy, private banks act as the backbone of economic growth and prosperity by acting as a catalyst in the process of development. Private banks are the drivers for innovation and growth in Myanmar's banking sector. They inculcate the habit of saving and mobilize funds from numerous small households and business firms spread over a wide geographical area.

According to the GIZ report 2018, today there are 27 domestic private banks operating in Myanmar, which own about 67% of total bank assets. Yet, asset concentration is high, with the three largest banks holding almost two thirds of total private banks' assets, and the six largest banks of the country accounting for 82% of assets. Due to the contagious effect, the performances of those three private biggest banks are important for the stability of Myanmar's banking sector. Out of those three banks, thus study will be focused on the second largest bank in Myanmar, AYA Bank.

AYA Bank, started its banking operation in 2010, has grown rapidly over the past eight years to become the second largest bank in Myanmar with 250 branches. Due to the intensified competition among banks and also recent regulatory changes, it's important to analyze how well AYA bank manages its assets and liabilities to tackle the liquidity risk and stabilize its short-term profits, maintain its sustainability in Myanmar banking sector. An effective ALM technique aims to manage the volume, mix, maturity, rate sensitivity, quality and liquidity of the assets and liabilities as a whole so as to attain a predetermined acceptable risk/reward ratio. In this study, the effects of ALM on the AYA bank's performance by applying Ratio analysis will be discussed.

1.2 Objectives of the Study

The objectives of this study are as follows:

1. To identify the asset liability management practices of AYA Bank
2. To analyze the effects of ALM on the AYA Bank's performance

1.3 Scope and Methods of the Study

This study focuses on the effects of ALM on bank's performance. Out of 27 private banks, this research conducted on the second largest bank, AYA bank. Though there are 250 AYA branches, this research focuses primarily on the ALM practices at AYA Head Office. The time series data used in this study from Mar 2015 to Sep 2018. Descriptive statistics and correlation analysis were used to study. In this study, secondary data employed and collected from published financial statements of AYA bank, relevant textbooks, research papers, journals, and articles. In addition, the in-depth interview with some of the Asset Liability Committee (ALCO) members was conducted to provide the supporting information on the published data.

1.4 Organization of the Study

This study organized into five chapters. Chapter one included the introduction, rationale of the study, objectives, scope and methods of the study, and organization of the study. Chapter two presented the review of the related literature including the aspects for similar studies and theoretical background of the study. Chapter three showed the profiles of AYA Bank and ALM practices. Chapter four contained the data analysis, interpretation and discussion on the impact of ALM on AYA bank's performance. Chapter five provided a summary of part of the findings, relevant suggestions, conclusion and the suggestion of the further study on ALM.

CHAPTER II

LITERATURE REVIEW

This chapter discuss the theories relating to the research. This section describes the asset and liability management theory, the effect of ALM on the financial performance of the bank. As, the Bank financial performance is a function of internal (bank-specific) and external variables, this section discusses the conceptual framework used in this study.

2.1 Importance of Asset Liability Management

The financial sector is the backbone of any country's economy and its smooth functioning is central to the economy's rapid and broad economic growth. The series of policy and internal shocks inflicted on Myanmar's financial sector has left several legacies of failure, the severest of which is loss of public trust on the banking system. From 1963 to 2013, the Myanmar banking sector encountered 6 bank crises that showed the banking system's fragility and vulnerability even to small shocks. The banking sector of Myanmar, once a front runner during the 1950s, is today the least developed in the ASEAN region. However, the Myanmar government has started to reverse this negative trend. Since 2011, various ambitious financial sector reforms have been kicked off, in particular through the new Financial Institutions Law enacted in 2016. Significant reforms can be found in the Myanmar's banking sector in 2017. The necessary regulations known as the "four regulations" were released by the Central Bank of Myanmar in Jul 2017. CBM sets a stage a Basel II framework in the banking sector.

The CBM, an independent institution, issues prudential regulations, instructions, and policies as and when needed to strengthen their supervisory role to overcome the failures of the past, address the banking sector's weaknesses and build on its strengths. Banks are required to fulfill those regulations with the control of systemic risk through principally balance sheet constraints such as capital adequacy and permissible bank concentration ratios to maintain safety and soundness of the banking system. As per the five directives issued on 7th Jul 2017, good management of assets and liabilities has become

a vital role in the banking sector to achieve the financial objectives with well-defined risk parameters and other constraints. As one of those directives stipulate, banks are required to submit asset liability management frameworks showing how the liquidity risk arising from longer term lending will be managed.

2.2 Asset Liability Management

Banks, in the usual course of business, accept financial risk by making loans at interest rates that differ from rates paid on deposits, preferable at a margin. Deposits often have shorter maturities than loans and adjust to current market rates faster than loans. The result is a balance sheet mismatch between assets and liabilities. That mismatch leads to the liquidity risk, interest rate risk and credit risk to the banks. Therefore, bank management needs to maintain a good balance between profitability and stability while managing market liquidity and interest rate risk. Due to the above requirements, banks are required to have a proper asset liability management framework which can enable to tackle these risks and help them to optimize the performance of banks.

According to Singh (2013), ALM is defined as "managing both assets and liabilities simultaneously for the purpose of minimizing the adverse impact of interest rate movement, providing liquidity and enhancing the market value of equity. It is also defined as "planning procedure which accounts for all assets and liabilities of a bank by rate, amount and maturity." Robert (2017) Sheela and Bastray (2014) define ALM as a process that is concerned with the strategic management of assets and liabilities of banks against various risks such as liquidity risk, interest rate risk, exchange rate risk, credit risk and contingency risk, while Charumathi (2008) defines ALM as a dynamic process of planning, organizing, coordinating and controlling the assets and liabilities – their mixes, volumes, maturities, yields and costs in order to achieve a specified Net Interest Income (NII).

The main objective of ALM is managing the Net Interest Margin (NIM) which is, the net interest income over their average earning assets while considering the loan growth and interest rate movement. ALM plays a vital role in managing risk and maximizing reward. ALM process has three pillar as follows;

- ALM Information System - Management Information System - Information availability, adequacy and expediency
- ALM organization - Structure and responsibilities - Level of top management involvement
- ALM Process - Risk parameters - Risk identification

To implement the ALM process, banks set up Asset Liability Committee (ALCO) comprising of top level management of the bank. ALCO is a decision making unit responsible for balance sheet planning from a risk - reward perspective including the strategic management of interest rate and liquidity risks. At the business level, ALCO would decide the product pricing for both deposits and loans, maturity profile of the incremental assets and liabilities. At the risk control level, ALCO analyzes the progress and impacts on the execution based on the given decision in the previous meeting. Anjichi (2014).

There are four steps in banks' Asset-Liability management process: liquidity management, asset management, liability management and capital management Christiansen (2012).

- a. Liquidity refers to the bank's ability to convert the liquid assets to cash to meet its liability as they become due. Liquidity risk occurs when the bank is not able to meet its liquidity needs due to the unforeseen circumstances or the tight market liquidity during the crisis. Due to the contagion effect, the shortfall at single financial institution can impact on the entire financial system. Robert (2017) stated that liquidity risk management is managing cost-benefit tradeoff between profitability and liquidity risk. In other words, liquidity management is designed to ensure that sufficient liquidity is reserved without sacrificing the net interest margin and without locking the idle fund in the banks.
- b. Asset management is making a decision on how much liquid assets and reserves a bank should maintain at any given time considering that liquid assets tend to have low returns and also holding of excessive liquid assets will have negative impact on the profitability.

- c. Majority of bank's liability (source of fund) is from deposits. Liability management is the process of restructuring, balancing the outstanding liabilities while considering the cost of fund and maintaining the required liquidity position and healthy balance sheet of the bank.
- d. Capital can be the foundation of any business; in banks, it serves as a buffer against losses resulting from risk they are exposed to through their intermediary role. In the banking sector, banks are required to hold minimum capital in line with their risk-weighted assets.

2.3 Asset Liability Management and Financial Performance

Anjili (2014) stated that financial performance is an indicator of how well a bank can use assets from its primary mode of business and generate revenue. Ramlall (2009) and Alper and Anbar (2011) found that bank financial performance can be hindered by both internal and external factors. Internal factors are micro or bank-specific determinants which are related to bank management which comprises the ALM culture of the bank and external factors are determinants which reflect the economic and legal environment that affect the operation and performance of the banks.

According to Hester and Zoellner (1966), there is a statistically significant relationship between ALM and financial performance of the bank, leading them to disregard the null hypothesis. On the contrary, Kosmidou et al, (2004) found that liability management plays its own pivotal role in contributing profitability difference among commercial banks. However, Vasiliou (1996) suggested that asset management rather than liability management plays the key role in explaining the differences in banks profitability. This study discussed several AML factors which have a direct influence on the financial performance of the bank. Anjili (2014) studied the effects of ALM on the financial performance of commercial banks in Kenya, concluding that the efficiency of the ALM process within the institution had a statistically significant impact on financial performance of the bank. Therefore, a proper ALM process ensures that risks associated with failures caused in a mismatch of firms' assets and liabilities are well minimized if not eliminated. As ALM has a direct effect on the financial performance of banks, it is crucial to have an

effective AML process within banks that closely monitor and balance both the assets and liabilities management.

2.4 CAMELS Framework

As a monitoring measure, supervision and continuous performance evaluation of the bank is necessary to ensure the ALM process of the bank is aligned with the profitability and sustainability of the bank in order to ensure that the financial interests of depositors in the country are safeguarded. In 1979, US introduced an internal supervisory tool called CAMEL rating system to evaluate the soundness of all financial institutions on a uniform basis. CAMEL is a widely used framework for evaluating bank performance in relation of ALM. CAMEL refers to the bank-specific factors, the Capital adequacy, Asset quality, Management, Earnings and Liquidity. In 1997, the sixth factor, a bank's Sensitivity to market risk, was added; the acronym changed to CAMELS, as outlined by Jose A. (1999). Although some alternative bank performance models have been introduced, the CAMEL framework is the most widely used and is also recommended by Basel Committee on Bank Supervision and IMF. In Myanmar, CBM uses the five component CAMEL rating system, to evaluate the bank performance, but this study will be using CAMELS to evaluate the bank performance of the AYA Bank.

(i) Capital Adequacy

Capital Adequacy is one of the prominent variables that reflect the inner strength of a bank. Capital adequacy ratio (CAR) is used to protect depositors from potential losses and promote the stability and efficiency of financial systems around the world. It measures the percentage of bank's capital to risk-weighted credit exposures. CAR ratio indicates that the bank has sufficient capital to expend business and that its net worth is able to cover any financial shocks without becoming insolvent. According Zahidur and Sohidul (2018), the higher the capital adequacy ratio, the stronger the bank, but a very high CAR indicates that the bank is too conservative and has not utilized the full potential of its capital. Similarly, Beckmann (2007) has found that high capital leads to low profit levels as shareholders of these banks become risk-adverse and ignore potential investments out of an increased

consideration of risks. This stands in contrast with the findings by Gavila (2009), who used a sample of 10 banks in Tunisia over the period from 1980 to 2000 for a panel regression analysis, concluding thereafter that well-capitalized banks are more profitable than lowly capitalized banks, with capitalization displaying strong positive relationships with ROA. Coming geographically closer to Myanmar, this result was confirmed by Sufian and Chong (2009), finding that capital has a strong influence on bank performance in Phillipines from 1990 to 2005. Recognizing the importance of CAR, CBM has directed each bank to maintain regulatory capital adequacy ratio at 8% and the minimum Tier1 capital adequacy ratio at 4%. This study uses CAR ratio calculation as per CBM guidelines:

$$\text{CAR} = (\text{Tier 1} + \text{Tier 2}) / \text{Risk-Weighted assets}$$

(ii) Asset Quality

Asset quality tests banks' financial strength against loss of value in the assets, as assets weakening is treated as banks' solvency risk. One of the biggest risks that banks face is credit risk, the risk of loan losses turning into default. In fact in a study conducted by Dang (2011), it was confirmed that the highest risk that a bank faces is the losses derived from delinquent loans. The asset quality depends on the exposure to credit risks, financial soundness and credit worthiness of the banks borrowers. As the ratio of non-performing loans rise, the situation worsens for any bank, as confirmed by Sangmi and Nazir (2010). Therefore, asset allocation of the scared resources with the consideration of risk plays a crucial role on the bank's financial performance.

