

**Exploring the Role of Mobile Payment and Financial Inclusion on the
Consumption Behaviours and Entrepreneurial Decisions: Micro-Level
Evidence from Ethiopia**

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Original Literary Work Declaration

This dissertation has been undertaken as part of the requirements for the PhD in Finance program, under the academic supervision of my principal supervisor, Dr. Abbi M. Kedir and co-supervisor, Dr. Alem Hagos. Their expert guidance, thoughtful feedback, and unwavering support have been instrumental in shaping and completing this research. This study represents my own scholarly engagement with the topic and constitutes an original contribution to the field of financial technology and financial inclusion applied in the context of Ethiopia.

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TABLE OF CONTENTS

Acknowledgments	i
Dedication	ii
List of Tables	iii
List of Acronyms& Abbreviations.....	v
Abstract	vi
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the Study	1
1.2 Statement of Research Problem	5
1.3 Objectives of the Study	6
1.3.1 General Objective.....	6
1.3.2 Specific Objectives.....	6
1.4 Research Questions	7
1.5 Scope of the Study	7
1.5.1 Time Coverage.....	7
1.5.2 Data Coverage.....	8
1.5.3 Geographic Scope.....	8
1.5.4 Methodological Scope	8
1.5.5 Analytical Focus	9
1.6 Significance of the study.....	9
1.7 Organization of the Study	10
CHAPTER TWO: REVIEW OF RELATED LITERATURE	11
2.1 Theoretical Framework: Integrating Behavioural and Technological	11
Perspectives	11
2.1.1 Behavioural Mechanisms: Psychological Foundations of FINTECH-Induced Consumption	11
2.1.2 Technological Mechanisms: Innovation Diffusion and Financial Inclusion...12	
2.1.3. A Social Capital Theory Perspective: The Moderating Role of <i>Iddir</i>14	
2.2 Empirical Literature	14
2.2.1 FINTECH and Household Consumption	14
2.2.2 Financial Inclusion and Household Consumption	18
2.2.3 Diverse Influence of FINTECH and financial inclusion on consumption	22
2.2.4 Financial Inclusion and Household Entrepreneurship	27

2.2.5 Financial Technology (FINTECH) and Financial Inclusion	32
2.2.6 Financial Technology (FINTECH) and Entrepreneurship	38
2.3 A Summary of Key Literature Gaps	46
2.4 Research Hypotheses	47
2.5 Research Implications	51
2.6 Conceptual Model	52
CHAPTER THREE: RESEARCH METHODOLOGY	54
3.1 Research Philosophy	54
3.2 Research Approach	55
3.3 Research Design	55
3.4 Data Source.....	57
3.4.1 Ethiopian Socioeconomic Survey Wave 4 (ESS4)	57
3.4.2 Sampling and data cleaning.....	58
3.5 Variables.....	59
3.5.1 Dependent variable.....	59
3.5.2 Key explanatory variable	60
3.5.3 Moderating Variable	62
3.5.4 Control variables	62
3.6 Econometric Model Specification	68
3.7 Estimation Techniques Used and Statistical Software Used	75
3.8 Ethical Considerations	76
3.9 Reliability and Validity Checks	76
CHAPTER FOUR: DATA ANALYSIS AND EMPIRICAL RESULTS	78
4.1 Analysis by Research Objectives	78
4.2 Summary of Study Variables	79
4.2.1 Household Distribution by Region, Residence and Gender	82
4.2.2 Household Distribution by Total Annual Consumption.....	83
4.2.3 Household Distribution by Consumption Quantiles	84
4.3 Results & Discussions by Research Objectives.....	85
4.3.1 The link between Mobile Payment and Household Consumption.....	85
4.3.2 The influence of Financial Inclusion Variables on Household Consumption ..	90
4.3.3 Link Between Mobile Payment, Financial Inclusion, and Household Outcomes with Heterogeneity Analysis	95
4.3.4 Financial Inclusion & Entrepreneurship	115
4.3.5 Mobile Payment & Financial Inclusion	120

4.3.6 Mobile Payment & Entrepreneurship.....	126
4.4 Model Selection and Robustness Check.....	133
4.5 A Summary of Research Hypotheses and Empirical Findings	134
CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	141
5.1 Summary of Key Findings	141
5.2 Conclusions	144
5.3 Specific recommendations	144
5.4 Policy implications	147
5.5 Limitations and future research directions	148
REFERENCES.....	149
APPENDICES.....	170
Appendix A :	170
Appendix B.....	178
Appendix C.....	182
Appendix D:	182
Appendix E.....	183

