



Determinants of Liquidity in Ethiopian Commercial Banks: Evidence from Panel Data Analysis

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Abstract

Liquidity reflects the capability of commercial banks to fund asset growth and meet obligations as they mature without incurring losses. Accordingly, the main aim of this study is to examine the determinants of liquidity within the context of Ethiopian commercial banks. To achieve this objective, the researcher employed a purposive sampling technique to select eleven commercial banks in Ethiopia, analyzing audited annual reports and data from the National Bank of Ethiopia covering the period from 2013/14 to 2022/23. Grounded in a positivism knowledge claim, a quantitative approach was applied to the continuous data. Furthermore, because individual banks may differ in organizational culture or management quality, a random effects (RE) regression technique was utilized for the empirical analysis. The findings reveal that capital adequacy, loan growth, deposit mobilization, money supply, and GDP growth have statistically significant effects on bank liquidity. Specifically, capital adequacy and deposit mobilization exert a positive impact. These variables carry important practical implications for bank management. Based on these insights, it is suggested that Ethiopian commercial banks optimize their liquidity by maintaining adequate capital, launching aggressive deposit mobilization campaigns, and aligning with contractionary monetary policy. Ultimately, this study contributes unique value to the existing literature by expanding both the sample size to eleven commercial banks and the number of observations, while introducing money supply (M2) as a fresh explanatory variable.

Keywords: *Liquidity, commercial banks, capital adequacy, deposit mobilization*

1. Back ground of the study

Commercial banks are really important in finance. They help people who have money to save and they use that money to help people who need it to start a business or do something useful. This helps create jobs and makes the economy grow. Commercial banks are like a bridge, between people who have money and people who need money. They make sure that people can pay for things easily. In countries that are still developing commercial banks are even more important because they are the way that people get money to start businesses. Commercial banks help these countries grow and become stronger.(World Bank, 2023; IMF, 2024).

Among the aspects of bank performance managing liquidity is very crucial for a bank's financial health and stability. The Bank for International Settlements (BIS, 2023) defines liquidity as a bank's ability to pay its debts on time without making losses. Commercial banks take short-term deposits. Give long-term loans, which create a mismatch in the duration of their assets and liabilities and this exposes them to liquidity risk. Maintaining the amount of liquidity is key to balancing making profits and staying financially stable. If a bank does not have liquidity it may struggle to pay its debts and face financial difficulties. On the hand having too much liquidity can also be a problem because it means the bank is not investing in assets that can give higher returns. The Bank for International Settlements and the Basel Committee on Banking Supervision emphasizes the importance of finding the balance, in liquidity management. (BIS, 2023; Basel Committee on Banking Supervision, 2023).

The importance of liquidity management has really grown after global financial troubles and new stricter bank rules. Banks need to manage liquidity so they can handle sudden funding problems keep depositors trusting them follow rules and keep lending money when the economy is uncertain. If banks do not manage liquidity properly they may struggle to give customers their money when they want it which can cause problems in the system and increase risk to the whole system (IMF, 2024; Basel Committee on Banking Supervision, 2023).

The Ethiopian financial system is mostly made up of banks. The National Bank of Ethiopia (2024) said that commercial banks have 96.1% of the total assets in the country's financial sector. This means that the Ethiopian financial system is really dependent on how the banking industry is doing. The banking sector has been doing okay far. However some recent checks, on

stability have found some problems. These problems are related to liquidity. Some banks have many deposits, mismatched maturity dates and not enough money to handle transactions. The Ethiopian financial system faces these challenges. These issues show that it is really important to manage liquidity risk. This will help keep the system stable and support economic growth that can be sustained over time (National Bank of Ethiopia, 2024).

Researchers are paying attention to how banks manage the money they have on hand. It is still important to figure out what makes banks have less money available. Some studies say that things like how capital a bank has how profitable it is and how big it is can affect how much money a bank has. They also say that things like inflation and how well the economy is doing can affect a banks money situation. When you look at the results of these studies they are not always the same in different countries and situations. This means that what affects a banks money situation can be different depending on the country. So it is an idea to look at each country separately to understand what is going on with bank liquidity as seen in the work of Yitayaw, (2021); Diriba, (2022). Bank liquidity is an issue and bank liquidity is something that needs to be studied closely. The factors that affect bank liquidity are not the same and bank liquidity can be very different, in different places (Yitayaw, 2021; Diriba, 2022).

In Ethiopia, empirical evidence on the determinants of commercial banks' liquidity remains relatively limited, particularly in light of recent financial sector reforms, regulatory changes, and evolving macroeconomic conditions. Given the dominant role of commercial banks in Ethiopia's financial system and the growing emphasis on financial stability, examining the determinants of bank liquidity is essential for informing regulatory policy and improving banks' liquidity management practices. Therefore, this study investigates the bank-specific and macroeconomic factors affecting the liquidity of Ethiopian commercial banks with the objective of providing evidence-based recommendations for policymakers, regulators, and bank managers.

Their results were inconsistent towards the effect of capital adequacy, profitability, size of the bank, non-performing loan, loan growth and deposit mobilized. This study contributes to the existing body of knowledge by adding new variables money supply (M2) in addition to the above common variables, because Ethiopian commercial banks liquidity is currently less than half of world average and African liquidity level and this reflects, in a liquidity crisis, liquidity problems at individual institutions lead to an acute increase in demand and decrease in supply of

liquidity, and the resulting shortage of liquidity may lead to extended defaults and even bankruptcies.

The author has targeted achieving the following research objectives

- To analyze the trend of Ethiopian commercial banks liquidity
- To examine the effect of external or macro-economic factors on liquidity
- To examine the effect of internal or bank specific factors on liquidity

2. Literature Review

2.1 Concept of Bank Liquidity

Bank liquidity is really important for a bank to be financially healthy and strong. It shows that the bank can pay its debts on time without losing much money. The Bank for International Settlements (2023) says that bank liquidity is about a bank being able to pay for assets and meet its payment obligations quickly and at a low cost. Vodová(2016) also talks about bank liquidity. Says it is the ability of a bank to fulfill its promises like giving customers their money back and lending money at any time. These ideas show that having bank liquidity is necessary for people to trust the bank for the bank to keep working smoothly and for the whole financial system to be stable. Bank liquidity is crucial for banks because it helps them to stay in business and avoid problems. The Bank, for International Settlements (2023) and Vodová (2016) both agree that bank liquidity is essential for banks to operate properly.