(iii) Management Efficiency

Management efficiency is the vital parameter to making sure that the bank management's adherence to standards and policies, capability to plan and be anticipatory, leadership, innovativeness and managerial aptitude of top level management. In this study, operational expense efficiency is used to measure the managerial efficiency of the banks. This qualitative measure is an important indicator for the survival, profitability and growth of the bank. Though qualitative in nature, various researchers have used as proxies various financial ratios. Illhomivich (2009) used operating profit to income ratio, while

Athanasoglou (2005) used operating expense to total assets. This study will follow Kebede (2014) and use non-interest expenses to total income.

(iv) Earnings Quality

Earnings quality is also the crucial parameter to measure the bank's ability to earn and sustain profit consistently. Earnings quality of the banks depends on the efficiency and effectiveness of the asset and liability management. The good quality of earnings will help the banks in executing present and future operations, paying out dividends to the shareholders, maintaining the capital to protect losses, developing diversification strategies for the further growth.

(v) Liquidity

Liquidity measures the bank's ability to meet its financial liabilities when they are due. Each bank is required to maintain adequate liquid assets to fulfill its timely financial commitments. Any liquidity shortfall of the banks will lead to reputational risk, loss of public trust, higher cost of funds, which can negatively impact financial performance of the bank. Due to the domino effect, liquidity shortfall at a single financial institution can impact the entire financial system of country. Therefore, the regulatory authorities set the limit of minimum liquidity and other required reserves to keep as the buffer to cover any potential financial shock. Central Bank of Myanmar set the liquidity ratio at 20% and minimum requirement reserves (MRR) at 5% of total deposits.

(vi) Sensitivity to the Market Risk

Market risk is the risk of losses in liquid portfolio arising from the movements in market prices such as interest rate, currency, and equity and commodity risks. Interest rate movement can largely impact the net interest income, profitability, value of on and off-balance sheet items and cash flows. The severity of interest-rate risk on the banks' balance sheet depends on the mismatch position in terms of maturity profile, size and mixture. The purpose of the interest rate risk management to sustain earnings, improve capacity and ability to cover potential loss and to ensure the adequacy of the compensation received for the risk taken. The immediate focus of ALM is to optimize interest-rate risk and return as measured by NIM. Therefore, managing the mismatch gap well can increase the financial

performance of the banks as well as reduce the magnitude the adverse impact on the banks if interest rates moved unfavorably.

2.5 Empirical Studies

Many researchers have studied how the ALM factors affect bank performance by using the CAMEL framework. Kosmidou (2008) observed 23 commercial banks in Greece from 1990 to 2002 and ran a linear regression model on bank profitability by using the asset quality variable (NPL loans/Gross loans). The results showed a negative significant impact of asset quality to bank profitability, indicating that banks would improve profitability by improving screening and monitoring of credit risk. Mihail (2009) studied how the ALM affect profitability of banks in Europe. 2004-2011 data of 30 banks in Europe was used to test the linear dependency between the structure of asset and liabilities. She concluded that the management of asset and liability must take into the consideration of CAMEL variables like earnings, liquidity, and solvency, level of loans and deposits and risk exposure to be effective.

Habtamu (2012) observed determinants of private commercial banks in Ethiopia profitability by using multiple liner regression. His results showed that bank specific factors like capital adequacy, managerial efficiency, bank size, and macroeconomic factors like GDP and regulations have strong influences on return on assets, return on equity, net interest margin of the banks. Hoffmann (2011) examined the determinants of US banking sector's profitability by using generalized method of moment (GMM). He used both bank-specific and macroeconomic variables. According to his study, ALM factors like management efficiency and capital adequacy are the strongest determinants of a bank's profitability and exogenous factor, interest rate, also determined the financial soundness of the bank.

Anijli (2014) studied the effects of assets and liability management of financial performance of commercial banks in Kenya by using a multiple linear regression method. Data from 2004 to 2013 from 43 banks was used. He concluded that financial performance of banks in Kenya is largely driven by ALM factors. He recommended policies that would

encourage banks to reduce operational risk, minimize credit risk, minimize the liquidity holdings and diversify their sources of income.

On the contrary, Robert (2017) observed the effects of ALM strategies and regulations on the performance of commercial bank in Leotho by using a regression model. He used the ALM variables capital adequacy, liquidity, cash reserves requirement, gap ratio and managerial efficiency to access the effects on the return on assets. His studies showed that ALM variables have no impact on the bank's performance while one of the regulatory variables has a negative significant impact on the bank performance. But he recommended to improve on the bank's ALM strategies and review those ALM policies and tools to ensure that they are in line with the market development and holds appropriate mix of asset and liability to achieve the higher profitability.

Njogo (2014) ran a statistical cost accounting model to test the effects of asset and liability management on commercial banks' performance in Nigeria over the period 2008 to 2012, thereafter finding that there is a strong relationship between ALM practices and bank profitability. As a recommendation, they suggest that banks maximize asset availability to meet the needs of increasingly complex liabilities. In addition, to minimize interest rate risk, banks should manage the maturity mismatch between assets and liabilities by restructuring their balance sheets and also through using derivative instruments.

In his survey of possible determinants of bank performances, Ongore (2013) operated a regression model that employed as explanatory variables both bank-specific factors, such as financial and managerial efficiency ratios, as well as macroeconomic variables such as GDP and the annual inflation rate. Rahman (2015) tested the potential impacts of similar parameters on bank performance, albeit in a different geographical location, but by conducting a correlation analysis.

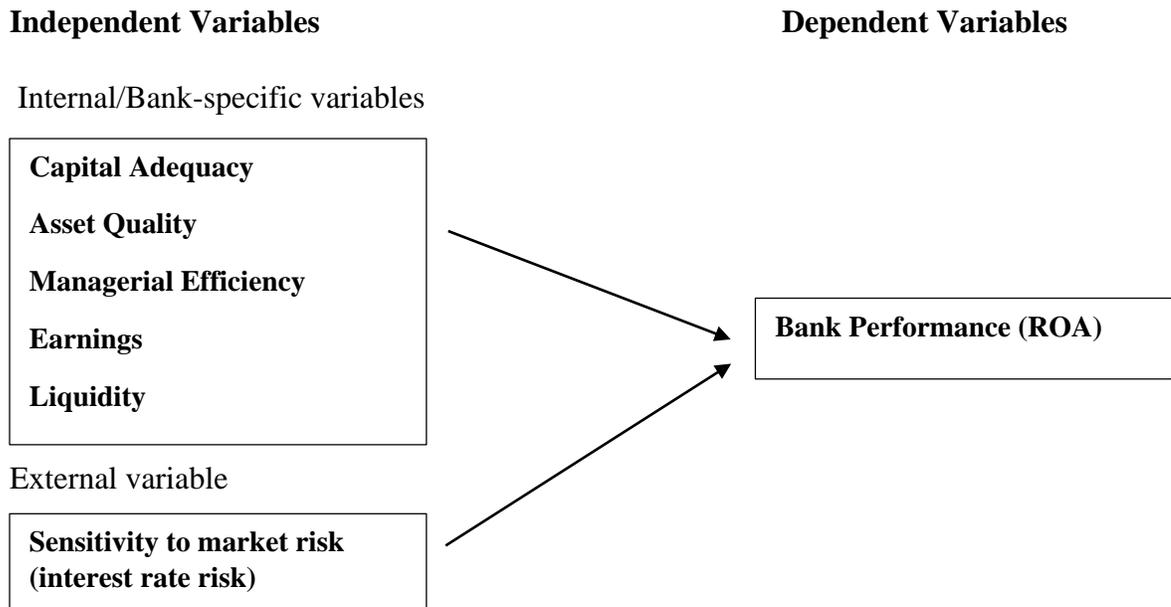
Obari (2015) investigated the effects of ALM activities on the performance of 44 commercial banks in Kenya for the period 2010 to 2014. He concluded that there was a strong positive relationship between performance and bank size and a negative one between performance and capital structure. He recommended that banks should design strategies to attract low cost funding and to manage liquidity mismatches.

2.6 Conceptual Framework of the Study

The above empirical studies showed most of the bank-specific variables used to assess banks performance have statistically impact on the banks performance. Therefore, it is very crucial to have an effective ALM process within the banks to monitor and balance the asset and liability for achieving the short-term and long-term objectives of the bank, a conclusion that the country's financial regulator the CBM seem to have reached, thereafter leading it to use the CAMEL framework. This study conducts the effects of asset liability management on the AYA bank performance by using the updated CAMELS ratio analysis.

This study uses the dependent variables as ALM factors or bank-specific variables which are Capital Adequacy, Asset Quality, Managerial Efficiency, Earnings and Liquidity to measure independent variable as AYA Bank's performance. In addition to ALM factors, this study also uses external variable as sensitivity to market risk to measure Bank's ROA. The Conceptual framework of this study used is shown in Figure (2.1).

Figure (2.1) Conceptual Framework of the Study



Source: Adopted from Robert Thejane (2017)

CHAPTER III

ASSET LIABILITY MANAGEMENT PRACTICES OF AYA BANK

This chapter discusses AYA Bank's profile, gives an overview of the Myanmar Banking sector, the importance of Asset Liability Management and practices of asset liability management at AYA Bank.

3.1 AYA Bank's Profile

AYA Bank started when it obtained banking license by Central Bank of Myanmar on the 2nd of July in 2010. AYA bank relicensed under financial institutions law 2016 as a full-service universal bank. Since then, the bank had grown significantly over the years to become the second largest bank in Myanmar. In just four years of its opening, AYA opened its 100th Branch within Yangon Division and currently sits at 258 branches nationwide with over 5.7 trillion kyats of customer deposits and 150 billion paid up capital of Shareholders' Equity.

A Bank is a fond member of UN Global Compact and as a member, AYA Bank is committed to practice and implement global standards to its corporate governance, management and operations. Additionally, AYA Bank is known to be the only bank in Myanmar that is compliant with International Financial Reporting Standards and the only bank in Myanmar to be audited by a big-four international firms under International Standards of Auditing (ISA). AYA Bank promises to revolutionize banking in Myanmar and to continue to extend its branch network. AYA Bank is also actively investing in Digital Banking platforms, Core Banking and Fintech platforms. Such investments in digital platforms has benefited AYA to provide its customer with innovative products and services across the nation. AYA Bank excels in strengthening its relationship with customers by providing the best customer service and accessibility. At the same time, AYA Bank aims to further strengthen its governance, risk and compliance structure.

AYA Bank's mission: To be Recognized as the leading bank in Myanmar through pursuit of excellent and long-term sustainable growth for the bank and its stakeholders. As

their mission, AYA Bank proves the public by showing significant growth by becoming the second largest bank in Myanmar within a short period of over 5 years. AYA Bank is also known as the first bank in Myanmar to introduce Centralized Core Banking System. Similarly, AYA Bank was the first to introduce mobile and internet banking platforms.

AYA Bank's corporate values-ethics are:

- We pursue our objectives with EXCELLENCE
- We progress as a TEAM
- We think and act in all HONESTY
- We maintain INTEGRITY in all our dealings
- We CARE for our customers, our colleagues and the people we interact with and in all our actions,
- We always act with SINCERITY

AYA Bank's brand promise as YOUR Trusted Partner, the bank of choice for anyone who is looking for fast, reliable, honest banking relationships at a reasonable cost. AYA Bank offers a full range of products and services to its customers with accessibility and reliability. Such products offered by AYA are Customer deposits; Savings, Current and fixed deposits. ATM cards and different types of credit cards are also available for customers at AYA Bank. Additionally, there are also several types of loans offered by AYA such as Home Loan, Education Loan, Auto Loan, Loan and advances and SME loans. There are also remittance services for both local and global needs by AYA through its systematic Telegraphic Transfer service. Trade services are also available at ease in AYA bank such as Letter of Credit issuance and Bank Guarantee. AYA Bank makes sure to live up to the standards of their customer expectations by providing cash management services of own accounts with iBanking and mBanking apps. Recently, AYA Bank had released an updated and improved mBanking v2.0 app for its customers which makes the experience of conducting live banking easier and more accessible.

