

DETERMINANTS OF FINANCIAL SUSTAINABILITY OF MICROFINANCE INSTITUTIONS IN ETHIOPIA

**A Thesis Submitted to the School of Graduate Studies of Jimma University
in Partial Fulfillment of the Requirements for the Award of the Degree of
Master of Accounting and finance (MSC)**

BY:

DAGEFU DANIEL SEFU



**JIMMA UNIVERSITY
COLLEGE OF BUSINESS & ECONOMICS
MSC PROGRAM**

JIMMA, ETHIOPIA

JUNE, 2024

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And

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Approval Sheet

This is to certify that the thesis entitles “Determinants of Financial Sustainability of Microfinance Institutions in Ethiopia”, submitted to Jimma University for the award of the Degree of Master of Accounting and finance (Msc) and is a record of bona fide research work carried out by Mr. *Dagefu Daniel Sefu*, under our guidance and supervision.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma

Main Adviser's Name

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Eshetu Yadecha. (phD)

Co-Advisor's Name

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Signature

Zawude Tariku (Msc)

DECLARATION

I hereby declare that this thesis entitled “**Determinants of Financial Sustainability of Microfinance Institutions in Ethiopia**”, has been carried out by me under the guidance and supervision of Dr. Eshetu Yadecha and Mr. Zawude Tariku.

The thesis is original and has not been submitted for the award of any degree or diploma to any university or institutions.

Researcher's Name

Date

Signature

Dagefu Daniel Sefu

Abstract

Financial sustainability is crucial for the long-term viability and effectiveness of microfinance institutions in serving their target population and contributing to poverty alleviation efforts. It involves achieving a balance between generating enough revenue to sustain operations while also reaching out to a large number of low-income individuals who lack access to traditional financial services. The objective of this study is to examine the determinants that influence the financial and operational sustainability of selected MFIs in Ethiopia. In this study, an explanatory design with a quantitative approach was used, and the source of data was secondary data. The method of data collection for the internal variable was taken from the sample selected from ten MFIs official MX website, and for the external variable, it was collected from the central statistics agency. The method of data and analysis is a descriptive analysis and econometrics model, specifically applying a balanced data set of 150 observations from ten MFIs over the period 2009–2023. The major findings from the descriptive analysis of MFIs financial sustainability in terms of OSS were sustainable, but in terms of FSS, it was not sustainable. From econometric analysis, a random fixed effect result indicated that OSS and FSS are considered as proxy dependent variables, and independent variables loan, efficiency, deposit, clients, competition, and inflation were statistically significant and important variables that had an impact on OSS and FSS, but loan repayment and employee were not statistically significant variables. The findings of the study sampled MFIs that were financially unsustainable in terms of FSS. The result of this study recommended that it is better to focus on improving the financial sustainability of MFIs by implementing strategies to attract more deposits from clients by offering competitive interest rates and convenient deposit options.

Key words: MFIs, operational self-sustainability, financial self-sustainability and competition

ACKNOWLEDGMENT

A thesis report requires not only substantial commitment and personal sacrifice of the researcher but also it depends upon support and encouragement of many other including professionals and family. I would like to express my appreciation to the following persons for their suggestion, support and contribution.

First I would like to thank the almighty GOD, the most Merciful and source of knowledge and wisdom, who bestowed upon me the health and the power of communication to accomplish this research proposal.

Secondly I would like to sincerely thank my main advisor Eshetu Yadecha (phD) and co-advisor Mr. Zawude Tariku for constructive comments, valuable suggestions and good guidance. I equally thank them for their kindness and necessary encouragement. Finally, I would like to thank my family without whom I would have found many things very difficult.

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Acronyms

AFMFN	African Microfinance Network
DECSI-	Debit credit and saving institution
FSS-	Financial self-sustainability
MFIs-	Microfinance institution
OSS-	Operational self-sustainability

CHAPTER ONE

1.1. Background of the Study

Financial sustainability in microfinance institutions refers to the ability of these institutions to cover their costs and generate enough income to operate without relying heavily on external subsidies or donations. It involves achieving a balance between generating enough revenue to sustain operations while also reaching out to a large number of low-income individuals who lack access to traditional financial services. Financial sustainability is crucial for the long-term viability and effectiveness of microfinance institutions in serving their target population and contributing to poverty alleviation efforts (Bayai I. , 2017).

The rise of microcredit in the 1980s, within the scope of the new economic and social policy aimed at combating poverty, caused many concerns. Development partners see this tool as a way to reduce poverty by empowering the poorest people in society and investing in the development of microfinance. Microfinance institutions have emerged since the late 1990s as an economic development tool designed to help low-income people (Okesina, 2022)

The aims of microfinance institutions as development organizations are to provision the financial needs of un served or underserved markets as a means of meeting development objectives such as to create employ, reduce poverty, aid existing business grow or expand their activities, empower women or other disadvantaged population groups, and boost the development of new business. In short, microfinance institutions have been expected to reduce poverty, which is considered as the most essential development objective (Chikwira, 2022).

Microfinance services served 139.9 million borrowers in 2018, compared to only 98 million in 2009. Of the 139,000 borrowers worldwide, 80% are women and 65% are rural borrowers; this number remained stable a decade ago despite rising loan rates a number of debtors. With an expected loan amount of \$124.1 billion, MFIs recorded another 8-plus year of growth in 2018—5% worldwide compared to 2017. MFI also had a capacity of in the last decade. (Morshed, 2019))

The number of borrowers benefiting from microfinance institutions in Africa will reach 50 million small families by 2022. Microfinance institutions play an important role in this. To provide financial services to people currently excluded from the banking system. These

institutions provide small loans, savings accounts, insurance, and other financial products to help empower individuals and small businesses in low-income communities (Wilson, 2012). Europe's experience over the last three decades shows that the combination of MFIs and microcredit with support from business leaders makes it possible to turn disadvantaged people into investors. Similarly, it can reduce poverty and social divisions while contributing to the achievement of sustainable development goals, as well as matching microcredit institutions to the long-term impact of the economy (Jemelyanov, 2020).

The South Asian country is a world leader in microfinance: it has the highest number of borrowers (85.6 million in 2018), a number that is growing significantly compared to other regions (+13.8% between 2017 and 2018). . While the number of MFIs in Africa has increased by 56% since 2012, the number of borrowers has increased by 46% in the same period, reaching 3 million people in 2018. Despite the low quality of the portfolio (13.6% PAR > 30 days in 2017) and the high price for the buyer, the portfolio continues to show a good return with a decline of 6.6 points (20%) (Kumari, 2019)

In Africa, micro finance institutions play a great role in subsidiary the economic activities of the rural and urban poor in developing countries. MFIs are also important actors in the financial sector, and they are well positioned to raise and reach the millions of latent clients Ethiopia is one of the low income countries whose economy is mostly depend on agriculture (Agustin, 2022).

Approximately 80% of the population is engaged in agriculture, and agricultural products represent approximately half of the country's gross domestic product. The main problem that leads to increased productivity and income for the rural and urban population in Ethiopia is a lack of money. Since access to financial services is very limited, a large number of people obtain financial services through informal moneylenders, family members and other informal sources. To improve such problems, the

Ethiopian government introduced economic reforms such as creating income-generating activities, encouraging entrepreneurs, encouraging savings and personal investments, and establishing small and medium-sized enterprises. They don't have many financial services anymore (Giller, 2021.)

So far, the Ethiopian government has implemented strong measures to increase financial services for small and medium-sized enterprises (IFAD, 2009). Providing support to microfinance institutions while seeking funds from international donors is one of the priority actions of the Ethiopian government in poverty alleviation and poverty development (Obo, 2009). One of the main objectives of subsidized MFIs is to enable and finance SMEs providing financial and financial services. Therefore, the researcher examined the factors affecting the sustainability of microfinance in Ethiopia.

1.2 Statement of the problem

In countries where families cannot access financial services, microfinance institutions play an important role in reducing poverty. They draw from this message and other strengths to appeal to a variety of companies, especially donors, with a mission to end world poverty. Donors and organizations seeking to evaluate the climate performance of MFIs are reaching out to low-income communities and working to meet the imbalances (Hermes, 2019).

Microfinance has become one of the most popular poverty- alleviation strategies in the world. Although microfinance institutions have grown at a record pace over the last three decades, their effectiveness and sustainability are still questioned. MFIs around the world face a distinct tension between financial inclusion and contribution to poverty alleviation (Addae-Korankye, 2018). Therefore, this study examined the factors affecting the financial sustainability of MFIs in Ethiopia.

Many studies have been conducted on the factors affecting the financial sustainability of microfinance institutions. Kinde (2012) describes the scope and depth of microfinance; the dependency ratio and cost per borrower affect the sustainability of the loan.

(Bayai I. &, 2016) Established that the MFI financial sustainability is driven by loans intensity and size of the MFI. However, most of the reviewed studies have focused on the balance sheet factors like dependency ratio, cost per borrower, loans intensity, size, portfolio at risk as the key factors that affect financial sustainability of MFIs.

As reference above reviewed literature shares similar problem. So, what a researcher has reviewed above previous literature were used descriptive statistics tools rather than most advanced statically tools for analysis and some of previous researchers found to be significant in one economy or applicable to a set of MFIs and some are not significant (Cull et al., 2007 & Christen et al., 1995) and even if they report the result of some performance measures.

Moreover, as the best researcher knowledge some of study has been conducted empirically in Ethiopia exclusively focused on factors determining financial sustainability MFIs. For instance, Gonfa, D. B. (2019) has been conducted on Determinants of Financial and Operational Sustainability of Microfinance Institutions in Ethiopia. Kinde, B. A. (2012) has been conducted on financial sustainability of microfinance institutions (MFIs) in Ethiopia. However, no one included important external variable like competition. Since a competition is one of indicator of overall stability of the financial operational sustainability of MFIs (Wale, 2009). Henceforward, the researcher believes that there is need to fill knowledge gap as well as methodological gap by utilizing five internal variables (loan efficiency, employees, deposits, loan repayment, Clients and four external variables (inflation, growth domestic product, exchange rate and Competition) with advanced econometric models in order to full picture in a comprehensive manner that indicates of financial sustainability on MFIs so as to suggest progresses in the future.

This study therefore, investigates empirically the factors determine the financial sustainability of MFIs in Ethiopia over the period 2009- 2023, and gets started to fill this knowledge gap after having the various statistical manipulations.

Additionally, the researcher intended to explore factors that influence financial sustainability on MFIs accordingly, has raised a need to undertake a study on the case area of micro finance institution given on the factors influencing financial sustainability of microfinance institutions, the present study seeks to bridge the gap by identifying the factors that influencing financial sustainability of MFIs in Ethiopia with specific focus at national level. Finally, this study is designed to address the following objective of the study.

1.3. Objective of the study

1.3.1. General Objective of the Study

The general objective of the study is to examine the determinants of financial sustainability of MFIs in Ethiopia.

1.3.2. Specific objective of the study

- To examine the trend of financial sustainability of MFIs in Ethiopia.
- To evaluate the effect of internal factors on financial sustainability of microfinance institutions in Ethiopia.
- To examine the effect of external factors on financial sustainability of microfinance institutions in Ethiopia.

1.4. Research Hypothesis:

In this current paper the model were have the following null hypothesis.

- Ho 1:** Loan has negative effect on financial sustainability of MFIS.
- Ho 2:** Efficiency Loan has negative effect on financial sustainability of MFIS.
- Ho 3:** Employees has negative effect on financial sustainability of MFIS.
- Ho 4:** Deposits has negative effect on financial sustainability of MFIS.
- Ho 5:** Loan repayment has negative effect on financial sustainability of MFIS.
- Ho 6:** Clients has negative effect on financial sustainability of MFIS.
- Ho 7:** Inflation has negative effect on financial sustainability of MFIS.
- Ho 8:** Interest rate has negative effect on financial sustainability of MFIS.
- Ho9:** Exchange rate has negative effect on financial sustainability of MFIS.
- Ho10:** Competition has negative effect on financial sustainability of MFIS.

1.5. Significance of study

The first user of this paper is a researcher to award of master degree in accounting and finance. The second significance of this paper as literature for future researchers and in addition to award of master degree in accounting and finance to understand the main factors that determine financial sustainability of MFIs in Ethiopia. Furthermore, this research has massive significance for future researchers & academicians as a base to modify the models and variables considered and do their scholarly.

1.6. Scope of the study

In Ethiopia microfinance institutions are classified into three peer categories on the basis their size: Small - MFIs with a gross loan portfolio from Br 15 million to Br 50 million birr. Medium MFIs with a gross loan portfolio from Br 15 million to Br 50 million birr Large MFIs with a gross loan portfolio greater than 50 million birr. Therefore the current study was bound only MFIs with a gross loan portfolio from Br 15 million to Br 50 million birr. The Medium MFIs encompassed in the sample are , Harbu , Peace, Metemamen, Wasasa, Vision Fund, and Eshet, Gasha, Meklit, Buusaa and Aggar MFIs. The main reason for stick on only medium MFIs are Small – MFIs is less than ten years old and Large MFIs are transformed in to banks.

1.7. Organization of the Study

The study was organized in to five chapters; the first chapter was deals with introduction which contains back ground of the study, research objective, and scope of the study, significance of the study and scope of the study. The second chapter was describing theoretical related literature review and empirical literature review. The third chapter was focus on methodology of the study. The fourth chapter was going to deal with result of analysis and discussion and the last chapter was going to deal with conclusion and recommendation.

CHAPTER TWO

LITERATURE RELATED REVIEW

2.Introduction

The study examines the factors that influencing the financial sustainability of microfinance. This chapter reviews the literature on financial sustainability of microfinance with a focus on the drivers of financial sustainability. Section 2.1 reviews the theoretical literature influencing the financial sustainability of microfinance whereas Section 2.2 reviews empirical literature on influencing the financial sustainability of microfinance.

2.1. Theoretical related review literature

The financial development of microfinance institutions is probably the most important aspect of microfinance. It refers to the ability of MFIs to meet all their personal income from their activities without relying on external financing or subsidies (Kinde B.A., 2012).

Financial development is the ability to achieve medium-term goals without the need for ongoing assistance. These definitions are based on the same principle, namely the ability to be self-reliant. Explanations point to the profit potential of microfinance activities (Zeller, 2002).

