Innovations

Macroeconomic Determinants of Commercial Banks Deposit Growth in Ethiopia: A Panel Analysis

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Abstract

The study examined macroeconomic determinants of bankdeposits growthby using Fixed Effect model (FEM) of 10 commercial banks over the period thirteen years (2008-2020). The study used relevant data from a sampled commercial banks and national bank of Ethiopia. Co-integration test was applied to estimate long run correlation among dependent and independent variables. And the Johnson co-integration test showed that, there was long run co-integrating relationship among the variables.A unit root test was also approved out using Levin, Lin and Chu test and variables have no unit root at level and first difference at 5% level of significance. Hausman test was made and fixed effect model was appropriate rather random effect model for this study. Finally,FEM results bring out allmacroeconomic/external determinants significantly influence the deposits growth including GDP, INR, EXR, PCI and UNR of commercial banks in Ethiopia.

Keywords: 1.Commercial banks 2.Fixed effect model 3.Deposits Growth 4. GDP 5.INR 6. EXR 7. PIC& UNR

Introduction

Deposits are the heart of banks. They play an authoritative role in economic development in both developed and developing countries to channel fund to business and individuals, particularly in Ethiopia. Granting of loans and advance and channeling savings to the corporate sector is mostly possible if the banks have accumulated sufficient deposits (Zewdu, 2014).

Banks mobilized deposits from the businesses, individuals and public.Thus, deposits with the bank grow along with the interest earned and essential for a bank as oxygen for human beingZelalem, 2020). To enhance profitability, banks take steps to minimize the expenditure and are forced to mobilize low cost deposits.

In Ethiopia, commercial banks are the most important financial intermediaries in the economies that provide a bundle of different services. As financial intermediaries, banks play a crucial role in the operation of most economies. The efficiency of financial intermediation can also affect economic growth.The Ethiopian banking system has conventionally occupied an important position in Ethiopia

financial system which is based on universal banking framework that legally authorizes commercial banks to service various kinds of activities in financial markets. Most of transactions and activities of money and capital markets are carried out by banks and the banking sector is most important mechanism to finance economic growth.

Factors affecting commercial bank deposits are divided into two, namely macroeconomic and bank specific factors. External factors are the factors that are not controlled by the bank management and internal factors are factors that are controlled by the bank.Macroeconomic factors include inflation, real interest rate, population growth of the country, per capita income, economic growth (as measured by real GDP), consumer price index, money supply, and shocks and others. Bank specific factors include liquidity, profitability, number of commercial bank's branches, bank size, reserves, loan loss provisions, asset quality, and transaction cost and others. The endogenous factors include awareness of the society, convenience of the bank's office and services in the bank.Nwe(2019) described macroeconomic factors rather than bank specific factors are significantly influenced banking sectors deposit growth. The study found that real interest rate, real GDP per capita, money supply and exchange rate have and significant effect on the deposits growth of banks. As macroeconomic and legal environment changes, determinants of deposits growth banking sector might change as well.

In Ethiopia, several studies e.g. Fikadu(2018), Abera(2019), Zelalem(2020) and Tolessa(2021) tried to examine the impact of both external and internal factors on deposit mobilization. They found inconstant results.Looking at the deposit growth trends of the commercial banks as shown below figure 1, its growth rate is not as expected which has been fluctuating(down/ up) from year to year due to macroeconomic factors. Additionally, as researcher knowledge, there were no studies done on macroeconomic determinants of deposit growth of commercial banks in Ethiopia separately. Therefore, this paper attempts to examine the macroeconomic determinants (gross domestic product, inflation, exchange rate, unemployment and per capita income)that had substantial effect on theof the deposits growth of commercial banks in Ethiopia over the period 2008-2020.