As AYA's corporate value-ethics, Excellency has led to several awards given by the world throughout the year 2013 till present. In 2014, AYA was awarded "Best Retail Bank" by International Finance. From 2013 till 2016, AYA Bank was awarded the "Best

Private Bank” in Myanmar for three consecutive years by World Finance. Similarly, AYA was awarded with back to back awards, “Best Banking Group Myanmar and Most Sustainable Bank” in Myanmar in 2015 and 2016, “Best Bank for CSR” by Asia Money in 2017, “Best Regional Banking Partner” by Capital Finance in 2017. In 2019, AYA was awarded with Best Bank for CSR & SMEs by Asia money, EDGE certificate for Gender Equality and Best Bank Advancement Program and People’s Choice Award by Myanmar Employer Awards.

AYA Bank is moving towards “Customer Centricity” and is looking to expand its business lines across a universal banking platform to provide its customers a holistic banking experience. With its rapidly growing bank network and innovation technology, AYA Bank will look to cross sell other financial products to its customers and offer more lucrative non-interest services to achieve long term sustainable strategy.

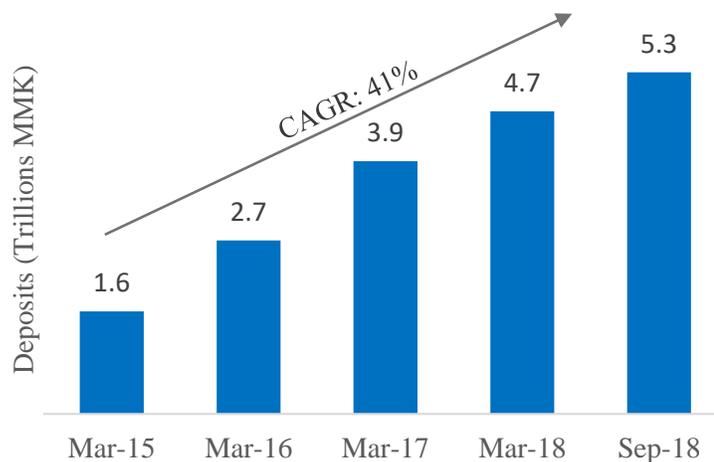
3.2 AYA Bank’s Performance Diagnostic

The banking sector of Myanmar has evolved and grown substantially over the last few years even though Myanmar is still regarded as one of the world’s most “under banked” countries. The advent of the new banking era will bring about threats and opportunities for AYA bank. Technology will bring competition from non-bank players (70% of population), and as Myanmar’s banking sector becomes more and more intertwined with the global financial markets, the need for an efficient financial sector and a comprehensive risk management policy will be unavoidable. There are many aspects and views on how banks can affect the growth of an economy of a country and how banks play a vital catalytic role in the process of development for a country. A good banking system is required for a country to have a significant growth in economy. For banks, it is an utmost duty to manage their asset and liability skillfully to maximize profits, sustain the growth and stay competitive.

The composition of the bank’s balance sheet is a good measurement of the bank’s current position to diagnose any pain points and the competitive advantage of the bank. Based on the diagnostic result, the bank can develop a strategy for future success plan. This

study performs a time series analysis on the financial statement and financial position from Mar-15 to Sep 18 AYA Bank (the “Bank”). AYA Bank’s growth story has been led by strong deposits growth. Capitalizing on a powerful brand image of youthful innovation and the stellar reputation of a Chairman that has provided so much for the country through his other business activities, contribution to national sports activities and philanthropic initiatives, the bank has been able to establish trust in customers and attract their deposits- the bank’s very slogan is “Your Trusted Partner”. In March 2015, the bank had 1.6 Trillion MMK in deposits, building up the base to 5.3 Trillion MMK by September 2018, a growth of 233% over the time period. The figure below visualizes this growth.

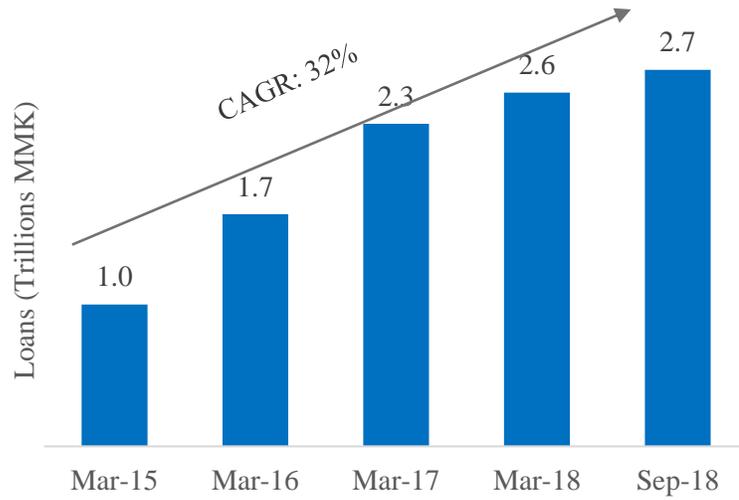
Figure (3.1) AYA’s Deposit Growth



Source: AYA Bank’s Audited Financial Statements (2015 – 2018)

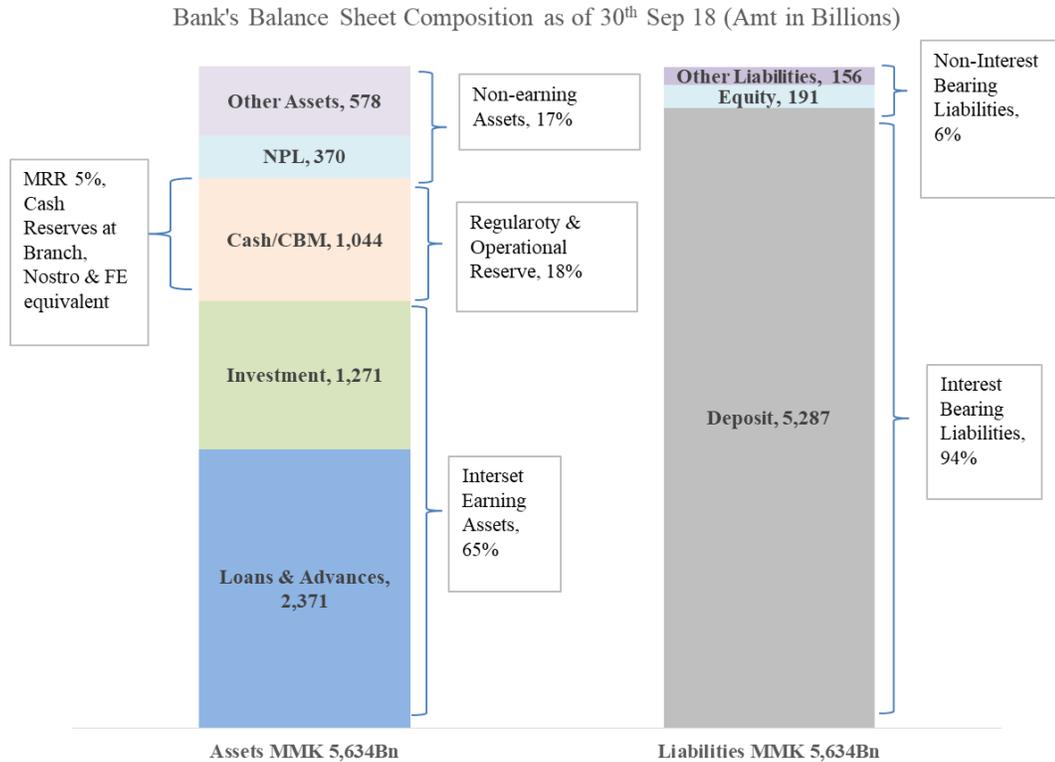
As a commercial bank, AYA’s primary business activity would be converting these funds that it pays interest on, into earning assets that it would receive payment on, ideally at a spread, the largest of which would be seen in loans. AYA’s loans have also grown at a rapid rate, from 1.0 Trillion MMK in March 2015 to 2.7 Trillion MMK in September 2018. The figure below demonstrates this growth.

Figure (3.2) AYA Bank's Loan Growth



Source: AYA Bank's Audited Financial Statements (2015 – 2018)

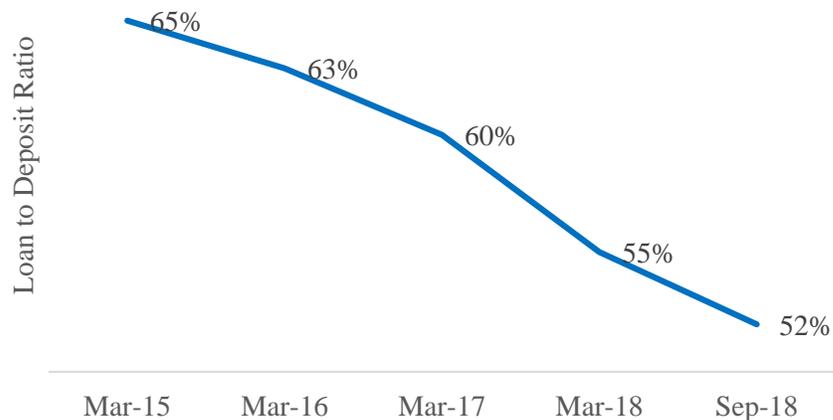
Figure (3.3) AYA Bank's Balance Sheet as at September 2018



Source: AYA Bank's Audited Financial Statements (2015 – 2018)

The above diagram is the balance sheet composition of the Bank as at 30th Sep 2018. From these graphs it is immediately apparent that AYA’s loan growth is weaker than its deposit growth. The compounded annual growth for loans is 32%, which stands in stark comparison against the 41% displayed by deposits. Going further, deposit growth is growing at a faster rate than loans, leading to a declining Loan to Deposit Ratio. As highlighted in Figure (3.3), as at September 2018, it seems that AYA only managed to convert a little over half of all its deposits into loans, 16% of which is not even performing. The figure below traces this ratio over the time period.

Figure (3.4) AYA Bank’s Loan to Deposit Ratio



Source: AYA Bank’s Audited Financial Statements (2015 – 2018)

The decline in the Loan to Deposit ratio has been virtually linear since March 2015, the continuation of which would necessitate AYA to consider corrective initiatives, either to drive loans themselves or to increase placements into investments in order to supplement its earnings, or both, as a growing balance sheet would amplify any ratio shortcomings with size. The bank will also have to decide the optimal risk-reward composition of assets as it finds a balance between the nominally risk-free government securities or customer loans that inherently carry credit risk and pay more, even if the earning from the latter is

not necessarily priced for risk. These decisions are only more pressing due to the nature of the balance sheet as the bank has to seek sources to place its surplus funds, which would not have been superfluous had the bank decreased the interest that it offers to pay on its deposit products or altered the terms on them to otherwise make them less enticing for customers, both of which constitute dynamic liability management activities that the bank will have to ponder. The asset management and liability management activities in union would craft a more efficient balance sheet that would be streamlined to maximize net interest income. Since 2016 when it was first chartered, AYA Bank's ALCO has accepted as its responsibility to oversee these asset-liability management activities, the scope of which would only grow in proportion to the bank's size and complexity. The section below explores these activities further.

3.3 Asset Liability Management Practices of AYA Bank

As discussed in the previous chapter and confirmed by various researchers and AYA Bank's own financial condition, banks need to engage in asset-liability management activities to address interest rate, currency, and liquidity risks. ALM provides a system under which these risks can be monitored and measured and to ensure that they are in-line with the bank's business objectives chiefly through dynamically managing the banks' balance sheet.

