



EFFECTS OF ELECTRONIC BANKING TECHNOLOGY ON STAFF SIZE IN THE ETHIOPIAN BANKING SECTOR

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STATEMENT OF DECLARATION

I, Muluken Balcha, hereby declare that this research work entitled; “Impact of Electronic Banking Technology on Staff Size in the Ethiopian Banking Sector” submitted by me for the award of the Degree of Master of Science in Accounting and Finance, is my own original work and that all sources of materials used for the study have been duly acknowledged.

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This is to certify that this thesis prepared by Muluken Balcha, entitled; “Impact of Electronic Banking Technology on Unemployment of Banks in Ethiopia” and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Accounting and Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ENDORSEMENT

This thesis Submitted to the School of Graduate Studies of Addis Ababa University College of Business and Economics for examination with my approval as a university advisor.

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Date

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ACRONYMS AND ABBREVIATION

ATM	Automated Teller Machine
E-banking	Electronic Banking
EFT	Electronic Fund Transfer
IB	Internet Banking
ICT	Information Communication Technology
ILO	International Labour Organization
MB	Mobile Banking
NATM	Number of ATM
NBE	National Bank of Ethiopia
NE	Number of Employees
NGO	None Governmental Organization
NIBS	Number of Internet Banking Subscribers
NMBS	Number of Mobile Banking subscribers
NPOS	Number of Point of Sales Machine
POS	Point of Sales Machine
STATA	General Ppurpose Sstatistical Ssoftware Ppackage

ABSTRACT

The objective of this study is to investigate the effect of e-banking technology on staff size in the Ethiopian banking sector. The explanatory strategy of the quantitative research approach was used to identify the effect of independent variables (ATM, POS machine, internet banking and mobile banking) on dependent variable (staff size). The study used panel data during the period 2014 to 2021 and selected six banking firms from the total banking firms operates in Ethiopia using their better familiarity with electronic banking. Multi-linear regression analysis has been performed using fixed effect model. The study finds that ATM and mobile banking have positive and significantly effect on staff size. On the other hand, POS machine has a positive and statistically insignificant effect. In addition to that, the staff size has been positively and significantly affected by internet banking. The study recommended that banks may work on creating awareness or change the system on create awareness for their e-banking products to the society because this may lead banks into more efficient and effective use of existing technology.

Key Terms: *Staff Size, Banking Firms, E-banking, Ethiopia, Quantitative Methods.*

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Technological advancement has its positive and negative impact in the society, country and in the whole world (Garedachew, 2010). In 1929, Keynes famously anticipated "technological unemployment" will be an issue as a result of fast adoption of automation technologies (Keynes, 1931). Accordingly, technological innovation has the potential to remove a large portion of the manufacturing (and other) workforce, resulting in widespread unemployment, social disturbance, and human hardship." (Mabry and Sharpin, 1989). Wassily Leontief, predicting similar issues for workers "Labor will become less and less important.....More and more people will be replaced by machines," I don't believe that new industries will be able to employ everyone who seeks employment." (Curtis, 1983). Furthermore, economic competitiveness has caused many organizations to cut costs by rearranging production and cutting employees (a process known as downsizing)," and the ensuing growth from innovation and productivity advances may do nothing to alleviate or perhaps aggravate the unemployment problem in some cases (Blanchard, 2017).

Particularly, banking firms are one kind of sector which highly influenced by technologies. Banks are also significant users of financial technologies that employ economic and statistical models to create and value new securities, estimate return distributions, and make portfolio decisions based on financial data (Berger, 2003). Specially, information technology affects the advancement and growth of the banking industries in the world. Electronic banking is the use of information and communication technology by banks to allow clients to access their services without having to physically visit of a branch (Ghasemi, 2012). The usage of Automatic Teller Machines (ATMs) began the evolution of e-banking, and Finland was the first country in the world to pioneer e-banking (Mishra, R. and J. Kiranmai, 2009). The entire banking sector is entering a new era of unparalleled competitiveness, underpinned by contemporary information and communication infrastructure, as a result of the broad and gradual growth of information and communication technology (Murthy, 2004).

This banking technology causes positive and negative effect on the growth and transformation of banks, society, and economy of the country. The positive effect is as Shirzadi et al, (2017) said

E-banking services resulted in the development of banking services and increased customer satisfaction, which resulted in increased bank efficiency and total income. Furthermore, the most notable consequence of technology was that it considerably decreased the workload of bank staff by automating manual tasks on the system. As a result of high inbuilt security, technology also lowered the likelihood of errors and fraud (Sweety and Anshu, 2017). On the contrary, banking technology has its own side effect as different researchers mentioned in their paper work. The use of electronic money transfer services, telephone banking, and banking electronic services reduces job stability and security. Therefore, using e-banking services resulted in a lack of attending customers to banks and resulted in workers retiring ahead of time (Shirzadi et al., 2017). In the short term, the introduction of new technology, such as information technology, will reduce employment as productivity rises. Because of the speed with which new technology is introduced, more employees may be displaced than in previous times (Cardullo and Ansal, 1997).

The above literatures and theories showed the effect of technological advancement on unemployment. Therefore, this research was conducted to identify the effects of e-banking technology on staff size of banks in Ethiopia.

1.2. Statement of the problem

Even though Garedachew (2010) founds the practice of Ethiopian banking system is very much behind compared to the rest of the world and cash is still the most dominant medium of exchange, now days banks in Ethiopia are investing their money on technology based service which is e-banking. So that it can benefit banks and society or user of banks through a lot. It benefits by cost savings, efficiency, gaining new segments of customers, improvement of the banks reputation and better customer services and satisfaction are primary benefits to banks (Jayawardhena & Foley, 2000). As it benefits banks and the society, it may have its own side effect on economy of the country or it may affect (positively or negatively) the economic and social aspects of society. As a report of (World Economic Forum, 2020) by 2025, 97 million jobs will emerge and 88 million jobs will be displaced due to automation technologies. Banks in the future might failed to use expected number of skilled and educated man power and motivated to use bank technology which may not need high number of employee. As digital technologies are expanding, unemployment grows to a maximum and then begins to decline as technology expansion exceeds a specific value (Hamed Mirzaei Abbasabadi and Mohammad Soleimani,

2021). Hence, this may cause overloads on unemployed man power in the country. Therefore, this study was intended to examine the effect of e-banking technology on staff size of banks in Ethiopia.

First, to the knowledge of the researcher, different studies conducted in Ethiopia showed the effect of e-banking on other dependent variables, but this study filled the knowledge gap of the effect of e-banking on staff size of banks. Second, this research is conducted to prove the results of researches done in other countries are whether the same or different in case Ethiopia and this research focused on particularly in banking sector in Ethiopia.

1.3. Objective of the study

1.3.1. General objective of the study

The general objective of this study is investigating the effect of e-banking technology on staff size in the Ethiopian banking sector.

1.3.2. Specific objective

1. Identifying the effect of ATM machine on staff size of banks in Ethiopia.
2. Investigating the effect of POS machine on staff size of banks in Ethiopia.
3. Examining the effect of mobile banking on staff size of banks in Ethiopia.
4. Scrutinizing the effect of internet banking on staff size of banks in Ethiopia.

1.4. Research Hypothesis

H1: There is significant effect of ATM machine on staff size of banks in Ethiopia.

H2: There is significant effect of POS machine on staff size of banks in Ethiopia.

H3: There is significant effect of mobile banking on staff size of banks in Ethiopia.

H4: There is significant effect of internet banking or online bank on staff size of banks in Ethiopia.

1.5. Significance of the Study

This research is conducted to identify the effect of e-banking on staff size in case of Ethiopian banks. The survey was conducted in Addis Ababa. Hence, the study has the Following significance; for commercial banks in Ethiopia and related parties by providing conducted information about effect of e-banking on staff size in case of Ethiopia banks. For policy makers such as NBE, the research will give helpful information about the relationship between e-banking and staff size. For academicians, economists and other researchers, it will drop light on

relationship of e-banking and staff size. It used as a source of other researches and reference for related studies.