Figure 1: Deposit Growth Trend (2008-2020)
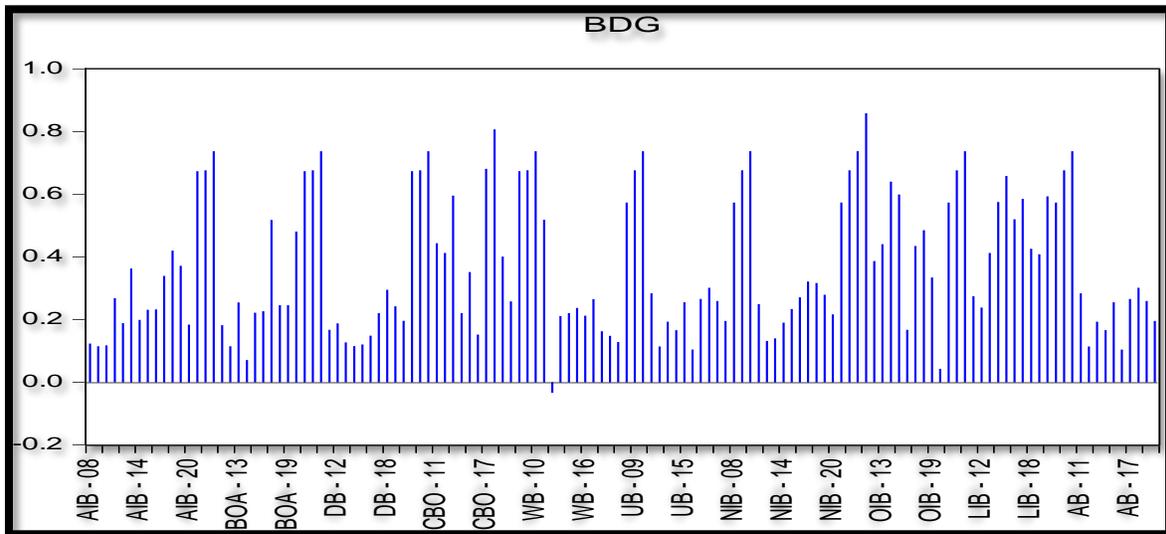
Source: EVIEWS 9.0 outputs

Objectives of the Study

The primary objective of this study was to scrutinizemacroeconomic determinants ofdeposit growth of commercial banksinEthiopia.The specific objectives of the study include:

› To assess the effect of GDPon deposits growth of commercial banks in Ethiopia.
› To determine the effect of inflation rateon depositsgrowth of commercial banks in Ethiopia.
› To know how exchange rate affects deposits growth of commercial banks in Ethiopia
› To see the effect of per capita income on Ethiopian commercial banks' deposit growth.
› To explain the significant impact of unemployment rate on depositsgrowth of commercial banks in Ethiopia.

Research Hypothesis

In order to achieve the objective of the study, five numbers of hypotheses were tested regarding the macroeconomic determinants of deposits growth in Ethiopian commercial banks. Based on different empirical research and theoretical reviewed made, the following testable hypotheses were formulated as follows:

H1:GDP has negative and significant influence on commercial banks deposit growth in Ethiopia.

H2: Inflation rate has negative and significant impact on deposits growth of Ethiopian commercial banks.

H3: Exchange rate positively and significantly related to commercial banks deposit growth in Ethiopia.

H4: Per capita income haspositive and significant impact on deposits growth of commercial banks in Ethiopia

H5: Unemployment rate has negative and significant impact on deposits growth of commercial banks in Ethiopia.

Literature Review on Macroeconomic Determinants of Deposits

Nathanael (2014) analyzed the influence of macroeconomic factors on bank's deposits in Nigerian banks. The economic analysis result showed that bank investment, interest rate and the general price level are significantly influence the bank deposit. Shemsu(2015), Akaninyenan(2018) and Seyte et al.(2018) found inflation rate, gross domestic product and foreign investment were positively influenced deposits.

On the other hand, Solomon et al(2016) and Reneta(2016) found inflation and GDP were inversely correlated to deposits. Apart from the above findings, Tseday(2017) and Ketema (2017) established GDP and inflation rate have insignificant impact.Correspondingly, Islam et al.,(2019)in Bangladesh put insignificant impact of GDP and inflation rate. The same results by Azolibe(2019) in Nigeria also revealed inflation rate, GDP, exchange rate and unemployment rare were statistically insignificant influence on deposits.