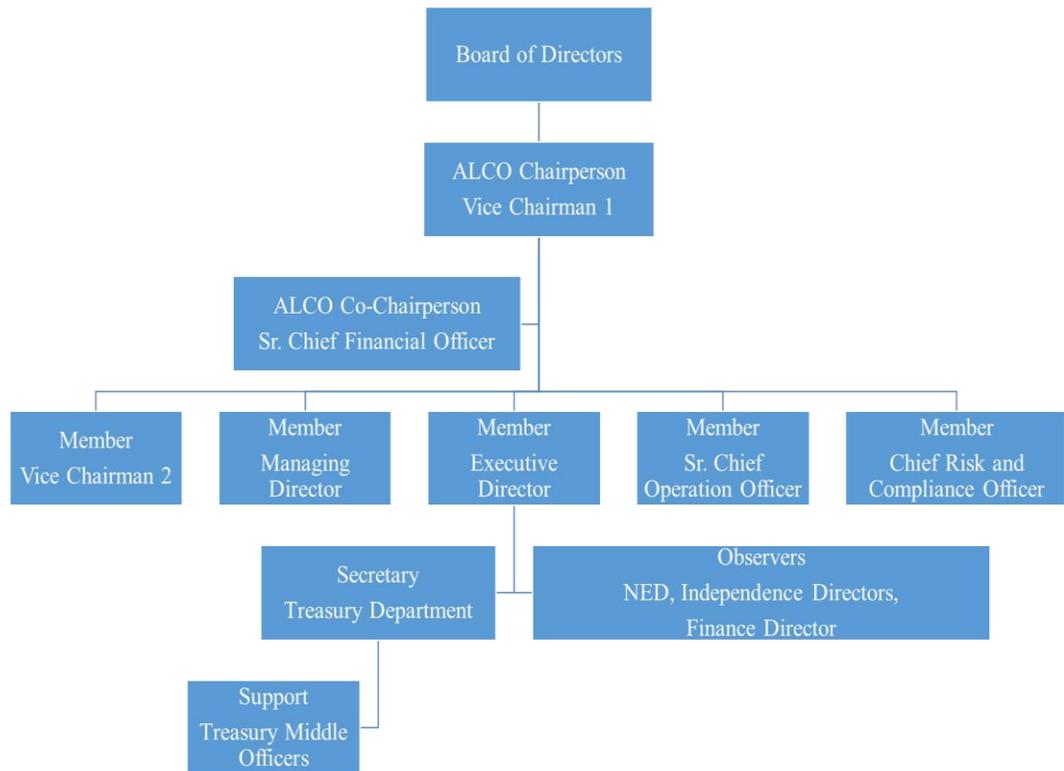
According to Dugar (2015), these activities are planned and overseen by a bank's Asset Liability Committee, the ALCO. The unit is responsible for planning the optimal mix of the balance sheet in the risk-reward perspective and for the strategic and active management of interest rate and liquidity risks. This management would cover all ALM activities, ranging from front-office money market functions to back-office operations and middle-office reporting and risk management under the framework of an ALM policy that it is also responsible for setting.

AYA has always been at the forefront in terms of innovative banking and will remain well-poised to tackle future challenges. AYA set up the Asset Liability Committee (ALCO) to dynamically manage the balance sheet, prudently and efficiently, with the

objective of maximizing net interest income and minimizing risk exposures in 2016. The role of AYA Bank's to oversee the balance sheet management of AYA Bank. ALCO is also responsible for setting policies on managing balance sheet exposure, covering areas on structural interest rate management, structural foreign exchange management, liquidity and funding risk management and the Bank's internal transfer pricing mechanism.

While the exact composition of the ALCO will depend on the institution, an interview with an ALCO member from AYA Bank reveals that at AYA, the membership is shown in Figure (3.5).

Figure (3.5) Asset Liability Committee (ALCO) at AYA Bank



Source: AYA Bank (2016)

The interviewed ALCO member also shared that the committee strives to make decisions unanimously wherever possible, and resorting to voting if not. The Chairman of

AYA Bank will be invited to all ALCO meetings. The ALCO at AYA meets once a month on a regular basis. As shared by the member, at AYA, a typical ALCO meeting will discuss the following items:

- 1) Market Updates- Regulatory updates, and their impacts on the bank's compliance statuses, are presented to the committee. When compliance status is compromised, the presenting member may also outline the steps the bank will take in order to restore compliance. Committee will also discuss expected changes in regulations. Regional and global factors that have material impacts on AYA Bank and/or Myanmar are also discussed, such as currency fluctuations and risks and the economies of neighbors. General economy status and competitor news are also discussed.
- 2) Bank Performance- the committee is updated on the bank's performance with respect to the net interest margin, cash flows and usable funds. General asset management is also discussed here, with the committee ensuring that all funds are efficiently and prudently deployed into earning assets in general and good-quality loans in particular. The loan pipeline is also presented to ensure the bank can supply sufficient funds upon drawdown.
- 3) Financial Institutions- the committee is presented with the bank's exposures to various financial institutions, both local and foreign, through the investments and money-market placements it has made.
- 4) Investment Portfolio- the bank's investment portfolio is discussed in more detail, with topics ranging from the bank's recent participations in CBM government investment auctions and how it should make placements in the near future in accordance with foreseeable business activities and liquidity requirements.
- 5) Foreign Exchange- the committee discusses the bank's market share of foreign exchange related activities, both wholesale and retail, and the resultant long or short position.

AYA bank top their asset liability management by being able to meet their liquidity needs and at the same time earn sufficient returns on their investments of assets over the

years. It can be seen by the significant growth of AYA itself throughout the years. AYA bank has able to manage their assets and minimize their risk through diversification. Diversification can be achieved when banks see out all types of options in its demographics and find what's best and less risky to invest for maximum profitability. AYA bank has benefited in issuing loans to different groups of customers such as businesses and corporations of different backgrounds. With these diversifications of investments in businesses by AYA, AYA bank has achieved high returns on loans thus proving assets and liability were managed skillfully to maximize profits.

Liquidity Ratio

AYA Bank's policy is to maintain sufficient liquidity to address any expected or unexpected deposits fluctuations and debt service requirements. The purpose of this policy is to ensure AYA bank meets the Central Bank of Myanmar required minimum liquidity ratio of 20%. The liquidity management is control by Head office with duties assigned to Money Market Desk and Middle office from treasury department as well as business department and ALCO (Asset & liability committee). AYA Bank's liquidity ratio is calculated daily by the treasury department. AYA bank's own liquidity ratio is set to 25% which is 5% higher than Central Bank of Myanmar minimum ratio requirement. AYA has set a strict internal policy such as if the banks liquidity ratio exceeds 25%, it is treasury department duty to utilized the excess funds on investments and loans to ensure that the bank's funds are not left idle.

AYA Bank exercises a vault-limit system that recommends the level of cash that each branch should strive not to exceed every day. The amount to maintain differs for each branch is based on a statistical model that first takes into account the historical actual net outflows that a branch may face and sets the limit as the amount of cash that would provide sufficient cash at a 95% confidence level. Second, the model takes into account qualitative factors such as a branch's distance to other AYA branches, proximity to business centers and urban centers. Lastly the model considers the past patterns pertaining to seasonal activities. Funds are then moved from branches with surplus to more productive places, prioritizing branches with cash shortages, secondarily going into government investments.

These activities are conducted by the Currency Team in corporation with the Treasury on a daily basis, updating the ALCO with major changes that are made.

Gap Analysis/Mismatching Ratio

One of the factors in Assets and liability management done by AYA is Gap analysis/mismatching ratio. AYA Bank interprets Gap analysis/mismatching ratio to create a gap schedule for liquidity risk. It then analyzes it by pulling apart each type of asset and liability into time bracket into corresponding maturities. The liabilities' maturity profile of assets and liability are matched to ensure assets can reliably fund liabilities as the liabilities fall due. AYA bank also takes into account off balance sheet items such as Letters of credit executively in stress scenarios level.

Interbank Placements/ Deposits

AYA bank day to day management of liquidity of the bank is through interbank borrowing and lending and investing in fixed income government securities. AYA' ALCO oversees total investments made and along with treasury team, strategically invest in placements to mitigate liquidity and interest rate risks. The function of money market desk is to generate net interest income from asset and liability management and to generate non-funded income through trading of securities.

Contingency Funding

The management of AYA bank recognizes the importance of having a plan for addressing liquidity in case of shortfall crisis. AYA bank has made sure their contingency funding plan addresses both internal shortfalls and external shortfalls. AYA bank recognizes the need for funding sources that go beyond retail deposit business and has been consequently monitoring and building a funding program based on different sources. The choice of sources is primarily linked to the cost of funds.

This chapter discusses the history of AYA Bank's growth from a balance sheet perspective and highlights the importance of active asset and liability management. It also outlines the decision-making unit that oversees these activities, The ALCO; its scope, members and potentials.

CHAPTER IV

ANALYSIS ON THE EFFECT OF ASSET LIABILITY MANAGEMENT ON THE PERFORMANCE OF AYA BANK

This chapter presented the study findings on the relationship between the five CAMEL variables and AYA Bank's financial performance over the course of five financial year-ends, from March 2015 to September 2018 and explores ALM strategies that could further enhance returns.

4.1 Research Design

Data used in the study comes from the audited financial statements for AYA Bank for the years 2015-2018, which are available on the company's website for public access. As the present study seeks to isolate the impacts of CAMEL variables on bank performance, irrespective of macroeconomic variables, in a data-scarce environment, correlation analysis employed to examine the relationships of individual independent variables with bank profitability. The table (4.1) below summarizes the different variables.

Prudential regulations announced and applied by the CBM in July of 2017 notably altered the calculation methodologies for capital adequacy and asset quality. AYA Bank annual reports before July 2017 report the regulatory ratios using the old methods while those after July 2017 use new methods. For this study, the two variables, CAR and ASQ, for times periods before July 2017, have been retrospectively recalculated using the new methodologies to realistically reflect the current regulatory environment.

Table (4.1) Summary of the CAMEL Variables

Variables	Acronym	Description
<i>Dependent Variables</i>		
Return on Assets	ROA	The ratio of profit before tax to total assets
<i>Independent Variables</i>		
Capital	CAR	The ratio of total capital to total risk-weighted assets*
Asset Quality	ASQ	The ratio of performing loans to total loans*
Management Efficiency	MME	The ratio of non-interest expenses to total income
Earnings	EAR	The ratio of net interest income to total assets
Liquidity	LIQ	The ratio of liquid assets to volatile liabilities

Source: Survey Data, 2019

The table below reports the descriptive statistics of all the variables used in the study.

Table (4.2) Descriptive Statistics

Variable	Mean	Maximum	Minimum	Std. Dev.
ROA	0.43%	0.61%	0.33%	0.12%
CAR	5.44%	6.04%	4.74%	0.55%
ASQ	5.51%	13.50%	0.24%	6.32%
MME	72.46%	81.09%	55.08%	10.50%
EAR	0.82%	1.22%	0.62%	0.24%
LIQ	27.76%	33.76%	22.49%	4.28%

Source: AYA Bank Audited Financial Statements (2015 - 2018)

The table above summarizes the different variables over March 2015 to September 2018, the period for which each financial year-end's data is listed out in the table below.

Table (4.3) Analysis on CAMEL

	<i>ROA</i>	<i>CAR</i>	<i>ASQ</i>	<i>MME</i>	<i>EAR</i>	<i>LIQ</i>
MAR-15	0.61%	6%	99%	71%	0.65%	22%
MAR-16	0.36%	6%	98%	80%	0.80%	26%
MAR-17	0.49%	5%	100%	75%	1.22%	26%
MAR-18	0.38%	5%	89%	81%	0.62%	30%
SEP-18	0.33%	6%	87%	55%	0.82%	34%

Source: AYA Bank Audited Financial Statements (2015 – 2018)

Table (4.2) shows that the largest absolute deviation over the time period is seen in the variable MME, management efficiency, at 10.50%, implying that there has been large changes in efficiency in either direction, a postulation confirmed by Table (4.3) that reports a marked 2500 bps drop in costs for the September 2018 year-end. Though the period is a half year, it does not call for any annualization as the variable is a ratio of a half-year number to another half-year number. Such a large drop does warrant further investigation however, possibly explained by differences in timing between non-interest payments and total income over the year.

