



SEEK WISDOM, ELEVATE YOUR INTELLECT AND SERVE HUMANITY!

**ADDIS ABABA UNIVERSITY**  
**COLLEGE OF BUSINESS & ECONOMICS**  
**MASTER OF BUSINESS ADMINISTRATION - FINANCE**

The Effect of Telecom Subscribers on Bank's Profitability

**By: Biruk Tilahun Garede**

**Advisor: Dr. Abebe Yitayew (PhD)**

**December 2023**  
**Addis Ababa, Ethiopia**

---

## Statement of Declaration

I declare that this thesis entitled “The Effect of Telecom Subscribers on Banks Profitability” is my original work, prepared under the guidance of my advisor Abebe Yitayew (PhD). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher-learning institution to earn any degree.

Name: Biruk Tilahun Garede

Signature: \_\_\_\_\_



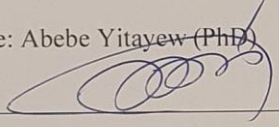
Date \_\_\_\_\_

22/05/24

## Statement of Declaration

This is to certify that, Biruk Tilahun Garede, has carried out his research work on the topic entitled “The effect of Telecom Subscribers on Banks Profitability”. The work is original and is suitable for submission for the award of the degree of Master of Business Administration in Finance at Addis Ababa University.

Advisor Name: Abebe Yitayew (PhD)

Signature:  \_\_\_\_\_

Date 22 - May - 2024 \_\_\_\_\_

**ADDIS ABABA UNIVERSITY**  
**COLLEGE OF BUSINESS AND ECONOMICS**  
**MASTER OF BUSINESS ADMINISTRATION**

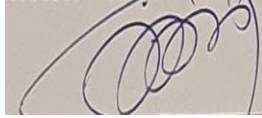
**Statement of Declaration**

This is to certify that the thesis prepared by Biruk Tilahun Garede, entitled “The Effect of Telecom Subscribers on Banks Profitability” and submitted for Partial Fulfilment of the Requirement for the Degree of Master of Business Administration in Finance compiles with the regulations of the University and meets the accepted standards with respect to originality and quality.

Approved by

✓ External Examiner: Abera Demsis(PhD) Signature  Date 30-06-2024

✓ Internal Examiner: Desalegn A(PhD) Signature  Date 02-07-2024

✓ Advisor: Abebe Yitayew (PhD) Signature  Date 22-05-2024

## Table of Contents

List of Tables .....	vii
List of Figures .....	viii
Acronyms.....	ix
Acknowledgment .....	x
<i>Abstract</i> .....	xi
CHAPTER ONE - Introduction .....	1
<b>1.1 Background of the Study</b> .....	<b>1</b>
<b>1.2 Statement of the Problem</b> .....	<b>3</b>
<b>1.3 Objectives of the Study</b> .....	<b>4</b>
1.3.1 General Objective .....	4
1.3.2 Specific Objective .....	4
<b>1.4 Research Questions and Hypotheses</b> .....	<b>5</b>
<b>1.5 Significance of the study</b> .....	<b>6</b>
<b>1.6 Limitations of the study</b> .....	<b>6</b>
<b>1.7 Structure of the study</b> .....	<b>6</b>
CHAPTER TWO: Literature Review .....	7
<b>2.1 Literature Relating Telecommunication and Banking Sectors</b> .....	<b>7</b>
<b>2.2 Literature showing the future expected relationship between Banks and Telecom companies.</b> ....	<b>10</b>
<b>2.5 Conceptual Framework</b> .....	<b>11</b>
CHAPTER THREE: Research Methodology .....	12
<b>3.1 Research Approach Adopted</b> .....	<b>12</b>
<b>3.2 Population Size and Sampling Technique</b> .....	<b>12</b>
<b>3.3 Data Collection, Presentation, and Analysis Techniques</b> .....	<b>14</b>
<b>3.4 Variable Description</b> .....	<b>15</b>
<b>3.5 Model Specification</b> .....	<b>16</b>
CHAPTER FOUR: Result .....	17
<b>4.1. Descriptive Statistics Analysis</b> .....	<b>17</b>
<b>4.2 Trend Analysis of Variables</b> .....	<b>18</b>
<b>4.3 Correlation Analysis</b> .....	<b>23</b>
<b>4.4 Diagnostic Tests - Testing Assumptions of Linear Regression Model</b> .....	<b>24</b>
<b>4.5 Result of Regression Analysis</b> .....	<b>25</b>
<b>4.6 Interpretation of R-Square and Regression Result</b> .....	<b>26</b>
CHAPTER FIVE: Conclusion and Recommendation .....	27

<b>5.1 Conclusion .....</b>	<b>27</b>
<b>5.2 Recommendations .....</b>	<b>28</b>
<b>5.3 Suggestions for Further Studies.....</b>	<b>29</b>
Reference .....	30

## List of Tables

Table 3.1 Descriptive statistics of dependent and independent variables.....	13
Table 3.2 Variables Description .....	16
Table 4.1 Descriptive statistics of dependent and independent variables.....	17
Table 4.2 Correlation Analysis of Dependent and independent variables .....	23
Table 4.3 Regression Analysis with all independent variables .....	25
Table 4.4 Regression Analysis with selected independent variables.....	26

## List of Figures

Fig 3.1 Conceptual Framework .....	11
Fig 4.1 Trend Analysis of Return on Equity .....	18
Fig 4.2 Trend Analysis of Total number of subscribers and mobile network (voice and data).....	19
Fig 4.3 Trend Analysis of Fixed Network Subscribers .....	19
Fig 4.4 Trend Analysis of Inflation.....	20
Fig 4.5 Trend Analysis of GDP .....	20
Fig 4.6 Trend Analysis of Company Size .....	21
Fig 4.5 Trend Analysis of Saving Rate.....	21
Fig 4.4 Trend Analysis of Economic Growth.....	21
Fig 4.7 Comparison of trend analysis with ROE .....	22

## Acronyms

ATM	Automatic Teller Machine
FDSUB	Fixed Data and Broadband Subscribers
FVSub	Fixed Voice Subscribers
GDP	Gross Domestic Product
MDSUB	Mobile Data and Internet Subscribers
MVSub	Mobile Voice Subscribers
NGN	Next Generation Network
ROE	Return On Equity
SMS	Short Messaging Service
TEP	Telecom Expansion Project
TOI	Total Operating Income
TSub	Total Number of subscribers
USSD	Unstructured Supplementary Service Data

## Acknowledgment

I want to thank God and his holy mother, Saint Mary, for all the blessings in my life. I honor and thank my advisor, Abebe Yitayew (PhD), for the multiple reviews, comments, and guidance given to bring this research to its finalization.

I want to thank my loving wife, Mekdes Kassahun, for all the love and support she gave me. This wouldn't happen if it wasn't for her affectionate care and support. በጤና ያኑርሽ የኔ ማር!

And my kids, አቡቴና ኤስሮም, ያሳድጋችሁ!

I also want to thank my mom, dad, sisters, brother, and friends for all the encouragement.

## ***Abstract***

*Telecommunications infrastructure is critical for banks' day-to-day operations. Due to easy access to telecommunication services, online banking transactions have shown a huge increase over the years. Going to bank branch offices is now only for critical issues, as most banking transactions can be held online using different banking applications. Different studies have assessed the effect these applications have on banks' performance like Mobile banking, Internet banking, Mobile money, ATMs, and others. However, limited studies are showing the effects of telecommunication subscribers on banks' performance. This study assessed whether telecommunication subscribers' increase or decrease affects banks' profitability. The study used the last ten years' financial data of Ethiopia's private commercial banks. Telecommunication data was collected from Ethio Telecom. The data collected was analyzed by use of descriptive statistics, and statistical software, Stata. The study found that there is no direct effect of telecommunication subscribers' increase on banks' profitability. The study recommended banks continue focusing on creating efficiencies using the telecommunication infrastructure as the increase in telecommunication subscribers by itself will not result in the bank's profitability.*

***Key Words:*** *Telecommunications, bank profitability, mobile and fixed telecom subscribers, Ethio Telecom*

## **CHAPTER ONE - Introduction**

### **1.1 Background of the Study**

Banks' performance can be evaluated by several financial indicators. Banks are profit-seeking financial entities, and their profitability is a critical measure of their performance. Their profitability indicates how effective they are in managing their income and expenses, and it can be influenced by many internal and external factors. Internally, their management and staff quality, their financial health, their operational efficiency to lower their costing by using technology, and their customer relationship will affect their profitability. Other external factors that are beyond the bank's control include the economic growth, GDP, inflation, and saving rate related to the country they operate in. Political and social factors will also affect their profitability.

