

Asset Liability Management and Commercial Banks Profitability in Ethiopia

Tamiru Belete

Department of Accounting and Finance, University of Gondar, Gondar, Ethiopia

Tel. +251913424786, P.O. Box 196

Email: tamsolan2003@gmail.com, tamiru.belete@yahoo.com

Abstract

This study examined the effect of ALM on commercial banks profitability in the Ethiopian financial market. The SCA model was used to estimate the profitability which is measured by ROA as a function of balance sheet and macroeconomic explanatory variables. For this purpose eight commercial banks over the time period from 2005 to 2010 were selected. The model hypothesize that the rate of return on earning assets is positive and varies across assets, and the rate of cost on liabilities is negative and varies across liabilities. The pooled OLS regression analysis result showed that all assets, except fixed assets, mainly loans and advances affect profitability positively, while all liabilities mainly saving and fixed deposits and other liabilities and credit balances have significant and negative effect on commercial banks profitability. With regard to macroeconomic variables, real growth rate in GDP has negative effect on commercial banks profitability. As a result, the study recommended that commercial banks should focus on increasing public awareness to mobilize more saving and fixed deposits and this will enhance their performance in provision of loans and advance to customers.

Key Words: Commercial banks, Statistical Cost Accounting Model, Asset Liability Management, Profitability

1. Introduction

The history of modern commercial banking in Ethiopian dates back to the turn of the twentieth century when, in 1905, the Bank of Abyssinia was established in Addis Abeba by the agreement between Emperor Menelik II and a representative of British owned National Bank of Egypt. After the bank was bought and owned by the Ethiopian government, it was disintegrated into two different banks forming the National Bank of Ethiopia and the Commercial Bank of Ethiopia (Mauri, 2003). According to Memmel and Scherteler (2010), traditional perception on such financial intermediaries show a simple logic that a bank accept deposits with short term maturities from a large number of individuals and grants loans with long term maturities to a small number of borrowers. These transformation activities expose a bank to credit, interest rate, and liquidity risks.

Commercial banks are among the financial intermediaries that raise funds, as traditionally perceived, primarily by issuing checkable/demand deposits¹, saving deposits², and time/fixed deposits³ (Mishikin, 2004). Because the financial system in our country is at its infancy stage, commercial banks are also authorized to provide all the banking service in the financial market. Since there is no organized financial market, almost all of the transactions and activities of money and capital market are carried out by the commercial banks.

As Mishikin (2004) shows, a commercial bank's liability which is mainly financed by current, saving, and fixed deposits and equity (which is contributed by shareholders) represent its sources of funds; while asset which is composed of mainly investments, loans and advances represent its use of funds. Given the legal requirements of

¹ Checkable/demand deposits: Deposits on which check can be written.

² Saving deposits: Deposits that are payable on demand but do not allow their owner to write checks.

³ Time/fixed deposits: Deposits with fixed term to maturity.

commercial banks, each commercial bank determines its own composition of liabilities and assets, which determines its specific operating objective; maximizing shareholders equity (profit).

The profitability of commercial banks is vital for the smooth operation of the financial system of a country (Tektaş *et al.*, 2005). In our country, even though the financial sector is regulated as all of other countries financial sector, it is contributing a lion share for the healthiness of the country's financial system (Francis, 2007). Therefore, the sector's profitability is of the major concern for those who are responsible for policy making and operating day to day with it. Among the possible factors that have effect on commercial banks profitability asset liability management (ALM) is the major one (Kosmidou, 2004; Shubiri, 2010; Sayeed and Hoque, 2008; Asiri, 2007; and others).

This factor, ALM, is defined by different scholars like Gup and Brooks (1993), Zawalinska (1999), and Charumati (2008). Charumati (2008) defined ALM as a dynamic process of planning, organizing, coordinating, and controlling the assets and liabilities; their mixes, volume, maturities, yield, and costs in order to achieve a specified net interest income (NII)⁴. In other words, it deals with the optimal investment of assets in view of meeting current goals and future liabilities. It is related to the management of the risks associated with liquidity mismatch, interest rates and foreign exchange movements. Therefore, ALM is concerned with an attempt to match assets and liabilities in terms of maturity and interest rate sensitivity to minimize interest rate and liquidity risks (Zawalinska, 1999).