1.6.Scope of the Study

Conceptually, the research focuses on the four types of electronic banking: ATM, POS machine, mobile banking and internet banking and their effects on banks staff size. Additionally, banks used in this research has been working for five year and more as business institution because the research used more than five years panel data to show regression analysis. Furthermore, the selection technique of the researcher was by considering better experience of banks on e-banking services. By keeping this criterion, the research had population of eighteen banks in Ethiopia. From these eighteen banks in Ethiopia, the researcher selected (sample out) only six (6) banks; One (1) state owned bank and five (5) privately owned banks. The research also used panel data since 2014 to 2021 which is eight years.

1.7.Limitations of the study

As a limitation of the study researcher observed the following issues, the research tries to answer the effect of digital banking on staff size of banks in Ethiopia but there are some other political, social, environmental and organizational factors that may affect the staff size of banks. These factors are not part of this study. In addition, the research is focused on only on banking sector in Ethiopia; there are some other dependent variables that may be affected by digital technology. So that this can be a limit for this research because it didn't address this sectors.

1.8.Organization of the Study

The final report of the research paper was organized as follows. The first chapter comprises introduction part of the paper explaining the background of the study, statement of the problem, objectives and research questions. Chapter two presents review of different literatures regarding the research objective. In chapter three, methodology of the study is presented. Data presentation with discussion and analysis are in chapter four. Lastly, in chapter five the result of the study is used to draw conclusion and recommendation.

CHAPTER TWO

LITERATURE REVIEW

2.1. Theoretical Review

2.2.1 Definition of E-banking

The next section shows some of the definitions of e-banking. E-banking is a type of banking service where funds are transferred by electronic signal exchange between financial institutions, instead of exchanges for cash, checks, or other non-negotiable instruments (Kamrul 2009). E-banking, also known as electronic funds transfer (EFT), is simply the use of electronic means of transferring funds directly from one account to another, rather than using check or cash (Malak, 2007).

2.2.2. Types of E-banking

Electronic banking can be defined as various forums such as online banking or (online banking), television-based banking, mobile banking, and PC banking (personal computer) (or offline banking) where customers have access to these services that use electronic intelligence. a device, such as a personal computer, personal digital assistant (PDA), cash register (ATM), point of sale (POS), kiosk, or touch tone phone (Alagheband, 2006, p.11). According to Alghaeband, there are different types of E-banking and some basic ones are discussed as follows:

Automated Teller Machines (ATM) - An electronic terminal, which gives customers access to a banking service at almost any time. To withdraw cash, deposit money or transfer funds between accounts, the customer need an ATM card and personal identification number (PIN).

Point-of-sale (POS) - The system allows buyers to pay for purchases with a check card, a new debit card name. This card looks like a credit card but with a big difference. Purchase money is quickly transferred from the bank cardholder account to the store account that is the seller (Malak, 2007).

Internet / online banking - An electronic home banking system that uses web technologies in which Bank customers can perform their business and banking activities using a single computer or other electronic device which can access internet.

Mobile banking - Mobile banking is a service that enables customers to perform other banking services such as accounting and transfer, through a text message (SMS).

2.2.3. Need for E-banking

A person should come to the branch in person, withdraw cash or make a check or request a statement of accounts. In true e-banking, any question or activity is processed online without reference to the branch (any banking) at any time. Providing e-banking is increasingly becoming a "necessity" for having a "good service" to have. Net banking, therefore, is now more common than in most developed countries because it is a cheaper way to provide banking services. Banks have often been at the forefront of using technology to improve their products, services and efficiency. They have long used electronic and communication networks to deliver a wide range of additional products and services. Delivery channels include direct dial communication, private networks; social networks etc. and devices including telephones, Personal Computers including Automatic Teller Machines, etc. With the advent of PCs, easy access to the Internet and the World Wide Web (WWW), the Internet is increasingly being used by banks as a source of instruction and delivers their products and services to their customers. This form of banking is commonly referred to as Internet Banking, although the range of products and services offered by different banks varies greatly in both its content and complexity (Singer and et al., 2001).

2.2.4. Benefit of E-banking system

Business organizations are trying to unlock new technologies from low-cost E-commerce applications that have led to the elimination of mergers in distribution channels (Salma and Kashif, 2010). Costs can be reduced to zero for other services such as information and knowledge of manufactured goods. Low cost and convenience sales offer the adoption of a new technology system for the exchange of information between different groups and business organizations. Information and communication technology has transformed a business from a local to a global one. However, it has been suggested that E-banking is important in the banking sector of developing countries (Polatoglu and Ekin, 2001). The online payment system is quite new in banking institutions and the distribution of this renaming could lead to online banking systems that have caused many changes in the technology of the banking sector. E-banking usually has banking, customer and economic benefits.

2.2.4.1. Benefit of E-banking for Banks

It should be noted that E-banking can bring various benefits to banks and their customers. It is clear that cost savings, efficiency, acquisition of new customer components, improved banking reputation and better customer service and satisfaction are key banking benefits (Jayawardhena

& Foley, 2000). Under Robinson's (2000) view, the reasonable cost of running an online banking service is much lower than in the brick and mortar branch. In addition, Sheheshunoff (2000) argues that one of the most important factors influencing E-banking performance by banks is the need to create strong barriers to customer outflow. In the author's view, once customers are familiar with the use of full E-banking service, they are less likely to switch to another financial institution. In particular, the banking industry has also benefited greatly from the growth of E-Banking infrastructure.

The growth of E-banking has highly supported banks in managing excess cash and operating costs. Many repetitive and tedious tasks of banks are now turned into technological that resulted greater efficiency, better time management and improved control. The growth of E-banking has made banks more competitive. It also led to maximizing the number of banking industry, and the opening up of new banking systems. Electronic banking has highly supported the banking industry to minimize paper based works, so that it helped them to move paperwork forward a bit. Electronic banking has also helped the bank to better record their transactions and reports.

The ability to access and send computers, such as the Internet, is far better than any branch network (Mols, 1998).

2.2.4.2. Benefit of E-banking for Customers

The benefits of E-banking are not limited to banks but also to their customers. Due to the advent of the Internet, banking transactions are no longer limited in time and space. It is very easy for consumers around the world to access their bank accounts 24 hours a day and seven days a week. Customers can enjoy a variety of services, especially services that can be provided by traditional bank branches (Pham, 2010). A major benefit of E-banking is that it is not expensive to be used by customers. However, some people believe that prices seem to be one factor that hinders the spread of E-banking (Sathye, 1999). Price disputes often revolve around local differences and differences between internet connection costs and telephone prices. It is also believed that E-banks have been flexible to respond to changing customer needs (Pham, 2010). There has been a tendency that the customer does not want to go to or from the bank branch to perform certain banking activities. In other words, they want to use E-banking to save time and money. E-banking can bring comfort and accessibility, which will have a positive impact on customer satisfaction and reliability (Pham, 2010). It is possible for customers to manage their banking services whenever they want and enjoy improved privacy in their interactions with the bank. In

addition, customers can enjoy additional benefits at lower cost levels through E-banking (Mols, 1998).

Turban (2008) argues that E-banking is indeed beneficial to clients such as:

Through e-banking, customers can perform their banking services whenever they want. E-banking is a 24-hour service, so customers are no longer tied to branch hours. In addition, they do not have to take the time to go to the branch and wait in line to avoid it, thus giving them extra time to do what they want. Additionally, e-banking can be done anywhere, as long as customers have an internet connection.

Furthermore, because e-bank does not have to worry about financing real estate with all those extra costs, fees can be reduced and usually are not. Those check-up and savings accounts offered by online banks are generally free of charge. Many online banks try to be as paperless as possible. Many statements and letters are made online, reducing the amount of paper used and sent to you. This will also help reduce the cost of online banking. As an added bonus, this makes online banking a good environmental option. Note, some banks charge you if you want a copy of the paper.

Moreover, for any income, such as income, customers can arrange for it to be deposited directly into a bank account by the remittance company. This is actually a double benefit, as customers do not have to take the time to submit a check, and the money goes into the customer account immediately allowing them to earn interest as quickly as possible. Using automatic Bill Payment, customers can pay their monthly bills automatically.

E-banking allows customers real-time account information because customers can access their accounts at any time; they can access the latest, real-time information on your account. It can also transfers between accounts with the same online financial institution can be made almost immediately. Not only is there no cash transfer, you can do it whenever you like and wherever you are from.