In relative size, the largest standard deviation can be seen in ASQ, representing asset quality- in fact it is the only variable in the study where, over the tested time period, the standard deviation is larger than the mean, signifying large changes to asset quality over the years, again a claim confirmed by Table (4.2) that shows the variable dropping from close to 100% to 87%. In 2017, regulations pertaining to Asset Classification did change the criteria for considering loans non-performing by decreasing the number days that would have to elapse until it is considered non-performing, but for this study, for the pre-regulation periods, the non-performing loan has been retrospectively calculating with the new requirements. Again, however, this stark drop may require further study, perhaps implying that the non-performing numbers reported in the audited financial statements alone do not provide sufficient data to be comparable with the new regulations. A more alarming possibility opens however- a possibility that may need to be considered in light of the lack of certainty- that AYA Bank’s asset quality has deteriorated over the years.

The asset-quality erosion hypothesis does seem to be supported by the steadily dropping ROA, with it reaching an all-time low as of September 2018, after correcting for FX gains and the irregular time period. However the definitiveness of this possibility, the completeness of asset-quality's decrease's contribution to declining profit levels, is called into question by rising liquidity levels that has been increasing since March 2015 and are currently at an all-time high, suggesting that asset-quality degradation in union with decreasing efficiency in the utilization of funds have been contributing to lower profit levels for the bank.

Table (4.2) also reports that AYA Bank's CAR has been hovering at an average of 5.44%, with its peer Table (4.3) confirming it with year-end numbers that show that AYA Bank has been, and will have been for pre-regulation periods as well, incompliant with the 8% CAR requirement. Without sufficient information, it currently cannot be known why this seems to be the pattern.

4.2 Analysis on CAMEL

CAR: For all entities, equity represents the portion of the balance sheet that can be used to repay any liabilities. For commercial banks, this is the capital that can be used to repay its depositors- which contribute the bulk of the funding necessary to balance the bank's assets- in a funding crisis. Therefore the strength of a bank's capital is of core consideration. But while a complete collapse or a bankruptcy situation is always a possibility, it is not very likely. So for purposes of capital adequacy, different portions of the bank's assets are discounted at varying weights that decrease with their likelihood of loss. For instance, the bank's cash and its cash equivalents bear no possibility of economic loss and are weighed at zero. All assets, in their weighed form, amount to the bank's Risk Weighted Assets. The capital adequacy ratio (CAR) then, are these assets set at a ratio to the bank's capital. One of the key components of capital is retained earnings, a portion of the bank's net profits reserved to be reinvested. While only some of the bank's returns are retained, still all of them contribute to returns. By way of a possible causal relationship, there can be expected a positive correlation coefficient between ROA and CAR.

ASQ: All entities would strive for good-quality assets. For commercial banks, asset quality dons a very particular definition- the quality of its loan book. It is in essence a function of exposure to credit risks of lenders for the bank, which is in turn a reflection of the credit worthiness of the bank itself from the perspective of lenders and depositors. Therefore the bank's asset quality is an important indicator of financial strength. As interest payments become late and loans go to expiry, the bank's loan book deteriorates. The loans are deemed to be no longer performing. The variable ASQ then, is those loans that are still performing set at a ratio to Total Loans, performing or otherwise. It can alternatively expressed as the formulaic inverse of the locally commonly used "NPL ratio". Loans are issued to customers in return for interest payments, which represent income for the bank, which is incorporated into ROA. Therefore there should be expected a positive correlation coefficient between ROA and ASQ.

MME: Management Efficiency is a reflection of the quality of the bank's management of all the administrative and operational costs it incurs to serve its primary commercial purpose. The relationship between the two can thus be numerically represented as the ratio of all the bank's Non-Interest Expenses to its Total Income. Non-interest expenses are paired with a negative sign for calculation purposes to denote efficiency as a beneficial factor and account for the fact that a net effect will be considered. Conceptually, as cost controls at the operational level improve, more income from the marginal level is retained for reinvestment or dividend purposes. Again, numerically, income – which is captured in ROA- appears in the denominator of the MME ratio, with the expense appearing in the numerator in the negative form. From this pattern, it would be logical to expect a positive correlation relationship between ROA and MME.

EAR: A commercial bank's primary business activity is accepting deposits in return for interest and lending these funds also in exchange for interest. This interest income and expense combine to result in the net interest income. Irrespective of the numerical size of the margin, an exact examination of the efficiency of the earnings needs to take into account the bank's asset size in order to contextualize for financial management quality. Therefore, EAR can be formulaically represented as a ratio of the bank's Net Interest Income to its Total Assets. As the bank earns more on the marginal level, the

income increase is represented in returns, which is in turn represented in ROA. This direct contributory relationship should be manifest itself as a positive correlation coefficient between ROA and EAR.

LIQ: A bank's Liquidity is an indication of its ability to repay its lenders in semi-urgent solvency situation. Specifically, the measure represents its ability to convert to cash those assets that it can in order to meet the needs of its lenders' requests. Since this activity can most likely be only done to liquid assets, LIQ then is the ratio of the bank's Liquid Assets to its Volatile Liabilities. A bank is expected- incentivized, even- to maximize the earning capacity of its assets by allocating its funds into profitable areas. As funds received in cash are increasingly turned into non-cash earning assets in order to generate more income, the bank's liquidity is expended and decreased. Conversely, if a bank retains its funds in cash form, its liquid state will incur the cost of loss of profitability. Therefore there should be expected a negative correlation coefficient between ROA and LIQ.

Entered into a cross-sectional correlation test, these variables together result in the correlation matrix presented below.

Table (4.4) Correlation Matrix

	<i>ROA</i>	<i>CAR</i>	<i>ASQ</i>	<i>MME</i>	<i>EAR</i>	<i>LIQ</i>
ROA	1.00					
CAR	0.17	1.00				
ASQ	0.70	(0.10)	1.00			
MME	0.14	(0.55)	0.46	1.00		
EAR	0.02	(0.57)	0.38	(0.06)	1.00	
LIQ	(0.85)	(0.06)	(0.92)	(0.51)	(0.04)	1.00

Source: AYA Bank Audited Financial Statements (2015 – 2018)

As anticipated in the preceding paragraphs, ROA has a positive correlation relationship with the four variables CAR, ASQ, MME, EAR and a negative correlation relationship with LIQ. In union, the bank deploys its liquidity into good quality assets to increase its marginal profitability while controlling for its costs, resulting in returns, some of which are retained and contribute to capital adequacy. Because the correlation coefficients all have conceptually anticipated signs, it can be concluded that the analysis suggests that for AYA Bank over the 5 year time period, the CAMEL analysis has been a good indicator of its financial strength.

4.3 Analysis on Asset Liability Management Strategies

(i) Sensitivity

So far, CAMEL has sufficed as a regulatory evaluation device. However as the country's economy becomes increasingly integrated with the global economy, it also exposes itself to economic ebbs and flows on a wider scale. While business opportunities progressively avail themselves, so do the risks. It is currently neigh impossible to survey all possible sources of economic shock, even at the country level and especially at the global level, and so the actual likelihood and impact of unfavorable effects cannot be measured. It is, however, possible to gauge a bank's exposure to such risks and its readiness to absorb them.

A retail commercial bank would be most sensitive to interest rate movements because it directly alters its earnings at the net interest income level. Interest rate changes also change the present value of the bank's cash-flows, which in effect alter the economic value of the bank's assets and in turn the bank itself, the strength of which should be an important parameter for a regulator to consider to examine the bank's ability to continue fulfilling's its business purpose and serving its customers.

Up to this point, the CBM has been bringing the financial sector to international best-practice standards in an effort to safeguard the depositor's, and the economy as a whole's, financial interests. It is then logical to assume that the CBM would continue this trend and deregulate interest rates and allow banks to price for risks, and to consider and

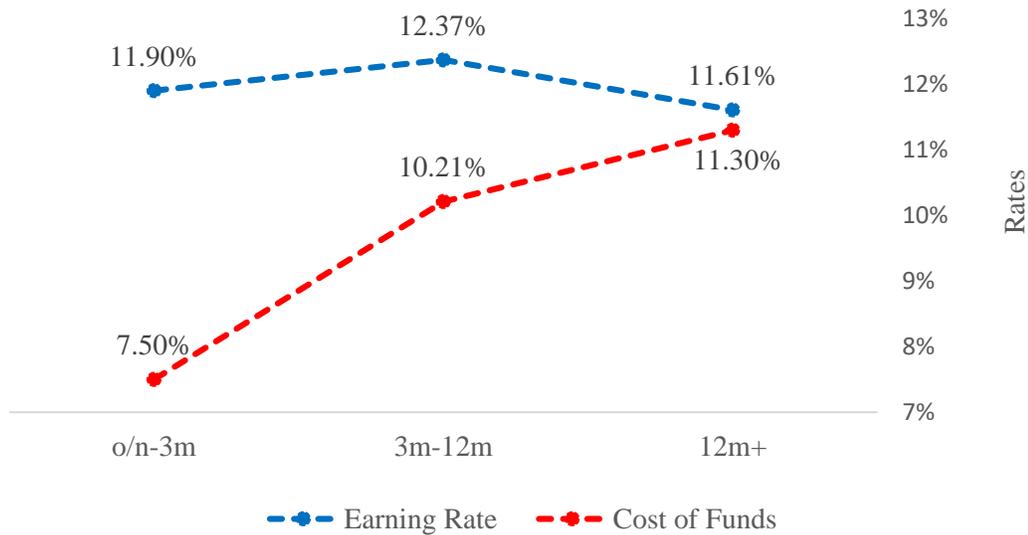
control for the resultant risks to financial institutions by including a new metric to evaluate banks with- Sensitivity, which would be distilled into the acronym S and attached to the pre-existing measurement system, resulting in the new updated system CAMELS.

The Office of the Comptroller of the Currency (OCC), Treasury, Federal Reserves and Federal Deposit Insurance Corporation of the United States of America issued in the Federal Register in 1996 a “Joint Agency Policy Statement: Interest Rate Risk” that seeks to define interest rate risk as the exposure of a bank’s financial condition to adverse movements in interest rates. It arises from differences in timing between a bank’s reception of interest incomes and its payments on its assets and liabilities; from changes in the steepness of the prevailing yield curves, from the asymmetrical movement in prices paid and earned on otherwise identical instruments that only differ in tenor, and from interest rate related options incorporated into the bank’s products. The section below examines AYA Bank’s position with respect to interest rate sensitivity.

(ii) Interest Rate Risk

A commercial bank’s primary business activity is accepting deposits in exchange for interest, and turning these funds into loans for which it receives interest in return. Due to the large effects changes in interest rates could have on the bank’s net interest income, interest rate risk is a chief concern for commercial banks. The figure below shows the weighted average yield of earning assets and the average cost of funds for each of the three discreet maturity buckets as at 30th September 2019.

