ADFJ ISSN 2522 – 3186.

# African Development Finance Journal

## VOLUME 5 (6)

*Effect of Bank Characteristics on the relationship between Asset Liability Management and Profitability of Commercial Banks in Kenya*

Onesmus Maluni Mutangili
Prof. Josiah Aduda
Dr. Herick Ondigo

# Effect of Bank Characteristics on the relationship between Asset Liability Management and Profitability of Commercial Banks in Kenya

By: Onesmus Maluni Mutangili[1], Prof. Josiah Aduda (PhD)[2] & Herick Ondigo[3]

## Abstract

*The study sought to establish the influence of bank characteristics on the relationship between asset liability management and profitability among commercial banks in Kenya. The study was anchored on liability management theory and also drew its theoretical support from commercial loan theory, the market power theory and the efficient structure theory. The study was guided by the positivism philosophical paradigm and a cross sectional descriptive design adopted. The population of the study was the 42 commercial banks in Kenya that were operational between 2015 and 2020. Secondary data was obtained from the annual reports of CBK and audited banks' financial statements from 2015 to 2020. Data was analyzed using descriptive and inferential statistics. The findings indicated that asset liability management had a statistically significant influence on the profitability among commercial banks in Kenya. Bank characteristics were found to have statistically significant influence on the relationship between asset liability management and profitability among commercial banks in Kenya. The study has made contribution to theory, policy and management in relation to how bank characteristics influences relationship between asset liability management and profitability among commercial banks in Kenya. In light of these findings, banks should ensure that asset liability management policies are crafted based on appropriate strategies for profitability enhancement. The study recommends the need to ensure that all banks adhere to the capital adequacy requirements, lower their credit risk exposure and enhance their management efficiency as this will have effect on the profitability of banks.*

*Keywords: Bank Characteristics, Profitability, Commercial Banks in Kenya*

## Introduction

Commercial banks are the main drivers of an economy especially in their role of funds reallocation from the surplus to the deficit units (Ongore & Kusa, 2013). They operate within an underlying mismatch between highly liquid liabilities and long term assets of the balance sheet. Commercial banks have been facing various risks in their business operations such as liquidity risk, credit risk, exchange rate risk and operational risk. While these risks could manifest in many forms, banks are more concerned about liquidity and interest rate risks. The significance being that liquidity risk affects the bank's ability to meet its liabilities in time while interest rate risk impacts the profitability. Banks now focus on integrated balance sheet management where all the relevant factors which affect its financial performance are considered.

---

[1] *Department of Finance and Accounting, Faculty of Business and Management Sciences, University of Nairobi, Kenya, E-mail: omutangili@gmail.com*
[2] *Professor, Department of Finance and Accounting, Faculty of Business and Management Sciences, University of Nairobi, Kenya*
[3] *Senior Lecturer, Department of Finance and Accounting, Faculty of Business and Management Sciences, University of Nairobi, Kenya*

Several components of the balance sheet are analyzed and evaluated in the present asset liability management (ALM) system, keeping in view the bank's strengths.

Asset liability management is managing assets and liabilities simultaneously in order to minimize the adverse effect of interest rate volatility, provide liquidity and enhance the financial performance. Banks have to keep a good balance among spreads, long-term viability and profitability; which is measured in terms of return on assets. Return on assets gives the comprehensive measure of overall bank's profitability and it is the total earning to total asset of a bank. It shows how managers are efficient in converting the assets of a bank into total income. The profitability of a bank is therefore influenced by ALM, measured as the ratio of total assets to total assets and liabilities; and a well-run ALM improves bank's profitability. Financial performance of banks is also affected by bank characteristics.

Bank characteristics are internal features which have the capacity to positively or negatively affect bank performance and can be influenced by the management decisions. They are variable and controllable and may include capital adequacy, measured as core capital to total deposit; management efficiency measured as total operating profit to total income and credit risk, measured as Non-performing loans to total loans (Ongore & Kusa, 2013).

Several studies by Pragathi and Veena (2018), Mohanty and Mehrotra (2018), Tee (2017), Sanjay and Shrestha (2015), and Sheela and Bastray (2014), have confirmed that ALM affect profitability of banks. However, theories anticipate the said correlations are influenced by bank characteristics (Marozva, 2017; Athanasoglou et al., 2008). The concepts and recommendations emanating from the above scholars led the researcher consider the bank characteristics as a probable construct which can influence the asset liability management and ROA relationship. In understanding cause of inconsistencies in asset liability management and ROA studies, scholars have also recommended future research to consider the effect of bank characteristics on this relationship. The focus of this study therefore is to determine the influence of bank characteristics on the relationship between ALM and profitability of commercial banks in Kenya.