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List of Tables

Table 2.1 Summary of Empirical Literature	44
Table 3.1 Variables Summary Table	64
Table 4.1 Summary Statistics Table	79
Table 4.2. The Link between Mobile Payment and Household Consumption: Simultaneous Quantile Regression Results.	87
Table 4.3 The Link between Mobile Payment and Household Consumption: Simultaneous Quantile Regression Result	92
Table 4.4 Regional and Urban/ Rural Differences in the relationship between Mobile Payment ,Financial Inclusion, and Household Consumption - Simultaneous Quantile Regression Result	97
Table 4.5. Gender Heterogeneity in Mobile Payment, Financial Inclusion and Household Consumption Nexus: A simultaneous Quantile Regression Result	104
Table 4.6 Age Heterogeneity in the relationship between Mobile Payment, Financial Inclusion and Household Consumption: A simultaneous Quantile Regression Result	108
Table 4.7 Education Heterogeneity in the Influence of Mobile Payment and Financial Inclusion on Household Consumption: Evidence from Simultaneous Quantile Regression.....	113
Table 4.8 The Influence of Financial Inclusion on Household Entrepreneurship: A Multivariate Probit Result.....	116
Table 4.9 Average Marginal Effects of Financial Inclusion on Household Entrepreneurship.....	118
Table 4 10: The Influence of Mobile Payment on Financial Inclusion : A Univariate Probit Estimation Result	122
Table 4.11 The Influence of Mobile Payment on Financial Inclusion: A Multivariate Probit Result	124
Table 4.12 The Influence of Mobile Payment on Entrepreneurship: A Univariate probit result.....	126
Table 4.13 Marginal effects from probit model on the influence of Mobile Payment on Entrepreneurship	128
Table 4.14 Summary of Hypothesis and Empirical Findings: H1	135
Table 4.15 Summary of Hypothesis and Empirical Findings: H2.....	136

Table 4.16 Summary Hypothesis and Empirical Findings:H3	137
Table 4.17 Summary of Hypothesis and Empirical Findings: H4.....	138
Table 4.18 Summary of Hypothesis and Empirical Findings:H5.....	139
Table 4.19: Summary of Hypothesis and Empirical Findings:H6.....	140

List of **Figures**

Fig. 2.1 Scope of Financial Inclusion	34
Fig. 2.2 Conceptual Model	52
Fig. 4.1 Regional, Urban/Rural and Gender Distribution of Household Heads	82
Fig. 4.2 Symmetric Quantile - Quantile (QQ) plot.....	83
Fig. 4.3 Household Consumption Quantile	84

List of Acronyms& Abbreviations

Acronyms	Full Form
AMEs	Average Marginal Effects
ATM	Automated Teller Machine
CGPA	Consultative Group to Assist the Poor
CSA	Central Statistical Agency
Eas	Enumeration Areas
ESS	Ethiopia Socioeconomic Survey
ESS4	Ethiopia Socioeconomic Survey – Wave 4
FI_Index	Financial Inclusion Index
FINTECH	Financial Technology
GSMA	Global System for Mobile Communications Association
ICT	Information and Communication Technology
<i>Iddir</i>	Informal Community-Based Insurance
LSMS	Living Standards Measurement Study
M-BIRR	Mobile Birr Payment Platform
M-PESA	Mobile Payment Service (Kenya-based)
MLE	Maximum Likelihood Estimation
MSMEs	Micro, Small, and Medium Enterprises
MVProbit	Multivariate Probit
NBE	National Bank of Ethiopia
NFIS	National Financial Inclusion Strategy
OLS	Ordinary Least Squares
POS	Point of Sale
PSI	Policy Studies Institute
QQ Plot	Quantile-Quantile Plot
ROSCA	Rotating Savings and Credit Association
SDGs	Sustainable Development Goals
SME	Small and Medium Enterprise
SQR	Simultaneous Quantile Regression
SSA	Sub-Saharan Africa
UNDP	United Nations Development Program