Financial development can be measured in two areas: sustainability and financial self-sufficiency. According to Pollinger (2007), operational sustainability means the ability of the MFI to pay the operating costs arising from its activities, regardless of whether it is financed or not. However, MFIs can be financially self-sufficient if they can pay their income through both operations and financing and other forms of financing valued at market rates. The above descriptions of financial sustainability imply that a loss making MFI's (MFI's with poor financial performance) was not categorized as financially sustainable. Once more a profit making MFI, whose profitability is determined later covering certain of the operating costs by sponsored resources or funds, was also not be careful as financially sustainable. There is a variety of definitions to microfinance and the concept has become ambiguous as it has dispersed globally. One of the most frequently used and most recognized definition of microfinance is, however, the definition by the Consultative Group to Assist the Poor (CGAP). They define microfinance as follows:

Microfinance offers poor people access to basic financial service (CGAP, 2011). Microfinance refers to small-scale financial services mainly credit and savings provided to people who farm

or sheep; who operate small enterprises or microenterprises where goods and services are produced, used, repaired, or sold; who provide services; who work for wages or contracts; who gain income from renting out small amounts of land, vehicles, draft animals, or machinery and tools; and to other individuals and groups at the local levels of developing countries, both rural and urban (Mishra, 2014). Even different microfinance institutions' definitions differ. Action International, one of the world's biggest microfinance institutions, for instance, defines microfinance as: Banking and/or financial services targeted to low-and-moderate income businesses or households, including the provision of credit (Nieri, 2007)

The definitions above differ in some senses but they all touch upon important features of microfinance. First, as CGAP's definition implies, microfinance means giving people access to financial services. It can be interpreted; just microfinance is aimed for those that do not have access to traditional financial services (Ledgerwood, 2013)

Furthermore, the definitions by CGAP - point that microfinance is aimed for poor people while Action, on the other hand defines the target group as low-and-moderate income businesses or households. Robinsons as was Actions definitions do also, in contrast to CGAP's definition, refer to services that are being addressed to income-generating businesses and even though many of the organizations that provide microfinance appeal to micro-businesses, there are microfinance programs that offer financial services to individuals as well as microfinance institutions have grown since the late 1990s as an economic development tool intended to advantage low income people. (Koveos, 2004).

(Ledgerwood, 2013) Points out that the goals of microfinance institutions as development administrations are to service the financial needs of un served or underserved markets as a means of meeting development objectives such as to create employment, reduce poverty, help existing business raise or expand their activities, empower women or other disadvantaged population groups, and encourage the development of new business. In short, microfinance institutions have been estimated to reduce poverty, which is considered as the greatest significant development objective (Okibo, 2014).

However, the positive impact of microfinance institutions on economic prosperity and the well-being of the poor can only be sustainable if institutions can improve their financial performance and reach. The financial development of microfinance institutions on a global scale is one of the topics that has attracted the attention of many researchers recently due to its importance in

the life of microfinance institutions. Financial Development of Microfinance Institutions is a necessary factor for the continuation of businesses (Kinde B.A., 2012).

As the saying goes, “Unsustainable MFIs may help the poor now, but they will not be able to help the poor in the future because MFIs will disappear” (Ndanyenbah, 2017). Rather than having unsustainable MFIs at all, there are no MFIs at all. or it is better not to have (Ganka, 2010) This shows how important this is for the sustainability of microfinance and explores the factors that influence the sustainability of microfinance and how the financial flexibility of MFIs can have an impact on the sustainability of microfinance. Poverty is high and deep Sustainability of MFI financing in Ethiopia (BERHE, 2018).

To reduce the incidence of poverty, financing is considered necessary to achieve the goal of poverty reduction. According to Ganka (2010), microfinance paradigms aim to reduce income poverty by improving access to finance and financial services. However, a persistent problem for microfinance institutions is how to provide sustainable financing (Dunford, 2003). This complexity has attracted the attention of many researchers in recent years, and as a result, according to Randhawa and Gallardo (2003), many measures have been taken to make MFIs sustainable. The situation is the same in Ethiopia, but it is doubtful whether they can continue their activities without donor support and technical assistance. (Weiss, 2005).

Therefore, research is needed to make these microfinance institutions sustainable in order to ensure sustainable delivery of microfinance services and a sustainable reduction of poverty. So the first step in doing this is to understand the factors that influence their business.

The definitions of microfinance institutions proposed by some academics and organizations appear to differ. But the spirit of the statement is generally the same. Microfinance is the provision of small financial services to small companies or banks.

It involves the provision of "a variety of financial services such as deposits, loans, payment services, remittances, and insurance to the poor and very poor and their farms or non-farm microenterprises" (Hartarska, 2005).

2.2. Empirical Literature

Numerous studies have been conducted on this serious issue of financial sustainability by many researchers and policy makers at local, at national and international level by using cross sectional data. But still there is a need to chat this thoughtful issue in more detail to find compact

policy framework in future based on the performance of micro finance and its nature. Trust in view this issue, some empirical evidence from international micro finance; particular study area and Ethiopia are listed below.

(Githinji, 2008) analyzed factors influencing sustainability of microfinance institutions in kenya, his finds that financial sustainability of microfinance is positively influenced by loan repayment, average size of savings, the amount of loans disbursed and total assets by using the simple single linear regression model and descriptive statistics.

(Adongo, 2006) Analyzed factors influencing sustainability in Namibia by utilizing OLS model and the researcher specify that loan portfolio group lending, Loans Disbursed and Savings Mobilized are the major factors influencing sustainability.

A study was conducted by Gideon as are (2018) factors influencing the sustainability of microfinance institutions in Ghan. The researcher findings that default rates, interest rates and financial technology are most important factors by using descriptive statistics.

(Long, 2015) examined factor influence financial sustainability of microfinance. By using the panel data and they found, depth of outreach, dependency ratio and cost per borrower were found to be important variables in determining financial sustainability of microfinance institutions in Ethiopia. However, no significant association was found between capital structure and financial sustainability of microfinance institutions, and the same is true for staff productivity.

(Tehulu, 2013) Has done his research on the, determinants of Financial Sustainability of Microfinance Institutions in East Africa, by including the Ethiopia, and he included Loan portfolio, size and management efficiency as significant determining factors for financial sustainability of East African MFIs including Ethiopia. This study clearly fails to include more determining factors for financial sustainability of MFIs in Ethiopia.

2.3.Indicators of financial sustainability MFIs

2.3.1.Indicators of financial sustainability

According Meyer (2002) noted that the poor needed to have access to financial service on long-term basis rather than just a one-time financial support. Short-term loan would degrade the well-being of the poor. Financial un-sustainability in the MFI arises due to low repayment rate or un-materialization of funds promised by donors or governments.

2.3.2. Dependent variables

Most of the literature indicated that to measure financial sustainability of microfinance institutions are Operational self-sustainability and financial self-sustainability. to measure financial sustainability of microfinance institutions both Operational self-sustainability and financial self-sustainability. Therefore in this current study the researcher was uses financial sustainability of MFIs by using Operational self-sustainability and financial self-sustainability (Meyer, 2002).

Operational self-sustainability (OSS) is when revenues are sufficient to cover activities such as salaries, utilities, loan losses, and other administrative costs. OSS indicates whether revenue is sufficient to cover the MFI's direct expenses, excluding investment costs but including payments. So the formula for calculating OSS is gross income (eligible income plus deduction for credit losses).

Financial self-sustainability MFIs can FSS set the costs of other types of financing received as long as they are valued at market prices. Meyer (2002) stated: "Measuring financial sustainability requires that microfinance institutions have sound financial accounts and follow recognized accounting practices that provide transparency about revenues, expenses, loans, and potential losses." In this study, we measure variables based on financial development. $FSS = \text{Revenue} / (\text{Changes} + \text{Revenue})$ is based on FSS 1 (organizations with $FSS > 1$ are financially sufficient).

2.3.3. Independent variables

In this study was including independent variables that was analyzed on internal and external (macroeconomic) factors that influencing financial sustainability. This includes the following a number of independent variables that influence on financial sustainability.

Loan (L): Loans from MFIs are money that borrowers have to repay with interest. This microcredit or loan is usually paid weekly, monthly or annually. In accounting, liabilities are considered assets of the business. For MFIs, loans are an important asset. Most microfinance institutions do not have other types of assets. Credit flexibility is one of the most important factors in the success or failure of fan life. The variable measured in this particular study is credits from various sources.

Efficiency (EF): Variables indicate the ability to earn higher returns at a given income level and are the most effective way to provide microcredit to the poorest MFIs. This involves

reducing costs and generating revenue at a given level of activity. Therefore, performance can be measured by productivity (number of borrowers per employee) and cost management (costs to consumers). The MFI variable was measured by the number of borrowers per employee.

Employees (EM): An employee is one of unique variable that determine the status of financial sustainability. Because whatever financial transaction as was as outside of financial transaction carrying out by employees this makes unique important variable in order to analyzing factors that influencing on financial sustainability on selected MFIs. This variable was measure the number of employees in MFIs.

Deposits (D): Deposits is as an important element in the microfinance as it is a potential cheap source of funding and depositor as a tool in improving the economic lives of the clients. The variable deposit was measure in this current study the extent of deposits among the MFIs is in relation to their outstanding loans: $\text{Deposits to loan} = \text{Deposits} / \text{Gross Loan Portfolio}$. Deposit: Deposit of MFIs states to the sum of savings deposited by their members. There are two types of deposits: Voluntary deposits refer to the savings deposited voluntarily by the members when members of Microfinance institutions have sufficient funds to save at market interest rates and can withdraw them at any time. The savings requirement refers to the amount of money borrowers must save in MFIs over a certain period of time to get a loan.

Loan repayment (LR): The variable loan repayment or loan collection performance is one of significant impact on financial sustainability on MFIs. Some indicators cover-up rather than clarify the true situation. Moreover, terminology and calculation methods are not always consistent. Therefore, when the percentage of default, delinquency, or loss is specified, the number and amount of these percentages must be clearly defined. MFIs' self-reported collection performance often understates the extent of problems, usually because of information system weaknesses rather than intent to deceive. The number of days (x) used for this measurement in this particular variable the ratio of outstanding principal balance of all loans past due more than x days to outstanding principal balance of all loans.

Clients: (CT) The number of clients an MFI serves can have a significant impact on its financial and overall performance. The number of clients an MFI serves is proportional to its economic sustainability. A large number of clients allows the MFI to generate more income through interest and fees, which can be used to pay operating costs and invest in the development of the institution.

Macroeconomic variables

There are many other factors that can affect the financial sustainability of MFIs, so check the changes in the model. This study examines four control factors: inflation, interest rate, exchange rate, and competition.

Inflation: (IF) The effect of inflation is also another important factor causing financial sustainability of MFIs. It is obvious, high inflation rates are associated with high loan interest rates and thus high income. However, asserts that the effect of inflation on MFIs performance depends on whether inflation is anticipated or unanticipated (Athanasoglou et al., 2005). Variable inflation in this study was measure rate of change in customer price Index.

Exchange rate: (ER) Exchange rate is one of external factor that determine financial sustainability of MFIs. When the exchange rate is strong, the cost of borrowing is lower, and MFIs can offer more competitive interest rates to their clients. However, no one use variable computation when the exchange rate is weak, the cost of borrowing increases, leading to higher interest rates for clients. This can make it more difficult for MFIs to attract and retain clients, ultimately affecting their performance.

Competition :(CP) A competitive MFI landscape can contribute to the overall stability of the financial sector in MFIs. As MFIs compete for clients, they are more likely to adhere to prudential regulations and maintain strong governance practices, which can help prevent financial crises and ensure the stability of the financial system.

Conceptual Framework: Conceptual framework of the Study is raised from literature in order to examining the factor that influences financial sustainability on MFIs. Different empirical evidences suggested that the financial sustainability is determined by different factors.

Conceptual framework is a representation of the expected relationship between dependent variables and independent in this study as following diagram.

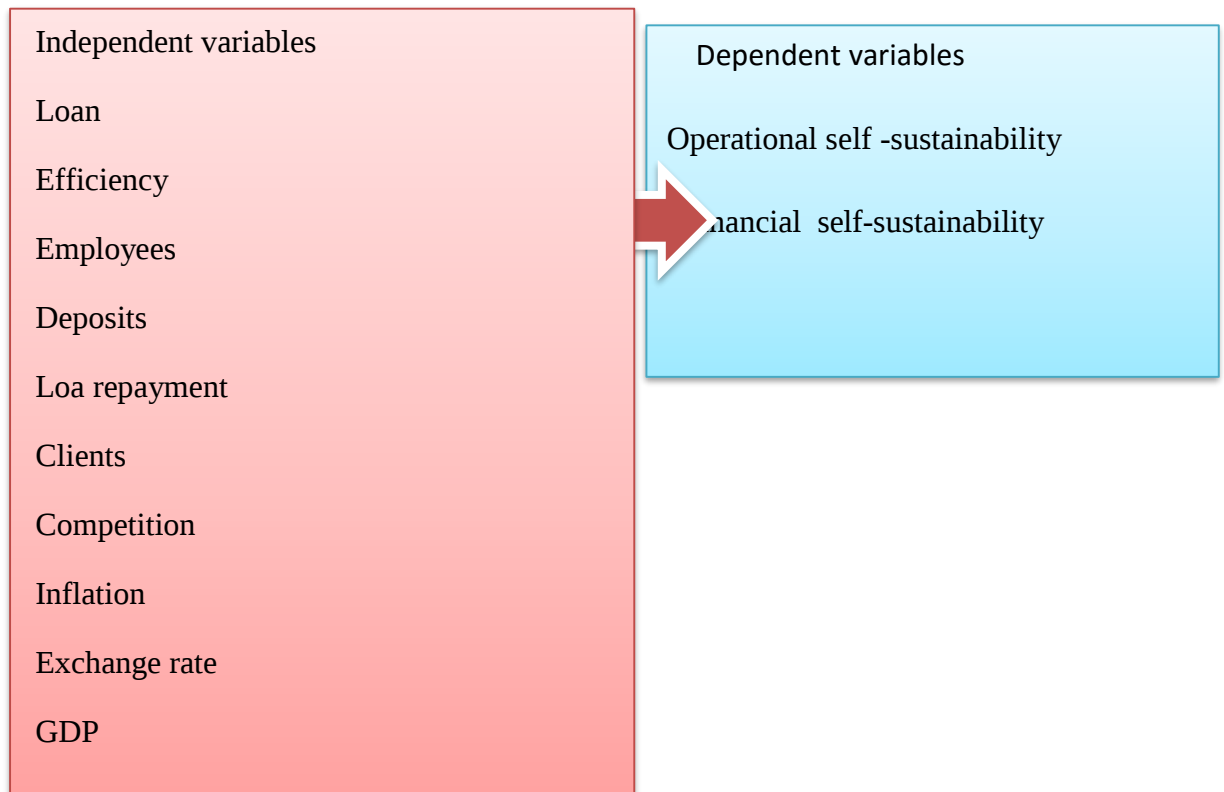


Figure 1: conceptual framework

CHAPTER THREE

RESEARCH METHODOLOGY

This section contains the following basic parts, the first section of this chapter was, research Design and approach, data type and Source, sample size and sampling technique, Data collection and data analysis.