2.2.4.3. Benefits E-banking to General Economy

Electronic Banking as already mentioned has greatly benefited the general public and the banking industry. This has resulted in the creation of a better environment that allows it to support growth, productivity and prosperity. In addition to the many tangible benefits of reduction if costs, reduced delivery time, increased efficiency, reduced waste, electronic banking and careful monitoring eliminates many illegal and illegal practices associated with the banking

sector such as money laundering, fraud and fraud. (Pham, 2010) .Profits from an economic perspective 'E-banking provided many benefits not only to the bank itself, but also to society as a whole (Pham, 2010).

2.3. Definition of Employment and Classification of workers

The International Labor Organization (ILO) defines as “vulnerable employment” the sum of the shares of “own-account workers” and “contributing family members” in the labor market (International Labor Organization, 2013). A strong relationship exists between the level of economic development and the share of wage employment in the labor market – a poorer country has a lower share of wage employment.

Employee: Employees are all workers who hold the type of jobs defined as “paid employment jobs”, where the incumbents hold explicit (written or oral) or implicit employment contracts that give them basic remuneration that is not directly dependent upon the revenue of the unit for which they work.

Employer: Employers are workers who, working on their own account or with one or a few partners, hold the type of activity defined as a “self-employment job” (i.e. jobs where the remuneration is directly dependent upon the profits derived from the goods and services produced) and, in this capacity, have engaged, on a continuous basis, one or more persons to work for them as employee(s).

Own-account workers: Own-account workers are workers who, working on their own account or with one or more partners, hold the type of activity defined as a “self-employment job” (see above) and have not engaged on a continuous basis any employees to work for them.

Members of producers’ cooperatives: Members of producers’ cooperatives are workers who hold “self-employment jobs” in a cooperative producing goods and services.

Contributing family workers: Contributing family workers are workers who hold “self-employment jobs” as own account workers (see above) in a market-oriented establishment operated by a related person living in the same household (International Labor Organization, 2013).

According to this research related with classification of labor, the researcher were focused employees under classification of labor.

2.4. Empirical Review

There are several related studies are conducted by different researchers in different parts of the world. Shahryar Shirzadi, Maryam Nazari Montazer and Mohammad Ahmadpour (2017) conducted their research on testing the impact of developed banking technology on bank job security in case that of picked branches of Kermanshah business banks. To achieve the research aim, scientists were circulated 385 questionnaires to employees and managers of Kermanshah's picked commercial banks, and the data was collected and judged utilizing appropriate statistical tests. The study's judgments told that appropriating e-banking, electronic money transfers and mobile banking had a negative and significant influence on employees' job protection. Job security, electronic banking, telephone banking, electronic money transfer, and e-banking were some of the core ideas on the research.

This paper was an empirical investigation to find a relationship between digital technology expansion and ICT developments on one major economic issue: unemployment. In this way, three indexes of technology (ICT Development Index, The Digital Index, and Technological Readiness) were chosen according to their focus on digital and ICT indicators, and also their sufficient number of observations to provide a global view by the researchers. The data consisted of 163 countries and was structured in a cross-sectional form including observations of the year 2016. Then, the data were subject to an empirical investigation following OLS and GLS estimation methods, along with stability tests. The results show a significant polynomial degree 2 relationship between unemployment and digital technology indexes. The empirical methodology indicates that the relationship is positive in degree 1 and negative in degree 2 coefficients, so the researchers concluded that: as digital technologies are expanding, unemployment grows to a maximum and then begins to decline as technology expansion exceeds a specific value (Hamed Mirzaei Abbasabadi and Mohammad Soleimani, 2021).

The purpose of the study was to determine the effects of electronic banking on employees' job security in the Nigerian banking sector, with special reference to four selected banks in Lagos, Nigeria. The researchers used survey design in out the study. Four hundred respondents from Guaranty Trust Bank, Equatorial Trust Bank, Eco Bank and Skye Bank were sampled. Two research questions and one hypothesis were raised and formulated to guide the study. A 20 item self-report instrument was used for the study. The responses were numerically quantified, tabulated and analyzed using mean and chi-square. The result shows that adoption of e-banking

directly leads to loss of jobs and early retirement of employees in Nigerian banking sector. Also, adoption of automated teller machine and other e -payment systems also affect job stability and employment of teller officers in the Nigerian banking sector. Although, e-banking services enhance customers' satisfaction and sustainable competitive advantage, efforts should be made by the management of Nigerian banks to ensure that adoption of e-banking does not necessarily lead to direct loss of jobs and early retirement of employees. Additionally, e-banking should be seen as an option to enhance the service delivery of employees in Nigerian banking sector and not a substitute to employees' performance (Atiku Sulaimon Olusegun, Genty Kabiru Ishola, and Akinlabi Babatunde Hammed, 2011).

Another research that the researcher reviewed is conducted on impact of technology on employment. The paper presented a model and empirical data, which illustrates the employment cycles. The data presented in this paper is for several Turkish industries. The analytical model could apply to most industries, but additional empirical data will be needed to verify this assertion. Finally, the researchers investigated or conclude that the overall growth in living standards, productivity and employment are the result in the introduction of new technological developments. Technology itself increases output and increases demand, either by increasing productivity or by the use of new products, i.e., growth in the information technology industry. However, the introduction of new technology in the short term will reduce employment as the productivity is increased. If the market does not increase, big enough, smaller number of workers will meet the needs with increased labor productivity. On the other hand, in the long term, it is assumed in the literature that such increased productivity will also increase demand and employment. The beneficial factors of new technology also result in displaced workers with skill sets that are no longer applicable (Cardullo and Ansal, 1997).

Garedachew (2010) conducted research on the practice, opportunities and challenges of E-banking in Ethiopia. The aim of his study was focused on analyzing the status of electronic banking in Ethiopia and investigates the main challenges and opportunities of implementing E-banking system. Garedachew (2010) founded "the practice of Ethiopian banking system is very much behind compared to the rest of the world. Cash is still the most dominant medium of exchange. Even the use of checks is mostly limited to government institutions, NGOs and some private business. ATM, Credit Card and debit card services, and other electronic payment systems are at

rudimentary stage. Low level of infrastructural development, lack of suitable legal and regulatory framework, inadequate banking system, high rates of illiteracy, resistance to changes in technology among customers and staff, frequent power interruption and security issues are the main challenges for developing e-banking in Ethiopia”.

Zelege (2014) conducted a research to analyze factors that influence customers’ intention to adopt e-banking service channels in Ethiopia. His findings revealed that the variables included in the models (attitude, subjective norms, perceived behavioral control, perceived usefulness, perceived ease of use and perceived risk) were significant in affecting users’ behavioral intention to use e-banking service channels. Results also revealed that the variable perceived behavioral control plays the most important role, followed by attitudes and perceived usefulness in predicting an individual’s intention to accept e-banking service channels Zelege (2014). There are also other researchers in Ethiopia that they focus on adoption and implementation or practice of e-banking Meaza (2013). The relationship between customer satisfaction and e-banking and other related researches were conducted in Ethiopia.