Similarly, Nwe (2019) found that real interest rate, real GDP per capita and exchange rate have a positive and significant effect on the deposit mobilization of private banks. Contrary results Also,Ibrahim and Aziza (2020) examined the factors determining bank deposit growth in Turkey. The results revealed that broad money supply, economic growth, and inflation are significant

determinants of deposit growth in the long run. In the same year, Ayodeji et al., (2021) used ARDL approach and estimated determinants of deposit in Nigeria banks. It was found that inflation rate and GDP exerted significant effecton bank deposit.

Conceptual Frame Work

The study revealed five critical external variables that are significantly influences the deposits growth of commercial banks in Ethiopia from the year of 2008-2020.

Figure 2 . Conceptual Frame Works
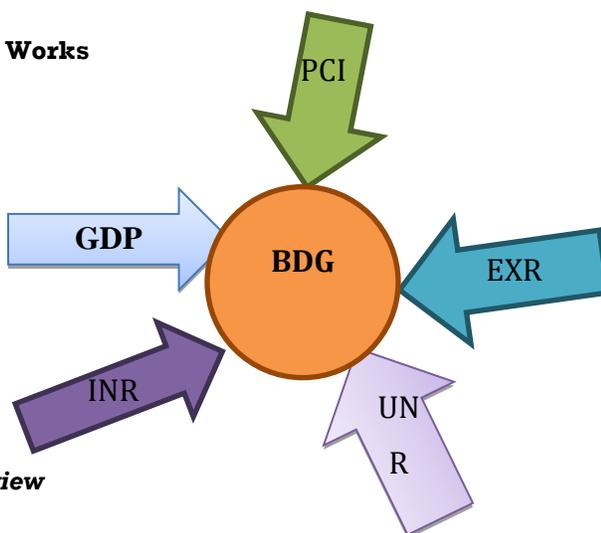
Source: Literature Review

Research Methods

1. **Data and Sample**

Secondary data was gathered from National Bank of Ethiopia (NBE) and ten commercial banks annual reports which covers the period of thirteen (13) years (2008-2020 G.C).

Table1: Lists of sampled commercial banks

No	Bank	Year of Est.	Age
1	Awash Bank S.C	1994	27
2	Dashen Bank S.C	1995	26
3	Bank Of Abyssinia S.C	1996	25
4	Wegagen B S.C	1997	24
5	United Bank S.C	1998	25
6	Nib Bank S.C	1999	24
7	Oromia Bank S.C	2008	13
8	Commercial Bank of Ethiopia	1963	58
9	Cooperative Bank of Oromia	2005	16
10	Lion Bank S.C	2006	15

Source: National bank of Ethiopia Annual report 2019/2020

2. **Data Analysis Methods**

The important financial and statistical tools, and methods used for the analysis are descriptive statistics and fixed effect regression analysis. Secondary data was collected and analyzed using MS-Excel and E-VIEWS 9.

3. **Econometric Model Specification**

Hausman test was applied and the study used fixed effect regression model to assess macroeconomic determinants of deposits growth of commercial banksin Ethiopia. According to this model, bank deposits growth is a function of growth domestic product, inflation rate, exchange rate, per capita income and unemployment rate. The model is, therefore, stated below as:

$$BDG_{i,t} = \alpha_0 - \beta_1 GDP_{i,t} - \beta_2 INF_{i,t} + \beta_3 EXR_{i,t} + \beta_4 PCI_{i,t} - \beta_5 UNR_{i,} + \varepsilon_{i,t} \dots\dots\dots\dots\dots\dots(1)$$

Where:

BDG = Banks deposit growth (Annual percentage changes in the total bank deposits)

GDP=Annual percentage change of real GDP

INR= Annual percentage changes in the consumer price index (CPI)

EXR= Exchange rate (Domestic currency (ETB) to Foreign currency ($))

PCI= Per Capita Income (GDP/Total population

UNR= the number of unemployed people in the country to the total number of workers

ε- Error term, t-Sampled period, i -Sampledcommercialbanks

α_0- Intercept and $\beta 1$ to β_5- coefficients of the external factors

4. **Variables Definition and Measurements**

In the empirical study, in order to analyze the determinants of commercial banks deposit growth, five macroeconomic variables were encompassed, one of them is the dependent variable (BDG) and the others were macroeconomic determinants of bank deposits growth.