3.1. Research Design and approach

This study is use explanatory design with quantitative approach is used to accomplish the purpose of the study .The research was quantitative research method by using panel financial data of each ten microfinance institutions for the last 15 years from secondary sources mainly from the each microfinance annual reports over the period of 2009 to 2023. The reason to stick on the year 2009 to 2023 based on availability of Data. The researcher was use paneldata, because for each year the researcher has 150 observations as those ten microfinances Institutions financial information was utilize in current analysis.

3.2. Data Type and Source

The study was use panel data set covers 15 a period from 2009-2023 with ten MFIs. The researcher was gather and was use secondary data from various sources was investigate the determinants of the financial and operational sustainability of microfinance institutions in Ethiopia. Therefore the researcher was collet secondary data specific to MFIs from the annual reports of the Association of Ethiopian Microfinance Institutions and from the website of MIX Market (www.themixmarket.com).Whereas the data related to macroeconomic factors was collected from the National Bank of Ethiopia only the most recent from fiscal years 2009 to 2023.

3.3. Sample size and sampling technique

The population of interest in this study was be consisted of all the ten micro finance institutions that large MFIs included in the sample are Harbu , Peace, Metemamen, Wasasa, Vision Fund, and Eshet, Gasha, Meklit, Buusaa and Aggar MFIs.. This study was limit to the institutions that MFIs with a gross loan portfolio equal to 15 million birr up to 50 million birr in order to address the influence of financial

sustainability of MFIs. Therefore, the population of study was focus ten institutions which has been identified with a gross loan portfolio 15 million birr up to 50 million birr. Since the study was be use secondary data, therefore all the ten MFIs with a gross loan portfolio 15 million birr up to 50 million birr was be selected for the study. Thus, there was no sampling of the MFIs to come up with a sample size.

3.4. Data collection

This study was utilizing panel secondary data. Secondary data was help in calculating the financial sustainability. It is difficult to measure financial sustainability of MFIs, as almost all MFIs are subsidized, where some subsidies are in kind form. Nevertheless, alternative measures is use to assess financial sustainability of MFIs in this study. Financial sustainability in this study was used to measure using proxy variable operational self-sufficiency (OSS) and financial self-sufficiency (FSS). MFIs is operationally sustainable if its OSS is 100% or more and financial sustainable if its FSS is 100% or more (Elias, 2020).

3.5. Data analysis

To meet objective of the study both descriptive and econometric method of data analysis was used. Descriptive statistics like trend, mean, maximum, minimum, chart and graph was used to analyze the quantitative information obtained.

3.5.1. Econometric Model analysis

Econometric model analysis was also run to establish the direction of influence of each of the factors on financial sustainability. The STATA version 14 software programs was used instrumental in establishing the data associations which eventually led to conclusions on the objectives of the study.

3.6. Model Specification

The research was applied econometrics model. An economic model can be defined as a multidimensional analysis of economic facts based on the development of a combination of theory and observation in relation to appropriate decision-making methods (ujarati, 2004).

Econometric model use because it provides the researcher numerical measure of the relationship between the dependent variable and explanatory variables; hence it show how much the dependent variable was go up or down as a result of a certain change in the

explanatory variable(s) which help the researcher to identify the major factors that influence the explanatory variables effector financial sustainability of MFIs.

Accordingly, there is need to estimate a relation of the following form using the panel data using the period from 2009-2023 data. Therefore, the model is specified for estimation financial sustainability status model equation as follows:-.

$$Oss_{it}/Fss_{it} = \beta_0 + \beta_1 L + \beta_2 EF + \beta_3 EM + \beta_4 D + \beta_5 LR + \beta_6 CL + \beta_7 IF + \beta_8 IR + \beta_9 ER + \beta_{10} CP + \varepsilon \quad 1$$

Where: Ossit/Fssit is dependent variable

β_0 = constant

$\beta_1 - \beta_{10}$ = coefficient of independent variables

ε = error term

Table 1: Variable measurement and Expected Sign

Variables name	Symbol	Measurement	Expected sign
Operational self Sustainability	OSS	Operating Income/ (Operating Expenses +provision for loan losses.)	
Financial self Sustainability	FSS	Revenue/ (Adjustments + Expenses)	
Loan	L	Outstanding principal balance of all loans past due more than x days / outstanding principal balance of all loans.	+
Efficiency	Ef	number of borrowers per staff	+
Employee		number of staff	+

Deposits	Dt	Deposits / Gross Loan Portfolio	+/-
Lon repayment	Lr	outstanding principal balance of all loans past due more than x days to outstanding principal balance of all loans	-
Clients	Cl	The number of active borrowers, depositors, and other clients who are currently accessing any financial service from the MFI.	+/-
Inflation	IF	Rate of change in customer price Index	-
exchange rate	ER	Yearly average Exchange Rate	—
Interest rate		Yearly average interest rate	-
Competition	Cp	Lerner Index	-

3.7. Ethical Consideration

Before undertaking the research in the field, an informed consent was obtained from the respondents, allowing them to participate voluntarily in the study. Approval was sought from the District ethical committee before undertaking the research. Respondents were informed that the information they give would be purely for research purposes.

The aims and objectives of the research was explained before and after undertaking the research, which helped in attaining an informed consent from the respondents. Before embarking on the field, the researcher has to meet the legal requirements and make prior appointments for the interview

CHAPTER FOUR

RESULT AND DISCUSION

Introduction

This section contains two basic parts, the first section of this chapter was analysis for the result of descriptive statistics analysis and the second section presents econometrics analysis and the basic tests for the assumptions of classical liner regression model.

4.1. Trends of financial sustainability

4. 1.1 Trends of financial Operational self-Sustainability (OSS) (2009-2023)

Operational self-sustainability (OSS) consider that the range of financial revenue covers financial expenses, impairment losses on loans and operating expenses without performing adjustments for non-lending activities or other revenue like donation or grant and government funding. MFIs with OSS exceeding 1 (100%) rates is indicating of a long-run financial expenses operational self- sustainability and equal to 100% breakeven point .i.e no loss or no gain of MFIs.

Table 2 : Operational Self -sufficiency (%)

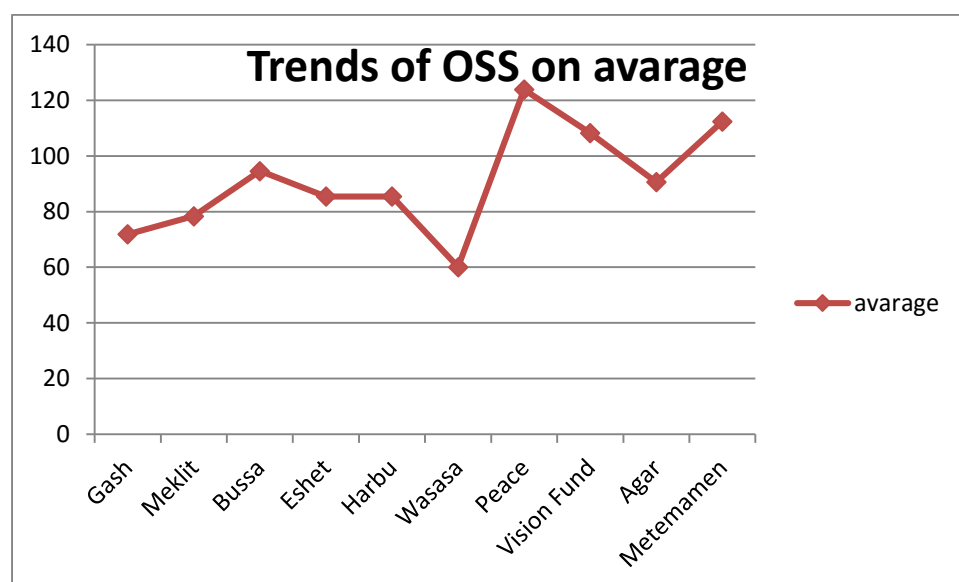
Name of the MFI	Operational Self -sufficiency (%)														
	2009	20010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Gash	60.80	72.50	109.70	93.70	98.50	112.00	130.00	98.42	98.25	89.63	93.65	97.25	79.25	121.14	110.02
Meklit	88.70	79.30	85.30	98.00	94.30	111.00	106.00	104.2	98.46	101.3	123.3	99.25	97.26	121.6	119.4
Bussa	74.10	100.40	76.50	114.50	110.00	125.00	115.00	99.23	112.3	146.2	124.3	104.5	132.2	114.36	146.2
Agar	57.20	83.10	74.80	72.50	65.00	97.00	99.00	85.36	89.63	101.2	96.6	104.2	120.8	99.11	113.25
Harbu	91.30	73.20	76.80	86.50	125.90	106.00	105.00	98.25	152.40	98.32	132.4	99.25	98.75	98.36	136.25
Vision F.	89.10	90.30	104.40	126.70	111.30	119.00	120.00	121.2	117.6	118.7	98.69	101.5	105.6	99.56	99.29
Wasasa	97.90	91.20	99.20	113.00	147.00	162.00	184.00	175.2	101.25	99.58	104.2	97.85	125.2	109.56	135.8
Pease	80.40	78.50	103.10	195.80	187.70	165.00	123.00	114.2	158.69	102.9	145.3	105.6	99.46	142.9	102.56
Eshet	84.80	86.00	148.00	159.60	105.00	101.00	101.00	116.5	97.98	121.9	96.9	154.5	124.6	97.98	119.8
MeM	88.60	87.50	107.10	129.10	99.10	96.00	107.00	123.6	145.95	104.6	99.78	108.6	121.9	142.9	136.9
Average	81.29	84.2	98.42	109.4	109.94	119.4	114.3	113.36	117.25	103.2	111.5	107.5	110.5	114.7	121.34

Source: Researcher's own computation from the data of AEMFI, 2024

Note: Vision F.=Vision fund and MeM=Metemamen

As it can be seen from the above table 2, presented the trends of operational self-sufficient of selected MFI's for the period from 2009 to 2023 are fluctuating in terms of operational self-sufficient and. This table indicated that fluctuating of financial sustainability of selected MFIs. Even if, there was an increasing trend or increment trend in the level of financial sustainability from 2009-2014 all selected sample of MFIs. However from 2015 to 2023 selected MFIs financial sustainability in terms of operational self-sufficient are fluctuated. To sum up above table 2 indicated that the no constant financial sustainability of selected MFIs realized. So, following graph or figure1 was clearly showing that fluctuation of MFIs financial sustainability in terms of operational self-sufficiency during study covered period of time. Researcher suggested that here is need of policy intervention in MFIs in order to find remedy for the fluctuation.

Figure 2: Trends of operational self-sufficient (OSS)



Source: Researcher's own computation from data, 2024.

Above graph indicated that fluctuation financial sustainability of from year to year due to the change of variables in this study considered. Financial sustainability of MFIs is not regular trends of movement. This clearly indicated that financial sustainability of MFIs in terms of operational self-sufficiency trends above threshold level or below threshold level.

Table 3: Financial Self -sufficiency (%)

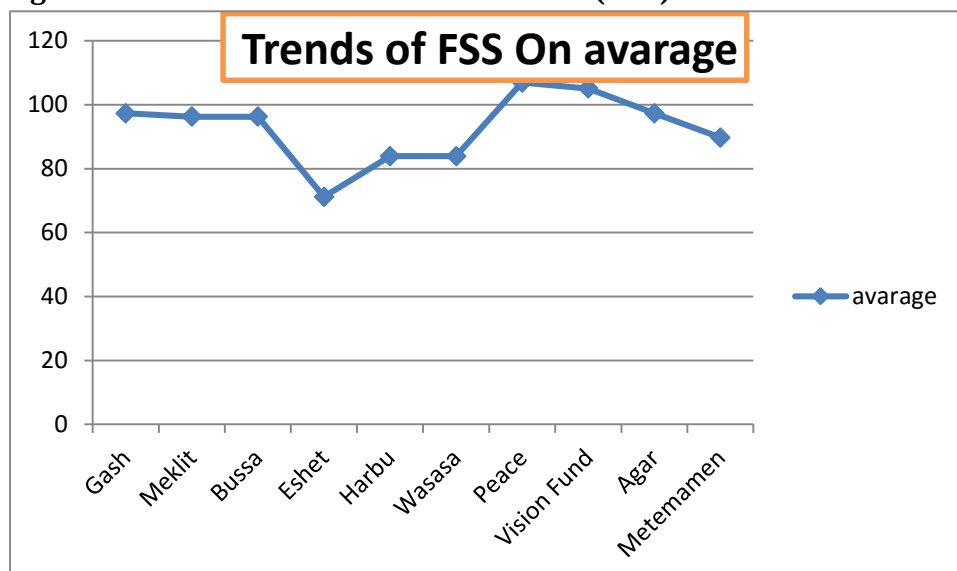
Name of theMFI	Financial Self -sufficiency (%)														
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Gash	40.60	45.20	91.40	60.70	73.30	49	107	98.42	98.25	89.63	93.65	97.25	79.25	99.14	101.02
Meklit	76.30	69.30	79.30	142.60	111.10	72	112	104.2	98.46	101.3	93.3	.25	97.26	102.6	98.4
Bussa	86.60	80.20	64.20	94.40	96.90	82	120	99.23	112.3	116.2	84.3	104.5	92.2	104.36	106.2
Harbu	36.60	50.80	41.70	41.90	41	36	42	85.36	89.63	98.2	96.6	96.87	110.8	97.11	103.25
Vision F	64.90	63.10	61.90	61.20	74.40	34	87	98.25	132.40	93.32	92.4	99.25	98.75	98.36	99.25
Agar	79.30	80.60	80.70	84.60	59.40	54	99	98.25.2	107.6	108.7	98.69	101.5	105.6	94.56	99.29
Wasasa	107.70	118.40	75.90	91.20	101.70	78	152	165.2	101.25	99.58	104.2	97.85	105.2	109.56	95.8
PEACE	67.40	120.20	80.60	141.40	137.10	78	101	114.2	108.69	87.9	125.3	105.6	97.46	112.9	98.56
Eshet	80.80	119.70	117.20	123	87	62	88	87.98	77.98	101.9	96.9	104.5	104.6	97.98	109.8
MeM	78.80	45.20	90.90	105.20	72.70	56	88	87.56	99.95	104.6	98.78	105.6	111.9	96.58	106.9
Average	71.9	78.38	94.62	85.46	85.46	60.1	99.6	103.79	102.65	100.1	98.41	101.42	100.3	101.31	101.84

Source: Researcher's own computation from the data of AEMFI, 2024

Note: Vision F.=Vision fund and MeM=Metemamen

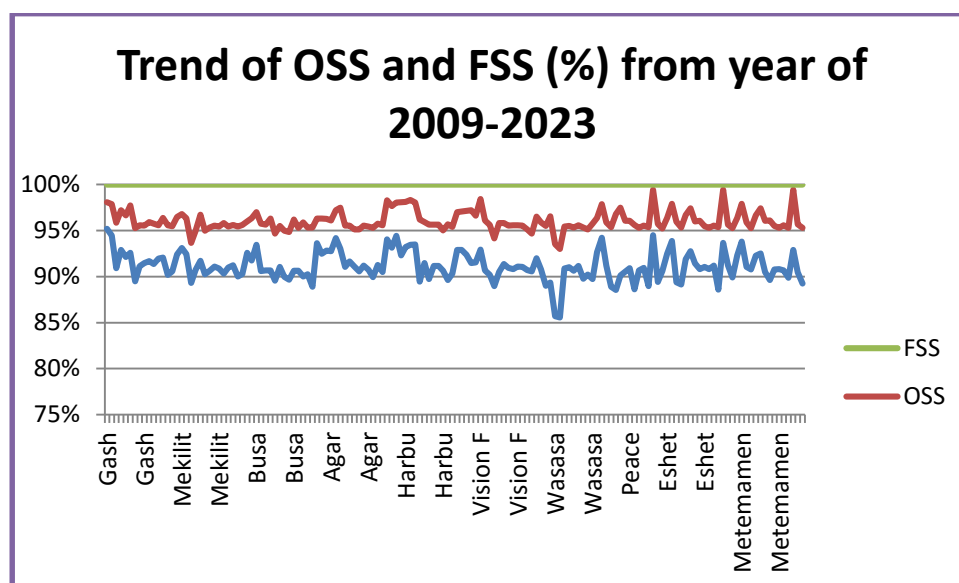
Based on the presentation of a above table 3 in year 2009 from to 2015 the 10 MFIs were not financially self-sufficient which means their FSS ratio is less than 100%. In year 2016 to 2023 of the MFIs financially self-sufficient ratio was greater than break even. From 2016 to 2023 most of the institutions ratio improved and they have financially self-sufficient ratio greater than 100%. Generally to see the trend of average operational and financial self-sufficiency ratio of Ethiopian microfinance sector from 2009 to 2023, it is presented in the above figure 2 .