Abstract

This study examines the role of Financial Technology (FINTECH) and financial inclusion in shaping household economic behaviour in Ethiopia, focusing on entrepreneurship and consumption, while accounting for informal networks such as Iddir. Grounded in behavioural economic and technology adoption frameworks, it applies the Pain of Paying Theory (Zellermayer, 1996), Conditioning Theory (Feinberg, 1986; Boden et al., 2020), and Double-Entry Mental Accounting Theory (Quispe-Torreblanca et al., 2019; Raghubir & Srivastava, 2008) to explain how digital payment methods influence consumer decisions. Roger's (2003) Diffusion of Technology Theory guides the understanding of how financial technology adoption fosters entrepreneurship and financial inclusion. Trust in digital financial services is highlighted as a critical factor influencing adoption and usage. Using nationally representative data from the 2018/2019 Ethiopian Socioeconomic Survey (ESS4), the study analyses interactions between mobile payment, financial inclusion, informal finance, trust, and household outcomes. Results show that mobile payment alone may have limited influence on entrepreneurship due to barriers such as digital literacy, accessibility, and low trust. However, integration with informal systems like Iddir substantially enhances entrepreneurial participation, as Iddir facilitates risk-sharing and builds social trust. Formal financial services like savings, insurance, and borrowing complement digital and informal mechanisms, supporting business engagement and boosting household consumption, particularly among lower- and middle-income households. The study contributes in three ways. Theoretically, it extends behavioural and technology adoption frameworks to the Ethiopian context, showing how digital, informal, and trust-based mechanisms shape household economic decisions. Empirically, it provides the first comprehensive, country-level evidence on the interplay of mobile payment, financial inclusion, informal finance, entrepreneurship, and consumption. Methodologically, it employs univariate, multivariate, and simultaneous quantile regression modelling approaches to capture complex interactions. Overall, findings emphasize integrating informal financial structures and trust-building measures into digital finance policies to promote inclusive and sustainable economic development in Ethiopia.

Keywords: Financial Technology, Financial Inclusion, Household Consumption, Household Entrepreneurship, *Iddir*, Ethiopia.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The rapid development of digital technologies has significantly transformed the global financial landscape, resulting in the emergence of Financial Technology (FINTECH). FINTECH applies technology to financial services for improved efficiency, accessibility, and inclusivity (Arner et al., 2015). FINTECH has changed how people, households, and businesses access and interact with financial systems in ways such as through mobile money, digital wallets, internet-based lending, and block chain platforms (Ha et al., 2025; World Bank., 2024), leading to enhanced access to finance, lower transaction costs, and improved service delivery, especially in developing countries where traditional financial institutions face geographical, structural, and socio-economic barriers.

In many low-income countries, including Ethiopia, inadequate access to formal banking services represents a significant development challenge. Traditional banking arrangements are often clustered in urban settings, while many parts of rural populations remain unbanked. In Ethiopia, 46% of adults had access to formal financial services as of 2022, which is pale in comparison to that of its neighbouring countries, such as Kenya (above 80%), Uganda (75%) and Rwanda (90%) (AFI, 2024; FINSCOPE SURVEY, 2024). Given this situation, digital financial services in the case of Telebirr and M-PESA are a catalytic opportunity in this context. Research indicates that Ethiopia could lift 700,000 people out of poverty, contribute to an increase in GDP of \$5.3 billion, and increase tax revenues by \$300 million if mobile money penetration reaches 60% by 2030 (GSMA, 2023).

On a global level, there have been four major phases of financial technology or FINTECH that demonstrate the evolution of technology in finance. The first phase (1866 - 1967) was the digitalization of financial infrastructure such as telegraph systems and early computers. The second phase (1967 - 2008) consisted of ATM's, electronic payment systems, and online banking. Following the second phase was the third phase, which coincides with the financial crisis of 2008. The time period of 2008 - 2014 saw a great expansion of mobile money, peer to peer lending, and crowd funding platforms due to a lack of trust in banks (Arner et al., 2015). Currently we are experiencing FINTECH 4.0

(2014 - present) which includes new technologies such as artificial intelligence (AI), block chain, big data analytic, and open banking. These technologies have greatly improved or developed a customer-centered financial ecosystem which is important for the shift towards decentralized finances(Frizzo-Barker et al., 2020; Gomber et al., 2017). Finally, there have also been improvements in fraud detection, transparency, and inclusivity and financial responsibility for marginalized groups(Ozili, 2020; World Bank, 2022).

Digital finance is important to driving inclusion and poverty alleviation in developing countries. For instance, mobile-enabled financial systems have allowed millions of people without bank accounts to save, transfer, and borrow funds. In Kenya, M-PESA has been a particularly useful tool to demonstrate how mobile money can reduce poverty and promote household consumption, especially among female-headed households (Abor et al., 2018; Suri & Jack, 2016). Women have shown a strong preference for mobile payments, as many studies around the world demonstrate relationships between access to digital payments, increased productive asset investments, and households having the ability to weather economic shocks (Batista & Vicente, 2020). Despite its immense potential, the adoption of FINTECH in Africa has a number of barriers to address, such as limited infrastructure, low smart phone penetration, cyber security concerns, low digital literacy skills, and a general mistrust regarding online transactions (World Bank, 2022).