**Commercial Banks in Kenya**

Commercial banks initiate deposits for customers which in return acquire assets from funds received (Rose, 2012). This enables banks to have assets and liabilities, a process which require efficient and effective

management in order to have a profitable balance sheet. Commercial banks strive to reduce liquidity gap problem, maximize profit and minimize costs by monitoring maturities of both assets and liabilities. In Kenya, commercial banks are regulated by central bank of Kenya and they are required to maintain a minimum liquidity ratio of 20 percent as per section 19 (1) of the Banking Act so as to secure depositors' fund and enhance stability in the banking sector. Commercial banks are also required to observe liquidity risk management strategies as outlined by the regulatory authority.

In Kenya, the financial sector has remained resilient and stable in the last three years, despite the interest rate capping by CBK and unfavourable weather conditions experienced in the country (CBK, 2020). The supervisory reforms and regulatory measures have facilitated the sector to grow both in efficiency and inclusiveness. The Kenyan financial sector asset base increased to Sh.5.4 trillion as at December 2020 compared to Sh. 4.8 trillion as at December 2019. There was an improvement of liquidity ratio to 54.5 percent in December 2020 compared to 49.7 percent in December 2019. This was higher than the statutory requirement of 20 percent. The Kenyan financial sector has been well capitalized. It had capital adequacy ratio of 19 percent as at December 2020, which was higher than 14.5 percent, the minimum prudential requirement (CBK, 2020). Despite the good overall financial performance of financial institutions in Kenya, there are several banks that have been declaring losses. Moreover, the failure of banks in the last decades in developing nations and bailouts thereof necessitate supervisory authority to examine the reason behind the poor performance in those institutions and how the situation can be reversed through efficient ALM.

## Research Problem

Banks forms the major part of the financial system and any shift in terms of their stability or performance can have immediate impact on financial healthiness of a country. The world has been experiencing a lot of crises, mainly of which is the 2008 economic downturn, which originated from banking institutions then spread to other sectors of the economy. It is liquidity problem that facilitated to the 2008 global financial crises (Acharya & schnabl, 2010). The banking institutions underrated the need of liquidity risk management and this confirmed the importance of effective risk management and financial controls through ALM (Marozva, 2017).

In Kenya financial institutions has experienced a number of challenges including funding and market risks. Many banks have been facing liquidity and credit risk problems and lack good framework to support the

banking business due to inadequate recognition of ALM and its effects on financial performance, for instance, Imperial bank and Chase bank were under receivership in 2018, while Dubai bank Kenya was liquidated in 2015. National bank of Kenya has also been experiencing liquidity challenges despite the government ownership of 70.55%. It had cost to income ratio of 99.3% in 2018 compared to an industry average of 56.3% in the same year. Further it had non-performing loan ratio of 47.1%, above the industry average of 9.9%, a low capitalization and CAMEL rating score (Cytonn investments report, 2018).

Several studies have been carried out on ALM and commercial bank's profitability in developing economies and have yielded inconsistent results. Thejane (2017) conducted a research to access the role of ALM and regulation on banks' income in Lesotho from 2005 to 2015, using ordinary least square regression model. The study revealed that ALM variable and Gap ratio had positive impact on banks' income. Yao et al. (2018) carried out a study to access the effect of external environment and bank characteristics on banks' income in Pakistan from 2007 to 2016. The results indicated that income of banks in Pakistan was determined by characteristics of the bank rather than by external factors.

Olweny and Shipho (2011) conducted a research on relationship between sector specific factors and banks' financial performance in Kenya from 2002 to 2008. The research revealed that sector specific factors are positively related to commercial banks' performance. Ongore and Kusa (2013) conducted a research to access the moderating role of bank characteristics on profitability of Kenyan banking institutions from 2001 to 2010. The study indicated that bank characteristics significantly affected banks' profitability in the country but moderating impact of ownership structure was insignificant. The study findings also indicated that macroeconomic factors had minimal impact.

The review of the above empirical studies on the relationship between ALM, bank characteristics and banks' profitability has not yet provided a conclusive connection among these variables. The studies have established that ALM affect profitability of banks. However, the overall banks' performance may be influenced by mediating effect of bank characteristics, which was not addressed by the studies. This highlighted a gap which the current study seeks to address.

**Research Objective**

The objective of this study is to determine the effect of bank characteristics on the relationship between asset liability management and profitability of banks in Kenya.