2.2 Theoretical literature reviews

Liquidity Preference Theory

The Liquidity Preference Theory is a way of understanding why people and businesses like to have money that they can use easily John Maynard Keynes(1936). The Liquidity Preference Theory says that people like to have assets because they need them for everyday things for emergencies and because they think they might be able to make some money from them someday. People like to have money that they can use easily because it helps them pay for things they need to buy it helps them deal with unexpected problems and it lets them take advantage of

good investment opportunities that might come up. Banks like to have assets too because they need to be able to give people their money when they want it.

The Liquidity Preference Theory is very important these days. This is because banks are not as sure about what will happen in the future as they used to be. There are a lot of things that are making it hard for them to know what to do like changes, in financial markets the fact that more people are doing their banking online and new rules that the government is making them follow as said by Allen et al.,(2023) and Mishkin& Eakins (2024). The Liquidity Preference Theory helps us understand what is going on with the banks and the Liquidity Preference Theory.

Commercial Loan Theory

The Commercial Loan Theory says that banks should mostly give short term loans to people who make and sell things. These loans are good because they get paid back when the things are sold. This way banks have money to give to people who want to take their money out. The Commercial Loan Theory also says that banks should give loans to people who have things to sell or who are doing business with people. When these people sell their things or finish their business they can pay back the loan (Rose & Hudgins, 2023; Saunders & Cornett, 2023). Even though the Commercial Loan Theory is old it is still useful. It helps us understand how loans and bank money work together. The Commercial Loan Theory is important, for understanding how banks work with the Commercial Loan Theory and how it affects the banks money (Rose & Hudgins, 2023; Saunders & Cornett, 2023)..

Shiftability Theory

The Shiftability theory says that banks liquidity depends on how it can sell its assets. According to the theory banks can stay liquid by holding high-quality securities that can be sold or used as collateral quickly without losing money. Banks liquidity is good if there are markets where it can sell these securities. The Shiftability Theory is the basis for modern ways banks manage liquidity especially under the Basel III rules. These rules tell banks to keep high-quality assets that can be easily turned into cash during problems. However this theory assumes that markets stay liquid during crises. This might not always be true during big financial disruptions (BIS, 2023; Rose & Hudgins 2023).

The Anticipated Income Theory

The Anticipated Income theory is about how banks can lend money to people and businesses. It says that banks should look at how much money borrowers will make in the future. This is more important than how it will take to pay back the loan or how easy it is to sell the assets that the loan is based on. The Anticipated Income Theory says that banks can give out loans for an long period of time. The people or businesses that borrow the money must have a steady income that they can use to pay back the loan. This way the bank will get its money back on a basis. The bank does not have to rely on selling assets only giving out short term loans (Mishkin & Eakins, 2024; Saunders & Cornett, 2023).

The Anticipated Income Theory is very important in banking. It helps banks to lend money to types of people and businesses. For example banks can give out mortgage loans, consumer loans, agricultural loans and investment loans. The theory is also helped by ways of checking credit risk and predicting cash flow. This means that banks can lend money safely.

The Anticipated Income Theory is one of four theories that help us understand how banks manage their money. The other theories are the Liquidity Preference Theory, the Commercial Loan Theory and the Shiftability Theory. Each theory looks at a part of how banks work. The Liquidity Preference Theory looks at why people want assets. The Commercial Loan Theory looks at how long loans are given out for. The Shiftability Theory looks at how assets can be sold. The Anticipated Income Theory looks at how borrowers can repay their loans (Mishkin & Eakins, 2024; Saunders & Cornett, 2023).

All of these theories together help us understand how banks make decisions, about lending money and managing their liquidity. They help us see what determines how money a bank has and how it uses that money.

2.3 Empirical Literature review

According to Jaafar et al. (2024), the main sources of liquidity risk includes; on the side of liability, there is a huge uncertainty from the volume of withdrawals of depositors or the rolled

over of inter-bank loans, on the side of asset, there is an uncertainty on the volume of new customer requests for loans that the bank will receive in the future, and off-balance sheet items, like credit lines and other commitments taken by the bank. Among liquidity ratios, liquid assets to total assets ratio is most commonly used measures of liquidity as it informs on the split between liquid and illiquid asset (such as loans) on the bank's balance sheet (Jaafar et al. 2024).The global economy report released about the liquidity of banks in different countries measured using Bank liquid assets to deposits and short-term funding, 2021¹.Measurement of Bank's Liquidity takes place in many different ways; hence, to meet the objectives of this study, the researcher used the proxy liquid assets to Deposit ratio to measure liquidity of Ethiopian commercial banks because of clear reflectiveness and uniformity with the banker's database, also liquid assets of each banks for some period of time are not available to use liquid asset to deposit and short term borrowing.

The liquidity position of banks is affected by numbers of determinant factors, which are classified in different ways. Several researchers like El-Chaarani (2019). use the classification made in two major groups namely internal, firm or bank specific and external or macro-economic factors. Few researchers like that of El-Chaarani, (2019; Yitayaw, (2021) and Jaafar et al., (2024)noted the classification of such factors in to three groups by dividing external factors in to two namely industry related and macro-economic factors. The researcher also classifies such determinants of liquidity of banks in to two, bank specific/internal and macro-economic/external factors by following the above researchers to make clear and precise classification and to be uniform with most researchers.

Capital Adequacy is one of the factors that significantly affect bank liquidity (Jaafar et al., 2024). It comprises paid-up capital, undistributed profit (retained earnings), legal reserve or other reserves and surplus fund that are kept aside for contingencies.Profitability accounts for the impact of better financial soundness on bank risk bearing capacity and on their ability to perform liquidity transformation (Jaafar et al., 2024; Tall &Niang, 2023).As to Yitayaw, (2021) and Jaafar et al., (2024).as size grows it will help them to overwhelm the risk which is similar to economies of scale but also it should be noted that as a firm grow in turn it may leads to failures.Since loans are illiquid assets by nature, rise in the loans amount means increase in

illiquid or non-current assets in the asset portfolio of a bank. The amount of liquidity held by banks is highly affected by customers' desire for loan and it is the cause for loan growth (Tall & Niang, 2023; Jaafar et al., 2024). On the other way if the interest rate spread increases, the liquidity rate increases (Jaafar et al., 2024). Moreover, higher inflation rates deteriorate overall macroeconomic conditions and lower liquidity (Vodová, 2016). Finally Money supply is the stock of all assets that are generally acceptable as medium of exchange within an economy of a particular country at a particular time which is mainly included as part of the research as a new variable.