In the banking area, different authors try to study the determinants of commercial banks profitability. Most recently, Ramlall (2009) and Alper and Anbar (2011) found that bank profitability can be hindered by both internal and external factors. Internal factors are related to bank management which encompasses the ALM culture of the bank and external determinants are factors which reflect the economic and legal environment that affect the operation and performance of commercial banks. The common macroeconomic factors that determine the profitability of banks in general and commercial banks in particular are GDP, inflation rate, market interest rates, and ownership.

With regard to the microeconomic determinants of commercial banks profitability, ALM plays a dynamic role. According to Hester and Zoellner (1966), there is a statistically significant relationship between ALM and profitability and they disregard the null hypothesis that there is no relationship between them. On the contrary, Kosmidou *et al.* (2004) found that liability management plays its own pivotal role in contributing profitability difference among commercial banks. However, before this study Vasiliou (1996) suggests that asset management rather than liability management play the key role in explaining the differences in banks profitability.

These all aforementioned studies employ the statistical cost accounting (SCA) model to examine the effect of ALM on banks profitability. But their studies do not incorporate additional macroeconomic variables. Practically, there are also other macroeconomic factors that have effect on commercial banks profitability. Although they have not found evidence that differential returns and costs on different categories of assets and liabilities exist, Kwast and Rose (1982) expanded the traditional SCA model to incorporate market structure and inflation rate as macroeconomic variables. Recently, Asiri (2007) found that assets management positively and liabilities management negatively related to the profitability of Kuwaiti banks.

⁴ NII = Interest Income – Interest Expense : (Basic source of bank profit)

This study also employed the SCA model with some modifications to examine the effect of ALM on commercial banks of Ethiopia during the sample period of 2005-2010. This method was tested in US, UK, Indian, Greek, Italian, Kuwaiti, Bangladeshi, and Jordan banks (Hester, 1964; Hester and Zoellner, 1966; Hester and Pierce, 1975; Kwast and Rose, 1982; Vasiliou, 1996; Calcagnini and Hester, 1997; Kosmidou *et al.*, 2004; Asiri, 2007; Sayeed and Hoque, 2008; Shubiri, 2010). As to date and to the best of the researcher's knowledge, no econometric study applying SCA has been undertaken to examine the effect of ALM on commercial banks profitability in the case of Ethiopian banks; therefore, this study attempted to fill such a vacuum.

According to Kosmidou *et al.* (2004), from such type of studies interesting finding about the relationship of ALM and the profitability of commercial banks could result. And a SCA model analysis can be of particular interest to bank management, as the managers can employ this analysis to identify the relative position of their banks in relation to their main competitors. This enables them to identify their competitive advantages and disadvantages and to change their policies towards ALM. Besides, this research can make some sort of contribution to the literatures relating to banks ALM. Because the research is conducted in a country where the financial sector is dominated by commercial banks, the findings can be useful for developing countries under the same scenarios. Last but not least, it can be of paramount importance for policy makers to evaluate their policies, regulation, directives in line with the finding of the research.

The remaining sections of the paper are organized as follows: Section two describes the data and methodology; Section three reports the empirical regression analysis, results, and discussion; finally, section four summarizes the conclusion of the study.

2. Data and Methodology

2.1 Data

This study used eight commercial banks (Commercial Bank of Ethiopia, Construction and Business Bank, Dashen Bank, Awash International Bank, Bank of Abyssinia, Wegagen Bank, United Bank, and Nib Bank) operating in Ethiopia which constitute 94.70 percent, 94.44 percent, and 92.62 percent of the total assets, deposits, and loans of the commercial banks, respectively (NBE, 2010). Development Bank of Ethiopia which is a public bank is not included in the sample because it has additional mission other than its commercial nature and this will enhance the relationship between variables.

Furthermore, some of recently established commercial banks which are operating in the Ethiopian financial market are not included in the sample because either they have no full data in the sample period or they may not be able to significantly influence the criteria used in the sample; i.e. their total assets, loans and deposits. Moreover, these commercial banks were at their infancy stage; as a result, their financial statement may not portray the true relationship between variables. The time period selected to this study by considering the availability of data and the limitation of short panel was the year between 2005 and 2010.