Figure (4.1) Average Earning Rate and Cost of Funds

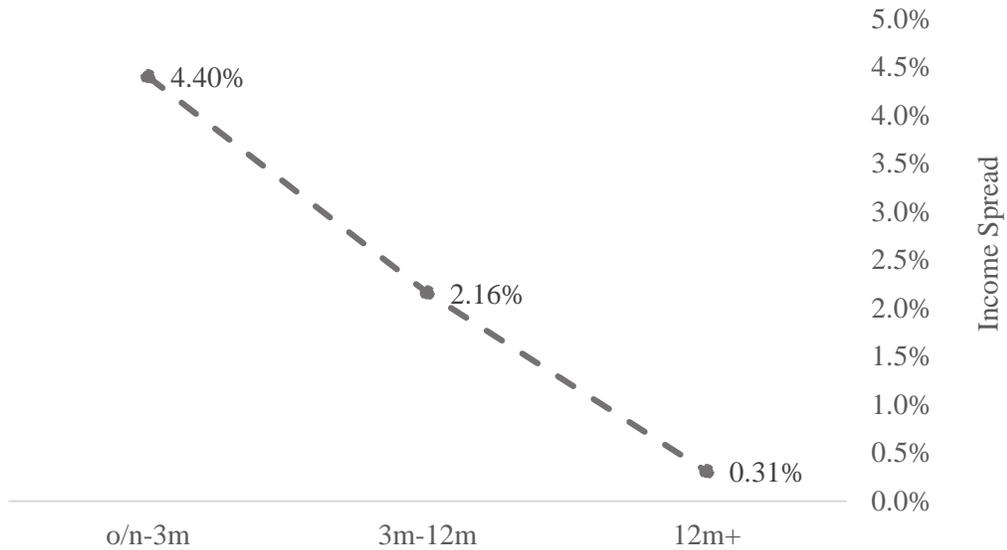


Source: AYA Bank Audited Financial Statements (2015 – 2018)

Earning rate is the blended rate of AYA Bank’s loan portfolio at the regulatory 13% and its investment portfolio earning at points on the yield curve published by the Central Bank of Myanmar on their website. The cost of funds is the weighted average interbank lending rate across private banks. The cost of funds curve behaves normally, rising as tenor rises to account for premiums related to liquidity and interest rate risks. In contrast, the average earning rate falls as maturity is extended past 12 months in response to the 13% cap on all loans. Therefore the graph illustrates the yield on its earning assets and the costs on its liabilities that AYA will have been faced with on the 30th of September 2019 at the gross level.

The difference between the two rates, then, represents the bid-offer spread, in essence the income spread for the bank on that date, which is in turn represented in the figure below.

Figure (4.2) Average Income Spread



Source: AYA Bank Audited Financial Statements (2015 – 2018)

As the figure illustrates, the income spread falls as a function of tenor. From the earning perspective, for each maturity bucket, the corresponding point on the graph constitutes the spread that AYA Bank gets to enjoy for its assets and liabilities. Though the jaw narrows, a spread persists nevertheless. Therefore to lock in the spread at each maturity bucket, AYA Bank can attempt to exactly match all its assets and liabilities for each period. Assuming the rates move together, AYA would have in essence expunged liquidity and interest rate risk simultaneously, and only credit risk on its loan book will remain. However this strategy's feasibility is questionable. Furthermore, while running a matched book may eliminate risks, AYA Bank can go further- it can enhance profitability by deploying a particular Asset-Liability Management Strategy whose design incorporates liquidity and interest rate risks, in essence the concepts embodied by the S at the end of CAMELS. The section below explores such a strategy.

As a financial intermediary primarily and a retail bank specifically, AYA Bank naturally earns income on its assets at varying earning rates- assets whose corresponding liabilities are borne at differing costs of funds. Rates on both sides are functions of credit

risks, withdrawal conditions, tenors, counter-party specificities and prevailing market conditions at origination. Due to its wide-ranging portfolio of products on both sides, AYA Bank faces a similarly wide array of rates. For illustrative purposes, these rates will be condensed into a single rate for each side of the balance sheet for each maturity bucket, averaged out by outstanding amounts to correct for representation. On the marginal level on a weighted-average basis then, the bank's net interest income can be formulated as below:

$$\text{Formula (1) NET INTEREST INCOME}_t = (\text{ASSETS}_t * \text{EARNING RATE}_t) - (\text{LIABILITIES}_t * \text{COST OF FUNDS}_t)$$

Where Assets and Liabilities comprise the entire respective side of the balance sheet at each maturity bucket denoted by the subscript t. Similarly denoted, the two formulas below mathematically showcase the interest rate spread and the maturity mismatch

$$\text{Formula (2) SPREAD}_t = \text{EARNING RATE}_t - \text{COST OF FUNDS}_t$$

$$\text{Formula (3) MISMATCH}_t = \text{ASSETS}_t - \text{LIABILITIES}_t$$

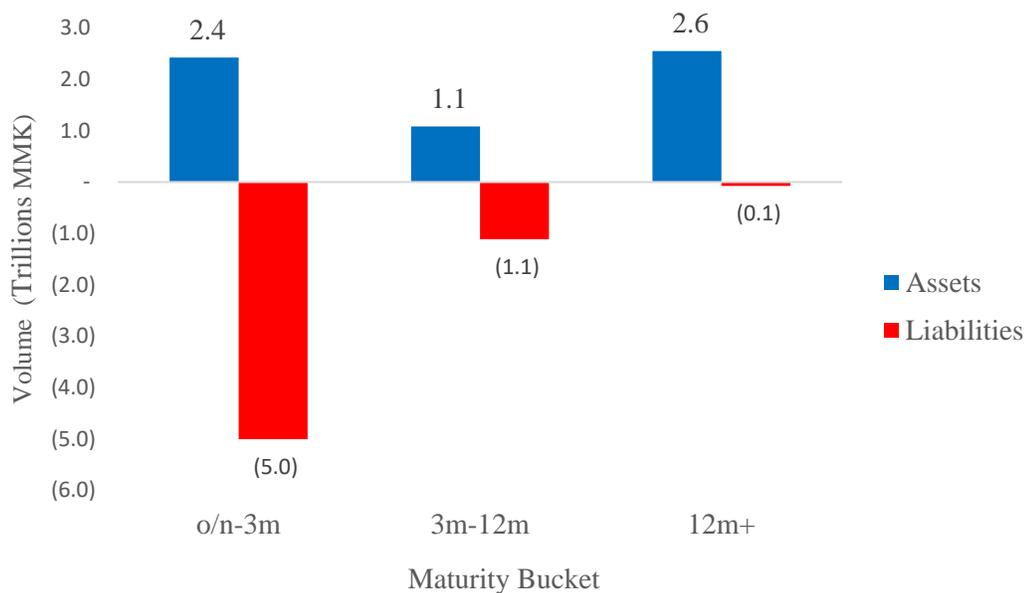
While formula (3) seems to imply an imbalance on the balance sheet, it only applies to one particular maturity bucket. Spread out over different buckets, the two sides of the balance sheet do equate one another. Algebraically rearranging formulas (1), (2), (3) produces the formula below. This one has the added benefit of emphasizes the linkage between net interest income, the interest rate spread and the maturity mismatch for each maturity bucket.

$$\text{Formula (4) NET INTEREST INCOME}_t = (\text{SPREAD}_t * \text{ASSETS}_t) + (\text{MISMATCH}_t * \text{COST OF FUNDS}_t)$$

Applying formula (4) to every maturity bucket yields the total net interest income for the bank on a weighted average basis. As the formula highlights, any effort to increase

net interest income has to align high spreads with high assets. AYA Bank is able to access the highest spread at the first maturity bucket, namely at the “o/n-3m” range. Formula (4) suggests that the most assets be placed in this bucket to attain high net interest income. The figure below showcases AYA Bank’s ALM profile as of September 30th, 2018

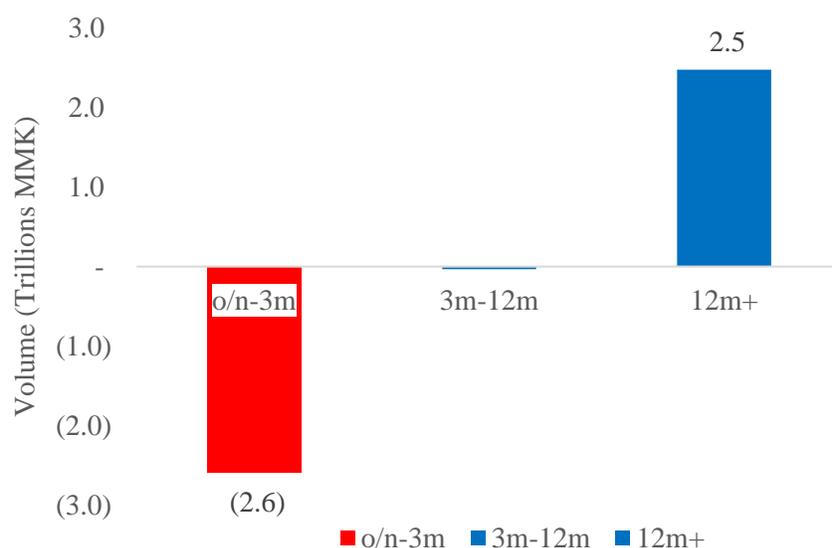
Figure (4.3) AYA Bank’s ALM Profile as of September 30th, 2018



Source: AYA Bank Audited Financial Statements (2015 – 2018)

As the preceding figure demonstrates, as it stands, AYA Bank’s maturing assets are virtually split evenly between the two buckets, the “o/n-3m” bucket and the “12m+” bucket. It stands to reason, then, based on formula (4), that it would be in AYA’s best financial interests to devise an approach to shift assets from the “12m+” bucket to the “o/n-3m” bucket. The formula also advises the conjoining of the largest mismatch in maturities with the highest cost of funds.

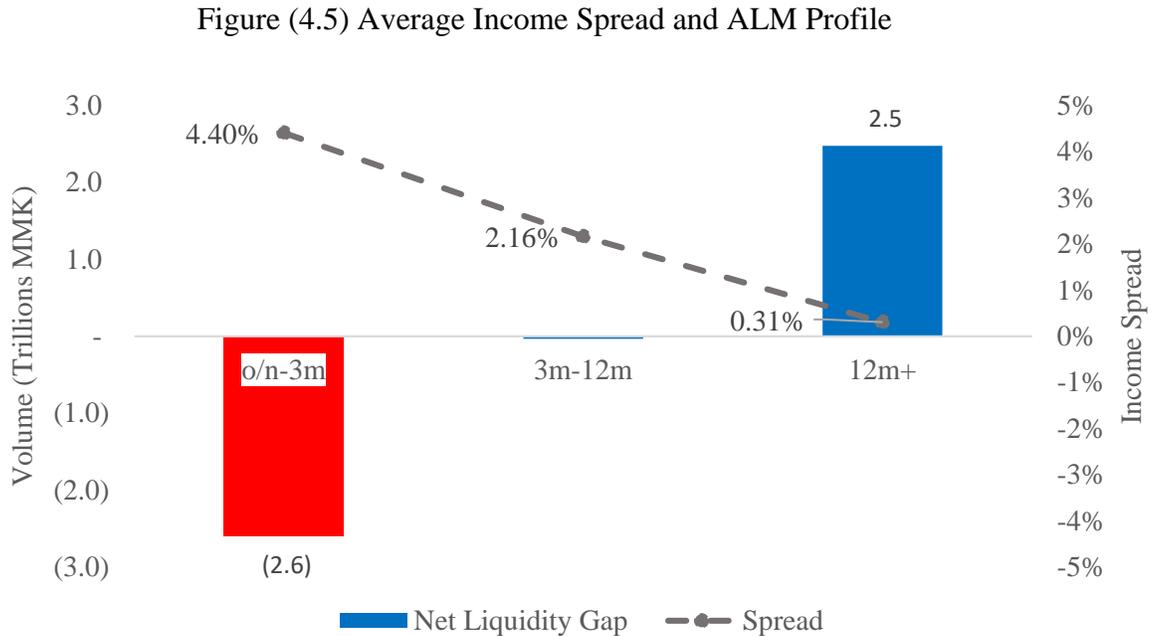
Figure (4.4) AYA Bank’s Maturity Mismatches as of September 30th, 2018



Source: AYA Bank Audited Financial Statements (2015 – 2018)

As formula (4) surveys the net interest income from the perspective of earnings, a high mismatch in its perspective will be where assets exceed liabilities the most. The maturity bucket where this occurs most markedly is in the “12m+” bucket. This bucket is also where the cost of funds is the highest. It follows then, that the formula recommends the expansion of the mismatch column in the “12m+” maturity basket. At first glance this recommendation seems to come into conflict with the previous recommendation. However, further investigation illuminates the fact that while this particular recommendation can increase profits if followed, it must be applied to all maturity baskets. However the nature of the balance sheet dictates that net combined mismatches in one direction must be offset by the same mismatches in the opposite direction, equaling in magnitude when considered across all maturities altogether. So while the formula advises the boosting of net maturing assets in the “12m+” category, the gains in net interest income would actually be offset by the detractions from income from the other categories, namely in the “o/n-3m” category, where a negative gap is occurring. This renders this portion of the formula’s recommendation tenuous. Therefore the only recommendation that remains is the first, where formula (4) advises the alignment of high spreads with high assets. It should be

noted that due to this portion of the formula’s consideration of assets, without accounting for liabilities, the balance sheet restriction that hindered the previous recommendation does not apply. The figure below unites the income spread and the maturity mismatches.