Several studies examined factors affecting liquidity at different scales – at country or regional level. For instance, Vodova (2016) conduct the research mainly to identify important determinants of Slovakia commercial banks liquidity. In order to meet its objective the researcher included both the bank specific and macro-economic variables and their data for the period from 2001 to 2009. The result denotes that; bank liquidity decline due to financial crisis, heavy bank profitability, higher capital adequacy and the size of banks while liquidity is measured by lending function of banks rise following the growth of gross domestic product or GDP and decline with the more unemployment. The remaining variables have no statistically significant effect over the liquidity of commercial banks in Slovakia.

All researches conducted both In Ethiopia and abroad revealed the impact of various determining variables and their effects. In this research, the researcher plans to incorporate the effect of money supply as an external factor of liquidity which is never employed as an independent variable.

3. Formulation of Hypotheses

This study creates its hypotheses using the Liquidity Preference Theory, Commercial Loan Theory, Shiftability Theory and Anticipated Income Theory. These are supported by studies, on bank liquidity. Each hypothesis is carefully explained using theory and evidence. The hypotheses are based on how banks work and the economy's condition.

Capital Adequacy and Bank Liquidity

Capital adequacy shows how well a bank can handle losses and keep depositors trusting the bank during hard times. According to the Shiftability Theory and Basel III rules banks with capital are in a better position to have enough liquidity. Diriba (2022) Yitayaw (2021) and Jaafar et al. (2024) all found a link between capital adequacy and liquidity. With these mixed results banks in Ethiopia have to follow strict rules that encourage both strong capital and good liquidity. So this study expects that capital adequacy will have an effect on bank liquidity.

H1: Capital adequacy has a positive effect, on the liquidity of commercial banks.

Profitability and Bank Liquidity

The Liquidity Preference Theory says that banks that make profit can save more liquid money by keeping their earnings. This suggests that profit and liquidity go up together. Tall and Niang (2023) found that profit and liquidity go up together. On the hand some experts think that banks that make a lot of profit will invest more in loans and other things that give high returns. Diriba (2022) and Jaafar et al. (2024) Found that they do not go up together.

H2: Profitability has a negative effect, on the liquidity of commercial banks.

Bank Size and Liquidity

Large banks have ways to get money, a good reputation and easy access to markets where they can borrow. This helps them to have liquid assets. However some people think that big banks might not need to keep much liquid assets because they think the government will help them if they get into trouble. Some studies, like Jaafar et al. (2024) Found that bigger banks have liquidity. Others found no effect or even a negative effect. In the case of banks bigger banks are likely to have more liquidity because of how they get their funding.

H3: Bank size has a positive effect on the liquidity of commercial banks.

Loan Growth and Bank Liquidity

When a bank gives out loans it has less money that it can use right away. This is because loans are not as easy to turn into cash as things the bank owns' like cash it-self or stocks and bonds. So

when a bank lends a lot of money quickly it can get into trouble if it needs cash fast. This is called a liquidity risk. Some people have studied this. They think that when banks lend more money they have less liquidity. This has been shown in a lot of studies like the ones done by Diriba in 2022 and Tall and Niang in 2023. Even if a bank gets a lot of deposits loan growth is still likely to cause problems with liquidity.

H4: Loan growth has a negative effect, on the liquidity of commercial banks.

Net Interest margin and Bank Liquidity

The net interest margin shows how banks decide to lend money and what they do with their assets. When banks want to make money from interest they usually put more of their resources into loans instead of keeping a lot of liquid assets (Jaafar et al., 2024; Tall & Niang, 2023). This means they have money available to use when they need it. Some people think that making money from interest is a good thing because it helps banks save up more liquid assets. For banks in Ethiopia, which focus on lending money we think the opposite is true.

H5: Net interest margin has a big negative effect on liquidity

Deposit Mobilization and Bank Liquidity

People put their money in banks. That is how banks get the money they need to work. This money is the basis of how banks have cash to do things. The Anticipated Income Theory says that when banks have a supply of money they can give people their money back when they need it and still lend money to people who want to start businesses. Many studies have found that when banks get more people to deposit their money the banks have cash available. Yitayaw (2021) did studies on this. Overall we think that when deposit mobilization happens it helps the liquidity of banks.

H6: Deposit mobilization has a positive effect, on the liquidity of commercial banks.

National Bank of Ethiopia Bill Purchase Requirement and Bank Liquidity

The National Bank of Ethiopia requires banks to buy its bills. This means that commercial banks have to use some of their money to buy these bills. The National Bank of Ethiopia bills does not give a lot of money back to the banks. So when commercial banks buy the National Bank of Ethiopia bills they have money to use for other things like lending to people or managing their day to day funds(National Bank of Ethiopia, 2024). The National Bank of Ethiopia made this rule to help the country develop. It actually makes it harder for commercial banks to manage their money. This rule is likely to reduce the liquidity level of commercial banks.

H7: The National Bank of Ethiopia bill purchase requirement has significant negative effect

Inflation and Bank Liquidity

Inflation affects how much people and businesses want to borrow money and also affects banks' ability to get funds. When inflation is high people and businesses may want to borrow money and the value of the money in peoples accounts may go down. This can make it hard for banks to have liquid assets. On the hand banks might increase interest rates to attract more deposits, which can help with liquidity. Studies have found results about how inflation affects bank liquidity. In Ethiopia inflation has been a problem for a time(International Monetary Fund, 2024; Tall &Niang, 2023). Because of this this study thinks that inflation will have an effect on the liquidity of commercial banks.

H8: Inflation has a negative effect, on the liquidity of commercial banks.

Money Supply and Bank Liquidity

When there is money around banks have more funds to work with and this can make it easier for them to do business at first. When the money supply grows banks start lending more money, which means they have fewer liquid assets left after a while. This is what usually happens with banks in Ethiopia. When they get money they lend more of it out. So in the end having money around is likely to make things tougher for banks(International Monetary Fund, 2024; World Bank, 2024).

H9: The money supply has a big negative impact on liquidity of commercial banks.