**Literature Review**

**Theoretical Foundation**

The study was anchored on the liability management theory by Redington (1952), which is asset and liability based theory. The study has also drawn its theoretical support from the commercial loan theory by Smith (1776), the market power theory by Bain (1951) and the efficient structure theory by Demsetz (1973). The liability management theory recognizes that bank's asset structure has a key role in providing it with the needed liquidity and profitability because it takes into account the two sides of balance sheet of a bank as sources of liquidity (Marozva, 2017).

Commercial loan theory is a liquidity risk management based theory that encourages banks to advance short term and self-liquidating loans. Self-liquidating loans enable banks to meet cash withdrawals with funds from maturing facilities and at the same time improve both liquidity and profitability. Market power theory suggests that profitability of firms is affected by their conduct and the structure of the market they operate. The theory asserts that a firm with big share of market is able to adjust market price and control profit margin. Efficient structure theory advocates that efficiency in firms reduces costs and enhances high profitability (Atemnkeng & Nzongang, 2006).

**Empirical Review**

Several studies have been carried out on ALM, bank characteristics and profitability. For instance, Sufian, Majid and Zulkhibri (2007) studied the Malaysian Islamic banking performance from 2001 to 2005. The study linked the variation in measured efficiencies to different variables that is, capital, ownership, non-performing loans, quality of management and bank size. The empirical findings revealed that over the study period, scale inefficiency over weighs technical ineffectiveness in the Islamic banking division of Malaysia. The findings further revealed that banks from foreign places show elevated technical efficiency in comparison to their local counterparts and that the more competent banks were most likely larger; with bigger intensity in regards to loans, and on average had fewer NPLs. However, the study indicated

insignificance relationship between macroeconomic factors and interest rate spread on the relationship between ALM and banks' profitability.

Sayeed et al. (2012) conducted a research to access the impact of ALM on returns of financial institutions in Bangladesh and the role of bank characteristics on the relationship between ALM and income from 2008 to 2012. The study established that high income banks earn high income from assets and low income from liabilities compared to low income banks. The study revealed that asset management in large banks is better compared to those of small financial institutions. The study further established that profitability in banks is greatly affected by ALM culture, governance structure, bank's size and ownership, contrary to a research by Ongore and Kusa (2013) on factors that determines the profitability of Kenyan banks, which revealed that ownership identity has insignificant effect on financial income. The research by Ongore and Kusa (2013) further established that quality of asset measured by NPLs to total asset is related to profitability. This differs to a research conducted in South Africa (CGAP, 2012) that proved ownership has an impact on financial performance, hence an empirical gap on the role of ownership as bank specific on the relationship between ALM and profitability of banks.

Memba and Makau (2014) conducted a research to access the effects of ALM on banks' net income and the impact of bank characteristics on this relationship, using Diamond trust bank as case study from 2006 to 2013. The research established that customer deposits are positively related to NII, meaning that deposits have big impact on the banks' net income. The study also established that credit risk is positively related to NII and greatly influence banks' profitability. Lemma (2017) carried out a study to access the impact of ALM on banks' income and the position of bank specifics on the linkage between ALM and banks' income in Ethiopia from year 2005 to 2016, using quantitative research design. The research established that ALM is positively related to banks' income. The research further revealed that income diversification, liquidity and bank's size has positive impact on banks' income. However, the relationship between external environment and banks' income was revealed to be insignificant.

Thejane (2017) conducted a research to access the role of ALM and regulation on banks' income in Lesotho 2005 to 2015, using ordinary least square regression model. The research revealed that ALM variable and Gap ratio are positively related to banks' income. The research further indicated that Capital adequacy ratio, being a regulatory variable of banks' characteristics has strong effect on banks' earning in Lesotho however,

the study did not indicate the role of credit risk and bank size on profitability. The above studies have revealed that the relationship between ALM and banks' profitability is affected by internal aspects however; none of the studies considered the mediating effect of bank characteristics on the relationship between ALM and profitability of banks, hence an empirical gap which the current study seeks to address.

**Methodology**

The target population of the study involved the 42 registered Kenyan banks between 2015 and 2020. However, 35 commercial banks were studied as 2 of the banks were under statutory management, 1 bank was under receivership while 4 banks were not in operation through the 6 years study period. The study employed both longitudinal and cross-sectional descriptive research design. Cross-sectional research involves drawing a sample of units from the population of interest and ascertaining whether variables are related to each other at a particular point in time (Mugenda & Mugenda, 2003). Longitudinal research design was justified because data was collected over a certain period of time. Cross-sectional research design was also justified on the fact that data for banks was collected at a specific time. Data for the variables of the study were also collected at a particular point in time. The research involved collecting published annual reports from commercial banks which were licensed and operational from 2015 to 2020 and also from CBK for the same period. The period was selected due to data availability.