Source: AYA Bank Audited Financial Statements (2015 – 2018)

As formula (4) suggests, this is decidedly not the optimal profit-generating mix of income spread and maturity mismatch. Following it will require the shifting of assets from the “12m+” bucket to the “o/n-3m” bucket, thus eliminating the surplus and gap columns. According to formula (4), the ideal graphical representation of the spread and mismatch will only be the spread. This Asset-Liability Management strategy would achieve the dual purposes of minimizing liquidity risk and not only minimizing interest rate risk, but also profiting from the mismatch, thereby directly contributing to ROA through the S variable in a CAMELS examination.

The formulaic proposition merely describes a design that would generate an improvement in returns, the actual realization of which requires operational initiatives from

an interested party to undertake. In the case of AYA Bank, it will see to shift its maturing assets from the “12m+” bucket to the one at “o/n-3m”. As it stands, several possibilities are currently open to AYA. A first approach would seek to mold a target maturity profile by altering the composition of the balance sheet, generally by reducing the amount of assets maturing at 12 months and out and increasing the amount of assets maturing between overnight and 3 months, specifically by turning long-maturing assets, such as investments and loans, into cash and cash equivalents which are deemed to mature overnight. However, an earning issue immediately becomes apparent as cash yields lower than loans. This leaves the bank the option of shifting its longer assets to mature sooner, which raises the earning issue spectre only slightly, as though investments may yield lower than loans, the weighted average earning rate is higher at the “o/n-3m” bucket than it is at the “12m+” one as illustrated in previous graphs.

A second approach would be to rely on natural market forces to tailor its asset composition. Current formulas indicate that long-maturing assets seem to earn similar to shorter-term assets and that the income spread is widest for the latter asset group. The second approach would seek to amend the maturity profile by raising the price of assets that would fall in the “12m+” basket. The law of demand decrees that patronage of higher-priced products, assets in the “12m+” basket, will fall, instead moving to the shorter tenors, bringing the balance sheet closer to the suggested composition.

It is, however, possible that the bank may overestimate the price sensitivity of its customer base, with customers persisting with their current product packages in spite of the increase in interest rates. While this would impede the molding of the maturity mismatch profile to the desired form, AYA Bank would find itself enjoying higher income levels nonetheless- brought about by the now suddenly higher interest rates- which is the goal of the ALM strategy anyway. Therefore a compromise need not be reached between molding the assets and adjusting their prices- both initiatives can be employed in the pursuit of profits.

A third approach represents a branch off the possibility tree off the previous approach and relies on the nature of the balance sheet. The two thus preceding approaches advise asset adjustments, which are only necessary to balance and account for the liabilities

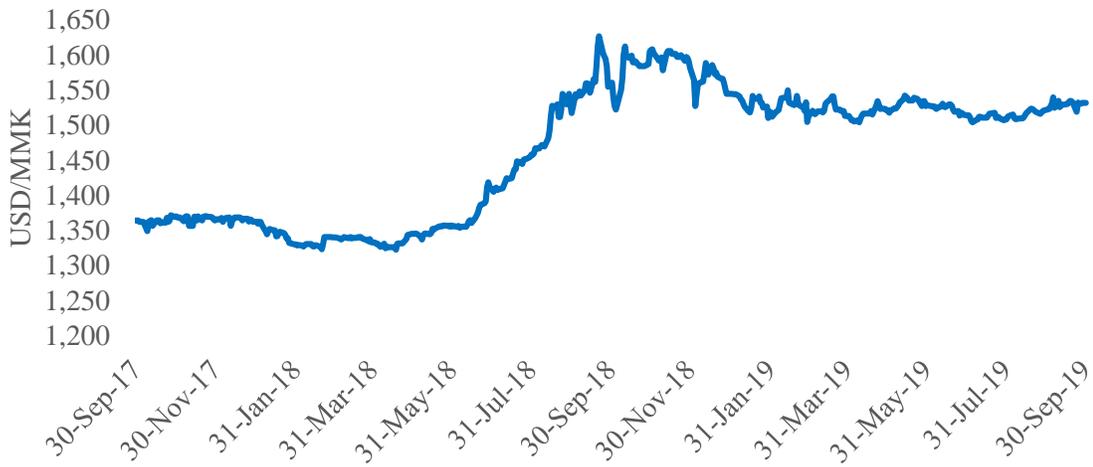
on the other side of the balance sheet. Therefore the third approach would seek to mend the bank's liability mix, which, with AYA being a retail bank, is chiefly comprised of customer deposits. Specifically, if it is to follow formula (4) to the latter, it will want to reel in its maturing liabilities from all other buckets to the "o/n-3m" bucket where the spread is highest. This is also the bucket containing the highest assets. Placing the highest amount of liabilities where the highest assets are also negates the maturity mismatch at that bucket.

Out of the four variables contributing to net interest income in formula (4), the only one that has had a negative sign is the maturity mismatch. Namely, for AYA, there was a negative maturity mismatch – from the assets' perspective- in the "o/n-3m" bucket on September 30th, 2018. The right portion of formula (4) applied here will be yielding a negative number; a subtraction from net interest income. Returning to the ALM strategy, placing liabilities to match assets in size will result in no negative mismatch values for each maturity bucket, in essence adding to profitability at the net interest income level. Due to the negation of a mismatch in this category by the shifting of assets into the "o/n-3m" bucket that would result from the two preceding approaches, this strategy need not be initiated if the former ones are. However the liquidity risk inherent in this strategy deems it unideal and warrants further development and refinement by the bank's ALCO committee.

(iii) Currency Risk

Another factor to consider as the bank becomes consolidated with the global market is currency risk- the possibility that the bank's earnings and economic value would be negatively affected by adverse movements in foreign exchange prices of the currencies it is holding on its books. For AYA Bank, as of September 30th, 2018, it has a net currency gap of 186 Billion MMK, 98% of which is comprised of USD. The graph below traces the USDMMK exchange rate over the past 2 years.

Figure (4.6) USD/MMK Exchange Rate



Source: Central Bank of Myanmar

Data comes from CBM official website and shows that the USD started at 1365 Kyats to the Dollar as at September 2017 and ended at 1532 by September 2019, representing a total change of 12% over the past two years. As AYA Bank is essentially running a long position on USD, this upwards price movement would have contributed to its earnings. So long as AYA continues to maintain a long position, it would continue to contribute to income in the face of sustained price appreciation. However, daily price changes calculation reveals that on average, the market price changes by a net of 0.02%, roughly representing an 8% appreciation over the course of one year. This stands in contrast with the 12% over two years, indicating that market price changes are sharp and inconsistent. Furthermore, as the graph shows, the rapid price appreciation ended on a high price point by the end of the financial year for September 2018, after which point the price has not recovered. While financial statements for September 2019 are not yet publicly accessible, it seems to follow that the bank will be incurring a foreign currency loss from its long position.

To mitigate the currency risk, AYA attempts to square its Net Open Position on a daily basis through active participation in the market. While the bank may negate losses, it can go another step further in the direction of profitability by adopting a more active ALM strategy- it can develop a view pertaining to future price changes and actively adjust its USD position, instead of only responsively squaring its daily trading activities and incidentally arriving at a long or short position at the end of the calculation period. In order to do this, the bank will have to develop anticipatory views first, a responsibility that falls squarely in the purview of the ALCO committee.

CHAPTER V

CONCLUSION

This chapter discusses the findings of the paper, the paper's results, suggestive directions for further studies in the area, makes recommendations regarding policy and profitability.

5.1 Findings

This study sought to investigate the relationships between the CAMEL evaluations on the financial performance of AYA Bank for the period March 2015 to September 2018. Correlation analysis shows that there are positive relationships between performance and Capital, Asset Quality, Management Efficiency, and a negative relationship between performance and Liquidity. All CAMEL variables have expected relationships with bank performance. The study also explored the effects that active asset-liability management will have on the bank's performance in preparation for when the CAMEL system is updated to a framework that considers sensitivity- CAMELS.

The new system CAMELS incorporates liquidity risk, interest rate and currency risk into the calculation. These risks are typically monitored by the bank's ALCO committee, which would also attempt to optimize the asset-liability mix of the bank. Specifically for AYA, the liquidity mismatches and interest rate risks can be negated by moving the assets from longer tenors to shorter tenors directly or through targeted price changes. And though it poses a liquidity risk, the bank can increase its profits by holding shorter-term liabilities on which it will have to pay lower cost of funds. Currency risk that the bank faces can be negated by being completely FX neutral, or it can supplement its earnings by developing forecasts and holding an accordingly long or short position.

5.2 Suggestions

Based on the findings and the resultant conclusions of this research, commercial banks in Myanmar can achieve higher levels of profit by improving their ALM strategies and their mix of assets and liabilities. These activities would be undertaken by an active

ALM department or by the ALCO, or both, with the board of directors regularly reviewing the policies and terms of reference.

For the regulators, so far even though the CAMEL framework has been adequate enough a system to evaluate the performance of banks, the risks that arise from an increasingly internationalized economy and the rising complexity of bank products will require the adoption of the CAMELS framework, measuring the banks under care with respect to their exposure to adverse movements and by guiding local banks on their ALM activities where needed.

5.3 Needs for Further Study

A major limitation on detailed studies on the financial sector in Myanmar is the dearth of data. This study tested for the relationship between CAMEL variables on bank performance over the past five financial year-ends. For AYA Bank, this is all that was publicly accessible. As this is too few data points to perform a regression analysis that can also display individual variables' significance levels, a natural continuation of this study would be to extend the time frame to include more time periods. In a similar vein, if the audited financial statements of more commercial banks were publicly, a cross-section of the various banks could be used to test for the existence of causal patterns in different banks. In union, times series data for multiple banks can be used in a panel setting to analyze the effect of various independent factors on the performance of a variety of banks over a period of time.

The Sensitivity portion of this study explored the possibilities of asset-liability management strategies with regards to maturity buckets. While both assets and liabilities are constantly maturing over a continuous spectrum ranging from overnight to well over a few years, AYA Bank, and presumably other local commercial banks in the country, only categorize their balance sheet items into three discrete maturity buckets on their financial statements. A further study into liquidity risk that manages to obtain entire asset and liability lists will be able to map them out into a more fluid analysis. Similarly, for interest rate risk, while a continuous yield curve can be extrapolated over points where actual data is absent, the same cannot be done to maturing balance sheet items.

This research studied the effects of various variables at each time period on the profitability of the same time period. Ratios by nature offer a snap-shot of the financial situation as at the end of the period. When more data avails itself, a further investigation can be launched into uncovering the effects of certain financial conditions as at a particular time period on profitability levels in future periods. Such a study would employ lagged independent variables.