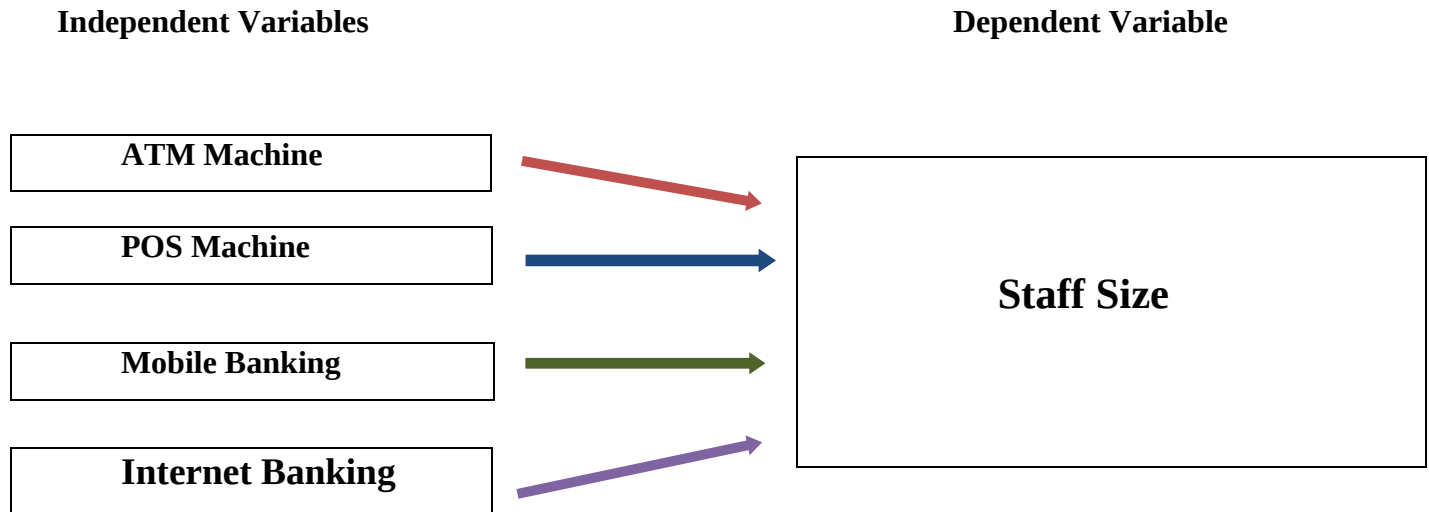
Knowledge gap

The research attempted to fill the gap by investigating the effect of e-banking on staff size of banks in Ethiopia. To the knowledge of the researcher, different studies conducted in Ethiopia showed the effect of e-banking on other dependent variables, but this study filled the knowledge gap of the effect of e-banking on staff size of banks. Generally, different researchers in different country found almost the same results related to technological effect on unemployment. This research is conducted to prove the results of researches done in other countries are whether the same or different in the case of Ethiopia and this research focused on particularly in banking sector in Ethiopia. So that, this research may fill the knowledge gap related to banking technology affection on staff size of Ethiopian banks.

2.5. Conceptual Framework

Conceptual framework involves forming an idea about the relationship between variables in the study and showing relationship graphically or diagrammatically (Mugenda, 2003). Figure 2.1 shows the relationship between e-banking (ATM, POS machine, and etc.) and staff size.

Figure 2.1. Research Framework



CHAPTER THREE

METHODOLOGY OF THE STUDY

3.1. Introduction

This section discuss about methodology of the research will adopt in order to actualize objectives or making true of the research. Research methodologies are defined by Leedy & Ormrod (2001, p. 14) as "the general approach that researchers take when conducting research projects". Quantitative research quantifies and statistically processes information and collects data to support or refute "alternative knowledge claims" Creswell (2003). Eldabi (2002) suggested a series of steps as a research paradigm to be followed in the methodological part of the study. So that, in order to be in line with these assumption the research approach, research design, operational definition and measurement of variables, type and sources of data, sampling technique, data collection method, data analysis technique, validity and reliability test, and regression equation were applied in this chapter. The researcher assumed that conducting of all kinds of research should be carried out according to well-defined research methods based on principle of science. Based on these assumptions, the researcher follows the basic framework of the research paradigm that had been developed.

3.2. Research Approach

The research approach is chosen by the researcher based on the research objective, the characteristics of the research, the problem area, and the research question (Alhamdani et al., 2006). "Quantitative researchers look for additional explanations and predictions from others and places. The reason is to create, confirm, or validate relationships and to expand generalizations that make contributions to theory" (Leedy and Ormrod, 2001).

To achieve the purpose of this study and answer the researchers' questions based on the above assumption, the researcher used a quantitative research approach exploring the relationship between e-banking and the unemployment of banks in Ethiopia.

3.3. Research Design

The research design outlines the methods and procedures used in collecting the information needed to answer basic research questions or to evaluate and theoretical evidence. This study used an explanatory strategy that is most popular for designing measurement methods. It is often used to interpret and interpret quantitative results by collecting and analyzing quality follow-up data (Creswell, 2009). It is also helpful when unintended consequences appear in quantitative

research (Morse, 1991). Therefore, the researcher has used this technique to explain, explain, and interpret the features and to develop the cause and effect of variables and to provide an additional opportunity for the researcher to study new ideas. Designs for such studies focus on the following: building research intent, designing data collection methods, sample selection, data collection, data analysis and analysis and reporting findings.

3.4. Operational Definition and Measurement of Variables

In the case of conducting the quantitative study, and in order to make the study clear to all readers how groups of variables are defined and measured (Creswell, 2009). The operational definition and measurement of each variable in this study are provided below.

Dependent Variable

To measure the banks employment decision the research used number of employee of selected banks as June 30 of each included in the study (2014-2021) as an important indicator of employment decision of banks. It was measured as the number of employee of banks of Ethiopia in the selected period.

Independent Variables

ATM machine: It is measured by the total numbers of ATM machines in selected banks of Ethiopia in the selected period.

POS machine: It is measured by the total numbers of POS machines in selected banks of Ethiopia in the selected period.

Mobile Banking: It is measured by the total number of mobile banking subscribers in selected banks of Ethiopia in the selected period.

Internet Banking: It is measured by the total number of internet banking subscribers in selected banks of Ethiopia in the selected period.

3.5. Types and Sources of Data

In this study, the researcher was used quantitative model which is numerical panel data. The study provides reliable and practical evidence to verify a significant effect of the different types of e-banking and overall banks employment decision in Ethiopia. According to Baltagi (2008), there are many benefits of using panel data such as controlling for individual heterogeneity, more degrees of freedom, and eliminating biases resulting from aggregation over firms or individuals. Creswell (2003) states, quantitative studies “employ strategies of inquiry consisting of experimental and surveys, and collect statistics on predetermined instruments that yield statistical facts”. The researcher used seconder type of date in order to conduct the research. Thus, the secondary data which was used in this study include eight years operational reports of six banks from their annual reports respectively.

3.6. Sampling technique

The researcher theoretical frames were banks in Ethiopia, which are selected by researcher judgment. The population included banks that are already in bank industries at least for six year of operation and banks that are prior in using (adopting) e-banking services because the research used more than five years panel data to show regression analysis. Additionally, the researcher selected banks those have full data that the researcher needed. The research was conducted in Addis Ababa on selected banks. In this sense, the numbers of banks in Ethiopia are eighteen (18). The population of this study included these eighteen (18) banks in Ethiopia. From total eighteen banks the researcher selected six (6) banks. One (1) state owned bank and five (5) privet owned banks. The procedures used for drawing the samples from the available lists were based on the banks currently use different technological instruments to deliver service to customers or based on their familiarity with technology specially in adopting e-banking services. So that, from private banks the researcher selected Dashen Bank, United bank, Awash Bank, Wegagen Bank, and Bank of Abyssinia and from state owned bank the researcher selected Commercial Bank of Ethiopia (CBE). The researcher found full quantitative data from these banks in order to conduct the research.

3.7. Method of Data Collection

The research used secondary data; operational data that are produced through banks annual reports for the years 2013/14-2020/21 which are eight years data.

Operational data that are needed by the researcher are number of employees throughout those six years in order to know the employment decision of selected banks. Other operational data those were used to conduct the research is number of e-banking adopted by banks in the selected six years; such as number of ATM machines, number of POS machines, number of mobile banking subscribers, and number of internet banking subscribers throughout those six selected years.

3.8. Method of Data Analysis

The data analysis technique of the study use quantitative method. The study identifies and measures the effect of different types e-banking on the Ethiopian banks employment decision measured in number of employee in each selected years. To test the hypothesis, the study begins with the quantitative approach initially to collect and analyse secondary data in order to generalize results to population. The collected data which are operational data were made on the balanced panel data. Descriptive statistics, regression and correlation models were used in analyzing the panel data. Inference statistics are applied to determine the random effect of associating an independent variable, which is e-banking, with a dependent variable, which is a bank's employment decision. Operational data from all selected banks is collected, aggregated in an Excel database containing the identified variables, and exported to a statistical software package called STATA13. Multivariate panel data regression analysis is performed to test the hypothesis that the independent variables were found individually or collectively to provide a meaningful contribution to the explanation of the independent variables. The panel data supported in most literatures are more useful and informative than time series and cross-sections because they can control individual heterogeneity and have a low degree of multilinearity between variables (Altunbas et al., 2001).