Data analysis was done through descriptive statistics and multiple linear regression models. The first face of the statistical data analysis was done using a regression model. The model variables helped in determining the variation in the dependent variable that was produced or associated with the independent variable (Cohen et al., 2003). The analysis yielded regression coefficients and correlation measures of various kinds that were used in inferring cause and strength of the causal relationships between the variables. Correlation coefficients (R) showed the strength of the relationships between the variables in the regression model while the coefficients of determination ($R^2$) ascertained goodness of fit of the model. The study developed empirical models that were used to find out the influence of bank characteristics on the relationship between ALM and banks' profitability. There were four steps in testing the intervening effect of bank characteristics on the relationship between ALM and profitability of banks. The four steps were conducted in accordance with procedures provided by Baron and Kenny (1986).

*Step One:*

A simple regression analysis to test the effect of ALM on bank's profitability was conducted;

$ROA_{it} = \alpha + \beta_{1it}ALM_{it} + e_{it}$

*Step Two:*

A simple regression analysis was conducted to test the effect of ALM on bank characteristics;

$CA_{it} = \alpha + \beta_{1it}ALM_{it} + e_{it}$

$CR_{it} = \alpha + \beta_{1it}ALM_{it} + e_{it}$

$ME_{it} = \alpha + \beta_{1it}ALM_{it} + e_{it}$

*Step Three:*

A multiple regression analysis to test the impact of bank characteristics on profitability was conducted;

$ROA_{it} = \alpha + \beta_{1it}CA_{it} + \beta_{2it}CR_{it} + \beta_{3it}ME_{it} + e_{it}$

*Step Four:*

A multiple regression analysis to test the impact of ALM and bank characteristics on profitability was conducted;

$ROA_{it} = \alpha + \beta_{1it}ALM_{it} + \beta_{2it}CA_{it} + \beta_{3it}CR_{it} + \beta_{4it}ME_{it} + e_{it}$

*Where:*

*$ROA_{it}$ is Return on Asset for $i^{th}$ bank in $t^{th}$ year, $\alpha$ is constant or the value of the intercept, $\beta$ is Regression Coefficients for $i^{th}$ bank in $t^{th}$ year, $ALM_{it}$ is Asset Liability Management for $i^{th}$ bank in $t^{th}$ year, CA is Capital Adequacy for $i^{th}$ bank in $t^{th}$ year, CR is Credit Risk for $i^{th}$ bank in $t^{th}$ year and ME is Management Efficiency for $i^{th}$ bank in $t^{th}$ year.*

**Findings and Results Discussions**

**Research Hypothesis**

The study's objective is to determine the effect of bank characteristics on the relationship between asset liability management and ROA among commercial banks in Kenya. The bank characteristics variables considered in this study were capital adequacy, credit risk and management efficiency. To establish the objective of this study, a corresponding hypothesis $H_{01}$: *Bank characteristics have no significant intervening*

*influence on the relationship between asset liability management and ROA among commercial banks in Kenya* was stated and tested. Regression analysis was conducted to determine the objective of the study. Regression results for step 1 were shown in Table 1.

**Table 1: Independent Influence of Asset Liability Management on ROA**

```
. xtreg ROA ALM, fe

Fixed-effects (within) regression              Number of obs    =        210
Group variable: ID                             Number of groups =         35

R-sq:                                          Obs per group:
    within  = 0.0397                                        min =          6
    between = 0.0000                                        avg =        6.0
    overall = 0.0089                                        max =          6

                                               F(1,174)         =       7.19
corr(u_i, Xb)  = -0.0732                        Prob > F         =     0.0080

─────────────────────────────────────────────────────────────────────────────
         ROA │      Coef.   Std. Err.       t    P>|t|     [95% Conf. Interval]
─────────────┼───────────────────────────────────────────────────────────────
         ALM │   1.253856   .4675413     2.68    0.008     .3310741    2.176639
       _cons │  -.6203147   .2360856    -2.63    0.009    -1.086275   -.1543546
─────────────┼───────────────────────────────────────────────────────────────
     sigma_u │  .03121314
     sigma_e │   .0243745
         rho │  .62119021   (fraction of variance due to u_i)
─────────────────────────────────────────────────────────────────────────────
F test that all u_i=0: F(34, 174) = 9.79                    Prob > F = 0.0000

.
```

The results of the effect of asset liability management on ROA on Table 1 shows that the R square value ($R^2$) was 0.0089, which indicates that the independent variable indicator which was the ratio of total assets to total assets and liabilities account for about 0.89% of the variation in bank profitability. The other percentage 99.11% was accounted for by other factors not considered in the model. The results further show that F statistic value of 9.79 was statistically significant an indication that asset liability management influences bank profitability significantly.