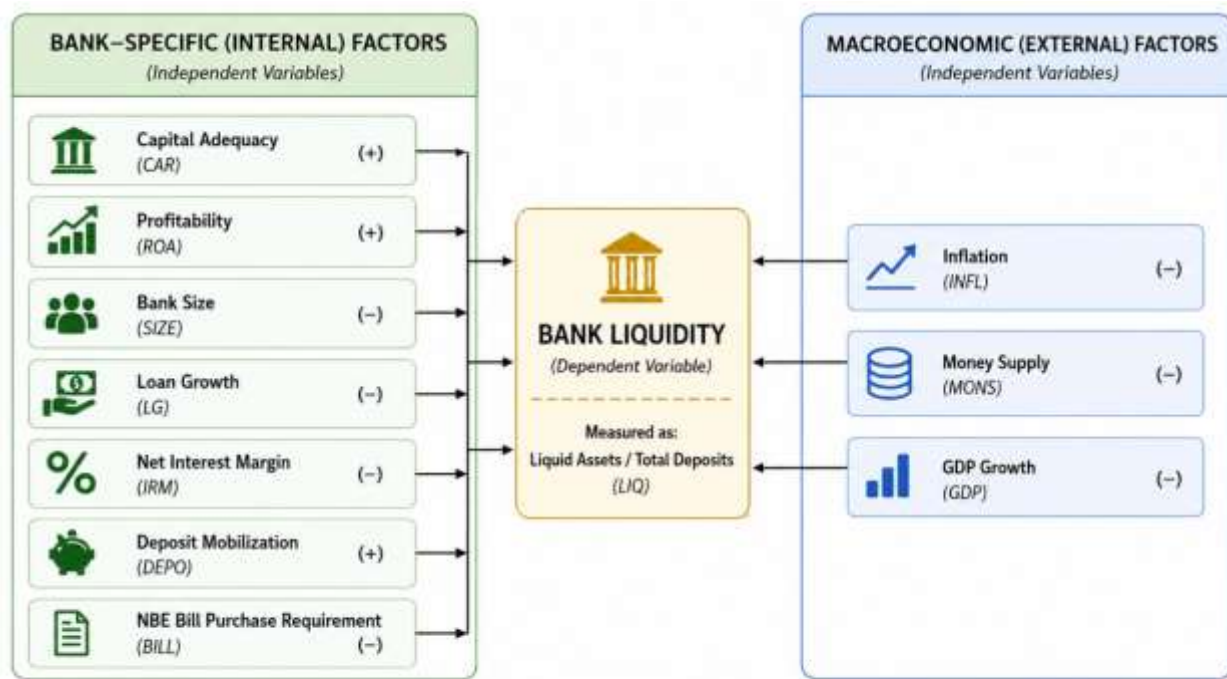
Economic Growth/GDP and Bank Liquidity

When the economy is doing well people have money to invest and they need to borrow more from banks. So banks give out loans to make more money, which means they have less money set aside. When the economy is really strong people also put more money into banks, which can actually help the banks have more money provided/lend(Jaafar et al., 2024; Yitayaw, 2021).This study is looking at how banks in Ethiopia act when it comes to lending money.

H10: GDP growth will have a big negative effect on liquidity of commercial banks

Conceptual framework

Figure 1: Conceptual framework of the determinants of liquidity of commercial banks.



Source: Developed by the author based on Keynes (1936), Saunders and Cornett (2023), Mishkin and Eakins (2024), Jaafar et al. (2024), Yitayaw (2021), and Diriba (2022).

4. Research Methodology

4.1 Data, variables and model specification

4.1.1 Data

The study relies on balanced panel dataset of 11 commercial banks operating in Ethiopia spanning the period 2013/14-2022/23G.C were collected from audited annual report of each commercial banks and annual report of national bank of Ethiopia for analysis. Those 11 commercial banks are selected purposively in order to get the data of 10 years and above with high market share. All commercial banks in Ethiopia are not included because of data constraint and market share or profitability measure. Panel dataset is considered to have advantages over time series and cross-sectional dataset methodology. As (Wooldridge, 2020), the advantages of using panel data set is; first and most importantly, it can address a wide range of issues to tackle more complex problems than would be possible with only pure time series or only pure cross sectional data. Second, it is generally of interest to scrutinize how variables, or the link between them, change dynamically over time by mixing cross sectional and time series data, we can increase the degrees of freedom and thus the power of the test by using information from the dynamic behavior of a large number of individuals at the same time.

4.1.2 Variables and model specification

The dependent variable in this study is liquidity(LIQ) of commercial banks in Ethiopia measured by the proxy of Liquid assets to Deposit ratio and the independent variables of this study were capital adequacy(CAR) as a Total equity to total assets ratio(Jaafar et al., 2024), profitability(ROA) as Net income after tax to total assets(Jaafar et al., 2024). As per (Yitayaw, 2021; Tall & Niang, 2023) bank size(SIZE) as a Natural log of total asset of the bank, loan growth(LG) computed as Annual growth rate of gross loans and advances to customers(Jaafar et al., 2024). Interest rate margin(IRM) as computed Annual lending rate less deposit rate (Tall & Niang, 2023)., NBE bill purchase requirement(BILL) measured by the Natural logarithm of total NBE bill Purchased(National Bank of Ethiopia, 2024)., inflation(INFL) by the proxy Annual general inflation rate or percentage change in CPI(International Monetary Fund, 2024), money supply(MONS) measured by M2: cash, checking deposits, and easily-convertible near money converted to Natural logarithm(International Monetary Fund, 2024), GDP growth rate the growth rate of real GDP of the country and Deposit mobilized(DEPO) as a deposit growth rate of bank i at time t (Jaafar et al., 2024; Yitayaw, 2021).

Determinants of Liquidity in Ethiopian Commercial Banks

Variable	Symbol	Measurement	Exp. sign
Liquidity	LIQ	Liquid assets to Deposit ratio	
Capital adequacy	CAR	Total equity to total assets ratio	+
Profitability	ROA	Net income after tax to total assets	-
Bank size	SIZE	Natural log of total asset of the bank	+
Loan growth	LG	Annual growth rate of gross loans and advances to customers	-
Interest rate margin	IRM	Annual lending rate less deposit rate	
Deposit growth	DEPO	Deposit growth rate of bank i at time t	+
NBE bill purchase	BILL	Natural logarithm of total NBE bill Purchased	-
Inflation	INFL	Annual general inflation rate or percentage change in CPI	-
Money supply	MONS	M2: cash, checking deposits, and easily-convertible near money converted to Natural logarithm	-
GDP growth	GDP	Annual real GDP growth rate	-

Accordingly, our econometric model is as follows:

$$y_{it} = \alpha_0 + \sum \beta_k x_{k, it} + \varepsilon_{it} \dots \dots \dots \text{Eq.1}$$

Where y_{it} = the dependent variable (i.e. Liquidity of banks i at time t), $x_{k, it}$ = the independent variables of the study, α_0 = intercept/constant term, β_k 's (β_1 – β_{10}) = parameters estimated/coefficients of the explanatory variables, i = the cross section, t = time series dimension, ε_{it} = the error term, and Σ = Summation.