3.9. Regression Equation

The studies analyses the effect of the extraordinary varieties of e-banking on the employment decision of banks in Ethiopia through using panel regression approach. For that reason, based on the findings presented in chapter four table 4.7, the subsequent linear regression equation model turned into developed.

$$NE_{it} = \beta_0 + \beta_1ATM_{it} + \beta_2POS_{it} + \beta_3MBit + \beta_4IB_{it} + \varepsilon$$

Where:

NE = Number of employees;

NATM= Number of automated teller machine

NPOS= Number of point of sells machine

NMBS = Number of mobile banking users/subscribers

NIBS = Number of internet banking users/subscribers

ϵ = The Error Component for firm i at time t assumed to have zero mean $E \{ \epsilon_{it} \} = 0$

β_0 = Constant

$\beta = 1, 2, 3, 4, \dots, 6$ are estimated parameters

i = selected banks, $i = 1, 2, 3, \dots, 11$

t = time period, $t = 1, 2, \dots, 10$

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1. Introduction

This chapter presents the data analysis and results. The result of descriptive statistics, correlation analysis, the test assumption and result of the regression analysis are presented in this chapter.

4.2. Descriptive Statistics

The descriptive statistics for the variables of selected six banks for eight years (2014 - 2021) with a total observation of 48 are showed in Table 4.1 below.

Table 4.1. Descriptive Statistics

	NE	ATM	POS	MBU	IBU	e	YEAR
Mean	3.831722	2.351904	2.653579	5.257113	4.574381	1.9e-10	2017.5
Maximum	4.527707	3.283301	4.075912	6.462242	6.382197	0.1457789	2021
Minimum	3.384533	1.69897	1.544065	3.732796	3.618048	-0.310696	2014
Std. Dev.	0.330192	0.4396346	0.647049	0.7511864	0.659262	0.1221988	1.725898
Observation	48	48	48	48	48	48	48

Source: - Using Stata-13

As showed in the table above, the number of employee on selected banks in Ethiopia have achieved a mean number natural logarithm of 3.831 over the last eight years. From the total sample, the mean, the maximum and the minimum values of NE had the natural logarithm of 3.831, 4.527, and 3.384, respectively. The maximum value indicated Commercial Bank of Ethiopia and the minimum value indicating United Bank. This means the bank with high number of employee were commercial bank of Ethiopia among the sample earned with total number of employees 33,706, this data attached on the appendix. On the other hand, the bank with lowest number of employee was united bank among selected banks as a sample with total number of employees 2,424 during selected periods. Respect to the standard deviation, it implies that the NE vary from its mean in right and left side by 33.2%. This shows low variation from the mean.

Table 4.1 above show the mean of the natural logarithm of total number of ATM machine had 2.351 with the standard deviation of 0.439. The maximum and minimum value was 3.28 and 1.69 respectively. Thus, this value indicated that commercial bank of Ethiopia take the maximum number of ATM and the minimum value gone with bank of Abyssinia.

Table 4.1 above show the mean of the natural logarithm of total number of POS machine had 2.653 with the standard deviation of 0.647. The maximum and minimum values were 4.07 and 1.54 respectively. Thus, this value shows commercial bank of Ethiopia takes the maximum number of POS and the minimum value gone with bank of Abyssinia with value.

Table 4.1 above show the mean of the natural logarithm of total number of mobile banking users (MBU) had 5.257 with the standard deviation of 0.751. The maximum and minimum values were 6.46 and 3.73 respectively. Thus, this value shows commercial bank of Ethiopia takes the maximum number MBU and the minimum value gone with Bank of Abyssinia.

Table 4.1 above show the mean of the natural logarithm of total number of internet banking users (IBU) had 4.574 with the standard deviation of 0.659. The maximum and minimum values were 5.52 and 3.61 respectively. Thus, this value shows Dashen Bank taken the maximum and Bank of Abyssinia the minimum number of IBU.

4.3. Correlation Analysis

The degree of correlation between the variables depends on the correlation coefficient, which should ranges between positive one and negative one. This range indicates the occurrence of a perfectly positive and perfectly negative correlation between those variables respectively. Therefore, it is the measurement level of correlation between variables. However, there is no correlation among the variable if zero value computed for the coefficient (Brooks, 2008). Table 4.2. Below more illustrated the above idea.

Table 4.2. Correlation Matrix

	NE	ATM	POS	MBU	IBU
NE	1.0000				
ATM	0.9020	1.0000			
POS	0.8414	0.8890	1.0000		
MBU	0.7915	0.7972	0.7116	1.0000	
IBU	0.3348	0.4141	0.3907	0.6910	1.0000

Source: - Using Stata-13

Table 4.2. Shows that ATM machine, POS machine, mobile banking users and internet banking users indicated a positive correlation with the number of employment of the selected banks.

These validated that an increase in each type of digital (virtual) banking would result in an increase in number of employment. The correlation matrix above shows that there is no independent variable in the model is highly correlated, weakly correlated, one key assumption of multiple linear regression. When two independent variables are highly correlated, these result in a problem of multicollinearity. Therefore, there is no multicollinearity problem in the model of this study.

4.4. Regression Model Tests

For the hypothesis that had been tested and the reliability of the regression results tested, it is necessary to test the hypothesis as well as the regression model part. To achieve this goal, the study performed the least important model tests including Normality, Multicollinearity, Autocorrelation, Variable variance (Heteroskedasticity) and Model specification which were performed in research.

4.4.1. Model Selection (Random Effect versus Fixed Effect Models)

The selection of the appropriate model is based on a choice between two types of panel data estimator approaches: random and fixed effects (Brooks, 2008). Therefore, to select the model, the study used the most famous test, the Hausman test. Therefore, the model selection hypothesis was conducted below;

Null hypothesis: random effect is appropriate

Alternative hypothesis: fixed effect is appropriate

Level of significant= 5% (0.05)

The choice rule of the above check turned into reject the null speculation if the opportunity cost of the check is much less than 0.05 whilst receive if it's far more than 0.05.

Table 4.3. Model Selection- Hausman Test

```
. estimates store re
. hausman fe re
```

	Coefficients			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
ATM	.1730353	.2285206	-.0554853	.
POS	.1253429	.1954331	-.0700902	.
MB	.0023286	-.0001315	.0024601	.
IB	.095678	.0465935	.0490845	.

```

      b = consistent under Ho and Ha; obtained from xtreg
      B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test:   Ho:   difference in coefficients not systematic

      chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
            =      13.67
      Prob>chi2 =      0.0084

```

Source: - Using Stata-13

Based on the above table the probability value of the test is 0.0084. Therefore, the null hypothesis is accepted and the research used the fixed effect model.

4.4.2. Tests for the Classical Linear Regression Model (CLRM) assumptions

Testing classic linear regression model assumptions, including zero mean, normality, multicollinearity, autocorrelation, and errors from model specifications, is the first before further econometric metrics. It is a step. In addition to testing hypotheses about possible estimation factors, the study used the usual least squares method, even with ideal properties (Brooks, 2008).