Dependent Variable

Bank Deposit Growth

In the literature, banks deposit, typically measured by annual percentage changes in the total bank deposits. Deposits are defined as the main source of banks funding and are the lowest cost of funds. The more deposits are transformed into loans, the higher the interest margin and profits.

Independent Variables

1. **Gross Domestic Product (GDP)**

The yearly real Gross Domestic Product (GDP) growth rate had been used. Real GDP per capita is calculated by dividing GDP at constant prices by the population of a country.

2. **Inflation rate (INR)**

Inflation is the rise in the general price level of the goods and services. In this study, the inflation rate is the annual percentage change in the consumer price index.

3. **Exchange rate (EXR)**

Exchange rate is the rate at which one currency is being converted in to another currency. The fluctuations of exchange rate can affect banks both directly and indirectly.

4. Per capita Income (PCI)

Per capita income is a measure of the amount of money earned per person in a nation or geographic region. It can be calculated by dividing the country's national income by its population.

5. Unemployment (UNR)

The average income of bank is directly affected by unemployment rate (Laurynas,2018). This impact is considered to influence both the ability of depositors to deposit funds. According to Bolt et al.,(2012), the overall demand for financial services undertaken by banks especially deposits are negatively affected by unemployment.

Table 2: Variables Measurement and Expected sign

Variables		Proxy / Formula	EXPECTED IMPACT
Dependent Variable	Bank Deposit Growth	Annual percentage changes in the total bank deposits	
Independent Variables	Gross domestic product (GDP)	Annual percentage change of real GDP	(-)
	Inflation rate(INR)	Consumer prices (annual %)	(-)
	Exchange rate(EXR)	Domestic currency(ETB) to Foreign currency ($)	(+)
	Per capita income(PCI)	GDP/Total population	(+)
	Unemployment rate(UNR)	Unemployment people/total civilian labor force	(-)

Source: Literature Review

Empirical Results and Discussions
Diagnostic Tests

1. Unit Root Tests

The study was used Levin, Lin and Chu test which became popular for panel analysis.The unit root test is performed at level and first difference I (1).Below table shows, except exchange rate, all other macroeconomic variables were stationary at both level and first difference.

Table 3: Unit Root Test: Levin, Lin & Chu test

Variables			At Level		1st Difference	
			t-statistic	p-value	t-statistic	p-value
B	D	G	-2.53945	0.0056	-3.61215	0.0002
G	D	P	3.53160	0.0004	-5.84303	0.0000
U	N	R	-4.30756	0.0000	-6.77800	0.0000
E	X	R	-4.361402	0.0000	12.12661	1.0000
I	N	R	-3.33518	0.0004	-3.69172	0.0010
P	C	I	-2.71178	0.0033	-5.23446	0.0000

Source: EVIEWS 9.0 outputs

2. Multicollinearity Test

In panel regression analysis, multicollinearity problem arises when the correlation between independent variables becomes plain. In order to investigate multicollinearity problem, the study

calculated the variance inflation factors (VIF) for all independent variables. The results of VIF shows all the independent variables encompassed in the model are less than 10 which specify that there is no Multicollinearity problem between the independent variables.

Table 4: The variance Inflation Vector

Variables	V i f
G D P	9 . 8 8 9 9 5
I N R	6 . 4 7 6 2 3
E X R	7 . 2 9 8 5 8
U N R	4 . 6 2 6 8 8
P C I	5 . 3 3 1 4 0

Source: EVIEWS 9.0 Outputs

3. Heteroskedasticity Test

The table (5) presents, both F-statistics and Obs*R-squared version of test gives the same conclusion that there is no evidence for the presence of heteroscedasticity since the p-value in all of the cases were greater than **0.05.**

Table 5: Breausch-Pagan-Godfrey Test			
F-statistic	0.179240	Prob. F(5,124)	0.9700
Obs*R-squared	0.932824	Prob. Chi-Square(5)	0.967
Scaled explained SS	1.623780	Prob. Chi-Square(5)	0.8984

Source: EVIEWS 9.0 Outputs

4. Co-Integration Test

Kao Co-integration test used to estimates the long run relationship between bank deposit and it determinants using the Johansen maximum likelihood method and since the p-value is less than 0.05, there is co-integration among all variables.