One of the critical factors that affect a bank's profitability is its ability to use technology to streamline its operations, create operational efficiency, and reduce costs. The technologies that are implemented are highly interrelated to the telecommunications industry. Banks are the major beneficiaries that base their business on telecom infrastructure. By using this infrastructure, they increased their coverage throughout the country. Broadband internet distribution all over the country helped them open their branch offices all over the country. ATMs use the same network to serve their customers 24/7. The expansion of mobile networks from the first 2G network to the current 5G resulted in the adoption of mobile and internet banking applications. Bank customers can do most bank transactions using these applications without the need to go to bank branch offices. For the first time in Commercial Bank of Ethiopia's history, digital transactions overpassed tellers' transactions in 2023 G.C. (Elias Tegegn, 2023, 7 1). All this is realized due to the telecommunication infrastructure creating efficiency for banks to reduce their operational costs and improve their profitability.

Many studies were done to test the effects of telecommunications on banks' profitability. Different studies took different approaches when referring to the telecommunications industry. Most research was done taking the different applications that are used by banks and created based on the telecommunication infrastructure. This includes mobile banking, internet banking, ATMs, and mobile money. Even though there is a disputing result on ATM effect, others are found to have a positive effect on banks' profitability.

This study investigated the telecommunications industry from the telecommunications subscriber's perspective. When any telecommunication investments are planned, the planning starts by identifying the number of subscribers intended to be covered by the telecom network. Once this is set, further plans can continue to know what should be done to make sure the coverage happens. Once the coverage is met, banks will use the network to automate their operations, increase their efficiency, and reduce their operational costs. With all these interlocks between the telecommunications and banking industries, it can be suggested that telecom infrastructure development, reflected by the increase in telecommunications subscribers, will be reflected in the banking industry's profitability. Every dollar spent to increase the telecom subscribers could also be an investment to increase banks' coverage, improve their efficiency, and overall, increase their profitability. This study's main mission is to check if this is the case.

## 1.2 Statement of the Problem

Banks day to day operations is highly dependent on telecommunications infrastructure to the extent that it seems banks can do nothing without such infrastructures in the background. We see bank branch offices idle for hours due to network problems with complaining customers. This makes us wonder if an improvement in telecommunication services affects banks' profitability. On the other hand, telecommunication companies' main challenge is getting the needed finances to build the telecom infrastructure and increase their number of subscribers in which banks come in handy. Telecom service providers like Ethio Telecom and Safaricom Ethiopia don't have Research & Development facilities and the technologies required to provide telecom services. This is not their main business model. Other telecom equipment suppliers own such technologies and patents like Nokia, Ericsson, Huawei, and ZTE. The financial arrangement with telecom service providers and telecom equipment suppliers is for the telecom equipment suppliers to bring both the technology and the finance. This finance is acquired from bank loans. They install the technology for the service provider, and once completed, the service provider will use these infrastructures to attract and increase their customer base, sell voice and data services, and pay off their debt. It requires huge investment and many years for telecom service providers to see a profit from their investment. In the process, they build a large customer base that can be used for other business models.

Knowing the effect of telecom subscribers on banks' profitability will be a very good reason for banks to enhance their collaboration with telecom companies. It will also motivate them to be open to financing huge telecom-related investments not only by the pure investment opportunity but also by considering its indirect effect on their income.

## 1.3 Objectives of the Study

### 1.3.1 General Objective

Generally, this thesis's objective is to see if the increase in telecommunications subscribers has resulted in the profitability of banks.

### 1.3.2 Specific Objective

Specifically, this study will look deep into telecommunications subscribers and will check if each has a specific effect or not. Different telecom subscribers are available depending on the type of services they are getting from the telecom service providers. Generally, they can be categorized into mobile and fixed subscribers; and then each category will be categorized as mobile and data.

- Identify and analyze the effect of total telecom subscribers on banks' profitability.
- Identify and analyze the effect of telecom mobile voice subscribers on banks' profitability.
- Identify and analyze the effect of telecom mobile data subscribers on banks' profitability.
- Identify and analyze the effect of telecom fixed voice subscribers on banks' profitability.
- Identify and analyze the effect of telecom fixed data subscribers on banks' profitability.
- Identify and analyze the effect of telecom mobile voice subscribers on banks' profitability.

To test the telecommunication effect on banks' profitability, other common important factors should also be taken into consideration. For this study, inflation, GDP, Economic Growth, Saving Rate, and Company Size are included in the model.

## 1.4 Research Questions and Hypotheses

To accomplish its objectives the research is designed to answer some key research questions.

1. Does the number of 'Telecom Total number of subscribers' have an effect on banks' profitability?
2. Does the number of 'Telecom Mobile Voice subscribers' have an effect on banks' profitability?
3. Does the number of 'Telecom Mobile Data subscribers' have an effect on banks' profitability?
4. Does the number of 'Telecom Fixed Voice subscribers' have an effect on banks' profitability?
5. Does the number of 'Telecom Fixed Data subscribers' have an effect on banks' profitability?
6. Does Inflation have an effect on banks' profitability?
7. Does GDP have an effect on banks' profitability?
8. Does Bank Company Size have an effect on banks' profitability?
9. Does Saving Rate have an effect on banks' profitability?
10. Does Economic Growth have an effect on banks' profitability?

The below hypothesis was taken into consideration when doing the research.

- The number of total telecom subscribers has a positive and significant effect on banks' profitability.
- The Number of Mobile Voice subscribers has a positive and significant effect on banks' profitability.
- The Number of Mobile Data subscribers has a positive and significant effect on banks' profitability.
- The Number of Fixed Voice subscribers has no effect on banks' profitability.
- The Number of Fixed data subscribers has a positive and significant effect on banks' profitability.
- Inflation and Bank Size have a negative and significant effect on banks' profitability.
- GDP, Saving Rate, and Economic Growth have a positive and significant effect on banks' profitability.

### **1.5 Significance of the study**

This study will give insight to both banks and telecom service providers on their close relationship. Banks will see their profitability linkage with the number of telecom subscribers and increase their investment. Telecom service providers will also get additional information to give more attention to bank-related services that can be an additional business model for them.

### **1.6 Limitations of the study**

The scope of the study is limited to analyzing selected private commercial banks in Ethiopia and Ethio Telecom, which was the sole telecom service provider in Ethiopia until recently. The study included only eleven private banks that stayed in the market for at least ten years. The accuracy of the data collected both from the banks and Ethio Telecom may also affect the study findings.

### **1.7 Structure of the study**

Chapter One addressed the introduction of the study which included background, statement of the problem, objectives, research questions and hypothesis, significance, scope, and limitation of the study. Chapter two provided a literature review related to the topic. The methodology of the study is described in chapter three. The result of the performed analysis and the conclusion is shown in chapter four and chapter five consecutively.

## **CHAPTER TWO: Literature Review**

### **2.1 Literature Relating Telecommunication and Banking Sectors**

One of the fruits of telecommunications is the emerging technologies and applications that facilitate the banking sector. Telecommunication coverage increases have resulted in more people using these applications in their day-to-day lives. These include Mobile banking, Internet banking, Mobile money, and ATMs. Based on the telecommunication infrastructure developed, banks were able to create different applications to make their operations effective. (Shaikh & Karjaluto, 2015). The easy availability of telecommunications technology created a conducive environment for the different banking services. A study done in Ghana assessed the role of telecommunication on banks by conducting interviews with users of such technologies. The questionnaires assessed the type of technologies used, which technology is preferred more by users, and the frequency of use and assessed how these technologies helped them. General feedback indicates that such technologies have helped save customers time and they believe the quality of services of banks have improved after adopting such technologies. (Ammattikorkeakoulu, 2009).

Even if the overall telecommunications infrastructure created a conducive environment for banks and banks created different applications to increase their efficiency, the available literature is only testing these applications' effect on banks' profitability. There was no literature found trying to directly relate the telecom number of subscribers to banks' profitability. The literature review available links applications like Mobile banking, Internet banking, ATMs, and Mobile money to banks' profitability. Each of these applications can be related to a specific telecommunication variable. Due to the increase in mobile telecom subscribers, more people started using mobile banking and mobile money applications to do their banking transactions instead of the conventional way of going to bank branch offices. Bank customers with a mobile phone and mobile banking or mobile money application can do most of their banking transactions from anywhere and at any time of the day. And literature review showed that mobile banking and mobile money usage have a positive and significant effect on banks' profitability. Literature review results for each will be shown below.