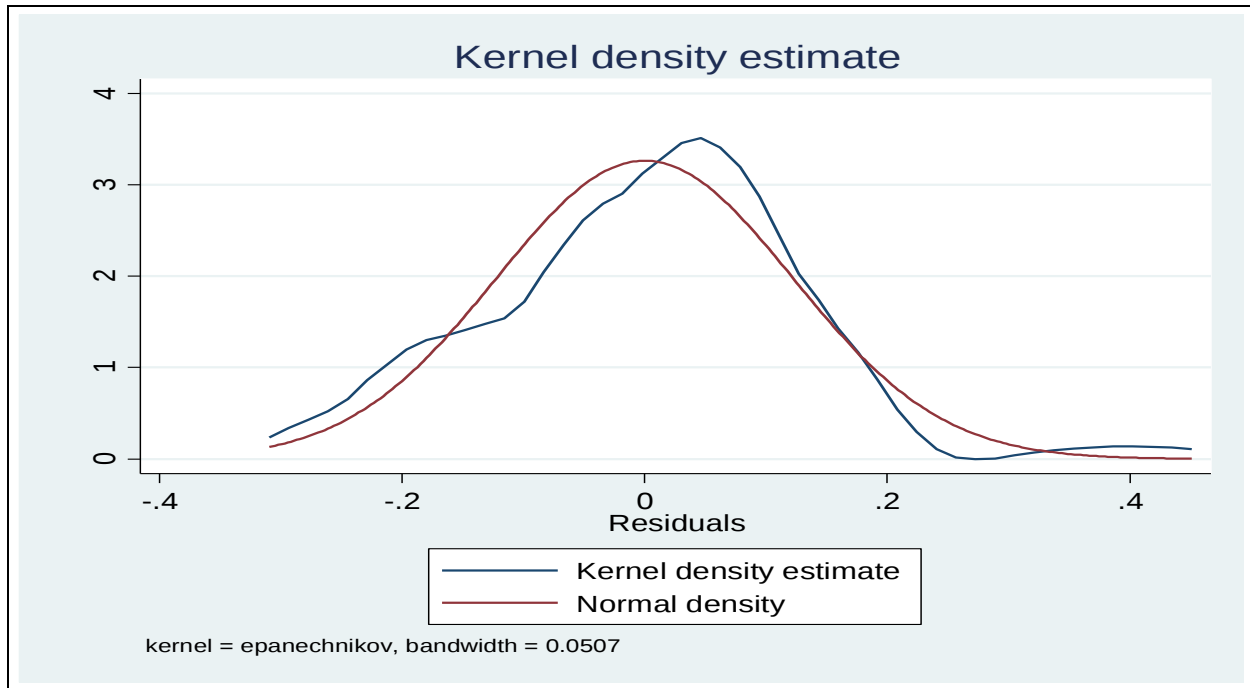
I. The Errors have Zero Mean ($E(U_t) = 0$)

The first assumption is errors have zero mean. According to Brooks (2008), if the regression equation exclude the constant term, the assumption will violated. Accordingly, the study holds this assumption hence a constant term was included in this research.

II. Normality Test

In verifying that the residuals are normally distributed, which is a very important assumption for regression, the kernel density estimate with the normal option displays a density graph of the residuals with a normal distribution superimposed on the graph.

Fig 4.1. Normality Test Result of the Study



Source: - Computed using Stata-13

Kernel bandwidth is a free parameter that has a significant impact on the estimation of results. The above diagram witnesses that the red curve is the true density (a normal density with mean 0 and variance 1). In comparison, Kernel density estimate, grey curve, normality assumption holds with a epanechnikov, bandwidth of 0.0507 because its density estimate is close to the true density.

III. Test for Autocorrelation Assumption ($\text{cov}(u_i, u_j) = 0$ for $i \neq j$)

According to Brooks (2008), in order to check/test the existence or not existence of autocorrelation problem in the model, the covariance between the cross sectional panel data of six banks and the error term could be zero. The study performed a Wooldridge test for the existence of autocorrelation.

Null hypothesis: There is no autocorrelation problem in the model

Alternative Hypothesis: There is autocorrelation problem in the model

Significant level= 5% (0.05)

Therefore, the decision is rejected by a null hypothesis if the number of probability probes is below the level of significance. If not, the test accepts the null hypothesis.

Table 4.4. Test for Autocorrelation

Wooldridge test for autocorrelation in panel data			
H0: no first order autocorrelation			
F(	1,	10) =	0.810
Prob > F =			0.3892

Source: - Using Stata-13

According to the table above because the probability values, 0.3892, are significantly higher than the 0.05 significance level, the null hypothesis of no autocorrelation should be accepted. Hence, the null hypothesis of no autocorrelation was not rejected, according to the test's findings. Therefore, the study concludes that autocorrelation was not the problem of the model.

IV. Test for Multicollinearity

Multiple regressions handle multicollinearity not because of its existence, but because of its magnitude. With a high degree of multicollinearity, the estimation variables of the correlation matrix become unstable, and the error terms of the parameters can be greatly exaggerated or bulged. To test multicollinearity, researchers used the variance inflation factor (VIF) test.

Table 4.5. Multicollinearity Test, VIF

. vif		
Variable	VIF	1/VIF
ATM	6.90	0.144835
MB	4.83	0.207042
POS	4.79	0.208901
IB	2.13	0.469303
Mean VIF	4.66	

Source: - Using Stata-13

If the VIF value is greater than 10, it may be worth further investigation. VIF tolerances are used to determine the degree of co-linearity. The table above shows this. The variance inflation factor

values for all variables are less than 10 indicated that multicollinearity is not an issue in this study.

V. Heteroskedasticity Assumption Test

According to Brooks (2008), this assumption applies when the variance of the error is constant, but it violates this assumption if the error does not have a constant variance known as the heteroskedasticity. In this study, the Breusch-Pagan / Cook-Weisberg test was used to test the presence of heterogeneous dispersion across the various independent factors investigated.

H_0 : Error has constant variance

H_1 : Error has no constant variance

Significance level= 5% (0.05)

Therefore, the decision is reject the null hypothesis if the probability value of the test is less than the significance level. Otherwise, the test accepts the null hypothesis.

Table 4.6. The Breusch-Pagan/Cook-Weisberg Heteroscedasticity Test

. hettest		
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity		
Ho: Constant variance		
Variables: fitted values of NE		
chi2(1)	=	0.03
Prob > chi2	=	0.8551

Source: - Using Stata- 13

In the Breusch-Pagan / Cook-Weisberg test in this study, the chi-square (1) = 0.8 and the regression model has a p-value of 0.8551, which is greater than 0.05. Therefore, on this occasion, the study accepts the null hypothesis H_0 and confirms that the study is free of heteroskedasticity problems.

IV. Model Specification

When one or more relevant variables are excluded from the model, or one or more unrelated variables are included in the model, a model specification mistake occurs. Detecting specification flaws can be done in a variety of ways. The researcher utilized the Ramsay RESET test, which uses the weights of the predicted values of the explanatory variables, among all

econometric regression model of specification error tests (RESET) for unobserved independent variables. The study formulated the following hypothesis for the model:

Null hypothesis: No omitted variables in the model

Alternative hypothesis: the model has omitted variables

Therefore, the decision was rejected the null hypothesis if the probability value of the test is less than the significance level. Otherwise, the test accepts the null hypothesis.

Table 4.7. Ramsey Model Specification Test

. ovtest			
Ramsey RESET test using powers of the fitted values of NE			
Ho: model has no omitted variables			
	F(3, 40) =	2.05	
	Prob > F =	0.1225	

Source: - Using Stata-13

Based on the table above, the regression analysis has a probability value of 0.1225 in the Ramsay model selection test for this investigation. As a result, the null hypothesis, that the model contains no omitted variables, was accepted. Therefore, the model was excellent, with no missing variables that influenced the dependent variable (return on asset) are excluded in the model.

4.5. Regression Analysis

The data-based findings from the econometric model on the effect of e-banking on staff size of banks in Ethiopia are presented in this part.

4.5.1. Regression Analysis between Dependent and Independent Variables

The following model was constructed to investigate the effects of e-banking on staff size of banks in Ethiopia based on the model summary in Table 4.8.

$$NE_{it} = 2.7376 + 0.1850ATM + 0.01721POS + 0.06572MB + 0.05540IB + 0.0442LR + \varepsilon$$

This part of the study focuses on data analysis of each impact of different types of digital banking on the employment opportunity of Ethiopian banks. In addition, this section reviewed the findings in the light of previous empirical findings. Therefore, the next section describes how to evaluate the regression results of the random effects model.

Table 4.8. Regression Results of the Study

. xtreg NE ATM POS MB IB, re						
Random-effects GLS regression			Number of obs		=	48
Group variable: Firms			Number of groups		=	6
R-sq: within = 0.8926			Obs per group: min		=	8
between = 0.9038			avg		=	8.0
overall = 0.7254			max		=	8
corr(u_i, X) = 0 (assumed)			Wald chi2(4)		=	284.62
			Prob > chi2		=	0.0000
NE	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
ATM	.1850843	.0516819	3.58	0.000	.0837896	.286379
POS	.0172022	.0280584	0.61	0.540	-.0377912	.0721956
MB	.0657219	.0286403	2.29	0.022	.009588	.1218559
IB	.058496	.0279959	2.09	0.037	.0036251	.1133669
_cons	2.737684	.0924912	29.60	0.000	2.556405	2.918964
sigma_u	.14636016					
sigma_e	.04429232					
rho	.9161014	(fraction of variance due to u_i)				

Source: Using Stata-13

The results of R-squared show how well the regression analysis describes the actual deviation of the dependent variable (Brooks, 2008). The model's aggregate R-squared score is 89.26 percent, implying that the factors in the model explained 89.3 percent of the variability in number of employees of banks in Ethiopia. As a result; these factors together provide a reasonably appropriate explanatory (highly explains) variable for determining the impact of e-banking on the staff size of banks in Ethiopia.