Hence, the general models which incorporated all of the variables will be as follows:

$$LIQ_{it} = \alpha_i + \beta_1(CAR_{i,t}) + \beta_2(ROA_{it}) + \beta_3(SIZE_{i,t}) + \beta_4(LG_{i,t}) + \beta_5(IRM_i) + \beta_6 (DEPO_{i,t}) + \beta_7 (BILL_{i,t}) + \beta_8(INFL_t) + \beta_9(MONS_t) + \beta_{10}(GDP_t) + \varepsilon_{it} \dots \dots \dots \text{Eq.2}$$

Where, LIQ_{it} : is liquidity of commercial banks i at time t.

4.2 Data analysis technique

The study applies both descriptive and inferential analysis based on Ten Years (20013/14-2022/23) panel data multiple regression models. according to hausman test for this panel data model, the model is better off if random effect model is used since the p-value for the model is 0.99, which is greater than 0.05(significant). To be more efficient we conduct Breusch and Pagan Lagrangian multiplier test for

random effects to consider pooled OLS as an alternative model. According to the result, we reject pooled OLS model and select random effect model because the Breusch and Pagan Lagrangian multiplier test for random effects result revealed that, $\text{Prob} > \chi^2_{(1)} = 0.0002$ is less than the significant level of 0.05 so using random effect model is preferable.

Hausman (1978) specification test

	Coef.
Chi-square test value	1.057
P-value	0.99

Source: STATA15 output results and own computation 2025

Bruesch and Pagan Lagrangian Multiplier test for random test

Breusch and Pagan Lagrangian multiplier test for random effects

$$LIQ[ID,t] = Xb + u[ID] + e[ID,t]$$

Estimated results:

	Var	sd = sqrt(Var)
LIQ	.0084228	.0917756
e	.0033799	.0581366
u	.0022066	.046975

Test: $\text{Var}(u) = 0$

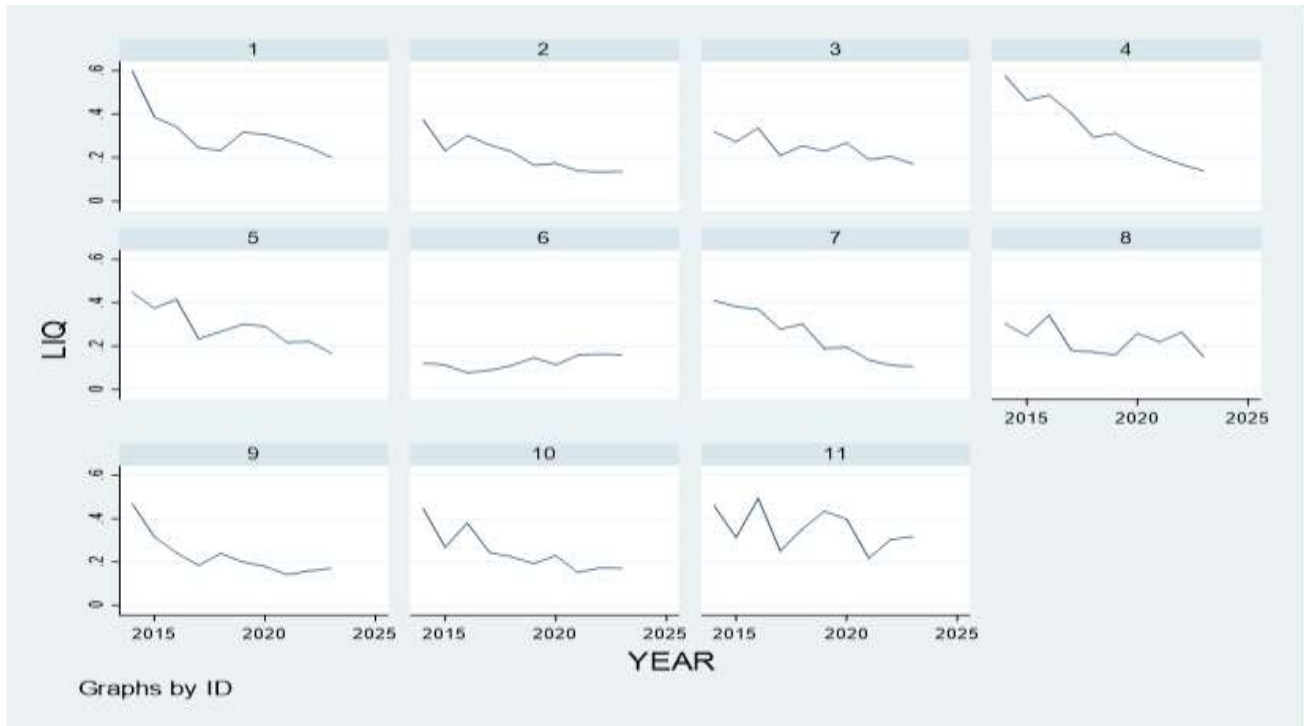
$$\begin{aligned} \chi^2_{(1)} &= 12.48 \\ \text{Prob} > \chi^2_{(1)} &= 0.0002 \end{aligned}$$

Source: STATA15 output results and own computation 2025

In addition, testing assumptions of classical linear regression model (CLRM) such as normality, multicollinearity, heteroscedasticity and autocorrelation are fit to continue the research analysis.

5. Results and Discussions

Figure I trend analysis of Ethiopian commercial banks liquidity



Where ID Number is stated below:1=Abay Bank 2=BoA 3=Awash Bank 4=Berhan Bank 5=Bunna Bank 6=CBE 7=Dashen Bank 8=Lion Bank 9=Nib Bank 10=United Bank and 11=Zemen Bank

Generally, the overall observation of liquidity status of Ethiopian commercial banks was collected from annual audited reports, which cover the period from 2014 to 2023 and combine eleven (11) selected commercial banks. The above graph shows that, liquidity of Ethiopian commercial banks is collectively diminishing time to time. The only exceptional liquidity is shown in Commercial Bank of Ethiopia, relatively stable level of liquidity.