Figure 3: Trends of financial self-sufficient (FSS)



Based on the presentation of table 4 in year 2003 from the 15 MFIs 87% of them were not financially self-sufficient which means their FSS ratio is less than 100%. In year 2006 47% of the institutions FSS ratio was greater than break even. There were no institutions that have FSS ratio greater than or equal to 100% in 2008. Then in 2009 most of the institutions ratio improved, in this period about 60% of them have FSS ratio greater than 100%. Generally to see the trend of average operational and financial self-sufficiency ratio of Ethiopian microfinance sector from 2003 to 2009, it is presented in the above figure 3.

Figure 4 : Trends of financial self-sufficient (FSS)



Source: Researcher's own computation from the data of AEMFI, 2024

Based on the presentation of table 4 in year 2003 from the 15 MFIs 87% of them were not financially self-sufficient which means their FSS ratio is less than 100%. In year 2006 47% of the institutions FSS ratio was greater than break even. There were no institutions that have FSS ratio greater than or equal to 100% in 2008. Then in 2009 most of the institutions ratio improved, in this period about 60% of them have FSS ratio greater than 100%. Generally to see the trend of average operational and financial self-sufficiency ratio of Ethiopian microfinance sector from 2009 to 2023, it is presented in the following figure 3. To sum up fig 4. Indicated that the no constant financial sustainability of selected MFIs realized. So, these graph suggested that here is need of policy intervention in MFIs in order to find remedy for the fluctuation in MFIs.

Table 4: Descriptive statics result in explanatory variables

Variables name	Mean	Std. Dev.	Minim	Maximum
Loan	4.96702	.9251488	2.7589	7.41666
Efficiency	5.105768	.7713907	3.800798	6.116013
Employee	319.1733	248.0599	21	2001
Deposits	7.655322	1.897121	3.8972	11.12413
Loan repayment	7.489411	1.871648	3.800798	11.05946
Clients	81012.83	82094.96	1598	456987
Competition	.0504751	.0210184	.0112	.09845
Inflation	.1807067	.0946812	.0663	.347
Exchange rate	27.24623	13.83707	10.7647	54.7442
Gross domestic product	10.87236	.3302789	10.476	11.854
Observation	150	150	150	150

Source: Financial Statements of Sampled of MIFs, STATA output, 2024

Descriptive statistics that was intended to give general descriptions about the data independent variables is presented in the above table 3.

Loan: Loan records a minimum of 4.96 and maximum of 7.05 with a mean of value of 6.15. This microcredit or loan is paid on, monthly or yearly basis. In accounting, a loan is considered as the asset of the firm. For MFIs, the loan is the major part of the asset; most of MFIs don't have any other types of assets. The variable loan is one of the most important element either the success or failure of fanatical sustainability.

Efficiency: Efficiency measured by number of borrowers per staff presents a minimum of 3.8% and maximum of 5.92% with a mean value and standard deviation of 4.7 and 0.56 respectively. Since,

efficiency refers to the ability to produce maximum output at a given level of limited recourse, and it is the most effective way of delivering small loans to the very poor in microfinance context. This involves cost minimization and income maximization at a given level of operation, and it has stable impact on financial sustainability of microfinance institutions.

Deposit: Deposited measured by natural logarithm total deposits to gross loan portfolio of presents a minimum of 5.81 and maximum of 5.95 with a mean value and standard deviation of 5.88 and 0.8% respectively. The higher the ratio, the greater is the MFIs' capability to fund its loan portfolio from deposits. The mean value showed that 5.88 of sampled MFIs loan portfolio have been financed by deposits.

Depth of outreach: Depth of outreach is measured by average loan size. It has a mean of 3.80 showing the lowest deviation 0.919 from its mean value. The average loan size indicates the depth of outreach. The average balances of outstanding loans are proxy indicators used to indicate a client's socioeconomic level of societies.

Loan repayment: Loan repayment is measured the ratio of outstanding principal balance of all loans past due more than x days to outstanding principal balance of all loans rangers. It has a mean of 6.32 showing the lowest deviation .256 from its mean value. These indicated that sample MIFs incurred 7.04% Loan repayment on average.

Infatuation: Infatuation has a mean of 0.06 showing the lowest deviation 0.063 from its mean value. The effect of inflation is also another important factor causing profit fluctuation of MFIs sector.

Gross domestic product: Gross domestic product is measured natural logarithmic by real GDP rangers from 11.84 to 10.87 percent. It has a mean of 10.47 showing the lowest deviation 0.34

from its mean value. Economic Growth Most literatures support the positive impact of economic growth to MFIs profitable. For instance, the tendency of GDP affects the demand for banks asset. During boom the demand for credit is high compared to depression.

4.2. Econometrics analysis

Normality test: Normality test is used to determine whether the error term is normally distributed or not. Jarque Bera test is to ensure that the data set is well-modeled by a normal distribution. The hypothesis for the Normality Test is stated as follow:

Table 5: Normality test for operational self-sustainability

Types of test	Probability (P-Value)
Jarque Bera Test	1.343483

Source: own computation through STATA output version 14, 2024

H0: The error term is normally distributed, H1: The error term is not normally distributed .If P- value of JB is greater than significant level of 5% (0.05) reject the H0. Therefore in this current study was normal distribution or no problem of normality.

Figure 5: Normality test for Oss

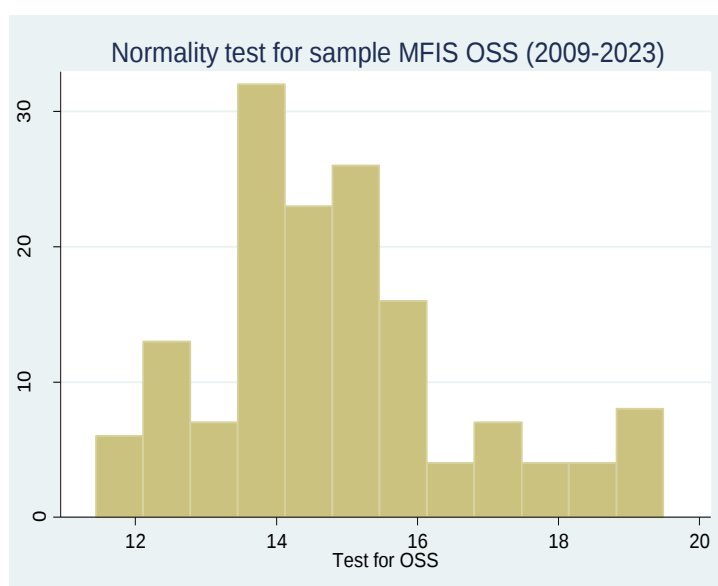


Fig Normality test for OSS for selected MFIs (2009-2023)

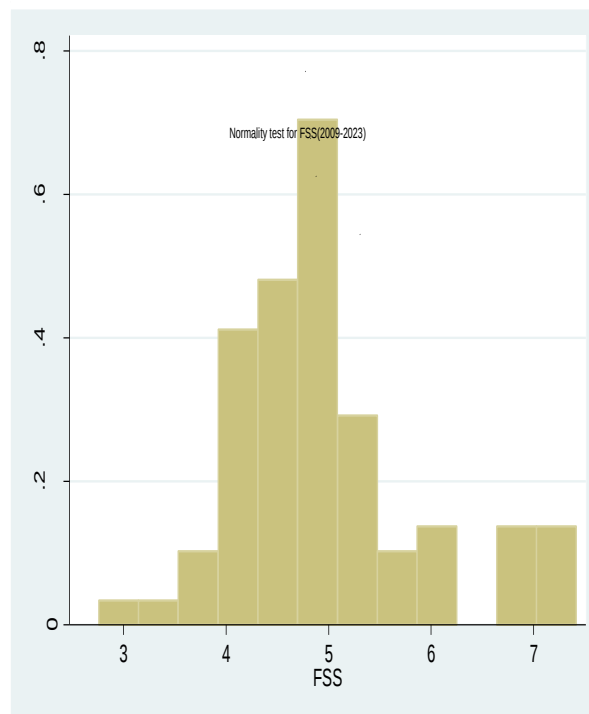
Table 6 : Normality test for financial self-sustainability

Types of test	Probability (P-Value)
Jarque Bera Test	1.433543

Source: own computation through STATA output version 14, 2024

H0: The error term is normally distributed, H1: The error term is not normally distributed .If P- value of JB is greater than significant level of 5% (0.05) reject the H0. Therefore in this current study was normal distribution or no problem of normality.

Figure 6: Normality test for FSS



4.2.1. Test for multicollinearity

Multi co linearity means the existence of association between two or more of explanatory variables. This association level might be nil that can be ignored or high that significantly affect the estimation of the parameters. If multi co linearity is perfect the regression coefficient of explanatory variable are undetermined and their standard error are immeasurable. The following table indicate

Table 7: Test for multicollinearity of OSS

Variables name	VIF	1/VIF
Deposit	7.99	0.125102
GDP	4.83	0.207183
Competition	3.10	0.322205
Employee	2.29	0.436605
Efficiency	2.02	0.495058
Exchange rate	1.55	0.645048
Loan repayment	1.40	0.712987
Loan	1.37	0.727309
Inflation	1.33	0.753145
Clients	1.32	0.755900
Mean VIF	2.72	

Source: own computation through STATA output version 14, 2024

Table 8: Test for multicollinearity of FSS

Variables name	VIF	1/VIF
Exchange rate	7.99	0.125119
GDP	4.75	0.2110666
Competition	3.12	0.320249
Employee	2.28	0.438382
Inflation	1.95	0.513157
Deposit	1.56	0.640798
Loan repayment	1.38	0.726820
Cilents	1.33	0.753145
Loan	1.20	0.831745
Efficiency	1.17	0.854381
Mean VIF	2.67	

Source: own computation through STATA output version 14, 2024

If multi co linearity is less than perfect the regression coefficient although determinate, possess large standard error which means the coefficient cannot be estimated with great precision or accurate, (Gujarati, 2003).Also Gujarati stated in (book, 208) zero correlation among explanatory variables is not occurring in any practical work. The mean of variation inflation factor (VIF) value among explanatory variables are less than 10 indicate absence of extreme co linearity problem among explanatory variables in the regression model.

The multi co linearity of all explanatory variables in this current study both operational self-sustainability and financial self-sustainability were 2.72 and 2.67 respectively .There for all explanatory variables mean of variation inflation factor are less than 10.It is strongly possible to say that no multicollinearity problem in the current study regression model.

4.2.2. Heteroscedasticity test

Heteroscedasticity to check the existence of heteroscedasticity problem or not Brush pagan/cook-Weisberg test is used to test the heteroscedasticity problem in this research. This test is very important because if the model consists of heteroscedasticity problem, the GLS estimator no large and error variances are incorrect, therefore the hypothesis testing, standard error and confident level will be invalid.

The p-value is less than significant levels reject the null hypotheses and accept alternative hypotheses. Therefore it is strongly possible to say that heteroscedasticity problem did not exists both operational self-sustainability and financial self- sustainability by supported the following table 6 and table 7.

Table 9: Heteroscedasticity test for operational self-sustainability

Types of test	Probability (P-Value)
Brush pagan/cook-Weisberg test	0.9555

Source: own computation through STATA output version 14, 2024

Table 10: Heteroscedasticity test for financial self-sustainability

Types of test	Probability (P-Value)
Brush pagan/cook-Weisberg test	0.083

Source: own computation through STATA output version 14, 2024

4.2.3. Autocorrelation test

The concept of autocorrelation defines that there is no serial correlation or autocorrelation among the disturbances or error term entering the population regression function (Greene 2008). The covariance between the error terms over time (or cross-sectional, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with each another. If the errors are not uncorrelated with another, it would be stated that they are “auto-correlated” or that they are “serially correlated”. Therefore, to conduct the Breusch- Pagan LM test, the hypothesis is stated as follows.