The data required for this study were collected from NBE (which is responsible for maintaining the audited financial statements of all banks operating in Ethiopia and regulate their operating activities), Ethiopian statistical agency, and from each sampled commercial banks and their website. The main reason that this study focused on commercial banks was to avoid comparison between different types of thrifts like cooperative banks, development banks, micro finances etc and to maintain homogeneity of data.

2.2 Model Specification

To examine the effect of ALM on commercial banks profitability in Ethiopia, the modified SCA model was adopted. That is, SCA model examine how operating profit is regressed by ALM in commercial banks of Ethiopia. As described by Hester and Zoellner (1966), the SCA model as a regression model assumes that the rate of return on earning assets is positive and varies across assets, and the rate of cost on liabilities is negative and varies across liabilities.

A bank earns revenue from many different sources and mainly from interest income, service fees and commissions from its assets and income from using liabilities. On the other hand, costs of banks are also sourced from bank's assets and liabilities. These expenses include interest expenses on deposits, other liabilities and administrative expenses. Now, if we subtract operating costs from operating revenues we will get net operating income for the banks. The variation in commercial banks' operating income is expressed by the traditional SCA model which was developed by Hester and Zoellner (1966) for bank b in time t which will be used in this study is as follows:

$$\pi_{bt} = \alpha_0 + \sum \alpha_{1i} A_{ibt} + \sum \alpha_{2j} L_{jbt} + \varepsilon_{bt} \dots\dots\dots \text{Eq. (1)}$$

Where:

- π_{bt} = Operating profit of a commercial bank
- A_i = the i^{th} asset of a bank; $i = 1, 2, 3 \dots n$
- L_j = the j^{th} liability of a bank; $j = 1, 2, 3 \dots m$
- b = banks; $b = 1, 2, 3 \dots z$
- t = the time period; $t = 1, 2, 3 \dots T$
- α_{1i} = the marginal rate of return on assets
- α_{2j} = the marginal cost of liabilities
- α_0 = Constant term
- ε_{bt} = Stochastic term

Because commercial banks are widely varied in their business volumes, it needed to divide all the variables in equation (1) by their average total assets. This is done in order to avoid inefficiency in estimation of coefficients associated with heteroscedasticity of residuals (Kosmidou *et al.* 2004).

$$\frac{\pi_{bt}}{ATA_{bt}} = \frac{\alpha_0}{ATA_{bt}} + \sum \alpha_{1i} \frac{A_{ibt}}{ATA_{bt}} + \sum \alpha_{2j} \frac{L_{jbt}}{ATA_{bt}} + \mu_{bt} \dots\dots\dots \text{Eq. (2)}$$

Where:

- ATA_{bt}^5 = Average total assets for bank b at time t
- $\mu_{bt} = \frac{\varepsilon_{bt}}{ATA_{bt}}$

The models which are described above imply that all banks experience identical interest rates on their assets and liabilities (Shubiri, 2010). But, practically, there are many factors that may have significant effect on profitability of commercial banks. Of which real growth rate in GDP and the general rate of inflation are the major ones (Sayeed and Haque, 2008). As different scholars like Ramlall (2009) describe, rapid economic growth increases

⁵ $ATA_{bt} = \frac{\text{Beginning book value of total assets} + \text{Ending book value of total assets}}{2}$

profitability for a large number of countries. Consequently, the movements in general activity level are expected to generate direct effects on the profitability of commercial banks. And the effect of inflation can be substantial and undermines the stability of the financial system and the ability of the regulator to control the solvency of financial intermediaries. Therefore, an important indirect influence on commercial banks lies in the effect of inflation on their customers and the consequence changes the demand for different kinds of financial services (Staikouras and Wood, 2001).

Such macroeconomic factors were incorporated in their models by Kwast and Rose (1982), Shubiri (2010), and Sayeed and Hoque (2008) to present the traditional SCA model in modified way. The following modified SCA model was employed for the study:

$$ROA_{bt} = \frac{\alpha_0}{ATA_{bt}} + \sum \alpha_{1i} \frac{A_{ibt}}{ATA_{bt}} + \sum \alpha_{2j} \frac{L_{jbt}}{ATA_{bt}} + \alpha_3 GDP_t + \alpha_4 INF_t + \mu_{bt} \dots \text{Eq.(3)}$$

Where:

ROA_{bt} = Return on assets for bank b at time t

GDP_t = the rate of gross domestic product at time t

INF_t = the general rate of inflation at time t

α₃ = Coefficient of real growth rate in GDP

α₄ = Coefficient of general rate of Inflation

This study does not use net income after tax as a dependent variable since tax rate is fixed by the government from time to time and not influenced by ALM.