The results further shows that the effect of ALM (B = 1.254, p < .05) on bank profitability was positive and statistically significant at 5% level of significance. In addition, the results show that the constant (B = -0.620, p < .05) had a negative and statistically significant influence at 5% level of significance. These results indicate that asset liability management has a significant effect on profitability of commercial banks in Kenya. The results of step two are as shown in Table 2, 3 and 4.

**Asset Liability Management and Bank Characteristics**

The results in Table 2 revealed that the R square value ($R^2$) was 0.2302, which indicates that the independent variable indicator which was the ratio of total assets to total assets and liabilities account for about 23.02% of the variation in capital adequacy. The other percentage 76.98% was accounted for by other factors not considered in the model. The results further show that F statistic value of 5.02 was statistically significant an indication that asset liability management influences capital adequacy significantly.

The results further shows that the effect of ALM (B = 6.199, $p < .05$) on bank capital adequacy was positive and statistically significant at 5% level of significance. In addition, the results show that the constant (B = -3.2949, $p < .05$) had a negative and statistically significant influence at 5% level of significance. These results indicate that asset liability management has a significant effect on capital adequacy of commercial banks in Kenya.

**Table 2: Asset Liability Management and Capital Adequacy**

```
Fixed-effects (within) regression            Number of obs      =       210
Group variable: ID                           Number of groups  =        35

R-sq:                                        Obs per group:
    within  = 0.0950                                     min =          6
    between = 0.4541                                     avg =        6.0
    overall = 0.2302                                     max =          6

                                             F(1,174)           =     18.27
corr(u_i, Xb)  = 0.3328                      Prob > F           =    0.0000
```

| Capitalade~y | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| ALM | 6.919912 | 1.618987 | 4.27 | 0.000 | 3.724531 | 10.11529 |
| _cons | -3.294896 | .8175097 | -4.03 | 0.000 | -4.908408 | -1.681384 |
| sigma_u | .0818308 | | | | | |
| sigma_e | .08440324 | | | | | |
| rho | .48452891 | (fraction of variance due to u_i) | | | | |

```
F test that all u_i=0: F(34, 174) = 5.02              Prob > F = 0.0000
```

The results in Table 3 revealed that the R square value ($R^2$) was 0.0275, which indicates that the independent variable indicator which was the ratio of total assets to total assets and liabilities account for about 2.75%

of the variation in credit risk. The other percentage 97.25% was accounted for by other factors not considered in the model. The results further show that F statistic value of 13.67 was statistically significant an indication that asset liability management influences credit risk significantly.

The results further shows that the effect of ALM (B = -9.1313, p < .05) on bank credit risk was negative and statistically significant at 5% level of significance. In addition, the results show that the constant (B = 4.7711, p < .05) had a positive and statistically significant influence at 5% level of significance. These results indicate that asset liability management has a significant effect on credit risk of commercial banks in Kenya.

**Table 3: Asset Liability Management and Credit Risk**

```
. xtreg Creditrisk ALM, fe

Fixed-effects (within) regression              Number of obs     =       210
Group variable: ID                             Number of groups  =        35

R-sq:                                          Obs per group:
    within  = 0.1894                                         min =         6
    between = 0.0025                                         avg =       6.0
    overall = 0.0275                                         max =         6

                                               F(1,174)          =     40.66
corr(u_i, Xb)  = -0.1832                        Prob > F          =    0.0000
```

| Creditrisk | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| ALM | -9.131335 | 1.432089 | -6.38 | 0.000 | -11.95784 | -6.304834 |
| _cons | 4.771096 | .7231352 | 6.60 | 0.000 | 3.34385 | 6.198342 |
| sigma_u | .11462009 | | | | | |
| sigma_e | .07465961 | | | | | |
| rho | .7021104 | (fraction of variance due to u_i) | | | | |

```
F test that all u_i=0: F(34, 174) = 13.67              Prob > F = 0.0000
```

The results in Table 4 revealed that the R square value ($R^2$) was 0.0226, which indicates that the independent variable indicator which was the ratio of total assets to total assets and liabilities account for about 2.26% of the variation in management efficiency. The other percentage 97.74% was accounted for by other factors not considered in the model. The results further show that F statistic value of 0.57 was not statistically

significant; an indication that asset liability management does not influence management efficiency significantly.