Table 11 : Autocorrelation test for OSS

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	66.79522	139	0.0291
Pesaran scaled LM	2.099600		0.0379
Pesaran CD	0.082307		0.7424

Source: own computation through STATA output version 14, 2024

Table 12: Autocorrelation test for FSS

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	68.51277	139	0.0302
Pesaran scaled LM	2.257646		0.0234
Pesaran CD	2.387412		0.0222

Source: own computation through STATA output version 14, 2024

Ho: No Autocorrelation ($\rho = 0$) Ha: Autocorrelation ($\rho \neq 0$)

As it can be seen from the statistics of Breusch- Pagan LM test, for both models the statistics reject the null hypothesis of No Autocorrelation. Therefore, it can be concluded that there is an evidence of a relationship between successive residuals and based on this, in both cases, and we rejected the null hypothesis of no autocorrelation

4.2.4. Model specification

A model specification error can occur when one or more relevant variables are omitted from the model or one or more irrelevant variables are included in the model. If relevant variables are omitted from the model, the common variance they share with included variables may be wrongly attributed to those variables, and the error term is inflated. On the other hand, if

irrelevant variables are included in the model, the common variance they share with included variables may be wrongly attributed to them. Model specification errors can substantially affect the estimate of regression coefficients. Therefore, in order to select a correct estimated model, the researcher has used the Ramsey-RESET Test to check on the model specification. The hypothesis for the model specification test at 5% level significance was formulated as follow;
 H_0 : the model specification is correct and H_1 : the model specification is not correct
 Decision Rule: Reject H_0 if P value of Ramsey RESET Test less than significant level

0.05. Otherwise, do not reject H_0 .

Table 13: Model specification Test for operational self-sustainability

Types of test	Test statistic value	Decision Rule
Ramsey RESET Test	0.9555	Do not reject the H_0

Source: own computation through STATA version 14, 2024

From table 8, it can be concluded that this research do not reject null hypothesis (H_0), since thep-value is 0.9555, which is greater than significance level of 0.05. Thus, it can be concluded that the model specification is correct from year 2009 to 2023. Overall reliability and validity of the model was enhanced further by the Prob (F-statistic) value of 0.000. In this current study the test P-value of Ramsey Reset test indicated that there is no omitted variable or not included irrelevant variable effect in terms of operational self-sustainability.

Table 14: Model specification Test for operational self-sustainability

Types of test	Test statistic value	Decision Rule
Ramsey RESET Test	0.7780	Do not reject the H_0

Source: own computation through STATA version 14, 2024

From table 9, it can be concluded that this research do not reject null hypothesis (H_0), since thep-value is 0.7780, which is greater than significance level of 0.05. Thus, it can be concluded that the model specification is correct from year 2009 to 2023. Overall reliability and validity of the model was enhanced further by the Prob (F-statistic) value of 0.000. In this current study

the test P-value of Ramsey Reset test indicated that there is no omitted variable or not included irrelevant variable effect in terms of operational self-sustainability

4.3. Correlation Analysis:

Correlation analysis was used in in this current study ten independent variables and their degree of association with dependent variable (OSS and FS). Therefore, in order to look at the degree of association between OSS and its independent variables as well as FSS and each independent variable. Variables, like Efficiency, employees, deposit, loan repayment, clients, competition and Growth domestic product were a positive correlation to Operational Self- Sufficiency Ratio. This indicates that a unit increase each variables leads a positive contributing towards changes in Operational Self-Sufficiency Ratio. However, loan, inflation and exchange rate a negative correlation to Operational Self Sufficiency Ratio. This implies that changes in the explanatory variables were a negative contributing towards the change in Operational Self-sufficiency Ratio. See appendix 4a and 4b. The degree of association between FSS and its explanatory variables like, loan Efficiency, employees, deposit, loan repayment, clients, competition and Growth domestic product were a direct correlation to Operational Self-Sufficiency Ratio. This indicates that a unit increase each variables leads an up contributing towards changes in Financial Self-Sufficiency Ratio. However, inflation and exchange rate adverse correlation to Financial Self- Sufficiency Ratio. This implies that changes in the explanatory variables were a negative contributing towards the change in Financial Self-sufficiency Ratio. See appendix B.

4.4 Regression results

This study used panel data models where the random effect and fixed effect models could be used to estimate the relationships among variables and thereby taking care of the omitted variables. Prior to go to doing the regression, deciding on whether the random effect model or fixed effect model was a vital phase of the research.

4.4.1. Random versus fixed effect model

According to Grene (2008) if the effects are fixed the random effect model estimators are inconsistent and fixed effect model should be used and vice versa. To check which of the two models provide consistent estimators; the researcher employed the standard Hausman test suggested in the econometric literatures (Greene 2008 and Brook 2008). The Hausman test tests the null hypothesis that random error provides consistent estimates compared to fixed effect model. The test results for the two models, FSS and OSS were not statistically

significant. Thus, researcher couldn't reject the null hypothesis that RE provides consistent estimates. So researcher enforced to utilize RE effect model rather than fixed effect.

Table 15: Regression result in terms of operational self-sustainability

Variables name	Coefficient	Std. Err.	Significant
Constant	-2.734165	.2960344	0.000
Loan	-.136539	.03712707	0.002**
Efficiency	.1939002	.0728214	0.008*
Employees	.0021234	.1432831	0.988
Deposits	.9031234	.0262987	0.000***
Loan repayment	.0785134	.1725772	0.649
Clients	-.2585115	.0914885	0.005**
Exchange rate	-.0814176	.2449153	0.740
Competition	.5187921	.1462417	0.000***
Inflation	-.0265959	.00293	0.000***
GDP	-.0317482	.0174322	0.069

Source: own computation through STATA version 14, 2024

Note: *, ** and *** 1%, 5% and 10% level of significance are significant.

MFIs Loan: The variable loan increased by one percent operational self-sustainability would be decrease 13.6 percent and statistically significant and keeping all independent variables constant. This result is contrary with researcher hypostasized and previous study conducted by Tehlu (2013) found that loan of MFIs has negative impact on operational self-sustainability. However, this result agreement with recent study conducted by Teninet Eliyas (2020). Justification of this result is through over-indebtedness of borrowers. When borrowers take on excessive debt that they struggle to repay, it can lead to high default rates, increased operational costs for the MFIs, and ultimately a decrease in financial sustainability. Or providing small loans to low-income individuals often comes with high operational costs for MFIs. The process

of disbursing and collecting small amounts of money from a large number of clients can be labor-intensive and costly. If these operating costs are not adequately managed, they can erode the financial self-sustainability of the MFIs.

MFIs efficiency: The coefficient of efficiency measured by number of borrowers per staff is .1939 and its P- value is 0.008. When efficiency increased by one percent operational self-sustainability would be increased by 19.39 percent and statistically significant at 5%, 1% and 10% of significance level keeping all independent variables constant. This result not agreed with studied by Ganka (2010) found a negative and strongly statistically significant relationship between number of borrowers per staff and financial sustainability. But consistent with the study by Gideon (2018) found number of borrowers per staff (efficiency) and operational self-sustainability are statically significant and positively related. Researcher justified that microfinance staff for sampled MFIs are efficient as a result they meet to manage borrowers when their number grows causing microfinance institutions sustainability or having a reasonable number of borrowers per staff member is essential for maximizing efficiency in microfinance institutions.

MFIs employees: The variable employee has insignificant and a positive effect on operational self-sustainability. When one unit of employee increase leads it decrease by 0.21 percent of operational self-sustainability. In other word, would leads to increase by 0.21 when MFIs hired additional number of employees of operational self-sustainability. Justification for this result was surprising that is the number of staff is large or increase leads to increase administrative cost like salary, periderm and other administrative related expense due to this fact that the number of employee negative effect on financial sustainability in terms of operational self-sustainability. Or by adding Additional number of employees may be is implied marginal productivity of employees or labor increase as the consequence of this reduction of financial sustainability occurs.

MFIs deposits: When deposits increased by one percent operational self-sustainability would be increased by 90 percent and statistically significant at 5%, 1% and 10% of significance level keeping all independent variables constant. This result is not agreement with study by Magali (2013) found negative effect on financial self-sufficiency and sustainability of Ethiopian MFIs. However, this result is not agreement with study by Okinbo (2014) found positive effect on financial self-sufficiency and sustainability of MFIs. Researcher justified the reason behind

the deposit increase financial stability through maintain investor confidence and attracting new depositors and investors further contributing for long term financial sustainability.

MFIs of loan repayment: The coefficient of loan repayment indicated that positive effect on operational self- sustainability and statically insignificant. When loan repayment goes up by one percent operational self-sustainability would be goes up by 7.8 percent keeping all independent variables are constant. Since, borrowers are typically required to repay their loans in regular installments, beginning soon after the loan is given out. This aspect of the repayment schedule is usually explained as making „fiscal discipline“ among borrowers. The potential for moral hazard Leads MFIs to no innovative mechanisms, such as regularly scheduled repayments, which is directly or indirectly, leads financial unsustainability.

MFIs of clients: When number of clients increase by one percent operational self-sustainability would be goes up by 25.8 percent keeping all independent variables are constant. This finding is consistent with the

studied by Cull et al., 2007 but contrary with the studied by Woller and Schreiner (2002). Justification for this result a large number of clients may take on multiple loans from different MFIs or informal lenders, leading to unsustainable debt levels. This can result in delinquencies and defaults, which increase the risk for MFIs and require additional resources to manage as the result of this decrease MFIS financial unsustainability in terms of operational self-sustainability.

Exchange rate

When exchange goes up by one percent operational self-sustainability would be goes up by 8.14 percent and statically insignificant keeping all independent variables are constant. Explanation of this result analysis indicates the variable has a positive and statistically insignificant impact on financial sustainability in terms of operational self-sustainability.

Competition: When competition increased by one percent operational self- sustainability would be increased by 51.87 percent and statistically significant at all level of significance levels keeping all independent variables constant. Researcher justified that competition is important variable for improvement of MFIs financial sustainability. Since, in 21 century competition is one of popular method to resist or not. So competition drives efficiency and innovation in order to cop up with competitors of other MFIs more efficient at delivering services. So client's or other customers have confidence full trust for competitor MFIs and this

attract new potential client's ensuring long term MFIS financial unsustainability in terms of operational self-sustainability.

Inflation: Variable inflation is one of significant and positive effect on operational self-sustainability. one unit of inflation rate increase leads to reduction of operational self-sustainability by 2.6 percent keeping other factors are constant. This result is agreement with study by Ganka (2010) found negative effect on financial self-sufficiency and sustainability of MFIs. However, this result is not agreement with study by Okinbo (2014) found positive effect on financial self-sufficiency and sustainability of MFIs.

Researcher justified this inflationary environments displayed by double digit trends were reflected in MFIs performance indicators .Because the increased inflationary trends may have a negative effect by eroding the real value of MFIs equity. Since, inflationary pressure reduces purchasing power of birr. Or Inflation often reminders to raise interest rates to control rising prices. When interest rates increase, MFIs that have fixed-rate loans face higher borrowing costs without being able to adjust their lending rates accordingly. This mismatch can mass their margins and profitability, negatively affecting their operational self-sustainability.

Gross domestic product: The coefficient of gross domestic product measured by yearly average real GDP was insignificant and negative effect on operational self-sustainability. When gross domestic product increased by one percent operational self-sustainability would be increased by 3.17 percent keeping all independent variables constant. However, this result is contrary with study by Mishara (2014) found positive effect on financial self-sufficiency and sustainability of MFIs. Researcher explanation of this a high GDP growth rate can sometimes leads to inflation which may be increase operating cost of MFI. If expenses rise faster than revenue due to inflation it can negatively impact the MFIs OSS. Or In high GDP environment, there may be increased competition from other MFI offering similar services. This leads to negatively effect on MFI operational self-sustainability.

Table 16: Regression results of econometrics model for financial self-sufficient

Variables name	Coefficient	Std. Err.	Sign
Constant	3.731455	.2343767	0.000
Loan	.8155465	.3957124	0.039*
Efficiency	-.179536	.076687	0.019**
Employees	-.0232529	.150043	0.877
Deposits	.99052	.0288436	0.000***
Loan repayment	.1440016	.1804563	0.425
Clients	.4626587	.0903741	0.000***
Exchange rate	.5964637	.2515572	0.018*
Competition	-.4898506	.1544463	0.002**
Inflation	.0304311	.002887	0.000***
Gross domestic product	.0626624	.0176916	0.000***

Source: own computation through STATA version 14, 2024

MFIs loan: The variable loan is increased by one percent; financial self-sustainability would be increased by 81.55 percent and statistically significant at all levels of significance, keeping all independent variables constant. This study, consistent with a recent study conducted by Elias (2020), found that MFI loans and financial self-sustainability are positively related. Therefore, the researcher explains the reason behind this variable: if the volume of loans increases, it directly leads to increased MFI revenue through loan interest and building a stable client base. Therefore, loans are an important variable for ensuring MFIs financial sustainability in terms of financial self-sustainability.

MFIs efficiency: when efficiency increased by one percent and financial self-sustainability decreased by 17.95 percent, it was statistically significant at all levels of significance, keeping all independent variables constant. Justification for this result: a higher ratio of borrowers per staff member suggests that the institution is able to serve more clients with more resources, which can be seen as a negative sign of efficiency. Therefore, when this ratio becomes too high, it can have negative implications for the financial sustainability of the MFI in terms of financial self-sustainability.

MFI employees: The variable employee has a significant and positive effect on financial self-sustainability. When one unit of employees increases, it increases by 2.32 percent in financial sustainability. Explanation of this result from the researcher's view: the increase in the number of employees caused overcrowding without job segregation, as a result of which MFIs became financially unsustainable.

MFI deposits: When deposits increased by one percent, financial self-sustainability would increase by 99 percent and are statistically significant at all levels of significance, keeping all independent variables constant. This study, consistent with a recent study conducted by Elias (2020) and Long (2015), found that MFI deposits positively contribute to financial self-sustainability. The justification for this variable is that if deposits at MFIs increase, it contributes to financial self-sufficiency by reducing the reliance on external borrowing. So, this leads to reducing borrowing costs and improving financial performance, which in turn contributes to greater financial self-sufficiency against economic shock.

MFIs loan repayment: When loan repayment goes up by one percent, financial self-sustainability would go up by 14.4 percent and be statistically significant at all levels of significance, keeping all independent variables constant.

Clients: The coefficient of clients measured by active customers of MFIs has a positive effect on financial self-sustainability. When clients go up by one percent, financial self-sustainability would go up by 46.26 percent, keeping all independent variables constant. This study, in line with studies conducted by Mishra (2014) and Rahaman (2014), found that MFI clients and financial self-sustainability are positively related. But contrary to the study by Nieri (2007), MFI clients and financial self-sustainability are indirectly related. The researcher explains why, behind this result, the timely repayment of loans by clients is crucial for the financial health of MFIs. When clients repay their loans on time, it ensures a steady cash flow for the MFIs, enabling them to cover their operational expenses and fund future lending activities. This contributes to the financial sustainability of the MFI's in terms of financial self-sustainability.

Exchange rate: When the exchange rate goes up by one percent, financial self-sustainability will go up by 59.64 percent, keeping all independent variables constant. This is in disagreement with the study by Mishra (2014) and Rahaman (2014). The justification behind this result comes from common sense, and economic theory is consistent. An increase in the exchange rate can lead to higher revenue for the MFIs that operate in multiple currencies. When the

Ethiopian birr depreciates against dollars, the value of the dollar's (\$) loans or investments held by the MFIs increases when converted to the Ethiopian birr. This boosts or improves the MFI's financial sustainability in terms of financial self-sustainability.

Competition: When competition increased by one percent, financial self-sustainability would increase by 48.98 percent and be statistically significant at all level of significance, keeping all independent variables constant. The positive sign of competition indicated that if competition increases among MFIs, it leads to increased market share, specifically in terms of clients. So, if MFIs has high completion, they will gain large share of market. This indicated that MFIs stimulate financial sustainability in terms of financial self-sustainability.