2.3 Balance Sheet Explanatory variables

The balance sheet of commercial banks was, in general, the explanatory variable of this study. In different studies conducted in other countries, assets were decomposed into independent variables primarily based on maturity, insured or federally guaranteed status, the existence of secondary market, and collateral (Hester and Pierce, 1975; Kwast and Rose, 1982; Vasiliou, 1996; Calcagnini and Hester, 1997; Kosmidou *et al*, 2004; Asiri, 2007; Sayeed and Hoque, 2008; Shubiri, 2010). This Breakdown of commercial banks assets was proved convenient for testing a number of important hypotheses. However, in the case of Ethiopian commercial banks assets, they do not have insured or federally guaranteed status and active secondary market. Therefore, the decomposition of assets into variables is by considering their maturity and collateral. On the right hand side of the balance sheet, the banks' share capital and retained earnings have not been taken into consideration since it can be assumed that its rate of cost is zero (Kosmidou *et al.*, 2004). The same thing is true for the asset items of cash on hand and reserve accounts maintained in the National bank of Ethiopia. These accounts have no rate of return rather they are maintained in order to accomplish the liquidity of the bank and to fulfill the legal requirements. By considering these facts, balance sheet explanatory variables are listed in the following table.

Table 1: Explanatory Variables

Variables	Description
Asset variables	
A1	Deposits in other banks
A2	Other Investments and debit balances ⁶
A3	Loan and Advances
A4	Fixed Assets
Liability variables	
L1	Demand Deposits
L2	Saving and Fixed Deposits
L3	Other Liabilities and credit balances ⁷
Macroeconomic variables	
GDP	Real Growth rate in GDP
INF	General rate of Inflation

3. Empirical Analysis, Results, and Discussion

The validity and reliability of the regression relationship depends on the tests conducted on the data used for analysis. In order to manipulate and draw inference from the data, the study used STATA 11 software. The regression analysis used to derive the relationship and significant effect of ALM on profitability of commercial banks. To test the suitability of the method used, Hausman test was run and make discrimination between fixed effect and random effect methods. The test result ascertained the use of random effect method and further discrimination was made by employing Breusch-Pagen Lagrangian multiplier (LM) test. The test result recommended for the use of Pooled Ordinary Least square (OLS) to get efficient and consistent estimators. The Pearson correlation matrix and Variance Inflation factor (VIF) tests were made to deal with the problem of multicollinearity. Cluster regression was run to test the existence of autocorrelation and there was no autocorrelation problem. According to Gujarati (2004), heteroscedasticity may arise from outliers. The Breusch-Pagen Godfrey test which is sensitive for normality was employed to test heteroscedasticity. Moreover, the normality test was made by using Anderson-darling (Skewness-kurtosis) and Shapiro-Francia and Chapiro-Wilk tests. In addition to the models presented above, descriptive statistics were used to describe the mean, standard deviation, minimum and maximum values of explanatory and explained variables.

3.1 Descriptive Statistics

⁶ Other Investments and debit balances include treasury bills, bonds, sundry debtor, trust funds, and Customers' LC.

⁷ Other Liabilities and credit balances include other banks deposits, Margin held on LC, provision for taxation, state dividend payables, long term loans.

The descriptive statistics of the explanatory and explained variables in this study are presented in table 2. It is based on a panel data set organized from eight commercial banks operating in the Ethiopian financial market during the period from 2005 to 2010. Looking at them, generally, the statistics indicate a wide variability exist in both the balance sheet and macroeconomic variables which have effect on commercial banks profitability. The ROA has a mean value of 4.45% with standard deviation of 0.92%. The mean value of the deposits made in other banks variable (A_1) is 12.19% with standard deviation of 6.85%. Total investments and other debit balances (A_2) variable has the mean value of 12.34% with standard deviation of 8.11%. The loans and advances variable (A_3) has a mean of 61.78% which may portrays above half of commercial banks assets are in the form of loans and advances. It has standard deviation of 17.20%; which also show there was greater variability than all other asset variables used in the study. Fixed assets variable (A_4) has a mean value of 1.65% with standard deviation of 0.74%. This might imply that funds used in acquisition of fixed assets has minimum portion than other asset items.