The results further shows that the effect of ALM (B = -35.2813, P > 0.05) on bank management efficiency was negative and not statistically significant at 5% level of significance. In addition, the results show that the constant (B = 18.0543) had a negative and not statistically significant influence at 5% level of significance. These results indicate that asset liability management has no significant effect on management efficiency of commercial banks in Kenya.

**Table 4: Asset Liability Management and Management Efficiency**

```
. xtreg Managementefficiency ALM, fe

Fixed-effects (within) regression          Number of obs    =      210
Group variable: ID                         Number of groups =       35

R-sq:                                      Obs per group:
    within  = 0.0059                                     min =        6
    between = 0.1918                                     avg =      6.0
    overall = 0.0226                                     max =        6

                                           F(1,174)         =     1.03
corr(u_i, Xb)  = 0.1786                     Prob > F         =   0.3118

─────────────────────────────────────────────────────────────────────
Management~y │     Coef.   Std. Err.      t    P>|t|   [95% Conf. Interval]
─────────────┼───────────────────────────────────────────────────────
         ALM │ -35.28127   34.78182   -1.01   0.312   -103.9298   33.36731
       _cons │  18.05434   17.56313    1.03   0.305   -16.60985   52.71853
─────────────┼───────────────────────────────────────────────────────
     sigma_u │ .56814506
     sigma_e │ 1.8132932
         rho │ .08939486   (fraction of variance due to u_i)
─────────────────────────────────────────────────────────────────────
F test that all u_i=0: F(34, 174) = 0.57          Prob > F = 0.9726
```

## Bank Characteristics and Profitability

Step three involved regressing the bank characteristics against bank profitability. The results are as shown in Table 5.

**Table 5: Influence of Bank Characteristics on Profitability**

```
. xtreg ROA Capitaladequacy Creditrisk Managementefficiency, fe

Fixed-effects (within) regression          Number of obs     =        210
Group variable: ID                         Number of groups  =         35

R-sq:                                      Obs per group:
    within  = 0.1051                                     min =          6
    between = 0.3475                                     avg =        6.0
    overall = 0.2184                                     max =          6

                                           F(3,172)          =       6.73
corr(u_i, Xb)  = 0.2812                    Prob > F          =     0.0003
```

| ROA | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| Capitaladequacy | .0527331 | .0224706 | 2.35 | 0.020 | .0083794 | .0970868 |
| Creditrisk | -.0273318 | .0230574 | -1.19 | 0.238 | -.0728437 | .01818 |
| Managementefficiency | -.0020835 | .0010671 | -1.95 | 0.053 | -.0041898 | .0000228 |
| _cons | .0071806 | .0067525 | 1.06 | 0.289 | -.0061479 | .0205091 |
| sigma_u | .02740357 | | | | | |
| sigma_e | .02366644 | | | | | |
| rho | .57278678 | (fraction of variance due to u_i) | | | | |

```
F test that all u_i=0: F(34, 172) = 5.24            Prob > F = 0.0000
```

Findings as per Table 5 indicates that bank characteristics explains 21.84 percent of the variation in bank profitability ($R^2 = 0.2184$). The overall model results reveal that the relationship between bank characteristics and ROA is statistically significant at 5% significance level (F = 5.24, p-value=0.0000). This indicates that bank characteristics influences profitability of banks in Kenya. The beta coefficients also indicate that statistically significant linear relationship between capital adequacy and ROA was detected (ß=.0527, p=.020). Credit risk and management efficiency however exhibited a negative and not significant effect on bank profitability.

**ALM, Bank Characteristics and Profitability**

The final step of the test for the intervening effect of bank characteristics on the relationship between asset liability management and ROA involved testing for the influence of asset liability management on ROA while controlling for bank characteristics. The results for step four are presented in Table 6.

## Table 6: Mediation Effect of Bank Characteristics on ALM and ROA

```
. xtreg ROA ALM Capitaladequacy Creditrisk Managementefficiency, fe

Fixed-effects (within) regression              Number of obs     =        210
Group variable: ID                             Number of groups  =         35

R-sq:                                          Obs per group:
    within  = 0.1156                                          min =          6
    between = 0.1523                                          avg =        6.0
    overall = 0.1306                                          max =          6

                                               F(4,171)          =       5.59
corr(u_i, Xb)  = 0.1146                         Prob > F          =     0.0003
```

| ROA | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. Interval] | |
|---|---|---|---|---|---|---|
| ALM | .7330422 | .515153 | 1.42 | 0.157 | -.2838358 | 1.74992 |
| Capitaladequacy | .0456584 | .022949 | 1.99 | 0.048 | .0003585 | .0909583 |
| Creditrisk | -.0138213 | .0248725 | -0.56 | 0.579 | -.062918 | .0352754 |
| Managementefficiency | -.0022294 | .0010689 | -2.09 | 0.038 | -.0043393 | -.0001195 |
| _cons | -.3636824 | .2607148 | -1.39 | 0.165 | -.8783162 | .1509513 |
| sigma_u | .02896523 | | | | | |
| sigma_e | .02359625 | | | | | |
| rho | .60109181 | (fraction of variance due to u_i) | | | | |

```
F test that all u_i=0: F(34, 171) = 5.26            Prob > F = 0.0000
```