Inflation: Variable inflation has a significant and positive effect on financial self-sustainability. One unit of inflation rate increase leads to an increase in financial self-sustainability by 3 percent, keeping all independent variables constant. However, this result is agreement to the study by Tehlu (2014) and Gideon (2018), which found a positive effect on the financial self-sufficiency and sustainability of MFIs and this result is consistent with the researcher hypnotized. Therefore, the researcher justified a similar justification for the impact of inflation pressure on MFIs financial sustainability performance indicators. Since inflation often prompts governments to raise interest rates to control rising prices, When interest rates increase, MFIs that have fixed-rate loans face higher borrowing costs without being able to adjust their lending rates accordingly.

Gross domestic product: The coefficient of gross domestic product measured by the yearly average real GDP had a significant and positive effect on operational self-sustainability. But statistically significant at the 1% level of significance, keeping all independent variables constant. The explanation of this result showed that increasing GDP leads to an expansion in overall income levels and economic activities. This growth is expanding the client base as more individuals have the capacity to increase demand for financial services, which leads to increased savings. Increased savings directly improve the financial sustainability of MFIs

CHAPTER FIVE

Conclusion and recommendation

In this section the researcher presents the conclusions and recommendations based on the findings of the study.

5.1 Conclusion

The results of the descriptive statistics analysis indicated that within the period covered by this study, sampled MFIs financial sustainability measured in terms of OSS and FSS scored an average score of 107.75% and 86.65%, respectively. The ratio of 1.0775, or 107.65%, indicates that the sample MFIs are financially sustainable in terms of active self-sustainability, but the ratio of 0.8665, or 86.65%, indicates that the sample MFIs are not financially sustainable in terms of financial self-sustainability. In general, it can be inferred from this research that the selected sample MFIs in terms of financial self-sustainability measures are unsustainable. The international requirement for operational self-sustainability and financial self-sustainability benchmarks or birth levels is 100%. The result below 100% means that it is difficult for MFIs to cover all costs and their obligations without ongoing donations, concessional loans, or government subsidies. Empirical evidence shows that unless a 100% OSS and FSS ratio is reached, the long-term provision of credit services is undermined, and MFIs select for the continued necessity of relying on donor funds.

Based on the random fixed effect model analysis findings, it can be concluded that loan, clients, inflation and growth domestic product have negative impact on OSS, but variables efficiency, deposit and competition have positive impact on OSS. With a negative and positive relationship, which means any change in or increase in the value of these variables leads to an increase or decrease on financial sustainability in terms of operational self-sustainability,. However, variables such as employee, loan repayment and exchange rate are statistically insignificant.

Based on the random fixed effect model analysis and regression findings, it can be concluded that efficiency, competition, inflation, and exchange rate have a negative impact on FSS with a negative relationship, which means any increase or decrease in the value of these variables leads to an increase or decrease in financial sustainability in terms of financial self-sustainability. But variables like loan, deposit, clients, and growth in domestic product have a significant and positive relationship with FSS. However, both internal variables employee and loan repayment are statistically insignificant.

Therefore, it can be concluded that all the above-mentioned independent variables of both proxies jointly explain both the dependent variables of operational self-sufficiency and financial self-sufficiency of the sampled MFIs.

5.2. Recommendation

The following recommendations were forwarded based on the findings of this study

- ❖ MFIs are advisable to understanding the competitive landscape in which the MFI operates and identify key competitors, their strength and weakness and marketing positioning. Use this information to become more competitors for offering financial services in order to attract more potential clients.
- ❖ The selected MFIs better to focus improving financial sustainability of MFIs implementing strategies to attract more deposits from clients through offering competitive interest rates convenient deposit options.
- ❖ The selected MFIs better improve to reach threshold level through diversify their loan portfolios across various sectors and clients segments to minimize the impact of inflation on their overall financial self-sufficiency.
- ❖ MFIs better consider economic condition, specifically , GDP, inflation and exchange rate projections how can impact the financial stability of MFIs by doing proactively adjust their strategies to mitigate the negative impact of potential external factors.
- ❖ MFIs management better to invest capacity building initiatives for MFI staff and management to train them with skill, knowledge and technology needed to more competition.
- ❖ Further research is highly required in MFIs since; selected MFIs are financially unstable in terms of financial self-sufficiency.

Reference

- Addae-Korankye, A. (2018). A framework for understanding microfinance as a tool for poverty reduction in Ghana (Doctoral dissertation, Cardiff Metropolitan University).
- Adongo, J. &. (2006). Factors influencing the financial sustainability of selected microfinance institutions in Namibia . *Windhoek: Namibian Economic Policy Research Unit.*, (No. 39). .
- Agustin, E. N. (2022). STUDI LITERATUR: PERANAN SISTEM PENGENDALIAN MANAJEMEN TERHADAP KINERJA MANAJERIAL. . *Research in Accounting Journal (RAJ)*, 2(4), 581-585.
- Bayai, I. &. (2016). Financing and financial sustainability of microfinance institutions (MFIs): a conceptual view. *Banks and Bank Systems*, . 11(2), 21-32.
- Bayai, I. (2017). *Financing structure and financial sustainability: Evidence from selected Southern Africa development community microfinance institutions (Doctoral dissertation, Stellenbosch: Stellenbosch University)*.
- BERHE, K. (2018). DETERMINANTS OF FINANCIAL SUSTAINABILITY OF MFIs IN ETHIOPIA (Doctoral dissertation, St. Mary's University).
- Chikwira, C. V. (2022). The impact of microfinance institutions on poverty alleviation. . *Journal of Risk and Financial Management*, 15(9), 393.
- Elias, T. (2020). *DETERMNENTS OF OPERATIONAL AND FINANCIAL SUSTAINABILITY OF THE MICRO FINANCE INSTITUTIONS (MFIs) in ETHIOPIA (Doctoral dissertation, St. Mary's University)*.
- ELIAS, T. (2020). *DETERMNENTS OF OPERATIONAL AND FINANCIAL SUSTAINABILITY OF THE MICRO FINANCE INSTITUTIONS (MFIs) in ETHIOPIA (Doctoral dissertation, St. Mary's University)*.
- Giller, K. E. (2021.). The future of farming: Who will produce our food?. *Food Security*, . 13(5), 1073-1099.
- Githinji, B. W. (2008). Factors influencing sustainability of microfinance institutions in Kenya (Doctoral dissertation, University of Nairobi).
- Gujarati, D. N. ((2004)). . *Econométrie (pp. 17-5). Brussels: De Boeck*.
- Hermes, N. &. (2019). Determinants of the performance of microfinance institutions: A systematic review. *Contemporary Topics in Finance: A Collection of Literature Surveys*,. 297-330.
- Kinde, B. A. (2012). Financial sustainability of microfinance institutions (MFIs) in Ethiopia. . *European Journal of business and Management*, 4(15), 1-10.
- Kinde, B. A. (2012). Financial sustainability of microfinance institutions (MFIs) in Ethiopia. . *European Journal of business and Management*, , 4(15), 1-10.
- Kinde, B. A. (2012). Financial sustainability of microfinance institutions (MFIs) in Ethiopia. . *European Journal of business and Management*, 4(15), 1-10.

- Kinde, B. A. (2012). Financial sustainability of microfinance institutions (MFIs) in Ethiopia. *European Journal of business and Management*, 4(15), 1-10.
- Koveos, P. &. (2004). Financial services for the poor: assessing microfinance institutions. *Managerial Finance*, . 30(9), 70-95.
- Kumari, J. P. (2019). The effect of microfinance services on poverty reduction: Analysis of empirical evidence in Sri Lankan perspectives. . *European Journal of Economic and Financial Research*.
- Ledgerwood, J. E. (2013). The new microfinance handbook: A financial market system perspective. . *World Bank Publications*.
- Long, G. (2015). Determinants of financial sustainability of microfinance institutions in Ghana. . *Journal of Economics and Behavioral Studies*, 7(4 (J)), 71-81.
- Matin, I. H. (2002). Finance for the poor: from microcredit to microfinancial services. *Journal of international development*, 14(2), 273-294.
- Matin, I. H. (2002). Finance for the poor: from microcredit to microfinancial services. . *ournal of international development*,, 14(2), 273-294.
- Matin, I. H. (2002). Finance for the poor: from microcredit to microfinancial services. . *Journal of international development*, , 14(2), 273-294.
- Mishra, A. I. (2014). & Megicks, P. Microfinance: supporting micro and small Enterprises. . *In The Routledge Companion to Financial Services Marketing* , (pp. 423-437).
- Morshed, Z. (2019)). Regulation and Performance of the Microfinance Industry . *Doctoral dissertation, Swinburne University of Technology, Australia* .
- Ndanyenbah, T. Y. (2017). Evolution, collapse and financial sustainability of MFIs and their beneficiaries. *Journal of Economics and Sustainable Development*, 8(13).
- Nieri, L. (2007). Access to credit: the difficulties of households. In *New Frontiers in Banking Services: Emerging Needs and Tailored Products for Untapped Markets* . Berlin, Heidelberg: Springer Berlin Heidelberg. (pp. 107-140).
- Obo, D. D. (2009). *Microfinance in Ethiopia. Institute of Social Studies*.
- Okesina, M. (2022). Why does microfinance target women? Empirical evidence from Nigeria. . *Global Journal of Emerging Market Economies*, 14(2), 246-264.
- Okibo, B. W. (2014). Effects of micro finance institutions on poverty reduction in Kenya. . *International Journal of current research and Academic Review*,, 2(2), 76-95.
- Pollinger, J. J.-G. (2007). The question of sustainability for microfinance institutions. . *Journal of Small Business Management*, 45(1), 23-41.
- Tehulu, T. A. (2013). Determinants of financial sustainability of microfinance institutions in East Africa. . *European journal of Business and management*, 5(17), 152-158.
- ujarati, D. N. (2004). (*Econométrie* (pp. 17-5). Brussels: De Boeck.

- Weiss, J. &. (2005). Great expectations: microfinance and poverty reduction in Asia and Latin America. *Oxford Development Studies*. 33(3-4), 391-416.
- Wilson, T. A. (2012.). Supporting social enterprises to support vulnerable consumers: the example of community development finance institutions and financial exclusion. . *Journal of consumer policy*, 35, 197-213.
- Yemelyanov, O. P. (2020). *Microcredits for sustainable development of small Ukrainian enterprises: Efficiency, accessibility, and government contribution. Sustainability* .
- Yemelyanov, O., Petrushka, T., Symak, A., Trevoho, O., Turylo, A., Kurylo, O., ... & Lesyk, L. (2020). *Microcredits for sustainable development of small Ukrainian enterprises: Efficiency, accessibility, and government contribution. Sustainability*, 12(15),. (n.d.).
- Zeller, M. &. (2002). Improving the performance of microfinance: Financial sustainability, outreach and impact. *The Triangle of Microfinance*, Baltimore, Maryland, . 2002, 1-18.

Appendix

A. Tata used in the analysis

Appendix: 1a, Operational Self -sufficiency data used in the analysis

Name of the MFI	Operational Self -sufficiency (%)														
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Gash	60.80	72.50	109.70	93.70	98.50	112.00	130.00	98.42	98.25	89.63	93.65	97.25	79.25	121.14	110.02
Meklit	88.70	79.30	85.30	98.00	94.30	111.00	106.00	104.2	98.46	101.3	123.3	99.25	97.26	121.6	119.4
Bussa	74.10	100.40	76.50	114.50	110.00	125.00	115.00	99.23	112.3	146.2	124.3	104.5	132.2	114.36	146.2
Agar	57.20	83.10	74.80	72.50	65.00	97.00	99.00	85.36	89.63	101.2	96.6	104.2	120.8	99.11	113.25
Harbu	91.30	73.20	76.80	86.50	125.90	106.00	105.00	98.25	152.40	98.32	132.4	99.25	98.75	98.36	136.25
Vision F.	89.10	90.30	104.40	126.70	111.30	119.00	120.00	121.2	117.6	118.7	98.69	101.5	105.6	99.56	99.29
Wasasa	97.90	91.20	99.20	113.00	147.00	162.00	184.00	175.2	101.25	99.58	104.2	97.85	125.2	109.56	135.8
Pease	80.40	78.50	103.10	195.80	187.70	165.00	123.00	114.2	158.69	102.9	145.3	105.6	99.46	142.9	102.56
Eshet	84.80	86.00	148.00	159.60	105.00	101.00	101.00	116.5	97.98	121.9	96.9	154.5	124.6	97.98	119.8
MeM	88.60	87.50	107.10	129.10	99.10	96.00	107.00	123.6	145.95	104.6	99.78	108.6	121.9	142.9	136.9
Average	81.29	84.2	98.42	109.4	109.94	119.4	114.3	113.36	117.25	103.2	111.5	107.5	110.5	114.7	121.34

Appendix: 1b, Financial Self -sufficiency data used in the analysis

Name of the MFI															
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Gash	40.60	45.20	91.40	60.70	73.30	49	107	98.42	98.25	89.63	93.65	97.25	79.25	99.14	101.02
Meklit	76.30	69.30	79.30	142.60	111.10	72	112	104.2	98.46	101.3	93.3	125	97.26	102.6	98.4
Bussa	86.60	80.20	64.20	94.40	96.90	82	120	99.23	112.3	116.2	84.3	104.5	92.2	104.36	106.2
Harbu	36.60	50.80	41.70	41.90	41	36	42	85.36	89.63	98.2	96.6	96.87	110.8	97.11	103.25
Vision F	64.90	63.10	61.90	61.20	74.40	34	87	98.25	132.40	93.32	92.4	99.25	98.75	98.36	99.25
Agar	79.30	80.60	80.70	84.60	59.40	54	99	98.25.2	107.6	108.7	98.69	101.5	105.6	94.56	99.29
Wasasa	107.70	118.40	75.90	91.20	101.70	78	152	165.2	101.25	99.58	104.2	97.85	105.2	109.56	95.8
PEACE	67.40	120.20	80.60	141.40	137.10	78	101	114.2	108.69	87.9	125.3	105.6	97.46	112.9	98.56
Eshet	80.80	119.70	117.20	123	87	62	88	87.98	77.98	101.9	96.9	104.5	104.6	97.98	109.8
MeM	78.80	45.20	90.90	105.20	72.70	56	88	87.56	99.95	104.6	98.78	105.6	111.9	96.58	106.9