The first liability variable, which is the current deposits (L_1), has mean value of 26.04% with standard deviation of 10.66%. Saving and fixed deposits variable (L_2) has mean value of 59.31% with standard deviation of 13.45%. Although there is no hard rule to compare current deposit variable with saving and fixed deposits variable means and standard deviations, the mean value of saving and fixed deposits variable is higher and its standard deviation is lower which probably show that it is the major source of funds for commercial banks without greater variability than current deposits. It is because commercial banks are financial intermediaries which have a simple logic that accept deposits with short term maturities from a large number of individuals and grant loans with long term maturities to a small number of borrowers. Other liabilities and credit balances variable (L_3) has the mean value of 15.11% with the standard deviation of 8.15%.

The macroeconomic variables incorporated in this study have the mean value of 11.23% and 16.16% with the standard deviation of 0.89% and 11.69% for real growth rate in GDP and the general rate of inflation, respectively. The comparison between minimum and maximum values with the mean value of real growth rate in GDP shows there is lower variability in the variable. Nevertheless, there is greater variability in the general rate of inflation which has big standard deviation in relation to real growth rate in GDP variable.

Generally, from the source of funds variables, the saving and fixed assets deposits variable has significant proportion. While from the use of funds variables, loans and advances variable has higher mean value and proportion. These implies that most of the commercial banks operating in Ethiopia during the study period are financed through saving and fixed deposits and they have used the fund for provision of loans and advances. Inrelation to standard deviations, fixed assets and other liabilities and credit balances have lower variability, while loans and advances and Current deposits have greater variability, from the use and source of funds point of view, respectively.

Table 2: Descriptive statistics of the variables

Variable	Mean	Std. Dev.	Min	Max
ROA	.0445406	.0092582	.0179993	.0601415
A1	.121973	.0685992	.0212681	.3319977
A2	.1234916	.0811342	.0073624	.5886136
A3	.6178181	.1720636	.2461131	.8723988
A4	.0165206	.0074317	.0060778	.0375375
L1	.2604076	.1066681	.0892808	0.495429
L2	.5931932	.1345706	.3295338	.7966882
L3	.151184	.0815949	.029029	.4638283
GDP	.1123333	.0089759	.099	.126
INF	.1616667	.1169785	.028	.364

Source: Panel Data Estimation, 2005-2010

3.2 Empirical regression results

As presented in table 1, the asset explanatory variables of this study were decomposed into explanatory variables as deposits in other banks (A1), other investments and debit balances (A2), loans and advances (A3), and fixed assets (A4). As shown in table 3, the pooled regression result shows that all assets, except fixed assets, have positive effect on commercial banks profitability. In other words, assets management has positive effect on commercial banks profitability. This finding is coincides with the findings of Vasiliou (1996), Asiri (2007), Sufian and Habibulah (2009), Miller and Noulas (1997), and Ali *et al.* (2011) who found that assets management has positive effect on commercial banks' profitability.

From the asset items loans and advances variable have significant contribution to the creation of commercial banks profit at 0.01 level of significance. This is consistent with theory and empirical evidence. Other things being constant, Naceur *et al.* (2003) explained that more deposits are transformed into loans for earning interest incomes from borrowers. The higher the interest rate margins, the higher the profits and banks are able to shield themselves against hazards of credit risk resulting from adverse selection and moral hazard. Kosmidou *et al.* (2004) found loans and advances were the asset items which create profitability difference between domestic and foreign banks.

All other items of assets have no significant effect on commercial banks profitability. Except for fixed assets variable, they have positive effect on profitability. This result is found because the spread commercial banks realize from the difference between rate of return from loans and advances and rate of cost of deposits is significant. As a result, loans and advance can be the major source of profitability for commercial banks in Ethiopia.

The only asset item variable which has negative coefficient, though insignificant, is the fixed assets which implies that fixed assets have negative relation with commercial banks profitability. Although this finding is in line with Asiri (2007), it contradicts the finding of Kosmidou *et al.* (2004) where they found a positive relation between fixed assets and profitability.