The increase in fixed (wired) telecommunications network infrastructure and the associated increase of fixed telecom network subscribers has resulted in the adoption of broadband networks for banking services mainly ATMs, and Internet banking. Internet banking can also be used through mobile phones.

Literature review showed that the adoption of ATMs and Internet banking has a positive and significant effect on banks' profitability. Literature review results on the same will be shown below.

## **Mobile Banking**

Mobile banking refers to the act of making financial transactions using mobile devices like cell phones and tablets, ... Research shows that an increase in the number of mobile banking users has a positive effect on banks' profitability. Recent research done in Ethiopian private banks showed mobile banking has a positive and significant effect on banks' profitability. (Temam. R, 2018).

Another recent research tried to see the effect of financial innovations on the profitability of private commercial banks in Ethiopia. The study assesses the effects of different technologies/innovations on banks' return on assets. This includes the number of ATM terminals, the number of mobile banking users, and the number of Internet banking users. The study concludes that the number of mobile banking users has a positive and statistically significant effect on banks' profitability. (Thakkar, 2022).

A study done in Kenya checking the effect of mobile banking on banks' profitability showed a positive and significant relationship. (Kithaka, 2014). A study done in Indonesia showed the same result. (Medyawati et al., 2021).

## **Mobile Money**

Mobile money refers to the usage of mobile phones to store, send, and receive money. This is a relative alternative to a bank account. A recent study done in Kenya showed that usage of mobile money, taking the transaction volume through mobile money innovations, has a positive effect on ROA where data was collected from 42 commercial banks in Kenya. (Kiprono, 2018). Kenya adopted mobile money on a big scale and the actual number of registered mobile money accounts has already surpassed the total population of Kenya. The study of the mobile money effect is not only seen from its effect on banks' performance but also the economy. Another study done in Nigeria also showed that there is a linkage between the adoption of mobile money and banks' profit after tax. (Iheanachor, 2020)

## **Internet Banking**

Internet banking is a means of banking where the bank customers do their transactions through the bank's website. Recent research done to see the effect of financial innovations on the profitability of private commercial banks in Ethiopia. The study assesses the effect of different technologies/innovations on banks' return on assets. This includes the number of ATM terminals, the number of mobile banking users, and number of Internet banking users. The study concludes that the number of Internet banking users has a positive and statistically significant effect on banks' profitability. (Thakkar, 2022). A study in Kenya also showed that the adoption of electronic ways of payment has a positive and significant effect on banks' financial performance. (Nyaga, 2015).

## **ATMs (Automated Teller Machine)**

ATMs allow bank customers to do basic banking transactions without the need to visit bank branches in person. They give easy access to banking services without creating a load on bank tellers. The long queue we see in banks can be mitigated by ATMs and tellers can focus on providing critical services. ATMs are interconnected to the bank's system using the fixed data telecommunication network. They rely on this network functionality to provide the required services.

A study done in Greece showed that the number of ATMs doesn't have any effect on banks' profitability stated with ROA, but they have a positive effect on fees and commissions. They also find that ATMs hurt the net interest income. (Giordani & Floros, 2015). Other studies have also shown that the huge initial investments required to install ATMs make it hard to see the fruit right away even if it has improved customer perceptions towards the banks. (Lee et al., 2020). A study done in Ethiopia showed the same result that the number of ATMs has a negative effect on banks' ROA. (Thakkar, 2022).

## **2.2 Literature showing the future expected relationship between Banks and Telecom companies.**

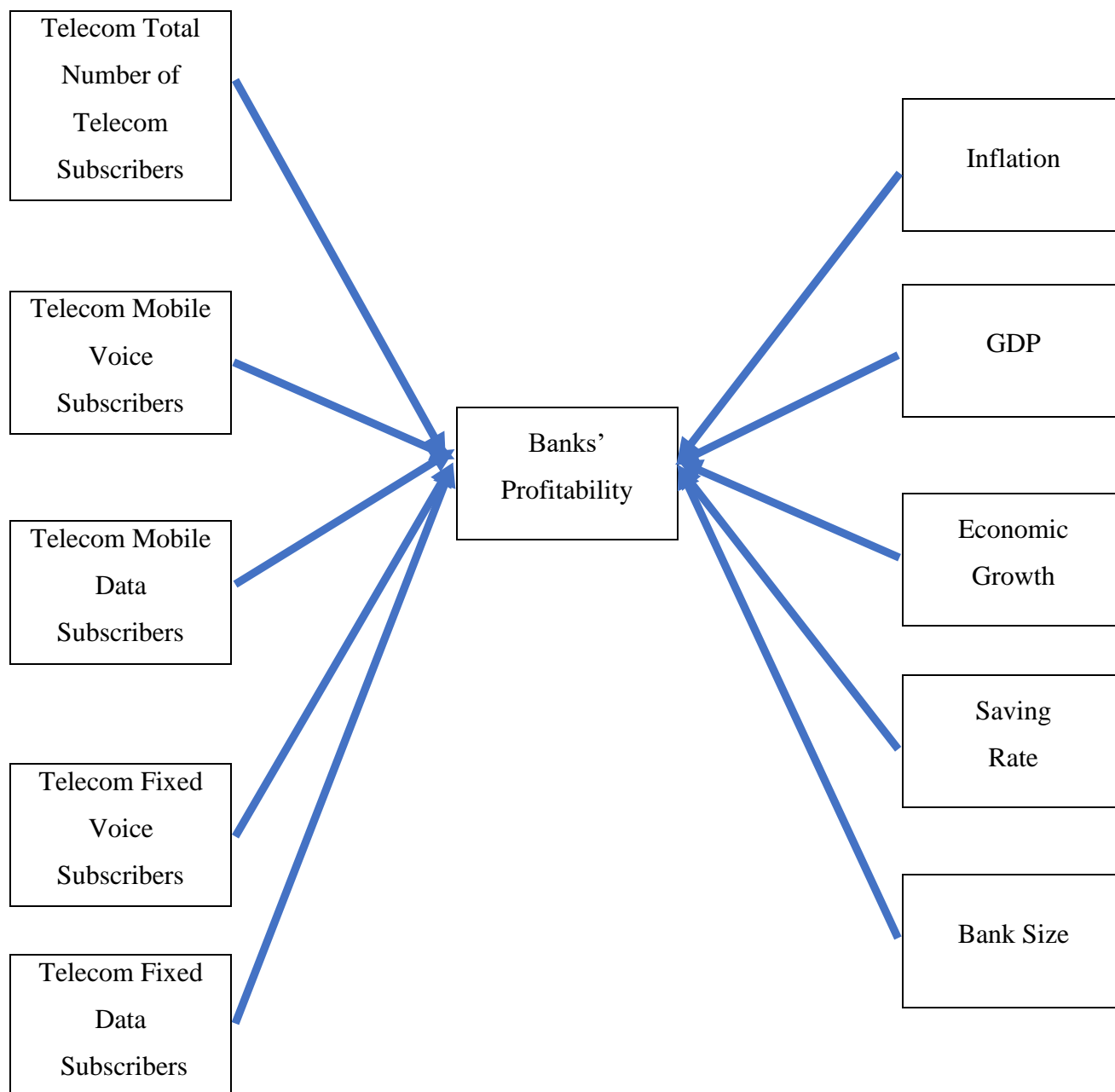
One shift we are seeing in the relationship between banks and telecommunication service providers is the close cooperation between them and the future expectation that telecom companies will start acting as banks. Research done by a company called Arthur D. Little in 2015 showed how such interactions could evolve. Telecom operators and retail banks have been converging for years. As remaining barriers vanish and extrinsic factors push further convergence, banks will see increasing competition from telecom operators, which will aggressively enter financial services, especially in transactional lines of business. From the study, it is stated that over 85% of customer transactions are now done via digital channels (ATM, computer, or mobile) in developed countries. (Arthur D. Little, 2025).

In addition, a study done by Scratch, an in-house unit of Viacom, in 2013, showed that 33% of millennials believe they will not need a bank in the future, and 73% would likely prefer to get financial services from digital start-ups. These millennials are defined as those between the ages of 18 to 33, and the study was done for three consecutive years. (The Financial Brand, 2013).