5.1 Descriptive statistics

As shown in Table 1 below, the mean value of the Ethiopian commercial bank, liquidity was 0.258 for the period of 2014-2023. This implies that, Ethiopian commercial banks were achieved 0.258 of average liquidity during the given period of time. It was additionally noticed that the bank liquidity was fluctuating between 0.078 and 0.6. The standard deviation for the bank's liquidity was 0.109 or 10.9 percent. This confirms that there were low varieties of liquidity among Ethiopian commercial banks during the study period, because the standard deviation for the bank's liquidity was below the mean.

([Table 1 here])

5.1.1 Normality test

The classical normal linear regression model assumes that each u_i is distributed normally with zero Mean and constant variance (Wooldridge, 2020). There are various methods to assess whether the data is normally distributed or not. Among those methods the researcher used Jarque-Bera test due its well-knowingness. According to this method, if the probability values (p value) for Jarque-Bera test less than alpha of 0.05, the Jarque-Bera test will be statistically significant, and the null hypothesis will be rejected in favor of the alternative. Rejecting the null hypothesis implies that, the residuals are not normally distributed, the inverse is also true.

jb residuals: Jarque-Bera test for H_0 : normality:

Jarque-Bera normality test: 1.511 Chi(2) 0.4698

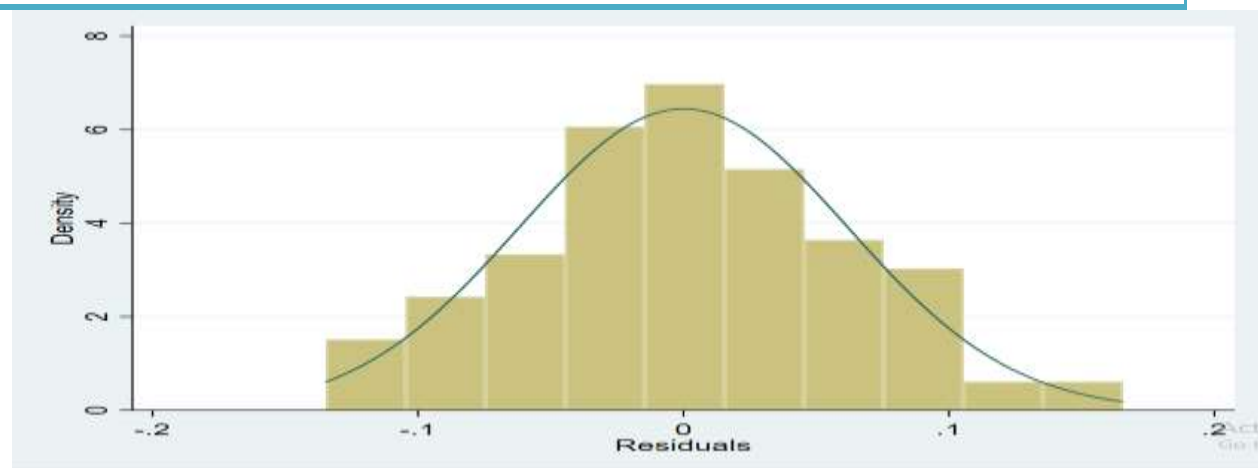
Source: STATA15 output results and own computation 2022

A skewness/Kurtosis test for Normality on STATA15 is also run to examine fitness of the model normality in terms of skewness and kurtosis. The result revealed that, the model is normal with probability of skewness, kurtosis and prob. chi square valued 0.6143, 0.6837 and 0.8086 respectively.

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj_chi2(2)	Prob>chi2
residuals	110	0.6143	0.6837	0.42	0.8086

Source: STATA15 output results and own computation 2025



Source: STATA15 output results and own computation 2025

5.1.2 Test for Heteroskedasticity assumption ($\text{var}(\text{ut}) = \sigma^2 < \infty$)

The homoskedasticity assumption of classical regression model states that, the variance of the unobserved error, u , conditional on the explanatory variables, is constant. Homoskedasticity fails whenever the variance of the unobserved factors changes across different segments of the population, where the segments are determined by the different values of the explanatory variables (Wooldridge, 2020). even if there are numerous of methods to detect the existence of heteroscedasticity, the researcher used Breusch-Pagan / Cook-Weisberg test for heteroskedasticityby converting LIQ to log form.

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of $\ln\text{LIQ}$

$\chi^2(1) = 0.56$

$\text{Prob} > \chi^2 = 0.4546$

Source: STATA15 output results and own computation 2025

Based on the above table 4.5, Both the chi square and Prob. Chi-Square test statistics provided the same conclusion that, there is no significant evidence for the existence of Heteroscedasticity the chi square Value of 0.56 and the Prob. Value Chi-Square 0.4546 Indicate that, there was homoscedasticity in the model. Since the p-values in all of the cases were over 0.05, the null hypothesis of homoscedasticity is failed to reject at 5 percent of significant level.

5.1.3 Test for Autocorrelation assumption ($\text{cov}(u_i, u_j) = 0 \text{ for } i \neq j$)

The Breusch–Godfrey test is one of the ways to test for autocorrelation problem in the errors in the regression model. It uses the residuals from the model being included in a regression analysis, and a test statistic is derived from these. This autocorrelation is tested from first order differentials or first order derivative of the data collected to avoid initial autocorrelation problem on the model.

H0: no serial correlation

Test of serial correlation

Number of gaps in sample: 10 Breusch-Godfrey LM test for autocorrelation chi2	Df	Prob>Chi2
1.723	1	0.189
<i>Source: STATA15 output results and own computation 2025</i>		

Based on the above Table 10 the Breusch-Godfrey Serial Correlation LM Test of Prob>Chi2 valued 0.189 makes the model fit, because Prob>Chi2 of 0.189 is greater than the significant value of 0.05 or 5 percent. This indicates that the absence of serial correlation with in errors term in the model. So, fail to reject null hypotheses which says, there is no serial correlation with in errors term in the model.

5.2 Correlation results

The correlation matrix examines the relationship between the variables of the study using Pearson correlation coefficient. When the correlations between two or more independent variables were (too) high, the problem of multicollinearity occurs (Wooldridge, 2020).

The correlation matrix in the table 2, demonstrate that a positive relationship between liquidity (dependent variable) and explanatory factors (capital adequacy, profitability, loan growth, deposit mobilization and GDP). On other side, there was a negative relationship between liquidity and the explanatory variables bank size, interest rate margin, NBE bill purchase, inflation and money supply.