Appendix: 1c, independent variables data used in the analysis

MFIs id	Loan	Efficiency	employee	Deposit	Loan repayment	Clients	Competition	Inflation	GDP	exchange rate
1	5.787926	3.81812	21	5.83384	6.917549	12546	0.012	0.117	10.511	10.7647
1	5.895384	4.297136	78	5.84244	6.930694	14524	0.052	0.0815	10.476	11.6187
1	5.983016	4.774257	94	5.85104	6.941393	13900	0.012	0.347	10.5045	16.9747
1	5.148855	4.606766	97	5.859641	6.952613	25418	0.021	0.229	10.6365	17.1651
1	5.510142	4.615367	97	5.868241	6.964741	32415	0.0213	0.0746	10.678	18.72
1	5.707718	3.8972	100	5.876841	6.968083	41654	0.0241	0.0689	10.745	19.679
1	5.845332	4.374321	100	5.885441	6.981941	75100	0.0213	0.178	10.81	20.67
1	5.951524	4.779788	105	5.894041	6.98975	79856	0.051	0.0663	10.87	21.81
1	4.965071	4.764435	146	5.902641	6.991789	85472	0.042	0.119	10.912	23.963
1	5.46852	4.945154	128	5.911242	7.007258	89954	0.0652	0.1581	10.9256	27.301
1	7.021189	4.567117	130	5.919842	7.020233	91203	0.0689	0.1581	10.9818	29.219
1	7.045323	5.800583	145	5.928442	7.03003	98254	0.0694	0.2036	11.032	34.734
1	7.033424	5.925211	218	5.937042	7.024162	99745	0.0721	0.2684	11.046	49.378
1	7.056905	4.61066	210	5.945642	7.042556	99797	0.08695	0.3389	11.103	51.952
1	6.982271	4.908855	290	5.954243	6.969535	100000	0.08654	0.3022	11.854	54.7442
2	4.638748	6.018503	24	8.567645	7.976657	22365	0.022	0.117	10.511	10.7647
2	4.808862	6.027103	62	5.902641	7.985258	22584	0.052	0.0815	10.476	11.6187
2	4.932902	6.035704	62	5.911242	7.993858	22749	0.032	0.347	10.5045	16.9747
2	5.030996	6.044304	92	5.919842	8.002458	32512	0.021	0.229	10.6365	17.1651
2	5.112424	6.052904	108	5.928442	8.011058	48975	0.0213	0.0746	10.678	18.72
2	5.182235	6.061504	134	5.937042	8.023895	74582	0.0241	0.0689	10.745	19.679

2	5.1527 07	6.05771 8	151	5.94564 2	8.032495	75246	0.0213	0.178	10.81	20.67
2	6.0663 18	6.06631 8	175	5.95424 3	8.041096	79854	0.061	0.0663	10.87	21.81
2	6.0749 19	6.07491 9	175	8.56764 5	8.049696	81524	0.042	0.119	10.912	23.963
2	5.3264 28	6.08351 9	209	4.90885 5	8.058296	85462	0.0752	0.1581	10.9256	27.301
2	5.3734 38	6.09211 9	289	6.01850 3	8.066896	92105	0.0889	0.1581	10.9818	29.219
2	7.4166 6	6.10071 9	289	6.02710 3	8.521355	99345	0.0694	0.2036	11.032	34.734
2	6.0550 1	6.05501	320	6.03570 4	8.554289	100564	0.0721	0.2684	11.046	49.378
2	5.4480 82	6.10741 2	356	6.04430 4	8.641401	100875	0.08695	0.3389	11.103	51.952
2	5.4860 17	6.11601 2	363	6.05290 4	8.650454	110000	0.09654	0.3022	11.854	54.7442
3	4.8283 14	3.80079 8	102	7.28413 5	6.900227	29875	0.032	0.117	10.511	10.7647
3	4.7361 98	4.27981 4	105	7.95507 4	6.913372	31256	0.032	0.0815	10.476	11.6187
3	4.7273 88	4.75693 6	142	8.22362 7	6.915388	32205	0.032	0.347	10.5045	16.9747
3	4.6205	4.58944 5	142	9.09929 8	6.935291	38546	0.041	0.229	10.6365	17.1651
3	4.1588 83	4.59804 5	153	9.40516 7	6.951788	41258	0.0213	0.0746	10.678	18.72
3	4.1743 87	3.87987 8	186	10.0297 2	6.950761	429654	0.0241	0.0689	10.745	19.679
3	4.1471 34	4.35699 9	185	4.90885 5	6.324756	46987	0.0213	0.178	10.81	20.67
3	3.5263 61	4.76246 6	197	6.01850 3	6.333357	46205	0.061	0.0663	10.87	21.81
3	3.6888 79	4.74711 4	242	6.02710 3	6.341957	47589	0.042	0.119	10.912	23.963
3	3.6888 79	4.92783 2	276	6.03570 4	6.350557	49875	0.0552	0.1581	10.9256	27.301
3	3.7841 9	4.54979 5	321	6.04430 4	6.359157	55642	0.0589	0.1581	10.9818	29.219
3	4.4773 37	5.78326 1	345	6.05290 4	6.367757	59864	0.0594	0.2036	11.032	34.734
3	4.1588 83	5.90788 9	382	5.98452 1	7.00684	63528	0.0521	0.2684	11.046	49.378
3	4.2484 95	4.59333 8	420	6.04430 4	7.025234	68754	0.05695	0.3389	11.103	51.952

3	4.3944 49	4.89153 3	484	6.05290 4	6.952213	72012	0.05654	0.3022	11.854	54.7442
4	4.4543 47	3.81812	201	9.52151 1	6.018503	11589	0.032	0.117	10.511	10.7647
4	4.2766 66	4.29713 6	201	8.01631 8	6.027103	11985	0.032	0.0815	10.476	11.6187
4	4.4188 4	4.77425 7	224	8.46252 5	6.035704	12596	0.032	0.347	10.5045	16.9747
4	4.6443 91	4.60676 6	235	8.69934 8	6.044304	18950	0.041	0.229	10.6365	17.1651
4	4.7706 85	4.61536 7	235	8.62533	6.052904	19500	0.0313	0.0746	10.678	18.72
4	4.9836 07	3.8972	235	9.22197 2	6.061504	125654	0.0341	0.0689	10.745	19.679
4	5.2203 56	4.37432 1	238	9.81011	6.057718	198405	0.0313	0.178	10.81	20.67
4	5.3890 72	4.77978 8	294	10.3465 7	6.066318	214567	0.061	0.0663	10.87	21.81
4	5.2626 9	4.76443 5	309	10.5692 9	6.074919	256002	0.042	0.119	10.912	23.963
4	5.3890 72	4.94515 4	375	10.6489	6.083519	257025	0.0452	0.1581	10.9256	27.301
4	5.5373 34	4.56711 7	372	11.0048 9	6.092119	286425	0.0489	0.1581	10.9818	29.219
4	4.7184 99	5.80058 3	385	11.1241 3	6.100719	290785	0.0694	0.2036	11.032	34.734
4	4.6539 6	5.92521 1	489	7.75662 3	6.05501	297985	0.0621	0.2684	11.046	49.378
4	4.4773 37	4.61066	502	11.0048 9	6.107412	299749	0.06695	0.3389	11.103	51.952
4	4.3694 48	4.90885 5	502	11.1241 3	6.116012	300000	0.06654	0.3022	11.854	54.7442
5	4.7543 47	6.01850 3	243	7.28413 5	3.800798	29256	0.042	0.117	10.511	10.7647
5	4.8441 87	6.02710 3	243	7.95507 4	4.279814	35874	0.042	0.0815	10.476	11.6187
5	3.5835 19	6.03570 4	205	8.22362 7	4.756936	36754	0.032	0.347	10.5045	16.9747
5	3.9512 44	6.04430 4	205	9.09929 8	4.589445	48546	0.041	0.229	10.6365	17.1651
5	4.1896 55	6.05290 4	215	9.40516 7	4.598045	49852	0.0313	0.0746	10.678	18.72
5	4.4773 37	6.06150 4	379	10.0297 2	3.879878	52416	0.0441	0.0689	10.745	19.679
5	4.6728 29	6.05771 8	392	10.3336 1	4.356999	53256	0.0313	0.178	10.81	20.67

5	4.7449 32	6.06631 8	409	10.5624 8	4.762466	54865	0.061	0.0663	10.87	21.81
5	4.9126 55	6.07491 9	409	10.6519 7	4.747114	55875	0.042	0.119	10.912	23.963
5	4.9126 55	6.08351 9	642	10.9147 4	4.927832	58975	0.0452	0.1581	10.9256	27.301
5	4.6634 39	6.09211 9	329	11.0594 6	4.549795	67498	0.0489	0.1581	10.9818	29.219
5	4.6249 73	6.10071 9	749	9.09929 8	5.783261	71458	0.0594	0.2036	11.032	34.734
5	4.9199 81	6.05501	984	9.40516 7	5.907889	78945	0.0651	0.2684	11.046	49.378
5	4.1431 35	6.10741 2	982	10.0297 2	4.593338	84254	0.07695	0.3389	11.103	51.952
5	3.9889 84	6.11601 2	1100	10.3336 1	4.891533	85485	0.07754	0.3022	11.854	54.7442
6	4.5217 89	3.80079 8	131	10.5624 8	6.981941	87705	0.0112	0.117	10.511	10.7647
6	5.1119 88	4.27981 4	132	5.81651 8	6.98975	1598	0.012	0.0815	10.476	11.6187
6	4.9416 42	4.75693 6	105	5.82511 8	6.991789	1875	0.022	0.347	10.5045	16.9747
6	4.7791 23	4.58944 5	105	5.83371 9	7.007258	1985	0.031	0.229	10.6365	17.1651
6	5.9242 56	4.59804 5	215	5.84231 9	7.020233	2874	0.0313	0.0746	10.678	18.72
6	4.4886 36	3.87987 8	215	5.85091 9	7.03003	8745	0.0441	0.0689	10.745	19.679
6	4.8040 21	4.35699 9	225	5.85951 9	7.024162	8978	0.0313	0.178	10.81	20.67
6	5.2149 36	4.76246 6	225	5.86811 9	7.042556	9876	0.0421	0.0663	10.87	21.81
6	2.7589	4.74711 4	210	5.87671 9	6.969535	10052	0.0442	0.119	10.912	23.963
6	3.0910 43	4.92783 2	210	5.88532	7.976657	10098	0.0452	0.1581	10.9256	27.301
6	3.5835 19	4.54979 5	298	5.89392	7.985258	11259	0.0489	0.1581	10.9818	29.219
6	3.4657 36	5.78326 1	298	5.90252	7.993858	119875	0.0594	0.2036	11.032	34.734
6	3.6109 18	5.90788 9	302	5.91112	8.002458	14529	0.0651	0.2684	11.046	49.378
6	4.1108 74	4.59333 8	342	5.91972	8.011058	14890	0.06695	0.3389	11.103	51.952
6	4.1271 34	4.89153 3	325	5.92832 1	8.023895	15000	0.06754	0.3022	11.854	54.7442

7	4.069	3.81812	55	5.93692 1	8.032495	165426	0.052	0.117	10.511	10.7647
7	4.0430 51	4.29713 6	123	7.54062 2	10.48969	171226	0.052	0.0815	10.476	11.6187
7	4.0604 43	4.77425 7	123	7.96067 2	9.210417	172256	0.0521	0.347	10.5045	16.9747
7	4.4886 36	4.60676 6	205	8.49023 3	9.266626	180652	0.0533	0.229	10.6365	17.1651
7	4.2626 8	4.61536 7	206	8.69081	9.261414	190568	0.0541	0.0746	10.678	18.72
7	4.5325 99	3.8972	352	8.95402 8	9.405167	120258	0.0613	0.0689	10.745	19.679
7	4.6821 31	4.37432 1	352	9.13421 5	10.21786	136256	0.0621	0.178	10.81	20.67
7	4.7449 32	4.77978 8	426	9.34149 8	10.71308	145056	0.0642	0.0663	10.87	21.81
7	4.8751 97	4.76443 5	426	9.54086 7	10.78245	150429	0.0752	0.119	10.912	23.963
7	5.0814 04	4.94515 4	426	9.53169 9	10.94615	180987	0.0889	0.1581	10.9256	27.301
7	7.0038 67	4.56711 7	684	9.52151 1	10.93849	190259	0.0894	0.1581	10.9818	29.219
7	7.0280 01	5.80058 3	689	8.01631 8	10.01234	201059	0.0851	0.2036	11.032	34.734
7	7.0161 02	5.92521 1	826	8.46252 5	11.05127	204589	0.08695	0.2684	11.046	49.378
7	7.0395 83	4.61066	1256	8.69934 8	7.284135	215986	0.08754	0.3389	11.103	51.952
7	6.7251 2	4.90885 5	2001	8.62533	7.955074	223144	0.09845	0.3022	11.854	54.7442
8	4.7449 32	6.01850 3	256	6.4126	8.223627	45986	0.042	0.117	10.511	10.7647
8	4.6821 31	6.02710 3	256	6.84906 6	9.099298	52489	0.052	0.0815	10.476	11.6187
8	4.7273 88	6.03570 4	240	7.31388 7	9.405167	58542	0.052	0.347	10.5045	16.9747
8	4.7791 23	6.04430 4	245	8.09742 6	10.02972	59456	0.051	0.229	10.6365	17.1651
8	4.9272 54	6.05290 4	354	8.43598 3	10.33361	58756	0.0513	0.0746	10.678	18.72
8	5.0039 46	6.06150 4	378	8.85395 1	10.56248	59875	0.0541	0.0689	10.745	19.679
8	4.8978 4	6.05771 8	375	9.28832	10.65197	60215	0.0513	0.178	10.81	20.67
8	4.9698 13	6.06631 8	405	9.3284	10.91474	60856	0.051	0.0663	10.87	21.81