At step four, ALM and bank characteristics adds significantly to the ROA as shown by an $R^2$ of 0.1306 which implies that the four variables explain 13.06% of the variation in profitability. This is an increase from the 0.89% explained by ALM alone. The results reveal that the variance explained by bank characteristics is significant (F=5.26, p-value = 0.000). The results revealed that the regression coefficients for capital adequacy and management efficiency were statistically significant ($p < .05$) implying that these two may be wielding a significant mediating effect. This implies that changes in the bank characteristics positively affect the relationship between asset liability management and ROA because there was a positive direction in their relationship.

The study's objective was to determine the intervening effect of bank characteristics on the relationship between asset liability management and ROA among commercial banks in Kenya. The corresponding hypothesis Ho$_1$ stated that bank characteristics have no intervening influence on asset liability management and ROA relationship among commercial banks in Kenya. In understanding cause of inconsistencies in asset liability management and ROA studies, scholars have recommended future research to consider bank characteristics.

Although research have found that certain aspects of asset liability management correlated with ROA (Sanjay & Shrestha, 2015), theory anticipates the said correlations were influenced by bank characteristics effects (Marozva, 2017; Athanasoglou et al., 2008). The concepts and recommendations emanating from the above scholars led the researcher consider the bank characteristics as a probable construct which can influence the asset liability management-ROA relationship.

Results for independent influence of the aspects of bank characteristics on ROA had positive relationship with performance and the influence was statistically significant. The combined influence had a positive relationship which was statistically significant. The mediating influence indicates that asset liability management independently had influence which was statistically significant on ROA while bank characteristics independently did have influence which was statistically significant on ROA.

The results revealed that the regression coefficients for asset liability management was statistically significant after adding bank characteristics to the regression implying that bank characteristics may be wielding a significant intervening effect. This implies that changes in the bank characteristics positively affect the relationship between asset liability management and ROA because there was a positive direction in their relationship. These findings are supported by Ongore and Kusa (2013) who established that quality of asset measured by NPLs to total asset is related to profitability.

The significance of the mediating effect indicates that bank characteristics had a mediating influence on asset liability management and ROA relationship. This finding supports a research conducted by Memba and Makau (2014) to access the impact of ALM on banks' net income, using Diamond trust bank as case study. The research established that customer deposits are positively related to NII, meaning that deposits have big impact on the banks' net income. The study also revealed that credit risk is positively related to NII and greatly influence banks' profitability. The study also supports Thejane (2017) who conducted a research to access the role of ALM and regulation on banks' income in Lesotho. The research revealed that ALM variable and Gap ratio are positively related to banks' income. The research further indicated that Capital adequacy ratio, being a regulatory variable of banks has strong effect on banks' earning in Lesotho.

## Conclusions and Recommendations

The study sought to find out whether bank characteristics influence the relationship between asset liability management and ROA among commercial banks in Kenya. The study established that bank characteristics intervenes the effect of asset liability management on ROA among Commercial banks in Kenya and the interaction relationship is statistically significant thereby accepting the hypothesis, that bank characteristics mediates the effect of the relationship between asset liability management and ROA among commercial banks in Kenya. The findings therefore inform firms that for the confirmed hypotheses, they need to be keen on the influence of the bank characteristics namely capital adequacy, credit risk and management efficiency.

The study recommends the need to ensure that all banks adhere to the capital adequacy requirements, lower their credit risk exposure and enhance their management efficiency as this will have an effect on the profitability of a bank. To achieve this, banks can come up with effective credit scoring models and more efficient credit risk management measures as this will enhance their asset quality which will eventually reflect on their profitability.

For commercial banks in Kenya to be profitable, there is need to ensure that the hiring and recruitment process attract the best available talents in the market as management efficiency has been found to be a significant determiner of profitability. The banks also need to offer competitive terms of employment to retain the most resourceful talents and to attract new ones. The ability of a bank to attract the best talents will lead to high management efficiency which will in effect promote profitability.