As Kosmidou *et al.* (2004) found, large banks have more emphasis on reducing fixed assets in order to generate profit. In contrast to this finding, Ethiopian commercial banks are incurring significant costs to acquire fixed assets in order to gain depositors reliability. This will magnify the opportunity cost difference between rent and acquisition of fixed assets. In the long run where commercial banks become large, the effect of fixed assets may change.

The parameter α_0/ATA is positive and significant indicating diseconomies of scale. As Kosmidou *et al.* (2004) found a positive significant constant show the existence of diseconomies of scale. Therefore, in the Ethiopian commercial banking market there is no significant cost difference between large and small banks during the study period although the average total assets size ranges from 66,820.5 (in millions) in CBE to 5,274 (in million) in UB in 2010.

Regarding the liability variables, the explanatory variables are decomposed as current deposit (L1), saving and fixed deposit (L2), and other liabilities and credit balances (L3). This decomposition is done by considering the characteristics of the liability and its maturity. Commercial banks' share capital and retained earnings have not been taken into consideration since it can be assumed that its rate of cost is zero (Kosmidou *et al.*, 2004).

As shown in table 3, the pooled OLS regression analysis result shows that all liabilities have negative effect on commercial banks profitability. As it was hypothesized by Hester and Zoellner (1966), the SCA model as a regression model assumes that rate of cost on liabilities is negative and varies across liabilities. The result found from the observation of eight commercial banks in the period of 2005 – 2010 reveal that banks profitability is negatively affected by liabilities. In other words, liability management has negative effect on the Ethiopian commercial banks profitability.

The result presented in table 4.2 shows that the saving and fixed deposits and other liabilities and credit balances variables are significantly costing the profitability of commercial banks in the Ethiopian financial market at 0.1 level of significance. It may be because saving and fixed deposits are the only big base sources of funds while other liabilities and credit balances are costly source of funds since they have too narrow base. This might be happened because commercial banks are in a simple logic that they accept deposits with short term maturities from a large number of individuals and grants loans with long term maturities to a small number of borrowers. As a result, they hold large amount of saving and fixed deposits than their counter parts such as micro finance institutions, saving and credit associations and the like. That might be why they are incurring significant costs on their saving and fixed deposits. And also probably, it is the only big base source of fund available for commercial banks to finance their assets than the other forms of liabilities.

Nevertheless current deposit variable do not significantly cost the profitability of commercial banks. This might be because commercial banks in the country do not pay interest for current deposits. This finding is in contrast to the finding of Kosmidou *et al.* (2004) who found that liability management affect positively in creating profitability difference among domestic and foreign banks. Recently, Asiri (2007) found that assets management positively and liability management negatively related to the profitability of commercial banks.

Table 3: Pooled OLS regression result

ROA	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
A1	.0333322	.0224744	1.48	0.146	-.0121649	.0788293
A2	.0095676	.0145893	0.66	0.516	-.0199669	.039102
A3	.0494292	.0117355	4.21	0.000*	.0256718	.0731865
A4	-.003068	.1827806	-0.02	0.987	-.3730881	.366952
L1	-.0165925	.0226817	-0.73	0.469	-.0625092	.0293242
L2	-.0430796	.0193108	-2.23	0.032**	-.0821723	-.0039869
L3	-.0420708	.0218657	-1.92	0.062***	-.0863356	.002194
GDP	-.6291626	.1699912	-3.70	0.001*	-.9732918	-.2850334
INF	-.0004752	.011432	-0.04	0.967	-.0236182	.0226677
_cons	.1157945	.0232292	4.98	0.000*	.0687693	.1628196

Number of Observations = 48
 F(9, 38) = 4.63
 Prob > F = 0.00004
 R-Squared = 0.5231
 Adj. R-Squared = 0.4102
 *, **, *** = Significant at 0.01, 0.05, and 0.1, respectively

Source: Panel Data Estimation, 2005-2010

Regarding the two macroeconomic variables, which were incorporated in the modified SCA model to examine the effect of macroeconomic variables on the profitability of commercial banks, table 3 presented that both real growth rate in GDP and general rate of inflation affect profitability of commercial banks negatively. But real growth rate in GDP has significantly affected at 0.01 level of significance. Real growth rate in GDP is expected to influence numerous factors related to the supply and demand for loans and deposits. Favorable economic conditions will affect positively on the demand and supply of commercial bank services, but will have either positive or negative effect on commercial banks profitability (Sufian and Habibullah, 2009). As a result, real growth rate in GDP will have negative effect on commercial banks profitability.