8	5.4467 37	6.07491 9	451	9.55775 3	11.05946	61035	0.0522	0.119	10.912	23.963
8	4.0430 51	6.08351 9	509	9.36683 1	10.02972	61542	0.0552	0.1581	10.9256	27.301
8	4.3174 88	6.09211 9	509	9.41881 7	10.33361	62000	0.0589	0.1581	10.9818	29.219
8	4.2341 07	6.10071 9	656	8.12177 8	10.56248	62538	0.0594	0.2036	11.032	34.734
8	4.2766 66	6.05501	679	8.34093 3	10.65197	63250	0.0621	0.2684	11.046	49.378
8	4.2626 8	6.10741 2	710	8.59932 6	10.91474	63452	0.07695	0.3389	11.103	51.952
8	4.5325 99	6.11601 2	702	8.95751 1	11.05946	65503	0.07654	0.3022	11.854	54.7442
9	4.4170 69	3.80079 8	78	3.8972	4.016072	23000	0.0132	0.117	10.511	10.7647
9	4.5538 77	4.27981 4	78	4.37432 1	4.112706	23985	0.0152	0.0815	10.476	11.6187
9	4.7449 32	4.75693 6	82	4.77978 8	4.10418	24568	0.0152	0.347	10.5045	16.9747
9	4.6821 31	4.58944 5	96	4.76443 5	4.158181	24658	0.0151	0.229	10.6365	17.1651
9	4.7273 88	4.59804 5	82	4.94515 4	4.175918	24789	0.01513	0.0746	10.678	18.72
9	4.7791 23	3.87987 8	201	4.56711 7	4.175831	278945	0.02541	0.0689	10.745	19.679
9	4.9272 54	4.35699 9	265	5.80058 3	4.532538	29875	0.02513	0.178	10.81	20.67
9	5.0039 46	4.76246 6	232	5.92521 1	4.541192	30253	0.0251	0.0663	10.87	21.81
9	4.8978 4	4.74711 4	284	4.61066	8.003525	31352	0.03522	0.119	10.912	23.963
9	4.9698 13	4.92783 2	264	4.90885 5	8.012125	32589	0.03552	0.1581	10.9256	27.301
9	5.4467 37	4.54979 5	298	6.01850 3	8.020725	35246	0.0489	0.1581	10.9818	29.219
9	4.0430 51	5.78326 1	319	6.02710 3	8.033562	35256	0.04594	0.2036	11.032	34.734
9	4.3174 88	5.90788 9	319	6.28503 2	8.046399	36548	0.04621	0.2684	11.046	49.378
9	4.2341 07	4.59333 8	360	6.02710 3	8.055	36589	0.04695	0.3389	11.103	51.952
9	4.2766 66	4.89153 3	341	8.10409 9	8.0636	37674	0.04654	0.3022	11.854	54.7442
10	4.2626 8	4.89784	302	8.78569 2	8.0722	25000	0.052	0.117	10.511	10.7647

10	4.5325 99	4.96981 3	302	9.18276 4	8.0808	25698	0.052	0.0815	10.476	11.6187
10	4.5951 2	5.44673 7	284	9.42802 9	8.0894	26145	0.0521	0.347	10.5045	16.9747
10	4.7535 9	4.04305 1	284	10.1060 2	7.724144	32568	0.0533	0.229	10.6365	17.1651
10	4.7874 92	4.31748 8	325	10.2307	9.557753	36458	0.0541	0.0746	10.678	18.72
10	4.8040 21	4.23410 7	326	10.2134 7	9.366831	37459	0.0613	0.0689	10.745	19.679
10	4.9199 81	4.27666 6	306	10.1200 5	9.418817	37986	0.0621	0.178	10.81	20.67
10	5.9515 24	4.26268	364	10.1546	8.121778	40000	0.0642	0.0663	10.87	21.81
10	4.9650 71	4.53259 9	342	10.0123 4	8.340933	41589	0.0652	0.119	10.912	23.963
10	5.4685 2	4.59512	398	8.38503 3	8.599326	42145	0.0789	0.1581	10.9256	27.301
10	7.0211 89	4.75359	354	8.61323 1	8.957511	48985	0.0794	0.1581	10.9818	29.219
10	7.0453 23	4.78749 2	402	8.76764	9.527193	48000	0.0751	0.2036	11.032	34.734
10	7.0334 24	4.80402 1	482	9.04014 5	9.867083	48125	0.08695	0.2684	11.046	49.378
10	7.0569 05	4.91998 1	580	9.19227 8	9.876681	48098	0.08754	0.3389	11.103	51.952
10	6.9822 71	4.71231	580	9.24348 4	9.92142	49000	0.08845	0.3022	11.854	54.7442

Appendix: 2a, STATA output result for descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
loan	150	4.96702	.9251488	2.7589	7.41666
efficiency	150	5.105768	.7713907	3.800798	6.116013
employee	150	319.1733	248.0599	21	2001
deposit	150	7.655322	1.897121	3.8972	11.12413
loanrepament	150	7.489411	1.871648	3.800798	11.05946
cilents	150	81012.83	82094.96	1598	456987
competetion	150	.0504751	.0210184	.0112	.09845
inflation	150	.1807067	.0946812	.0663	.347
gdp	150	10.87236	.3302789	10.476	11.854
exchangerate	150	27.24623	13.83707	10.7647	54.7442

Appendix: 3a, Heteroskedasticity test for OSS

```
. estat hettest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of fss

```
chi2(1)      =      0.00
```

```
Prob > chi2   =  0.9555
```

Appendix: 3b, Heteroskedasticity test for FSS

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of fss

```
chi2(1)      =      0.08
```

```
Prob > chi2   =  0.7780
```

.

Appendix: 3c, Multicollinearity test for OSS

Variable	VIF	1/VIF
deposit	7.99	0.125102
gdp	4.83	0.207183
competetion	3.10	0.322205
employee	2.29	0.436605
efficiency	2.02	0.495058
exchangerate	1.55	0.645048
loanrepaym~t	1.40	0.712987
loan	1.37	0.727309
inflation	1.33	0.753146
cilents	1.32	0.755900
Mean VIF	2.72	

Variable	VIF	1/VIF
exchangerate	7.99	0.125119
gdp	4.75	0.210666
competetion	3.12	0.320249
employee	2.28	0.438382
inflation	1.95	0.513157
deposit	1.56	0.640798
loanrepaym~t	1.38	0.726820
cilents	1.33	0.754510
loan	1.20	0.831745
efficiency	1.17	0.854381
Mean VIF	2.67	

A

appendix: 3d, Multicollinearity test for Fss

Appendix: 4a, Correlation test for OSS

```
. *(15 variables, 150 observations pasted into data editor)

. corr oss loan efficiency employee deposit loanrepayment competetion inflation gdp exchangerate
(obs=150)
```

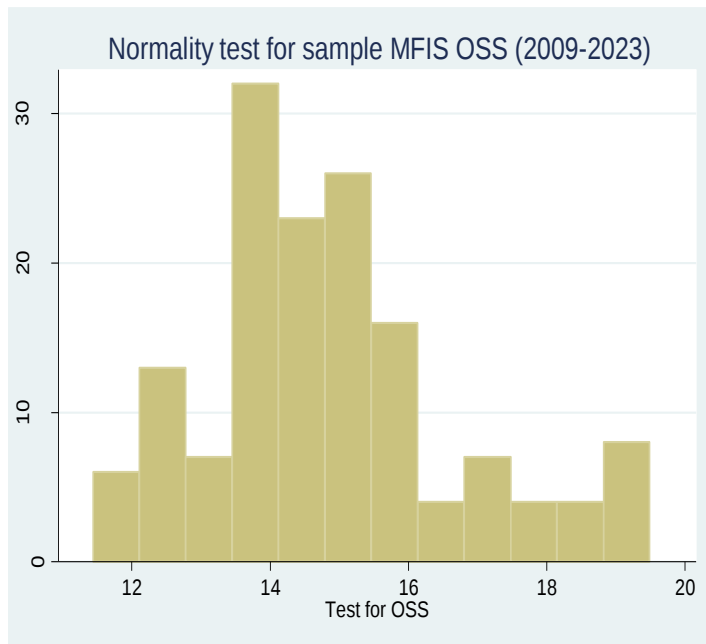
	oss	loan effici~y	employee	deposit	loanre~t	compet~n	inflat~n	gdp	exchan~e	
oss	1.0000									
loan	-0.2854	1.0000								
efficiency	0.0771	0.1380	1.0000							
employee	0.1752	-0.1116	0.3380	1.0000						
deposit	0.2111	0.0022	0.6308	0.6174	1.0000					
loanrepaym~t	0.2051	-0.1646	0.0731	0.1956	0.1808	1.0000				
competetion	0.3664	-0.2704	0.3297	0.6142	0.6723	0.4758	1.0000			
inflation	-0.0048	-0.3484	0.2102	0.2665	0.2730	0.1315	0.2725	1.0000		
gdp	0.1866	0.0284	0.4155	0.5850	0.8689	0.1609	0.6214	0.1955	1.0000	
exchangerate	-0.0025	-0.2321	-0.0280	0.4186	0.0483	0.1319	0.2776	0.1056	0.0922	1.0000

Appendix: 4b, Correlation test for FSS

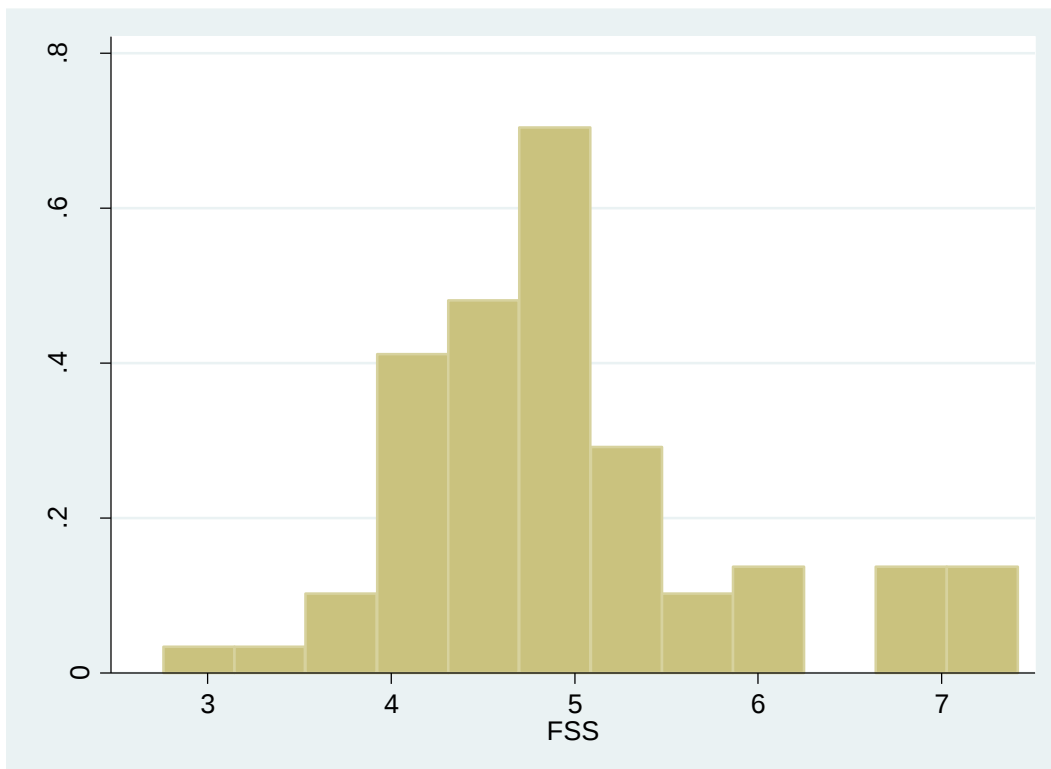
```
. corr fss loan efficiency employee loanrepayment cilents competetion inflation exchangerate gdp
(obs=150)
```

	fss	loan effici~y	employee	loanre~t	cilents	compet~n	inflat~n	exchan~e	gdp	
fss	1.0000									
loan	0.2051	1.0000								
efficiency	0.0771	0.0731	1.0000							
employee	0.1752	0.1956	0.3380	1.0000						
loanrepaym~t	-0.2854	-0.1646	0.1380	-0.1116	1.0000					
cilents	0.1593	0.0631	0.0511	0.3067	-0.1280	1.0000				
competetion	0.3664	0.4758	0.3297	0.6142	-0.2704	0.3169	1.0000			
inflation	-0.0048	0.1315	0.2102	0.2665	-0.3484	-0.0444	0.2725	1.0000		
exchangerate	-0.0025	0.1319	-0.0280	0.4186	-0.2321	0.3724	0.2776	0.1056	1.0000	
gdp	0.1866	0.1609	0.4155	0.5850	0.0284	0.2482	0.6214	0.1955	0.0922	1.0000

Appendix: 4c, Normality Test for OSS



Appendix: 4d Normality Test for FSS



Appendix 5 a, Regression results for the determinants of Operational self-sufficiency

```
. xtreg oss loan efficiency employee deposit loanrepayment clients competetion exchangerate inflation gdp

Random-effects GLS regression                Number of obs   =          150
Group variable: year                        Number of groups  =           15

R-sq:                                       Obs per group:
    within = 0.9784                          min =           10
    between = 0.9648                         avg =          10.0
    overall = 0.9778                         max =           10

Wald chi2(10) =        6121.78
Prob > chi2   =         0.0000

corr(u_i, X) = 0 (assumed)
```

oss	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
loan	-1.136539	.3712707	-3.06	0.002	-1.864216	-.4088616
efficiency	.1939002	.0728214	2.66	0.008	.051173	.3366275
employee	.0021234	.1432831	0.01	0.988	-.2787063	.2829531
deposit	.9031234	.0262987	34.34	0.000	.851579	.9546678
loanrepayment	.0785134	.1725772	0.45	0.649	-.2597316	.4167585
clients	-.2585115	.0914885	-2.83	0.005	-.4378256	-.0791974
competetion	.5187921	.1462417	3.55	0.000	.2321636	.8054206
exchangerate	-.0814176	.2449153	-0.33	0.740	-.5614429	.3986076
inflation	-.0265959	.00293	-9.08	0.000	-.0323386	-.0208532
gdp	-.0317482	.0174322	-1.82	0.069	-.0659146	.0024182
_cons	-2.734165	.2960344	-9.24	0.000	-3.314382	-2.153948
sigma_u	0					
sigma_e	.25674258					
rho	0	(fraction of variance due to u_i)				

.

Appendix 5b, Regression results for the determinants of financial self-sufficiency

```
. xtreg fss loan efficiency employee deposit loanrepayment clients competetion exchangerate inflation gdp
```

```
Random-effects GLS regression              Number of obs   =       150
Group variable: year                      Number of groups  =        15

R-sq:                                     Obs per group:
    within = 0.9811                        min =          10
    between = 0.9696                       avg =         10.0
    overall = 0.9805                       max =          10

Wald chi2(10) =      6998.97
corr(u_i, X)  = 0 (assumed)               Prob > chi2       =      0.0000
```

fss	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
loan	.8155465	.3957124	2.06	0.039	.0399644	1.591129
efficiency	-.179536	.076687	-2.34	0.019	-.3298397	-.0292323
employee	-.0232529	.150043	-0.15	0.877	-.3173318	.2708261
deposit	.99052	.0288436	34.34	0.000	.9339875	1.047052
loanrepayment	.1440016	.1804563	0.80	0.425	-.2096862	.4976895
clients	.4626587	.0903741	5.12	0.000	.2855287	.6397887
competetion	-.4898506	.1544463	-3.17	0.002	-.7925598	-.1871415
exchangerate	.5964637	.2515572	2.37	0.018	.1034206	1.089507
inflation	.0304311	.002887	10.54	0.000	.0247727	.0360895
gdp	.0626624	.0176916	3.54	0.000	.0279875	.0973372
_cons	3.731455	.2343767	15.92	0.000	3.272085	4.190825
sigma_u	0					
sigma_e	.26804487					
rho	0	(fraction of variance due to u_i)				

```
.
```