Therefore, in this study correlation matrix for nine independent variables of the study shown below in the table had been estimated. From the result of the following correlation matrix table, the highest correlation value of -0.887 was observed between deposit and loan growth. According to (Wooldridge, 2020) argument, that correlation coefficient below 0.9 may not cause serious multicollinearity problem. We can accept or tolerate this correlation, besides; we also consider the VIF test result of the variable (refer table 3 below), which is very good to accept the correlation matrix.

([Table 2 here])

([Table 3 here])

5.3 Regression results

Table 4 provides a summary of the regression results on the relationship between explained variable liquidity of commercial banks in Ethiopia and ten independent variables were regressed using econometric software STATA15.

As displayed in table 4 the overall R-squared coefficient of 0.672 resulted from the estimated model Demonstrated that 67.2 percent of the variation in the liquidity (LIQ) of commercial banks in Ethiopia was explained by the selected explanatory variables.

Based on the regression result below, the case and effect relationship among dependent variable (LIQ) and explanatory variables (CAR, ROA, SIZE, LG, IRM, DEPO, INFL, BILL, MONS, GDP) was displayed as follow.

$$\text{LIQ} = 2.151^{0.344} + 0.914^{0.404*} \text{CAR} + 0.153^{1.242*} \text{ROA} - 0.021^{0.017*} \text{SIZE} - 0.158^{0.053*} \text{LG} - 1.641^{1.555*} \text{IRM} + 0.187^{0.06*} \text{DEPO} - 0.003^{0.016*} \text{BILL} - 0.002^{0.003} \text{INFL} - 0.086^{0.023*} \text{MONS} - 0.02^{0.01*} \text{GDP} + \epsilon$$

([Table 4 here])

6. Discussion and Conclusion

6.1 Discussion

The regression results show that Ethiopian commercial banks are influenced by two things: the banks themselves and the overall economy. The model we used explains how these banks manage their money through things like how capital they have how profitable they are, how big they are, how many loans they give out what kind of interest rates they offer, how well they get people to deposit money what the National Bank of Ethiopia requires them to do inflation, the amount of money in circulation and how well the economy is doing.

When we look at how capital the banks have we see that it is a good thing for them to have a lot. This is because the capital they have the more liquid they are. In words they have more money that they can use to deal with unexpected problems. The number we found was 0.914 with significant effect at 5%, which means that for every unit of capital the bank has they can increase their liquidity by about 0.914 units. The result also agrees with recent empirical evidence

carried out by Diriba (2022), Yitayaw (2021), and Jaafar et al. (2024). This makes sense because banks that have a lot of capital are stronger and can handle problems more easily.

We also found that banks that are profitable tend to have more liquidity ($\beta = 0.153$). However, this relationship is not very strong. This means that just because a bank is making a lot of money does not mean they will have a lot of liquidity. It is not a very reliable number.

The size of a bank also has an effect but it is not strong enough to be important. This is shown by the numbers, where the effect's is $\beta = -0.021$, $p = 0.212$. The negative sign means that bigger banks usually keep a little money in their reserves. This is probably because they have ways to get money and can use other banks for help. The fact that the relationship is not strong means that the size of a bank does not really explain why some banks in Ethiopia have more money available than others in line with the finding of Yitayaw (2021). Bank size does not seem to be a factor, in understanding why this happens with Ethiopian commercial banks.

The loan growth rate has a negative effect on banks liquidity. It was found to be -0.158 is highly significant with a p-value of 0.003 . This means that when banks lend more they have liquid assets for every one unit increase in loan growth liquidity goes down by 0.158 units. This finding agrees with the Commercial Loan Theory and with the empirical finding of Diriba (2022), Yitayaw (2021). The loan growth rate really impacts the banks' ability to manage liquidity.

The interest rate margin has an effect but it is not significant with estimated coefficient of -1.641 . The p-value is 0.291 , which means it is not statistically significant. El-Chaarani, (2019; Yitayaw, (2021) reflects this is probably because they are using their money to make loans and other investments instead of keeping it in liquid assets.

Deposit mobilization (DEPO) shows a positive and highly significant effect on liquidity ($\beta = 0.187$, $p = 0.002$). When a bank is good at getting people to deposit their money it has money to lend and can meet people's demands to withdraw their money. Deposits are the way that banks get the money they need to operate so when more people deposit their money it helps the bank to have enough money on hand. The idea that having a source of money is important for banks to have enough liquidity is supported by what we found out about deposit mobilization. This idea is also supported by the Anticipated Income Theory and the finding of Diriba (2022), Yitayaw

(2021), which says that having a source of money, is the foundation of being able to manage how much money a bank has to lend.

The National Bank of Ethiopia bill purchase requirement has an effect on liquidity but it is not significant ($\beta = -0.003$, $p = 0.848$). When Ethiopian commercial banks have to buy National Bank of Ethiopia bills they have money to lend to people and manage their cash. The National Bank of Ethiopia bill purchase requirement did not really affect how much cash Ethiopian commercial banks had during the study period (International Monetary Fund [IMF], 2024). This is probably because Ethiopian commercial banks are good, at changing what they invest in and how they get money to make up for the National Bank of Ethiopia bill purchase requirement. The National Bank of Ethiopia bill purchase requirement is something that Ethiopian commercial banks have to deal with. It does not affect their cash situation that much.

When we look at inflation we see that it has an effect, on things but it is not a strong effect with ($\beta = -0.002$, $p = 0.607$). The numbers show that inflation does not really change how money banks have to hold supported by Diriba (2022). This is because banks can change the interest rates they charge and how they manage their money when inflation goes up. So even though inflation is happening the banks can still control how much money they have. Inflation or the rate at which prices go up is something that banks have to deal with. They can adjust to inflation, which means it does not directly affect how money they have to lend.

The money supply has a negative impact on liquidity of Commercial banks. When the money supply goes up it really reduces the amount of money that banks have. This is very important to know. The numbers ($\beta = -0.086$, $p < 0.001$) show that for every bit that the money supply goes up the banks money goes down by a lot and this is not just a little bit it is a very big deal (International Monetary Fund [IMF], 2024). So what is happening here is that when there is money floating around banks want to lend it out so they take the money they have and they make loans with it which means they have less money just sitting around.