The negative and insignificant relation between profitability and general rate of inflation exist either because bank managements may not be able to well anticipate the future rate of inflation or it may be happened unexpectedly. This might be because bank management's ability to predict inflation accurately can positively affect the profitability of the bank as the bank can adjust interest rates in the desired direction in order to increase profit, where as failure to accurately predict inflation could raise costs due to imperfect adjustment of interest rates and thus adversely affect bank's profit.

Generally, by employing the SCA model, this study was conducted in the Ethiopian commercial banking market and it was found that assets management, mainly, loans and advances, contributes positively while liability

management particularly saving and fixed deposits and other liabilities and credit balances cost negatively the profitability of commercial banks. This finding is consistent with the assumptions of SCA model which was developed by Hester and Zoellner (1966). It states that the SCA model as a regression model assumes that the rate of return on earning assets is positive and varies across assets, and the rate of cost on liabilities is negative and varies across liabilities.

4. Conclusions

The basic purpose of this study was to empirically examine the effect of ALM on commercial banks profitability in Ethiopia by employing the SCA model. A balanced panel data of eight commercial banks for the period between 2005 and 2010 were used. By adopting the pooled OLS method, the regression results were estimated and the forthcoming conclusions were drawn.

The empirical findings of this study provide evidence that the profitability of commercial banks in Ethiopia is positively affected by assets management, except for fixed assets; which is negatively affected by liability management.

Specifically, the loans and advances have significant effect on the profitability of commercial banks when profitability is measured as the ratio of operating income to ATA. All other asset variables have no significant effect on commercial banks profitability. This implies that the asset base of commercial banks in Ethiopia is too narrow. They cannot be able to generate income from alternative sources. Particularly, the other investments and debit balances variable is not as important as in the case of other countries. Assets portfolio investment on bonds, commercial papers, and the like do not exist because of unavailability of related markets like money, capital, bond, equity, and the like markets.

Although the other asset variables are not able to generate income for the Ethiopian commercial banks, loans and advances are making significant contributions toward profitability. This leads us to generalize that the spreads realized from loans and advance in the Ethiopian commercial banking market is attractive. This might be the reason that currently more and more commercial banks are being opened.

The parameter α_0/ATA is positive which indicates diseconomies of scale. As Kosmidou *et al.* (2004) find a positive significant constant show the existence of diseconomies of scale. Therefore, in the Ethiopian commercial banking market there is no significant cost difference between large and small banks during the study period.

From the liability variables the saving and fixed deposits and other liabilities and credit balances variables significantly cost the profitability of commercial banks. The significance of the cost of saving and fixed deposits is related to its greater amount in the commercial banks source of funds. It may not have any implication on the costliness of this source of fund. As a result, the performance of commercial banks is related to its ability to attract individual depositors.

The current deposits variable has negative and insignificant effect on commercial banks profitability. That is because commercial banks are receiving better service charges on current deposits that can cover the liquidity requirement costs on its off-balance sheet activities.

The macroeconomic variables incorporated in this study model were the real growth rate in GDP and the general rate of inflation. They have negative effect on commercial banks profitability. The real growth rate in GDP has

significant negative effect because its effect is depending on the economic conditions prevalent in the economy. Favorable economic condition will affect positively on the demand and supply of commercial banking services and profitability.

When the general rate of inflation is considered, it has a negative effect on profitability although it is insignificant. This factor depends on the predicting ability of commercial bank management's. If predictions become correct, such adjustments in interest rates could be incorporated in inflation expectation, to achieve higher profits. In this case, the effect to bank profitability becomes positive. A positive relationship between inflation and bank profitability would suggest that banks are able to project the effect of inflation expectations in their operational costs to increase profits. From this conclusion, if the forecast is incorrect, the effect of inflation on bank's profitability could be negative or less significant.

In general, assets management, mainly loans and advances, contributes positively for the profitability of commercial banks, except fixed assets. While liability management, particularly saving and fixed deposits and other liabilities and credit balances, cost negatively the profitability of commercial banks. Therefore, in the Ethiopian commercial banking market, assets management positively and liability management negatively affect profitability.

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