Different recent research also signaled the same on the future risk banks could face due to the emergence of other telecommunication-related financial services. (Nyoka, 2022).

## 2.5 Conceptual Framework

The conceptual framework including the relevant variables is shown in the below picture.



**Fig 3.1 Conceptual Framework**

## **CHAPTER THREE: Research Methodology**

Research methodology refers to the framework that helps researchers plan and perform studies rigorously and systematically, ensuring that the study is credible and can be used to contribute to the specific industry. It guides researchers to collect, analyze, and interpret information in a formal and structured way. This chapter presents the research methodology employed for this study.

### **3.1 Research Approach Adopted**

The three common approaches to conducting research are quantitative, qualitative, and mixed methods. A researcher needs to decide on the type of approach to be adopted depending on the specific need of the study. The critical question to ask will be which type of approach will provide the best result. The availability of the data to be analyzed will also affect the decision-making process.

For this study, a quantitative research methodology was adopted to see the relationship between banks' profitability and telecommunication subscribers. This is mainly because the study analyzed historical data of private commercial banks, Ethio Telecom, and macroeconomic variables including inflation, Saving Rate, Economic Growth, and GDP.

### **3.2 Population Size and Sampling Technique**

Sampling techniques refer to the methods used to select a subset of individuals or items from a larger population. These techniques are crucial in research and statistical analysis because they help ensure that the sample accurately represents the population and that the results can be generalized from the sample back to the population.

The choice of sampling technique depends on various factors such as the nature of the research, the characteristics of the population, the resources available, and the desired level of accuracy and representation. Each technique has its strengths and weaknesses, and the researcher must carefully consider which method is most appropriate for their study.

The sampling method used for this study is the non-probability judgmental sampling technique. It is a form of conventional sampling where the researcher's judgment is used to select the sample elements. The total population for this study is all commercial and private banks in Ethiopia and Ethio Telecom. There were twenty-six private commercial banks in Ethiopia as of 2023 G.C. Ten of them were established in the last three years only. Including all these banks in the study will not give accurate

results to the study. It will be impossible to judge the performance of any bank within a few years of establishment. The first few years are more of preparation, investing more to enter the market and establish a name for itself. The profit earned in these few years will not reflect the actual performance of the bank. Due to this, banks that worked for at least ten years were selected for this study. Accordingly, from the twenty-six total number of banks, the below fifteen met the criteria of ten years and above experience.

Bank Name	Year of Establishment (G.C)
Awash International Bank	1994
Dashen Bank	1995
Bank of Abyssinia	1996
Wegagen Bank	1997
Hibret Bank	1998
Nib International Bank	1999
Cooperative Bank of Oromia	2005
Lion International Bank	2006
Oromia International Bank	2008
Bunna International Bank	2009
Zemen Bank	2009
Abay Bank	2010
Berhan International Bank	2010
Addis International Bank	2011
Dehub Global Bank	2012

**Table 3.1 Descriptive statistics of dependent and independent variables.**

### 3.3 Data Collection, Presentation, and Analysis Techniques

Effective data collection is important for generating reliable results. It provides a foundation for research studies by ensuring that the information gathered is valid, relevant, and usable for achieving research objectives. It involves the systematic gathering of information through structured methods and procedures, aimed at obtaining accurate, reliable, and meaningful data to address the research questions or objectives. It is a foundational step in the research process, contributing to the validity and credibility of research findings and their application in practical settings.

This study used bank-specific, macroeconomic, and telecommunications data from the year 2013 to 2022 G.C on an annual basis. The bank-specific data includes the bank's yearly income statement and balance sheet included in their yearly reports and reported to the National Bank of Ethiopia. The Macroeconomics data including inflation, GDP, Saving Rate, and Economic growth included as controlling variables for possible economic-wide effects on banks' profitability that may not be captured in the banks' specific data. Thus, secondary data was used for this study.

The data collected is then arranged in a panel data technique. Panel data, also known as longitudinal data or cross-sectional time series data, refers to a type of dataset where observations are collected over time on the same entities. In panel data, each entity is observed multiple times, creating a structured dataset that combines characteristics of both cross-sectional and time series data. From the fifteen banks meeting the sampling criteria, data was collected for eleven banks namely Awash, Dashen, Abyssinia, Wegagen, Hibret, Nib, Lion, Bunna, Zemen, Berhan, and Addis International banks. Ethio Telecoms' ten-year subscribers-related data is collected from their headquarters. Inflation, GDP, Saving Rate, and Economic Growth-related data are collected from the World Bank repository.

Representing research data effectively is crucial for communicating findings accurately and comprehensively. Descriptive statistical methods are used for this study to show the results of the study. They provide simple summaries of the sample and the observations that have been made. These statistics are often the first step in analyzing data and are commonly used to describe the basic characteristics of data in a study.

A statistical software called, STATA, is used to analyze, visualize, and interpret the data. STATA is preferred for its efficiency in handling longitudinal data, panel data analysis, and complex survey designs. It offers a wide range of statistical analyses, data management tools, and graphics capabilities. Its' syntax-based approach allows for reproducible research and automation.

### 3.4 Variable Description

Below is a description of the variables used for the study.

- Profitability (ROE) is the best way to explain banks' performance. It is calculated by taking the specific year 'total profit after tax' and the average Equity of two consecutive years.
- Total Number of Telecom Subscribers (TSub) is a measure of the overall Ethio Telecom subscribers considering all telecom services.
- Number of Mobile Voice Subscribers (MVSub) is a measure of voice subscribers specifically for voice calling through wireless mobile devices.
- Number of Mobile Data Subscribers (MDSUB) is a measure of data and internet usage through wireless mobile devices.
- Number of Fixed Voice Subscribers (FVSub) is a measure of voice subscribers specifically using fixed-line networks.
- Number of Fixed Data Subscribers (FDSUB) is a measure of data and internet usage through fixed line networks.
- Inflation (Inf) is the general upward price movement of goods and services in an economy. Over time, as the cost of goods and services increases, the value of a currency is going to fall. A person will not be able to purchase as much with that currency as he/she previously could.
- GDP - The economic growth of a nation is measured using the annual growth rate in gross domestic product.
- Bank Company Size (CompS) measures the total assets of the company. The Bank Size variable is computed as the natural logarithmic of banks' total assets.
- Saving Rate (Svgr) refers to the portion of a country's national income saved rather than spent. It is an important macroeconomic indicator that reflects the saving behavior of households, businesses, and the government within that country.
- Economic Growth (EcoG) refers to the change in the value of all goods and services produced within a country for a specific period in comparison to an earlier period. It is calculated by taking the difference between two consecutive GDPs and dividing the result by the previous year's GDP.

### 3.5 Model Specification

Model specification refers to the detailed description of the variables used in a statistical or econometric model. It provides a clear and precise outline of how the model is structured and what relationships it aims to capture between variables. The below model was created for this study. To investigate the effects of telecom subscribers and general macroeconomic variables on banks' profitability, the general multivariate regression model was adopted.

$$ROE = \beta_0 + \beta_1 (Tsub) + \beta_2 (MVsub) + \beta_3 (MDsub) + \beta_4 (FVsub) + \beta_5 (FDsub) + \beta_6 (Inf) + \beta_7 (GDP) + \beta_8 (CompS) + \beta_7 (SvgR) + \beta_8 (EcoG)$$

Symbol	Description
<b>Independent Variables</b>	
TSub	Total Number of Subscribers
MVSub	Number of Mobile Voice Subscribers
MDSub	Number of Mobile Data Subscribers
FVSub	Number of Fixed Voice Subscribers
FDSub	Number of Fixed Data Subscribers
Inf	Inflation
GDP	Gross Domestic Product
CompS	Bank's Company Size
SvgR	Saving Rate
EcoG	Economic Growth
<b>Dependent Variable</b>	
ROE	Return On Equity

**Table 3.2 Variables Description**

## CHAPTER FOUR: Result

In this chapter, a detailed analysis of the descriptive statistics and regression results is shown. It includes a descriptive analysis of variables, a correlation analysis that shows the degree of association between variables, the regression analysis results, and the associated assumptions.