Finally GDP growth affects liquidity in a way and its significant ($\beta = -0.020$, $p = 0.046$). This means that when the economy grows stronger banks tend to lend more. The number we found was -0.020 which means that for every unit of economic growth the banks liquidity decreases by

about 0.020 units. As a result they release liquid assets on loan and their liquid asset level will be reduced. This result conforms the finding of Diriba (2022), Yitayaw (2021), during economic times banks focus on making more money. They do this by giving out loans. This action then leads to liquidity levels decrement.

Overall our results show that Ethiopian commercial banks need to have capital and deposits to be liquid. They also need to be careful about how loans they give out and how much money is, in circulation. By doing these things they can manage their liquidity. Be more stable. The National Bank of Ethiopia and other regulators should pay attention to these things to make sure that the banks are safe and sound.

6.2 Conclusion

The main objective behind this study was to uncover determinants of liquidity in Ethiopian commercial banks. Ten variables were examined to determine their effect on liquidity of commercial banks in Ethiopia. Based on the regression analysis, the following conclusion has been provided;

The trend analysis of this study shows, the amount of liquidity level of each sampled commercial banks shows ups and downs movements, Which means in some period of time there was high liquidity level recorded by some commercial banks and in some period of time there was low amount of liquidity recorded by those commercial banks. This was because of the fluctuation of some explanatory variables.

Also the trend analysis showed that, there is a general downward movement of liquidity level in most banks. Generally, from 2014 to 2023, the liquidity status of most banks were declining and declining.

The regression analysis of this study showed that, capital adequacy ratio, loan growth, deposit mobilization, money supply and GDP growth has significant effect on liquidity of Ethiopian commercial banks (CAR and GDP at 5% significant level).

Even if some variables, have significant and the remaining have insignificant effect on liquidity of commercial banks; Capital adequacy ratio, profitability and deposit mobilization were positively affecting liquidity of commercial banks. But, other variables had negative effect.

Based on the regression analysis, both Bank-specific factors and macro-economic factors are important determinant of commercial banks liquidity, but comparatively Bank-specific factors have dominant effect. Among those five significant variables (namely; capital adequacy ratio, loan growth, deposit

mobilization, money supply and GDP growth), three of them are bank specific factors the remaining two factors are macroeconomic determinants.

6.3.Recommendations

Based on what we have found in the study, here are some suggestions pointed by the researcher:

- ✓ Commercial banks can make their capital base stronger by keeping earnings being careful with dividend payments and having enough capital.
- ✓ Banks should try to get deposits via reaching to more customers improving online banking and offering attractive deposit options.
- ✓ Bank managers need to be careful with lending. They should watch loan growth closely so that it does not hurt liquidity and balance making a profit with being liquid.
- ✓ The National Bank of Ethiopia should keep an eye on money supply and the economy. When there is money and the economy grows banks lend more and liquidity suffers.
- ✓ Commercial banks should keep high-quality liquid assets and test their liquidity often especially when the economy is growing fast and money policy is loose.
- ✓ Even though some factors like profitability, bank size and inflation did not affect liquidity in our study, bank managers and policymakers should still watch them. Changes in rules and the economy can make them important later.
- ✓ Future studies should look at factors cover a longer period and compare Ethiopian banks with others in developing countries.

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Appendices

Table 1: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
LIQ	110	.258	.109	.078	.6
CAR	110	.133	.034	.042	.213
ROA	110	.025	.006	.007	.04
SIZE	110	23.675	1.403	20.937	27.622
LG	110	.388	.248	.041	1.86
IRM	110	.07	.004	.065	.077
DEPO	110	.326	.226	-.005	1.957
BILL	110	21.768	1.054	18.984	23.875
INFL	110	12.63	4.442	7.4	20.2
MONS	110	13.139	.627	12.152	14.114
GDP	110	8.65	1.521	6.1	10.4
<i>Source: STATA15 output results and own computation</i>					

Table 2: Pairwise Correlation Results

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) LIQ 1.000											
(2) CAR	0.594	1.000									
(3) ROA	0.399	0.343	1.000								
(4) SIZE	-0.736	-0.809	-0.407	1.000							
(5) LG	0.166	0.238	-0.001	-0.307	1.000						
(6) IRM	-0.164	-0.092	-0.111	0.120	0.042	1.000					
(7) DEPO	0.240	0.226	-0.100	-0.285	0.887	0.043	1.000				
(8) BILL	-0.681	-0.530	-0.453	0.807	-0.357	0.121	-0.348	1.000			
(9) INFL	-0.260	-0.095	-0.254	0.330	0.046	-0.047	0.004	0.316	1.000		
(10) MONS	-0.596	-0.182	-0.444	0.544	-0.036	0.200	-0.053	0.689	0.594	1.000	
(11) GDP	0.310	0.135	0.297	-0.379	-0.038	-0.225	0.006	-0.392	-0.880	-0.683	1.000
<i>Source: STATA15 output results and own computation</i>											

Table 3: VIF Test of multicollinearity

	VIF	1/VIF
SIZE	8.217	.122
GDP	7.282	.137
INFL	6.297	.159
DEPO	5.295	.189
LG	5.185	.193
BILL	4.852	.206
CAR	4.445	.225
MONS	3.939	.254
ROA	1.573	.636
IRM	1.486	.673
Mean VIF	4.857	.
Source: STATA15 output results and own computation		

Table 4: Random effect GLS regression result

LIQ	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
CAR	.914	.404	2.26	.024	.123	1.706	**
ROA	.153	1.242	0.12	.902	-2.281	2.588	
SIZE	-.021	.017	-1.25	.212	-.055	.012	
LG	-.158	.053	-2.97	.003	-.261	-.054	***
IRM	-1.641	1.555	-1.06	.291	-4.69	1.407	
DEPO	.187	.06	3.13	.002	.07	.303	***
BILL	-.003	.016	-0.19	.848	-.034	.028	
INFL	-.002	.003	-0.51	.607	-.008	.005	
MONS	-.086	.023	-3.81	.000	-.131	-.042	***
GDP	-.02	.01	-2.00	.046	-.04	.000	**
Constant	2.151	.344	6.25	.000	1.476	2.826	***
Mean dependent var		0.258		SD dependent var		0.109	
Overall r-squared		0.672		Number of obs		110	
Chi-square		178.751		Prob> chi2		0.000	
R-squared within		0.633		R-squared between		0.756	
*** $p<.01$, ** $p<.05$, * $p<.1$							
Source: STATA15 output results and own computation							