REFERENCES

- Alper, D. & Anbar, A. (2011), Bank Specific and Macroeconomic Determinants of Commercial Bank Profitability: *Empirical Evidence from Turkey*, *Business and Economics Research Journal*, Vol. 2, No.2, pp. 139-152, 2011
- Anjili, A. D. (2014). *Effects of Asset and Liability management on the financial performance of commercial banks in Kenya*. Degree of masters of Science in finance thesis. University of Nairobi.
- Athanasoglou, P.P., Sophocles, N.B., Matthaios, D.D. (2005) *Bank-specific, industry-specific and macroeconomic determinants of bank profitability*
- Charumathi, B. (2008). Asset Liability Management in Indian Banking Industry – with specific reference to interest rate risk management in ICICI bank, *Proceedings of the world congress on engineering Vol II*
- Christiansen, J. (2012). *New Financial Regulatory Standards (Basel III) and its implication for the European Banking Sector*. Master Thesis. Copenhagen Business School.
- Dang, Uyen. (2011) *The CAMEL Rating System in Banking Supervision: a Case Study of Arcada University of Applied Sciences*, International Business.
- Dugar, R. “ALCO – Asset Liability Committee – Role Functions and Objectives”, rajeshdugar.wordpress.com, website, Retrieved 2015
- Federal Register, *Joint Agency Policy Statement: Interest Rate Risk*, Vol. 61, No. 124, Wednesday, June 26, 1996, <https://www.govinfo.gov/content/pkg/FR-1996-06-26/pdf/96-16300.pdf>, website, Retrieved 2019
- Gavila, S. & Santabarbara, D. (2009). *What Explains the low Profitability in Chinese Banks*
- Habtamu, N. A. (2012). *Determinants of Bank Profitability: An Empirical Study on Ethiopian Private Commercial Banks*, research report, Addis Ababa University
- Hester, D. D, & Zoellner, J. F (1966). The Relation between Bank Portfolios and Earnings: An Econometric Analysis. *The Review of Economics and Statistics*. Vol. 48, 1996

- Ilhomovich, S.E. (2009) *Factors Affecting the Performance of Foreign Banks in Malaysia*.
 . Malaysia: A thesis submitted to the fulfillment of the requirements for the degree
 Master of Science (Banking) College of Business (Finance and Banking.)
 International Journal of Finance and Economics, 4(1), 27-59.
- Jose A. Lopez (1999), *Using CAMELS Ratings to Monitor Bank Conditions*, Economic
 Research
- Kamau, A.W. (2009). *Efficiency in the Banking Sector: An Empirical Investigation of
 Commercial Banks in Kenya*.
- Kebede, E. (2014). *The Impact of National Bank Regulation on Banks Performance:
 Evidence From The Private Banks Of Ethiopia*. Master of Business
 Administration in Finance Thesis, Addis Ababa University.
- Khrawish, H.A. “Determinants of Commercial Banks Performance: Evidence from
 Jordan.” *International Research Journal of Finance and Economics*, no. 81
 (2011): 148-59.
- Khrawish, H.A. “Determinants of Commercial Banks Performance: Evidence from
 Jordan.” *International Research Journal of Finance and Economics*, no. 81
 (2011): 148-59.
- Kosmidou, K., Pasiouras, F. & Floropoulos, J. 2004, 'Linking Profits to Asset-Liability
 Management of domestic and foreign banks in the UK.', *Applied Financial
 Economics*, vol. 14, no. 18, pp. 1319-1324.
- Mihail I.C. (2009). *Effects of Asset Liability Management in Banks: an Empirical study of
 Banks in Europe*. Cesta: Faculty of Finanace, Cesta, NaAmfiteature University
- Njogo, B., Ohiaeri, N. and Omisakin, J. (2014). ‘A Panel Data Analysis Of Asset And
 Liability Management On Performance Of Some Nigerian Commercial Banks’.
Research Journal of Finance
- Obari (2015). *The Effect of Asset Liability Management on Profitability of Commercial
 Banks in Kenya*. MBA Thesis, School of Business, University of Nairobi

- Ongore, V.O “*Determinants of Financial Performance of Commercial Banks in Kenya*”.
International Journal of Economics and Financial Issues, Vol 3. No. 1 (2013)
- Prof. (Dr) Kanhaiya Singh (2013), Asset-Liability Management In Banks: A Dynamic Approach, *Aima Journal of Management & Research*, May 2013, Volume 7, Issue 2/4, ISSN 0974 – 497
- Rahman, M.M “*Determinants of Bank Profitability: Empirical Evidence from Bangladesh*”
International Journal of Business and Management; Vol. 10, No. 8 (2015)
- Ramlall, I. (2009). Bank-Specific, Industry-Specific, and Macroeconomic Determinants of Profitability in Taiwanese Banking System: Under Panel Data Estimation, *International Research Journal of Finance and Economics*, Vol 34.
- Sangmi, M., Tabassum, N. (2010). Analyzing Financial Performance of Commercial Banks in India: Application of CAMEL Model. *Pakistan Journal Commercial Social Sciences*.
- Sufian, F. & Chong, R. R. (2009). Determinants of Bank Profitability in a Developing Economy: Empirical Evidence from Philippines. *Asian Academy of Management Journal of Accounting and Finance*.
- Thejane, Robert (2017) *The Effect Of Asset Liability Management Strategies And Regulation On Performance Of Commercial Banks In Lesotho*, University of the Witwatersrand, Johannesburg,
- Zahidur, R. and Shohidul I. (2018), Use of CAMEL Rating Framework: A Comparative Performance Evaluation of Selected Bangladeshi Private Commercial Banks, *International Journal of Economics and Finance*; Vol. 10, No. 1; 2018

APPENDIX

Appendix (1) AYA Bank Balance Sheet

AYEYARWADY BANK LIMITED

STATEMENT OF FINANCIAL POSITION
September 30, 2018

In Kyats millions

	Note	September 30, 2018	March 31, 2018
ASSETS			
Cash and cash equivalents	8	761,552.2	774,706.3
Placement with other financial institutions	9	282,406.0	300,351.9
Investment securities	10	1,270,811.8	803,069.5
Loan and advances	11	2,740,447.8	2,574,328.5
Bills receivable		47,990.8	40,158.6
Other assets	14	168,737.7	118,820.5
Property, plant and equipment	12	357,301.5	353,734.5
Intangible assets	13	4,388.5	-
Total Assets		5,633,636.3	4,965,169.8
LIABILITIES			
Deposits from banks	15	23,584.6	33,103.0
Deposits from customers	16	5,263,108.3	4,663,001.0
Other liabilities	17	149,991.5	107,291.6
Total Liabilities		5,436,684.4	4,803,395.6
EQUITY			
Share capital	18	125,000.0	120,000.0
Reserves	19	65,629.4	41,422.0
Retained earnings		6,322.5	352.2
Total Equity		196,951.9	161,774.2
Total Liabilities and Equity		5,633,636.3	4,965,169.8
OFF-BALANCE SHEET			
Contingent liabilities	27	252,042.9	291,636.7
Commitments	28	182,418.5	208,887.9

Source: AYA Bank Audited Financial Statements

Appendix (2) AYA Bank Income Statement

AYEYARWADY BANK LIMITED

STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME Period ended September 30, 2018

<i>In Kyats millions</i>	Note	April 1, 2018 to September 30, 2018	April 1, 2017 to March 31, 2018
Interest income	21	202,501.2	374,062.9
Interest expense	21	(167,482.2)	(313,691.1)
Net interest income		<u>35,019.0</u>	<u>60,371.8</u>
Fee and commission income	22	25,029.2	43,667.9
Fee and commission expense	22	(1,320.7)	(3,944.4)
Other income (expense)	23	31,527.7	(1,032.6)
Net non-interest income		<u>55,236.2</u>	<u>38,690.9</u>
Income before operating expenses		<u>90,255.2</u>	<u>99,062.7</u>
General and administrative expense	24	(26,370.6)	(56,325.6)
Operating lease expense	28	(3,827.8)	(7,403.3)
Depreciation and amortisation	12	(8,355.0)	(14,751.3)
Other operating expense	25	(807.7)	(1,853.3)
Provision for doubtful debts	11	(10,349.4)	-
Total expenses		<u>(49,710.5)</u>	<u>(80,333.5)</u>
Profit before tax		40,544.7	18,729.2
Income tax expense	26	(10,367.0)	(5,731.0)
Net profit for the period representing total comprehensive income for the period		<u>30,177.7</u>	<u>12,998.2</u>

Source: AYA Bank Audited Financial Statements

Appendix (3) AYA Bank Liquidity Mismatch

AYEYARWADY BANK LIMITED

NOTES TO THE FINANCIAL STATEMENTS Period ended September 30, 2018

5.2 Liquidity Risk (cont'd)

<i>In Kyats millions</i>	On demand or less than 3 months	3 months to 12 months	Over 1 year	No specific maturity	Adjustment	Total
As at September 30, 2018						
Assets						
Cash and cash equivalents	761,786.5	-	-	-	(234.3)	761,552.2
Placement with other financial institutions	283,938.7	-	-	-	(1,532.7)	282,406.0
Investment securities	259,085.4	177,573.7	1,106,901.1	2,393.5	(275,141.9)	1,270,811.8
Loan and advances	956,941.4	904,949.6	1,445,334.0	-	(566,777.2)	2,740,447.8
Bills receivable	47,990.8	-	-	-	-	47,990.8
Other assets	114,057.6	-	-	-	-	114,057.6
	<u>2,423,800.4</u>	<u>1,082,523.3</u>	<u>2,552,235.1</u>	<u>2,393.5</u>	<u>(843,686.1)</u>	<u>5,217,266.2</u>
Liabilities						
Deposits from banks	(22,921.8)	(730.4)	-	-	67.6	(23,584.6)
Deposits from customers	(4,635,850.9)	(969,608.8)	-	-	342,351.4	(5,263,108.3)
Other liabilities	(140,182.0)	-	-	-	-	(140,182.0)
	<u>(4,798,954.7)</u>	<u>(970,339.2)</u>	<u>-</u>	<u>-</u>	<u>342,419.0</u>	<u>(5,426,874.9)</u>
On-Balance Sheet Liquidity Gap	(2,375,154.3)	112,184.1	2,552,235.1	2,393.5	(501,267.1)	(209,608.7)
Off-Balance Sheet						
Contingent liabilities	(189,878.3)	(34,410.3)	(27,754.3)	-	-	(252,042.9)
Commitments	(23,159.4)	(109,998.2)	(49,260.9)	-	-	(182,418.5)
Off-Balance Sheet Liquidity Gap	(213,037.7)	(144,408.5)	(77,015.2)	-	-	(434,461.4)
Net Liquidity Gap	(2,588,192.0)	(32,224.4)	2,475,219.9	2,393.5	(501,267.1)	(644,070.1)

Source: AYA Bank Audited Financial Statements

Appendix (4) AYA Bank Currency Gaps

AYEYARWADY BANK LIMITED

NOTES TO THE FINANCIAL STATEMENTS Period ended September 30, 2018

5.4 Currency risk

Currency risk is the potential adverse impact on the Bank's earnings and economic value due to currency rate movement. The Bank is exposed to currency risk in the spot foreign exchange markets. The Bank mitigates currency risk by attempting to square its Net Open Position on a daily basis through active trading as well as participating in CBM auctions of USD.

<i>In Kyats millions</i>	USD	EUR	SGD	Others	Total
As at September 30, 2018					
Assets					
Cash and cash equivalents	69,878.2	3,431.7	2,485.3	158.0	75,953.2
Placement with other financial institutions	262,392.0	-	-	-	262,392.0
Bills receivable	46,400.6	-	-	30.2	46,430.8
Loan and advances	40,422.4	-	-	-	40,422.4
Other assets	18,596.5	-	-	-	18,596.5
	<u>437,689.7</u>	<u>3,431.7</u>	<u>2,485.3</u>	<u>188.2</u>	<u>443,794.9</u>
Liabilities					
Deposits from banks	(4,905.3)	(5.0)	(0.1)	-	(4,910.4)
Deposits from customers	(213,044.2)	(1,290.1)	(418.3)	-	(214,752.6)
Other liabilities	(37,052.6)	(239.2)	(203.0)	-	(37,494.8)
	<u>(255,002.1)</u>	<u>(1,534.3)</u>	<u>(621.4)</u>	<u>-</u>	<u>(257,157.8)</u>
Net Currency Gap	182,687.6	1,897.4	1,863.9	188.2	186,637.1

Source: AYA Bank Audited Financial Statements