### 4.1. Descriptive Statistics Analysis

Variable	Observation	Mean	Std. Dev.	Minimum	Maximum
ROE	109	19.69611	5.693716	2.5	42.76
TSub	110	39.52771	14.40915	19.07	66.59
MVSub	110	38.04376	14.02422	18.06	64.51
MDSub	110	16.34046	7.361334	4.43	26.08
FVSub	110	0.979633	0.1540017	0.79	1.22
FDSub	110	0.1411009	0.1634429	0.01	0.51
Inf	110	15.19666	9.238035	6.628133	33.88988
GDP	110	84980	24335.8	47650	126780
CompS	110	9.24023	.7983294	8.085942	10.46652
SvgR	110	20.702	2.553292	15.22	24.3
EcoG	110	11.432	4.664934	3.06	16.71

**Table 4.1 Descriptive statistics of dependent and independent variables.**

The descriptive analysis of each variable is depicted in Table 4.1 above. The descriptive analysis represents the average results and standard deviations of the variables. The Return on equity, inflation, saving rate, and GDP are shown in percentages whereas Ethio Telecom variables are shown in millions. Bank size is shown as a natural logarithm of banks' assets.

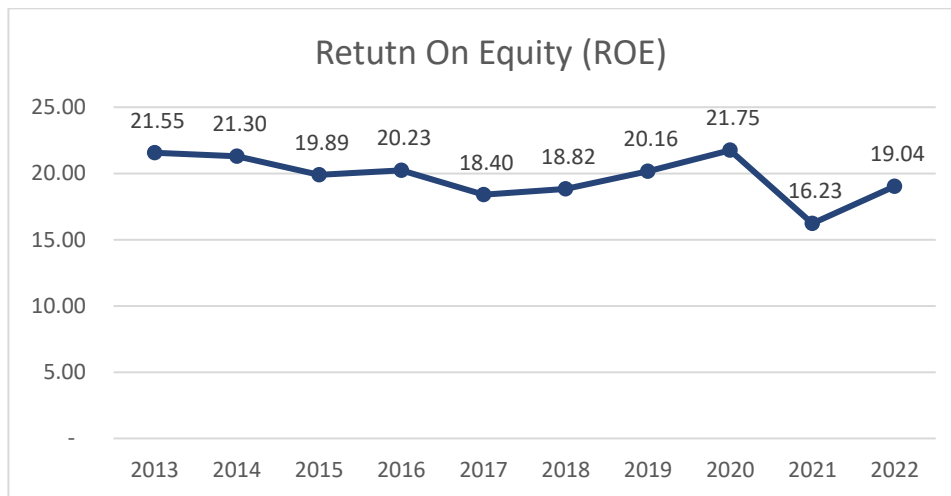
The average ROE is 19.69% meaning, on average, banks will earn 19.69% profit on their average equity. Their return on equity ranges from 2.5% to 42.76%. This shows there is a big profit difference between private banks operating in Ethiopia despite all staying for more than ten years in the industry. The total number of subscribers has increased from 19.07 million to 66.59 million in the ten-year range from 2013 to 2022 G.C which is a 350% increase. When we see the increase of mobile voice and mobile data in the ten-year range, mobile data has shown an increase of almost 600% while mobile voice shows an increase of 350%. This shows that there has been a huge demand for mobile data usage compared to voice. Before ten years ago, Ethio telecom customers tend to use more mobile voice service than mobile data. The mobile data-to-mobile voice service ratio was 1:4. After ten years, the ratio shifted to 1:2.5. When looking into the fixed network status, fixed data users have increased by 5100% while

fixed voice users have increased by 154%. This shows that the fixed data users have increased dramatically, while the fixed voice users didn't show that much increase over the years. This is mainly due to the preference of customers to use mobile networks instead of the fixed phone in their houses. Many customers disconnected from using fixed phones. Ethio Telecom's focus was also on expanding the mobile network rather than the fixed mobile network. The disconnection of the public fixed phones is one of the signs of this. The fixed mobile network has shown this much increase due to the broadband internet expansion and the huge interest of customers to have Wi-Fi networks in their houses. Broadband network is something you see in most households nowadays. This is also the impact of the Covid pandemic and companies pushing employees to work from home. The increase in usage of social media and people wanting to be connected all the time has increased the demand to have a broadband network at home.

In the ten years where the data was collected from 2013 to 2022 G.C., the country's average GDP was 24.3Bln ETB showing a yearly 11.43% average economic growth and having 20.7% saving rate.

## 4.2 Trend Analysis of Variables

### Trend Analysis of ROE

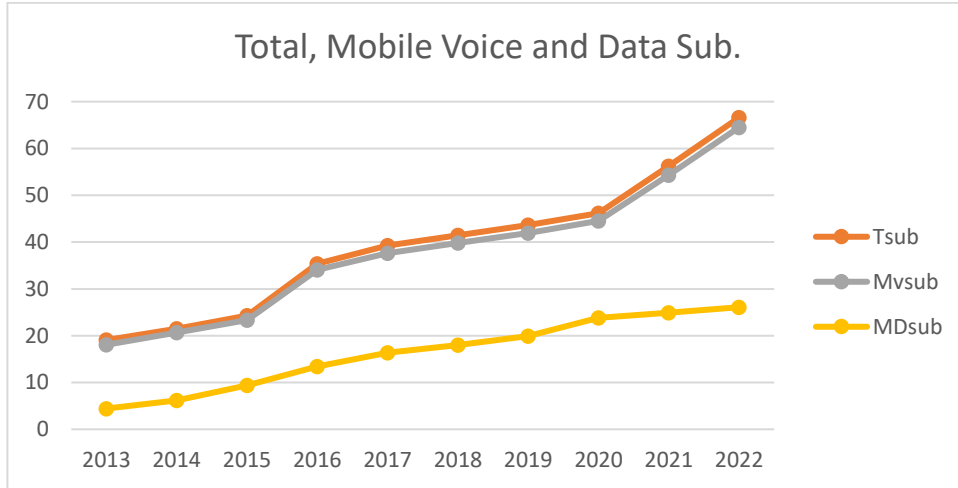


**Fig 4.1 Trend Analysis of Return on Equity**

This analysis shows the pattern for Return on equity (ROE) of private commercial banks operating in Ethiopia during the study period from 2013 to 2022 G.C by taking an average rate. The ROE depicted as a percentage is shown on axis Y while axis X shows the respective years. ROE showed the smallest value in the year 2021 GC. The dip is also due to the biggest pick being reached one year back in the

year 2020 G.C, and due to profit after tax being the lowest during the year 2021 for most banks where Berhan, Lion, and Wegagen banks showed the biggest drop.

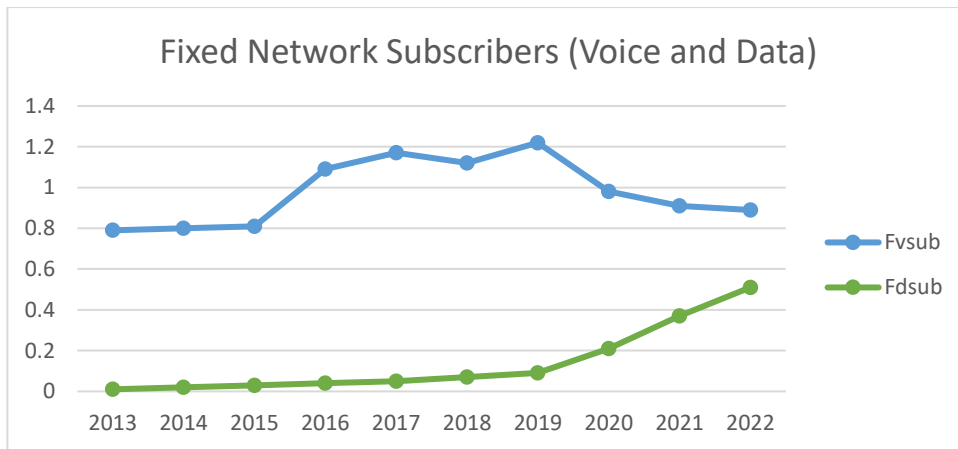
**Trend Analysis of Total Number of Subscribers, Mobile Voice and Mobile Data Subscribers**



**Fig 4.2 Trend Analysis of Total Number of subscribers and mobile network**

This analysis shows the pattern for Ethio Telecom's total number of subscribers including mobile voice and mobile data subscribers during the study period from 2013 to 2022 G.C. The number of subscribers (in Millions) is shown on axis Y while axis X shows the respective years. The total number of subscribers and the mobile voice subscribers showed almost the same trend. The total number of subscribers is highly related to the number of mobile voice subscribers.