Table 6: Kao Residual Test

			t-Statistic	Prob.
A D F			-4.039358	0.0000

Source: EVIEWS 9.0 Outputs

5. Autocorrelation Test

CLRM assumes that autocorrelation does not exist in the disturbances. Table(7) shows both F-statistics and Obs* R- squared version test gives that there is no autocorrelation problem among explanatory variables since p- value in both tests are greater than 0.05.

Table 7: Breusch-Godfrey Test

F-statistic	25.74828	Prob. F(2,122)	0.15600
Obs*R-squared	38.58609	Prob. Chi-Square(2)	0.16020

Source: EVIEWS 9.0 Outputs

Descriptive Statistics

Descriptive measures used in this study are mean, median, maximum, minimum and standard deviation. The below table 3 showed that the mean value of BDG is 0.368904 and the minimum and maximum value is -0.033450 and 0.859367 respectively with the volatility ratio of 0.218465. The average level of EXR is 20.60 % which ranges from 15% to 31.34% with median value and standard deviation as 19.07% and 4.9% respectively. The average GDP is 5.68%. Similarly, the average UNR, INR and PCI of sampled banks were 13.84%, 12.96% and 3.52% respectively.

Table 8: Descriptive Statistics

	BDG	EXR	GDP	UNR	INR	PCI
Mean	0.368904	20.60129	5.676627	13.84375	12.95767	3.516876
Median	0.277274	19.07480	5.876927	13.90654	9.700000	3.884342
Maximum	0.859367	31.34270	5.997936	19.38322	34.10000	4.325187
Minimum	-0.033450	15.00518	4.875061	8.504153	7.400000	1.758716
Std. Dev.	0.218465	4.898572	0.429240	3.252992	7.388188	0.980236
Obs.	130	130	130	130	130	130

Source: EVIEWS 9.0 Output

Correlation Analysis

The study used Pearson correlation coefficient to establish the relationship between dependent variable and explanatory variables of commercial banks in Ethiopia. Besides, correlation coefficient helps us to detect the strength of their relationship. It also shows positive or negative association among themselves. The correlation output shows negative association amongst GDP, INR and UNR and whereas PCI and EXR were positively related to BDP (see table 9).

Table9: Pearson Correlation matrix of dependent and independent variable

Variables	B D G	G D P	E X R	I N R	P C I	U N R
B D G	1	-0.61437843	-0.29977960	-0.36786312	-0.60903283	-0.443014213994
G D P	-0.61437843374	1	0.639501449	0.32078355	0.99597402	0.817308594649
E X R	0.29977960422	0.63950144	1	0.12441276	0.65523934	0.658440605281
I N R	-0.367863121524	0.32078355	0.12441276	1	0.36018271	-0.044954821399
P C I	0.609032837865	0.99597402	0.65523934	0.36018271	1	0.784599587286
U N R	-0.443014213999	0.81730859	0.65844060	-0.04495482	0.78459958	1
Variables	B D G	G D P	E X R	I N R	P C I	U N R
B D G	1	-0.61437843	-0.29977960	-0.36786312	-0.60903283	-0.443014213994
G D P	-0.61437843374	1	0.639501449	0.32078355	0.99597402	0.817308594649
E X R	0.29977960422	0.63950144	1	0.12441276	0.65523934	0.658440605281
I N R	-0.367863121524	0.32078355	0.12441276	1	0.36018271	-0.044954821399
P C I	0.609032837865	0.99597402	0.65523934	0.36018271	1	0.784599587286
U N R	-0.443014213999	0.81730859	0.65844060	-0.04495482	0.78459958	1

Source: EVIEWS 9.0 outputs

Hausman Specification Test

Hausman test is a statistical test to select whether the most appropriate fixed effect or random effect model is used. The Hausmen test hypothesis is:

✓ **H0**= Random effect model is appropriate and **H1**= Fixed effect model is appropriate

Table 8 below shows Hausman specification test, the P-value is 0.0000 which is less than 5% level of significant level. This implies that, for this research model fixed effect model is more appropriate than random effect model.