R-square is not highly helpful in panel data analysis, according to various studies. Rather than it, focus on particular variables significance and overall model significance in panel data analysis. In general, cross sectional data has a lower R squared than time series data. It is not very high with panel data due to the variability of cross sections. In general, the magnitude of R squared increases when more relevant explanatory factors are included. However, the purpose of this study should be on the study objectives that must be met from the start of particular and general model significant, ensuring that there is no model specification bias and misleading regressions are avoided. Another thing to keep in mind is that a higher R squared in the presence of few meaningful t-values implies that the regression is multicollinearity and misleading.

The probability values of the zero test statistic and the regression F statistic (284.62) show that all independent variables in the model collectively affect the number of employees, the dependent variable. In addition, three independent variables (75%), ATM, MB and IB are statistically significant at the 5% significance level. The single variables significance level is more than 50%, mentioned by Zellner et al. (2001) as criterion.

The beta value for ATMs and MBUs with coefficients of 0.1850 and 0.0657, respectively, had a positive and significant association with the dependent variable (NE) at the 5% significance level. In addition, POS machine in this analysis is 0.0172, indicating that point of sales machine has positively associated with number of employees (staff size) of banks in Ethiopia. And the association is insignificant at the 95% confidence interval. Finally, the IBU value is 0.0584, indicating that internet banking users has a positive and significant relationship on staff size (number of employees) of banks at the 95% confidence interval.

4.5.2. Discussion of Regression Analysis Result

The analysis outcome in Table 4.8 above certainly illustrates that the dependent and independent variables, ATM, POS, MBU and IBU with NE, which are included in the proposed research model, have a strong and significant association. The relationship between each independent variables and the staff size is described in detail below.

Automated Teller Machine

H1: There is significant relationship between ATM and staff size of banks in Ethiopia.

Based on the regression analysis result in Table 4.8 above ATM machines have statistically significant positive effect on staff size. Accordingly, the result supports the working hypothesis that ATM has positive and statistically significant impact on the number of bank employees in Ethiopia.

Point of Sales Machine

H2: There is significant relationship between POS machine and staff size of banks in Ethiopia.

Based on Table 4.8 above, point of sales machines (POS) have a positive impact on number of staff size and are not statistically significant. As a result, this result is inconsistent with the research hypothesis that POS machines have a positive and significant impact on the staff size in Ethiopian banks. This is consistent with previous research of (Shahryar S., Maryam Nazari M.

and Mohammad A., 2017), (Hamed M. and Mohammad S., 2021) and (Atiku S., Genty K., and Akinlabi B., 2011).

Mobile Banking

H3: There is significant relationship between mobile banking and staff size of banks in Ethiopia.

As a result of the regression analysis in Table 4.8 above, mobile banking has statistically significant positive effect on number of bank staffs in Ethiopia. As a result, the finding result is in agreement with the research hypothesis that mobile banking has positive and statistically significant impact on number of staff size of banks in Ethiopia. This result agrees with result of (Shahryar S., Maryam Nazari M. and Mohammad A., 2017).

Internet Banking

H4: There is significant relationship between internet banking and staff size of banks in Ethiopia.

Table 4.8 above; shows that Internet banking (IB) has a positive impact on staff size and are not statistically significant. Therefore, this does support the working hypothesis that internet banking has a positive and statistically significant effect on the staff size in Ethiopia. This result agrees with result of (Shahryar S., Maryam Nazari M. and Mohammad A., 2017).

4.6. Regression Analysis excluding Commercial Bank of Ethiopia

The data-based findings from the econometric model on the effect of e-banking on staff size of banks in Ethiopia are presented in this part.

4.6.1. Regression Analysis between Dependent and Independent Variables

The following model was made to investigate the effects of e-banking on staff size of banks in Ethiopia based on the model summary in Table 4.8. This analysis shows only private banks regression or it did not include the data of Commercial Bank of Ethiopia. Because the researcher do believe that the research data of CBE can highly affects research result based on descriptive statistics. So this may help the research result to be high accurate.

$$NE_{it} = 2.5640 + 0.1730ATM + 0.1253POS + 0.0023MB + 0.0956IB + 0.0423LR + \varepsilon$$

This part of the study focuses on data analysis of each impact of different types of digital banking on the staff size of Ethiopian banks. In addition, this section reviewed the findings in the light of previous empirical findings. Therefore, the next section describes how to evaluate the regression results of the random effects model.

Table 4.9. Regression result excluding CBE

. xtreg NE ATM POS MB IB, fe						
Fixed-effects (within) regression			Number of obs		=	40
Group variable: Firms			Number of groups		=	5
R-sq: within = 0.9130			Obs per group: min =			8
between = 0.6248			avg =			8.0
overall = 0.7622			max =			8
corr(u_i, Xb) = 0.1181			F(4, 31)		=	81.32
			Prob > F		=	0.0000
NE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ATM	.1730353	.0463866	3.73	0.001	.0784292	.2676414
POS	.1253429	.0463011	2.71	0.011	.0309112	.2197746
MB	.0023286	.0314656	0.07	0.941	-.0618459	.066503
IB	.095678	.0263588	3.63	0.001	.0419189	.1494372
_cons	2.564099	.0674497	38.01	0.000	2.426535	2.701664
sigma_u	.08906802					
sigma_e	.042331					
rho	.81574201	(fraction of variance due to u_i)				
F test that all u_i=0:		F(4, 31) =		27.66	Prob > F = 0.0000	

Source: Using Stata-13

The results of R-squared show how well the regression analysis describes the actual deviation of the dependent variable (Brooks, 2008). The model's aggregate R-squared score is 91.2 percent, implying that the factors in the model explained 91.2 percent of the variability in staff size of private banks in Ethiopia. As a result; these factors together provide a reasonably appropriate explanatory (highly explains) variable for determining the impact of e-banking on the staff size of private banks in Ethiopia.

R-square is not highly helpful in panel data analysis, according to various studies. Rather than it, focus on particular variables significance and overall model significance in panel data analysis. In general, cross sectional data has a lower R squared than time series data. It is not very high with panel data due to the variability of cross sections. R squared can be bigger while the dataset is more time dominating. In general, the magnitude of R squared increases when more relevant explanatory factors are included. However, the purpose of this study should be on the study objectives that must be met from the start of particular and general model significant, ensuring that there is no model specification bias and misleading regressions are avoided. Another thing to keep in mind is that a higher R squared in the presence of few meaningful t-values implies that the regression is multicollinearity and misleading.

The probability values of the zero test statistic and the regression F statistic (284.62) show that all independent variables in the model collectively affect the number of employees, the dependent variable. In addition, three independent variables (75%), ATM, POS machine and IB are statistically significant at the 5% significance level. The single variables significance level is more than 50%, mentioned by Zellner et al. (2001) as criterion.

The beta value for ATMs and MBUs with coefficients of 0.1850 and 0.0657, respectively, had a positive and significant association with the dependent variable (NE) at the 5% significance level. In addition, POS machine in this analysis is 0.0172, indicating that point of sales machine has positively associated with number of employees (staff size) of banks in Ethiopia. And the association is insignificant at the 95% confidence interval. Finally, the IBU value is 0.0584, indicating that internet banking users has a positive and significant relationship on staff size (number of employees) of banks at the 95% confidence interval.

4.6.2. Discussion of Regression Analysis Result without including CBE

The analysis outcome in Table 4.8 above certainly illustrates that the dependent and independent variables, ATM, POS, MBU and IBU with NE, which are included in the proposed research model, have a strong and significant association. The relationship between each independent variables and the staff size is described in detail below.