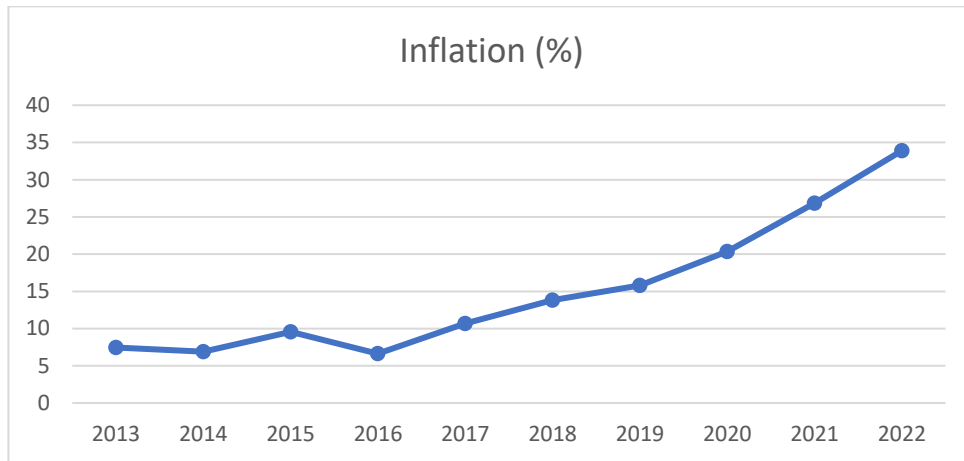
**Trend Analysis of Fixed Network Subscribers including voice and data subscribers.**



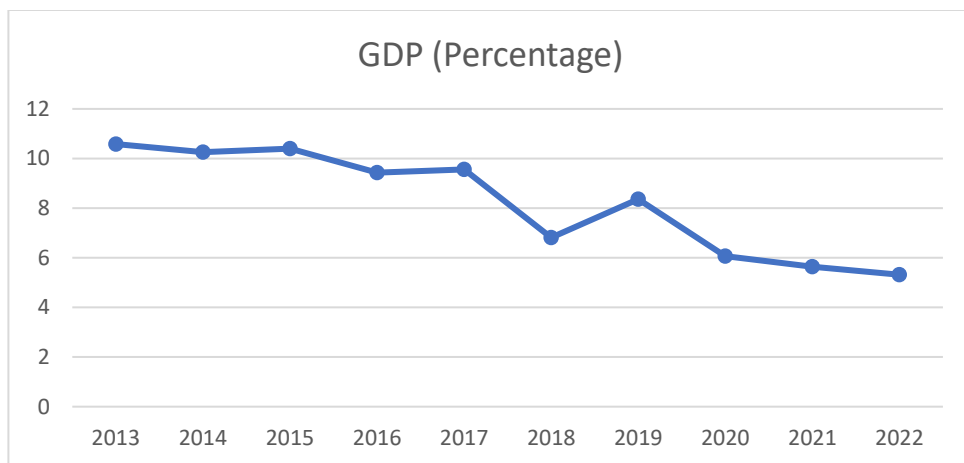
**Fig 4.3 Trend Analysis of Fixed Network Subscribers**

This analysis shows the pattern for Ethio Telecom Fixed network voice and data during the study period from 2013 to 2022 G.C. The number of subscribers (in Millions) is shown on axis Y while axis X shows the respective years. As shown in the figure, the fixed voice subscribers showed a drastic increase during 2016 G.C and showed a continuous decrease from 2019 onwards. The fixed data subscribers showed a steady increase from the year 2019 when the downfall of fixed voice subscribers started.

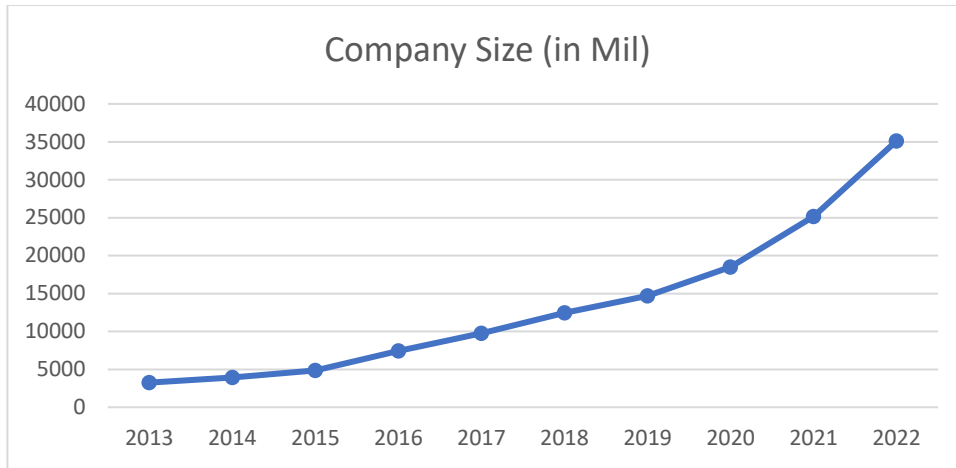
**Trend Analysis of Inflation, GDP, Bank Company Size, Saving Rate, and Economic Growth**