Table 10: Hausman Test

Test summary	Chi-sq. statistic	Chi-sq.d.f.	Prob.
Cross-section random	12.635	6	0.0000

Source: EVIEWS 9.0 outputs

Fixed Effect Regression Analysis

Table 11: Regression output

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.876908	0.911719	6.445963	0.0000
GDP	-1.209575	0.217199	-5.568984	0.0000**
INR	-0.005671	0.000943	-6.014642	0.0000**
EXR	0.006323	0.002163	2.923206	0.0042*
PCI	0.323601	0.090682	3.568541	0.0005*
UNR	-0.211808	0.004990	2.366466	0.0196*

R-squared =0.775941   Prob.(F-statistic) = 0.00000

*Notes: * denotes significance at 1% level and ** at 5% level of significance*
Source: Annual report of sampled commercial banks and results are drawn from E-views 9.

The model empirically tested for the dependent variable (BD) was displayed as follows:

$$BDGModel = \alpha_0 - \beta_1 GDP_{i,t} - \beta_2 INR_{i,t} + \beta_3 EXR_{i,t} + \beta_4 PCI_{i,t} - \beta_5 UNR_{i,t} + \varepsilon_{i,t} \text{------} 2$$

$$BDG \ Model = 5.89 - 1.209X_1 - 0.006X_2 + .006X_3 + .324X_4 - .212X_5 \text{..........} 3$$

$$[.912] \quad [.217] \quad [0.0009] \quad [.0022] \quad [.0907] \quad [.005]$$

Table 9show that, R-squared is 0.775941, this means 77.5941% variation of deposits explained by independent variables of the model. The above table shows that P-value of F-statistic is 0.0000 which implies all the macroeconomic factors in the model were jointly significantly influenced bank deposits growth.The coefficient of GDP growth is negative though statistically significant at 1% level of significance, suggesting that economic activities in the long run decrease bank deposits growth in Ethiopian commercial banks.This result is consistent with the findings of Ibrahim &Aziza (2020) and Ayodeji et al., (2021).Furthermore, inflation illustrationsnegative andhighly significant impact on bank deposits growth at 1% level. The finding infers that in periods of high inflation, savers induces to save less amount and households get stable price prediction from deposit. The result conforms to the findings of Mohammad& Mahdi (2010), Akaniyenan (2018), Solomon et al (2016) &Ketema (2017). Among macroeconomic variables, both exchange rate (EXR) and per capita income (PCI) had positive and statistically significant influence on depositsgrowth at 5% level. This designates that increase in EXR and PCI generatesdeposit in bank. This results confirmed by the findings of Ngel(2012), Azolibe (2019)and Azolibe (2019). Finally, unemployment rate (UNR) shows a negative and significant impact on deposit growth of commercial banks. This displays that as a number of joblessness people increases in the country, it directly affects average income and reduces their ability to deposit. This evidence is supported by the findings of Bolt et al.(2012) and Zampara et al.(2017).

Conclusions

Bank depositsgrowth is an integral component of commercial bank operations in every country economy. Recognizing the key external factors affecting deposits growthis essential for banks to formulate workable policies and strategies to mobilize deposits. This study assessed the macroeconomic drivers of commercial banks depositgrowth in Ethiopia. The findings revealed that all macroeconomic factors(GDP (-), INF (-), EXR (+), PCI (+) and UNR (-) were significantly determined the depositsgrowth of commercial banks in Ethiopia.

Limitations and Suggestions for Future Research
- ✓ The study employed only fivemacro-economic determinants of the deposit growth of commercial banks in Ethiopia and there might be other variables that were not held by the model and indeed ought to be incorporated in the future studies.
- ✓ The study used only secondary data of ten(13) years from only thirteen (10) commercial banks.
- ✓ This relatively smaller sample size of banks and study periods might limit the results of the study to generalize for the population.
- ✓ Thus, future studies can be conducted by taking larger sample sizes by increasing both study periods and the number of banks.
- ✓ The focus of the study was only on quantitative (financial) data and non-financial measures which may have influence were not treated and might need further investigation.
- ✓ Therefore, studies can be carried out in the future by taking into account the financial (quantitative) data as well as non-financial (qualitative) aspects of determinants of banks deposits.

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