The adoption of FINTECH in Ethiopia is still in the early stages, as there are structural challenges (e.g., low financial literacy, poor infrastructure, and regulatory situations) that hinder shift towards a more digital financial services environment. Not all current mobile subscribers utilize app based financial services e.g., digital wallets, as only 44% of mobile subscribers possess smart phones(Ethio Telecom, 2024). Access to the internet and electricity also presents large challenges, particularly in rural areas, to broader Financial Technology adoption (World Bank, 2022). Financial practices are also influenced by cultural and social norms, where community-based financial institutions (e.g., *Iddir* and *Equb*) are seen as trustworthy and accessible, even in rural and semi-urban contexts (Aredo, 2010; World Bank, 2018). The government of Ethiopia recognizes these challenges and is beginning to introduce some reforms e.g., National Financial Inclusion

Strategy (2017-2022) and Digital Ethiopia 2025 have been introduced to support increased access to digital financial services in the country. The government also spearheaded the launch of Telebirr in 2021 which has also spurred financial innovation through commercial entities e.g., Safaricom/M-PESA, with Telebirr gaining above 34 million users in 2024(Ethio Telecom, 2024; GSMA, 2023).

The financial services sector in Ethiopia has rapidly developed digitally in recent years. The number of access points to financial services increased by 64% in 2023 and 2024, mainly driven by the expansion of mobile money agents. The total value of digital transactions increased to 9.7 trillion birr in 2024, representing 129% year-on-year growth (Shemsu, 2025). Further, the launch of the Fayda digital ID and Women's Financial Inclusion Scorecard in 2025 and other programs like it is expected to address barriers to identification and increase gender equality(World Bank, 2025). Despite this progress, gaps between rural and urban populations and between men and women still persist related to the equitable achievement of financial inclusion.

Geographic and socio-demographic barriers continue to be significant barriers for FINTECH adoption. Rural areas frequently experience electricity and network coverage outages and do not possess agent networks necessary for digital transactions. In addition to geographic and structural barriers, gender, education, and digital literacy gaps lead to exclusion. Women, older adults, and those with less formal education are less likely to own mobile phones and use digital financial services(Baah et al., 2021; Liu et al., 2023). Furthermore, structural barriers such as limited affordability of smart devices, communication in other languages, and distrust in digital systems lead many Ethiopians to rely on informal institutions, such as *Iddir* because it provides accessible and culturally acceptable financial services (Aredo, 2010; CGPA, 2021). In summary, the potential of FINTECH for inclusive growth will not only hinge upon the availability of technology but also on addressing these systemic inequalities (Sahay et al., 2020).

FINTECH connects financial inclusion to entrepreneurship and household consumption. Digital financial services, such as mobile payments and microcredit, allow households to manage risks, invest in enterprise, and smooth consumption over time (Harsono & Suprapti, 2024; Y. Li et al., 2022). Expanded financial inclusion leads to more

entrepreneurship by extending access to credit and decreasing reliance on informal lending (Fan & Zhang, 2017; A. Kedir & Kouame, 2022). For households, these services improve welfare through efficient transactions and financial planning for the long term. The realisation of these benefits will ultimately depend on whether households can effectively navigate barriers associated with digital literacy, infrastructure and trust in financial technologies in rural Ethiopia.

While there is an emerging body of global evidence, there continues to be little empirical evidence addressing the role of FINTECH in promoting financial inclusion, entrepreneurship, or consumption in Ethiopia. The evidence that does exist has focused largely on traditional finance, without regard for specifically studying the different roles enjoyed by digital financial innovations. Similarly, there has yet to be an explicit examination of the role of informal institutions, such as *Iddir* and *Equb*, which provide informal insurance, risk-sharing, and credit, in relation to FINTECH. These informal institutions are highly relevant and central to societal and economic life in Ethiopia, and may either operate as complements or be displaced by digital finance innovations (Dercon et al., 2005; Hussen & Mohamed, 2023). Investigating the interplay between formal FINTECH and informal institutions is an important consideration for any construction of an inclusive financial system, which could integrate elements of both modern and traditional financial mechanisms.

Although there is a growing body of worldwide evidence, there remains a scarcity of empirical evidence describing the function of FINTECH in aiding Financial Inclusion, Entrepreneurship, or Consumption in Ethiopia. Existing evidence predominantly focuses on the aspects of traditional finance, without any attempt to specifically examine the distinct roles of digital financial innovations. For example, considering the part that informal institutions, such as *Iddir* and *Equb*, which provide informal insurance, risk-sharing and credit, play in FINTECH has not been examined. These informal institutions are very meaningful and important for social and economic life in Ethiopia and may act as complements to, or be disrupted by, digital finance innovations (Alemayehu, 2024a; Aredo, 2010; Hussen & Mohamed, 2023). Exploring the relationship between formal FINTECH and informal institutions is a valuable consideration for anyone trying to conceptualize an inclusive financial system that may involve elements of traditional and modern financial services.