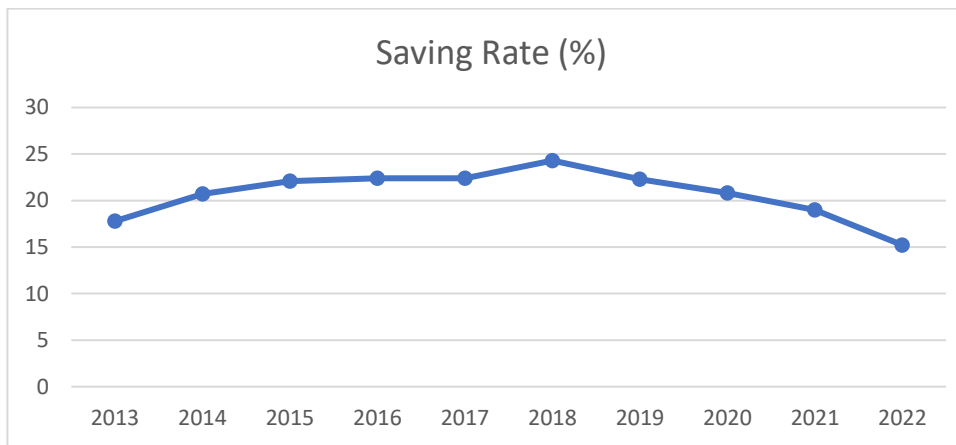
**Fig 4.4 Trend Analysis of Inflation**



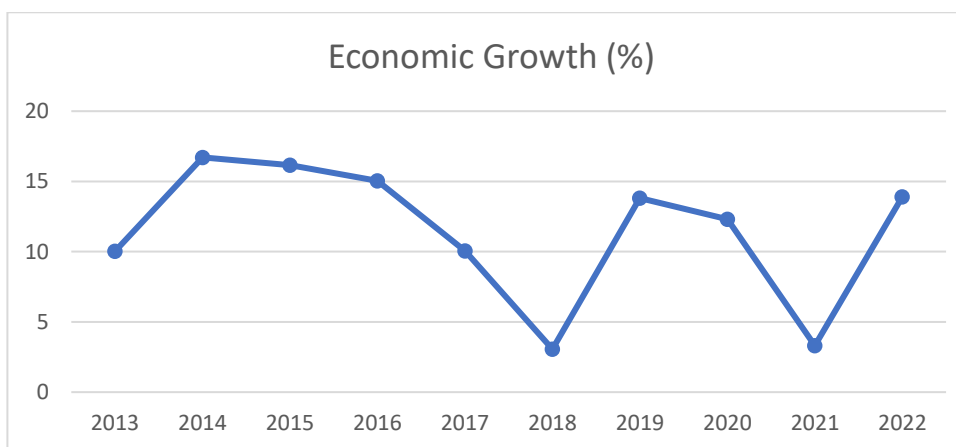
**Fig 4.5 Trend Analysis of GDP**



**Fig 4.6 Trend Analysis of Company Size**



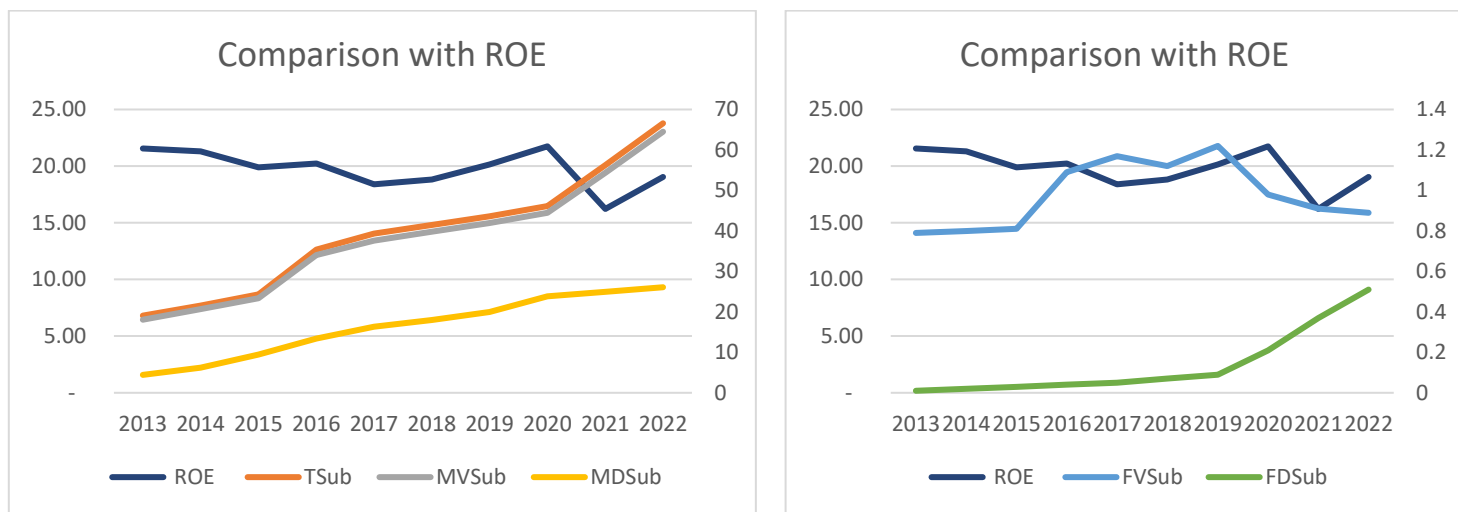
**Fig 4.5 Trend Analysis of Saving Rate**



**Fig 4.4 Trend Analysis of Economic Growth**

The above tables showed the trend analysis of the controlling variable, Inflation, GDP, Bank Company Size, Saving Rate, and Economic Growth. Inflation showed a steady increase over the years, except in 2015 GC, where a spike was seen. Gross Domestic Product has shown to decrease over the years, showing a steep decrease from 2019 G.C. Banks' total assets have been showing a steady increase. The saving rate increased at a smooth rate till 2018 G.C., where it started to decrease onwards. The economic growth rate is decreasing but showing big deep in 2018 and 2021 GC.

**Trend Analysis Comparison with ROE**



**Fig 4.7 Comparison of trend analysis with ROE**

The above two tables show the trend analysis of Ethio Telecom variables compared to the dependent variables Return on Equity. As can be seen in the tables, Ethio Telecom variables trend is not aligned with banks Return On Equity.

### 4.3 Correlation Analysis

Correlation measures the degree of linear association between variables. primary objective is to measure the strength and degree of linear association between two variables. The correlation coefficient between two variables ranges from +1 (i.e. perfect positive relationship) to -1 (i.e. perfect negative relationship). If the correlation coefficient is 0, the movement of variables is said to have no correlation. The correlation between the variables is shown in the below table.

```
. corr roe tsub mvsub mdsb fvsub fdsb inf gdp comps svgr ecog
(obs=109)
```

	roe	tsub	mvsub	mdsb	fvsub	fdsb	inf	gdp	comps	svgr	ecog
roe	1.0000										
tsub	-0.1628	1.0000									
mvsub	-0.1623	1.0000	1.0000								
mdsb	-0.1467	0.9620	0.9612	1.0000							
fvsub	-0.0629	0.2994	0.2939	0.3929	1.0000						
fdsb	-0.1353	0.8963	0.8987	0.8061	-0.1480	1.0000					
inf	-0.1363	0.9246	0.9260	0.8705	-0.0415	0.9771	1.0000				
gdp	-0.1354	0.9793	0.9795	0.9846	0.2830	0.8800	0.9267	1.0000			
comps	-0.1532	0.9873	0.9869	0.9911	0.3440	0.8581	0.9117	0.9921	1.0000		
svgr	0.0098	-0.3819	-0.3851	-0.2116	0.5901	-0.7038	-0.6137	-0.3476	-0.2950	1.0000	
ecog	0.1819	-0.3402	-0.3360	-0.3731	-0.2305	-0.2196	-0.2869	-0.2665	-0.3651	-0.1012	1.0000

**Table 4.2 Correlation Analysis of Dependent and independent variables**

As shown in the output, three of the independent variables are highly correlated. Total subscriber and mobile voice subscriber variables are fully correlated with a correlation matrix of 100%. It is also highly correlated with Mobile data subscribers with a 96.15% correlation. In addition, it is highly correlated with Fixed Data subscribers with an 89.65% correlation. There is a negative correlation between Fixed voice and fixed data subscribers where an increase in fixed data subscribers showed a decrease in the number of fixed voice subscribers. Fixed Voice subscriber is the only independent variable that is not correlated to the other Ethio Telecom-related variables. Company size is correlated to Ethio Telecom variables, inflation, and GDP.

## 4.4 Diagnostic Tests - Testing Assumptions of Linear Regression Model

### **Normality**

The normality assumption is based on the normal distribution of the residual. skewness and kurtosis test are used the test the normality of the residual, and it has resulted in a normal distribution.

### **Multi-Collinearity**

As shown in the output, three of the independent variables are highly correlated to each other. This shows that a one million subscribers increase, whether mobile voice or mobile data, is the same as a one million increase in the total number of subscribers. To avoid multi-collinearity from our regression model, variables resulting in multi-collinearity should be deducted. Accordingly, from telecom-related variables, Mobile Voice Subscribers, Mobile Data Subscribers, and Fixed Data Subscriber variables are removed from the regression analysis and only Total Subscribers and Fixed Voice subscribers are kept in the regression analysis. Company size is also removed from the regression analysis due to multi-collinearity issues.

### **Heteroscedasticity**

If we take all independent variables into the regression analysis, a heteroscedasticity issue will happen. A hettest is done with a result of chi-square statistics less than 0.05. The same heteroscedasticity problem still exists after removing the three variables and doing the regression analysis with the remaining variables.

## 4.5 Result of Regression Analysis

This section shows the result of the regression analysis. Regression analysis is done first by taking all independent variables and then after removing the three Ethio Telecom and Company size variables that are highly correlated.

The below table shows the regression analysis concerning Return on Equity considering all independent variables.

```
. reg roe tsub mvsub mdsb fvsub fdsub inf gdp svgr ecog
```

Source	SS	df	MS	Number of obs	=	109
Model	278.997071	9	30.9996745	F(9, 99)	=	0.96
Residual	3196.18338	99	32.2846806	Prob > F	=	0.4775
				R-squared	=	0.0803
				Adj R-squared	=	-0.0033
Total	3475.18045	108	32.1775968	Root MSE	=	5.682

roe	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
tsub	-16.84838	17.54501	-0.96	0.339	-51.66149 17.96472
mvsub	17.68429	19.03303	0.93	0.355	-20.08137 55.44995
mdsub	-2.31103	10.80897	-0.21	0.831	-23.75838 19.13632
fvsub	-22.32466	55.22216	-0.40	0.687	-131.8974 87.24809
fdsub	-123.4721	167.2865	-0.74	0.462	-455.4048 208.4607
inf	-.3959455	2.921101	-0.14	0.892	-6.192044 5.400153
gdp	.0012497	.0046561	0.27	0.789	-.0079889 .0104883
svgr	-1.91528	1.895983	-1.01	0.315	-5.677323 1.846762
ecog	-.691144	2.446592	-0.28	0.778	-5.545713 4.163425
_cons	37.00678	147.8943	0.25	0.803	-256.4475 330.4611

**Table 4.3 Regression Analysis with all independent variables**

As per the result, the overall model is statistically insignificant with a P-value of 0.4775 which is greater than 0.05. When looking at each independent variable, they are also all statistically insignificant. Another regression analysis is done to see if the model and variables will be statistically significant after removing the subscribers that are highly correlated.

```
. reg roe tsub fvsub inf gdp svgr ecog
```

Source	SS	df	MS	Number of obs	=	109
Model	201.147737	6	33.5246229	F(6, 102)	=	1.04
Residual	3274.03272	102	32.09836	Prob > F	=	0.4012
				R-squared	=	0.0579
				Adj R-squared	=	0.0025
Total	3475.18045	108	32.1775968	Root MSE	=	5.6655

roe	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
tsub	-.322838	.2580392	-1.25	0.214	-.8346574	.1889815
fvsub	3.58022	9.070058	0.39	0.694	-14.4102	21.57064
inf	-.107486	.4811105	-0.22	0.824	-1.061766	.8467944
gdp	.0001732	.0001847	0.94	0.351	-.0001932	.0005395
svgr	-.4459954	.5250405	-0.85	0.398	-1.487411	.59542
ecog	.0659103	.1722004	0.38	0.703	-.2756483	.4074689
_cons	24.33726	10.20283	2.39	0.019	4.099998	44.57453

**Table 4.4 Regression Analysis with selected independent variables**

As shown in the above table, both the model and variables are also not statistically significant even after removing the highly correlated variables that resulted in the multi-collinearity problem.