Automated Teller Machine

H1: There is significant relationship between ATM and staff size of banks in Ethiopia.

Based on the regression analysis result in Table 4.8 above ATM machines have statistically significant positive effect on staff size. Accordingly, the result supports the working hypothesis that ATM has positive and statistically significant impact on the staff size of private banks in Ethiopia.

Point of Sales Machine

H2: There is significant relationship between POS machine and staff size of banks in Ethiopia.

Based on Table 4.8 above, point of sales machines (POS) have a positive impact on number of staff size and are statistically significant. As a result, this result is consistent with the research hypothesis that POS machines have a positive and significant impact on the staff size in

Ethiopian banks. This is consistent with previous research of (Shahryar S., Maryam Nazari M. and Mohammad A., 2017)

Mobile Banking

H3: There is significant relationship between mobile banking and staff size of banks in Ethiopia.

As a result of the regression analysis in Table 4.8 above, mobile banking has statistically insignificant positive effect on number of bank staffs in Ethiopia. As a result, the finding result is in agreement with the research hypothesis that mobile banking has positive but statistically significant impact on number of staff size of banks in Ethiopia. This result agrees with result of (Shahryar S., Maryam Nazari M. and Mohammad A., 2017).

Internet Banking

H4: There is significant relationship between internet banking and staff size of banks in Ethiopia.

Table 4.8 above; shows that Internet banking (IB) has a positive impact on staff size and are not statistically significant. Therefore, this does support the working hypothesis that internet banking has a positive and statistically significant effect on the staff size in Ethiopia. This result agrees with result of (Shahryar S., Maryam Nazari M. and Mohammad A., 2017).

4.7. The Difference between the two Regression Analysis results

- The research has the same result for both ATM and Internet or online banking effect on staff size of banks in Ethiopia. Both independent variables have positive and statistically significant relationship with staff size of banks in Ethiopia.
- On the other hand, the both regression analysis result shows variation on result of POS machine and mobile banking. POS machine has positive but statistically insignificant relationship with staff size when the researcher uses the data of all selected banks. Otherwise, POS machine has positive and statistically significant relationship between staff size of banks in Ethiopia. On the other side, mobile banking has positive but statistically significant relationship with staff size when the researcher uses the data of all selected banks. Even though, mobile banking has positive and statistically insignificant relationship between staff size of banks in Ethiopia.
- So that, the research conclusion and recommendation is held by considering both results.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1. Introduction

Generally, this chapter contains the summary of the research findings, the conclusions that are taken out from the research findings and the researcher recommendations.

5.2. Summary of Findings

The very first objective of this research is examining the effect of electronic banking technology on unemployment of banks in Ethiopia. The study used six (6) sampled selected banks in Ethiopia, which have a recent eight (8) years operational data report from 2014 to 2021. Regarding secondary data gathered from operational data under annual reports, the analysis used Ordinary Least Square to develop an unbalanced panel regression model, and a random effect model was used according to the Hausman test. The final outcome of the regression model shows that e-banking has an impact on staff size of banks in Ethiopia. Totally number of employee in each selected years of each selected banks was the dependent variable used to measure the staff size, and it had four determinants of e-banking. These are ATM, POS machine, mobile banking, and internet banking respectively under investigation in order to attain its objective. Therefore, from the regression result, ATM, mobile banking and internet banking has positive and significant effect on staff size, but POS machine has positive and significant effect on staff size of banks in Ethiopia.

5.3. Conclusion

The primary objective of this study was to investigate the impact of e-banking technology on staff size of banks in Ethiopia. Hence, the research concluded that:

- ATM had positive as well as significant impact on staff size of banks in Ethiopia. This suggested that the higher number of ATM boosts number of employment of banks in Ethiopia. In other word, increasing number of ATM does not have negative influence staff size of banks in Ethiopia.
- Mobile banking had positive as well as significant impact on staff size of banks in Ethiopia. This suggested that the higher number of mobile banking subscribers/users may increase staff size of banks in Ethiopia. In other word, increasing number of

mobile banking subscribers does not have negative influence on staff size of banks in Ethiopia. As such mobile banking may offer additional job opportunity in banking industries.

- POS machine has positive and statistically insignificant effect on staff size of banks in Ethiopia. This implies higher number of POS machines that banks are using may not decrease number of staffs of banks in Ethiopia but, in an insignificant amount. In other word, if POS machine did not decrease the current staff size of banks, it will also not decrease the employment opportunity of banks in the future.
- Internet banking has positive and statistically significant effect on staff size of banks in Ethiopia. This implies higher number of internet banking subscribers that are using banks' e-banking service may not decrease staff size of banks in Ethiopia in a significant amount. In other word, if internet banking subscribers do not decreases the current staff size of banks, it will not decrease the employment opportunity of banks in significant amount.

5.4. Recommendation

The researcher would like to recommends banks in Ethiopia may work on making awareness or change the system on making awareness for their e-banking products to the society because this may lead banks into more efficient use of existing technology. The efficient use of the e-banking may led banks to productivity growth and settlement.

Additionally, according to the research investigations and conclusions the researcher recommends National Banks of Ethiopia would encourage banks continue to use more preferable e-banking technology or products that may consider current Ethhiopian labour market and the economy.

Furthermore, the research suggested that the educational curriculum that are being sated for banking and finance sector might think about including technological knowledge and skills.

Finally, the researcher wants to recommend for other researchers that are interested in this area; they might test or investigate the relationship between e-banking and job security of employees in Ethiopia.

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Appendixes

1. Descriptive Statistics

. sum					
Variable	Obs	Mean	Std. Dev.	Min	Max
Year	0				
Firms	48	3.5	1.725898	1	6
NE	48	3.831723	.3301918	3.384533	4.527707
ATM	48	2.351904	.4396346	1.69897	3.283301
POS	48	2.653579	.647049	1.544068	4.075912
MB	48	5.257113	.7511864	3.732796	6.462242
IB	48	4.574381	.6592621	3.618048	6.382197
e	48	1.99e-10	.1221988	-.2589413	.4000497

2. Correlation Analysis Result; Correlation matrix

. pwcorr NE ATM POS MB IB, sig					
	NE	ATM	POS	MB	IB
NE	1.0000				
ATM	0.9020 0.0000	1.0000			
POS	0.8414 0.0000	0.8890 0.0000	1.0000		
MB	0.7915 0.0000	0.7972 0.0000	0.7116 0.0000	1.0000	
IB	0.3348 0.0200	0.4141 0.0034	0.3907 0.0060	0.6910 0.0000	1.0000

3. Regression Model Selection; random effect Model and Fixed effect model

. hausman fe re				
	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe	(B) re		
ATM	.4172261	.4693069	-.0520808	.
POS	.0033197	-.0532048	.0565245	.0051677
MB	.3026331	.2855198	.0171133	.
IB	-.0607955	-.1730719	.1122764	.0343689
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
= 8.73				
Prob>chi2 = 0.0683				
(V_b-V_B is not positive definite)				

4. Regression Analysis Result

. xtreg NE ATM POS MB IB, re						
Random-effects GLS regression			Number of obs		=	48
Group variable: Firms			Number of groups		=	6
R-sq: within = 0.8926			Obs per group: min		=	8
between = 0.9038			avg		=	8.0
overall = 0.7254			max		=	8
corr(u_i, X) = 0 (assumed)			Wald chi2(4)		=	284.62
			Prob > chi2		=	0.0000
NE	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
ATM	.1850843	.0516819	3.58	0.000	.0837896	.286379
POS	.0172022	.0280584	0.61	0.540	-.0377912	.0721956
MB	.0657219	.0286403	2.29	0.022	.009588	.1218559
IB	.058496	.0279959	2.09	0.037	.0036251	.1133669
_cons	2.737684	.0924912	29.60	0.000	2.556405	2.918964
sigma_u	.14636016					
sigma_e	.04429232					
rho	.9161014	(fraction of variance due to u_i)				

5. List of Selected Banks of the Study

No.	Name of Banks	Ownership
1	Commercial Bank of Ethiopia	Governmental
2	Bank of Abyssinia	Private
3	Awash Bank	Private
4	Dashen Bank	Private
5	United Bank	Private
6	Wegagen Bank	Private