## References

Acharya, V. V., & Schnabl, P. (2010). Do global banks spread global imbalances? Asset-backed commercial paper during the financial crisis of 2007–09.*IMF Economic Review,* 58, 37-73.

Atemnkeng, J., & Nzongang, J. (2006). *Market structure and profitability performance in the banking industry of CFA countries*, working paper on Commercial Banks in Cameroon.

Athanasoglou, P., Brissimis, S., & Delis, M. (2008). Bank-specific, industry-specific and Macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money, 18*(2), 121-136.

Bain, J. S., (1951). Relation of Profit Rate to Industry Concentration, Quarterly *Journal of Economics, 65*: 293 – 324.

Belete T., (2013). Asset Liability Management and Commercial Banks Profitability in Ethiopia. *Journal of Finance and Accounting, 4,* 10, 2222-1697.

Central Bank of Kenya, (2020).Bank supervision annual report 2020. http://www. Central bank.go.ke/downloads/acts regulations/banking Act.pdf

Cytonn Investments, (2016) Kenya Banking Sector Report 2016.

Demsetz, H. (1973). Industry structure, Market Rivalry, *Journal of Law and Economics,* 16:1-9

Drobetz, W., & Wanzenried, G. (2006). What determines the speed of adjustment to the target Capital structure? *Applied Financial Economics, 16*(13), 941 – 958.

Kanwal, S., & Nadeem, M., 2013. The Impact of Macroeconomic Variables on the Profitability of Listed Commercial Banks in Pakistan. *European Journal of Business and Social Sciences, 2* (9), 186-201.

Kiganda, E.O. 2014. Effects of Macroeconomic factors on Commercial Banks Profitability in Kenya: Case of Equity Bank Limited. *International Journal of Economics and Sustainable Development, Vol. 5*, No. 2, 2014, ISSN 2222-1700

Maigua, C., & Mouni, G., 2016. Influence of Interest Rates Determinants on the Performance of Commercial Banks in Kenya. *International Journal of Academic Research in Accounting Finance and Management Sciences* Vol. 6, No.2, April 2016, pp. 121- 133

Marozva , G. (2017). Empirical Study of Liquidity Risk embedded in banks' Asset Liability Mismatches.

Memba, F., & Makau, N. F., (2014). Influence of asset liability management on financial performance of commercial banks in Kenya: *Journal of Economics, Commerce and Management* United Kingdom Vol. II, Issue 10, Oct 2014, page 1-20, ISSN 2348 0386.

Mohanty, B., & Mehrotra, S., (2018). The effect of liquidity management on profitability: A Comparative analysis of public and private sector banks in India. *The IUP Journal of Bank Management*, Vol. XVII, No. 1, 2018

Mugenda, O. M., & Mugenda, A. G. (2003). Research Methods: Quantitative and qualitative Approaches. Nairobi: African centre for technology studies.

Ongore, V. O., & Kusa, G. B. (2013).Determinants of financial performance of commercial banks in Kenya. *International Journal of Economics and Financial Issues, 3*(1), 237-252.

Osamwonyi, P. I. S., & Michael, C.I., 2014.The Impact of Macroeconomic Variables on Profitability of Listed Commercial Banks in Nigeria. *European Journal of Accounting Auditing and Finance Research*.Vol.2, No.10, pp.85-95.

Porter, M. E. (1985). *Competitive advantage: Creating and sustaining superior performance.* New York: Free Press.

Pragathi, K. M., & Veena, K. P. (2018). An analysis of Asset Liability Management in Banking Sector: A case study of Kotak Mahindra Bank. *IOSR Journal of Business and Management* (IOSR-JBM). Volume 20, Issue 2. Ver. VIII (February. 2018), PP 01-07

Redington, F.M. (1952). Review of the Principles of Life –office Valuations, Journal of the Institute of Actuaries. Vol. 18, Pg. 286 -340.

Sanjay, S. (2015).Asset Liability Management and Commercial Banks' Profitability in Nepal. A multidisciplinary Journal Volume 5, No. 1, 2015. ISSN 2091 - 1106

Sheela.P., & Bastray, T. (2014).Effect of Asset Liability Management on Commercial Banks Profitability in Indian financial market. International Journal of Business and Administration Research Review, Vol.1, Issue.6, July - Sep, 2014. Page 92

Smith, (1776). Theories of Money: Maryland and the Carolinas in Journal of Political Economy, volume 93.

Tee, E. (2017). Asset Liability Management and the profitability of listed banks in Ghana *IOSR Journal of Economics and Finance* Volume 8, Issue 3 Ver. IV (May - June 2017), PP 09-14