#### 4.6 Interpretation of R-Square and Regression Result

The regression analysis for the regression that was done with ROE after taking the highly correlated variables shows 3% which shows that the change in the return of banks equity can't be explained by a change in the number of subscribers of Ethio Telecom. The individual variables are also not statistically significant and can't draw a regression model to explain the effect each variable has on the bank's return on equity.

## **CHAPTER FIVE: Conclusion and Recommendation**

### **5.1 Conclusion**

The purpose of this study was to examine the effect of telecommunication subscribers' increase on banks' profitability. The idea of the study came from the researcher's personal experience working in the telecom industry for more than fifteen years. From the data collection and analysis, it was found that most Ethio Telecom-related variables are correlated to each other where one will explain the other. For this study, only the total number of subscribers and fixed voice subscribers were selected in the regression model in addition to the controlling variables. The other variables including mobile data, mobile voice, and fixed data subscribers can all be represented by the total number of subscribers variable.

According to the results of the descriptive and regression analysis, banks' profitability is not directly linked to the telecommunications number of subscribers, whether it is mobile or fixed network. The models tested all resulted in statistically insignificant models and variables. To test the effect of telecommunication on banks' profitability, it is necessary to look deeply into the usage of applications banks employ to improve their efficiency that are implemented based on the telecommunications infrastructure. Otherwise by only looking into the number of subscribers increase, it will not be clear to see the effect that seemed obvious.

## 5.2 Recommendations

With the ever-increasing number of telecom and banking customers, it is inevitable to see more engagement of telecom service providers in the banking industry. It is obvious one plays an important role in the other. Banks especially benefit from the telecommunication infrastructure to improve their efficiency, reduce their operational costs, and increase their profitability. Besides the obvious relationship, it will help to know the areas banks need to focus on to create better efficiency with less investment and less time possible. This study showed that looking only at the number of telecommunications subscriber increases will not give clear visibility of the effect on a bank's profitability.

Banks should also investigate the emergent competition arising from telecom service providers that can be a threat to their business. Money can now be deposited in Ethio Telecom using the Tele-Birr application or on M-Pessa of Safaricom Ethiopia. Users of Tele-Birr/M-Pessa may not get the interest banks pay on deposit, but still, it is another means of depositing money. This is mainly due to the easiness of doing transactions on money saved in Tele-Birr/M-Pessa than the one saved in banks. Buying and selling is now easier than ever including receiving foreign currency from abroad. Ethio Telecom/Safaricom Ethiopia will use the deposited money to their advantage besides the money collected through commissions of transactions without additional liability like banks have. With further regulation adjustments from the government, Ethio Telecom/Safaricom Ethiopia can also become a key participant in the banking industry. The only thing that is currently missing for them to act as a bank is their current inability to lend money to others. The credit feature in the Tele-Birr application is the beginning of the big chapter. With the current government push to involve Tele-Birr in almost all transactions, it could be a matter of time. Ethio Telecom being a government owner entity, the government is looking the Tele-Birr involvement from the benefit it could bring to the country. If it was a private company, the involvement could have been a different scenario. Banks need to look at this threat closely and work to either be part of the opportunity or find other means of reducing the risk.

### **5.3 Suggestions for Further Studies**

This study is the first study in its sense to relate the overall KPIs of telecommunications to the overall income and profitability of banks, even if there are many studies relating banks' performance to specific software, applications, and features created based on telecom infrastructure.

Further studies can be done by looking closely into ways banks can improve their efficiency using telecom infrastructures. Besides the usually tested applications like mobile money, internet money, and ATMs, it will help banks to do more studies on mobile money applications that are expected to change future banking transactions through interviews and surveys instead of looking at historical data.

## Reference

- Ammattikorkeakoulu, V. (2009). *The role of telecommunication on banking services in Ghana*.  
Theseus. <https://www.theseus.fi/handle/10024/4513>
- Arthur D. Little. (2015). Convergence of banking and telecoms [Viewpoint]. *Viewpoint*.  
[https://www.adlittle.com/sites/default/files/viewpoints/ADL\\_ConvergenceOfBankingAndTelecoms.pdf](https://www.adlittle.com/sites/default/files/viewpoints/ADL_ConvergenceOfBankingAndTelecoms.pdf)
- Elias Tegegn. (2023, 7 1). Retrieved from The Reporter: <https://www.thereporterethiopia.com/35242/>
- Giordani, G., & Floros, C. (2015). Number of ATMs, IT investments, bank profitability and efficiency in Greece. *Global Business & Economics Review*, 17(2), 217.  
<https://doi.org/10.1504/gber.2015.068571>
- Iheanachor, N. &. (2020). Dynamic linkages between mobile money and banks' performance in Nigeria. an Autoregressive Distributed Lag (ARDL) approach. *International Journal of Management, Economics and Social Sciences (IJMESS)*, 9(3), 224-246. Retrieved from (Iheanachor, N., & Ozegbe, A. E. (2020). Dynamic linkages between mobile money and banks' performance in Nigeria: an Autoregressive Distributed Lag (ARDL) approach. *International Journal of Management, Economics and Social Sciences (IJMESS)*, 9(3), 224-246
- Kiprono, G. (2018). *Effect of mobile money innovations on the financial performance of commercial banks in Kenya*. <http://erepository.uonbi.ac.ke/handle/11295/106293>
- Kithaka, E. (2014, October 1). *The effect of mobile banking on financial performance of commercial banks in Kenya*. <http://erepository.uonbi.ac.ke/handle/11295/76444>

- Lee, C., Wang, C., & Ho, S. (2020). Financial inclusion, financial innovation, and firms' sales growth. *International Review of Economics & Finance*, 66, 189–205.  
<https://doi.org/10.1016/j.iref.2019.11.021>
- Medyawati, H., Yunanto, M., & Hegarini, E. (2021). Financial technology as determinants of bank profitability. *Journal of Economics, Finance and Accounting Studies*, 3(2), 91–100.  
<https://doi.org/10.32996/jefas.2021.3.2.10>
- Nyaga, P. G. (2015). *Effect of financial innovation on financial performance of commercial banks in Kenya*. <http://erepository.uonbi.ac.ke/handle/11295/93867>
- Nyoka, C. (2022). *Does the Growth in Non-Banking Financial Institutions Signal the Death of a Bank as a Brand: A View from The South African Banking Market?* Questa Soft.  
<https://www.ceeol.com/search/article-detail?id=1161838>
- Shaikh, A. A., & Karjaluoto, H. (2015). Mobile banking adoption: A literature review. *Telematics and Informatics*, 32(1), 129–142. <https://doi.org/10.1016/j.tele.2014.05.003>
- Temam.R. (2018). The effect of financial innovation on financial performance of commercial banks in Ethiopia. *MSCThesis. Addis Ababa University*.
- Thakkar, A. a. F. D. A. (2022, June 4). *Effect of financial innovations on profitability of private commercial banks in Ethiopia*. <https://journalppw.com/index.php/jpsp/article/view/7929>
- The Financial Brand. (2013). *Millennials Find Banks Irrelevant (And Why That Matters in Banking)*. Retrieved from <https://thefinancialbrand.com/news/millennial-banking/millennial-banking-survey-viacom-37787/>