1.2 Statement of Research Problem

Ethiopia remains challenged in attaining inclusive financial development and formal financial inclusion remains low even with incremental improvements, from 22% of adults with a formal account in 2014, to 35% in 2017, to around 46% in 2022 (Demirgüç-Kunt et al., 2015, 2018, 2022). Despite governmental reforms to include opening the digital finance industry to foreign investors, launching the digital banking option like Telebirr, and rolling out a Digital Financial Services Strategy (National Bank of Ethiopia, 2020), actual adoption remains low. In fact, nearly all (98%) transactions are cash based and access to other financial products, like formal savings, credit, and insurance, is still very low (World Bank., 2024). There are also significant structural constraints like limited access to smart phones, low levels of digital and financial literacy (World Bank, 2022), high costs of accessing the internet and devices, and uneven infrastructure, particularly in rural areas, that are hindering the uptake of FINTECH solutions.

Gender, age, education, and urban-rural differences have a further effect on financial exclusion. Women face barriers such as limited mobility, limited access to productive resources, and low levels of financial literacy (Adera & Abdisa, 2023; AFI, 2021; Allison et al., 2015; Demirgüç-Kunt et al., 2022). Young people's adoption of digital finance occurs faster than among the elderly, who have the greatest difficulty with digital illiteracy (World Bank, 2022). Highly educated households are more likely to deal with and use financial services than less educated households (Demirgüç-Kunt et al., 2022). Households in rural areas experience limited network coverage, unreliable electricity supply, and fewer points of access for financial services. Informal institutions (*Iddir*) are still essential for risk-pooling, social protection, and informal credit (Alemayehu, 2024a; Aredo, 2010; Hoddinott et al., 2005), the interaction between FINTECH and informal systems has largely been neglected.

Furthermore, the connection between financial inclusion and entrepreneurship in Ethiopia has not been sufficiently examined. On the one hand, cross-country studies have found that financial inclusion can stimulate entrepreneurship by relaxing liquidity constraints (Blattman et al., 2014; Cho & Honorati, 2013; Fan & Zhang, 2017b); however, evidence in Ethiopia has been limited. From existing evidence, only two studies found no or minimal impact (Grimm & Paffhausen, 2015; Van Der Zwan et al., 2012), and even fewer

have engaged with whether access to digital financial services or informal finance spur entrepreneurial advancement at the household level (Fan & Zhang, 2017b; A. C. Lyons et al., 2022).

Thus, this thesis fills these gaps by considering how FINTECH adoption in the form of mobile payment combined with formal and informal financial inclusion shapes household consumption or entrepreneurial activity, with respect to demographic differences (i.e. gender, age, education, urban-rural residence, and geographic region). Using nationally representative micro-level data from the Ethiopian Socioeconomic Survey (ESS4) understanding how digital financial service is shaping longstanding institutions such as *Iddir* to stimulate inclusivity and economic growth, and inform policy on how to improve household welfare in Ethiopia will greatly contribute.

1.3 Objectives of the Study

1.3.1 General Objective

The objective of this research is to analyse the role of mobile payment and financial inclusion on household entrepreneurship decision and household consumption behaviours in Ethiopia.

1.3.2 Specific Objectives

In line with the main aim of the study, the specific objectives are

- To examine the influence of mobile payment on household consumption.
- To analyse the relationship between financial inclusion and household consumption.
- To evaluate the combined influence of mobile payment and financial inclusion across diverse socio-demographic and regional contexts.
- To determine the influence of mobile payment on Financial Inclusion
- To assess how financial inclusion influences household entrepreneurship.
- To investigate the moderating role of informal finance (*Iddir*) in the relationship between mobile payment and entrepreneurship.

1.4 Research Questions

To fulfil the outlined objectives, this research is designed to provide answers to the central research questions regarding the relationship between mobile payment, financial inclusion, entrepreneurship, and household expenditure in Ethiopia. The following research questions are intended to provide empirical inquiry and a formal framework for assessing the role of mobile payment systems on household economic outcomes. Thus, the research questions are:

- What is the association between mobile payments and engagement in formal financial services and household consumption across socio-demographic groups?
- What is the relationship between use of mobile payments and household consumption across different consumption quantiles (low, middle, and high)?
- How is financial inclusion indicators (bank account ownership, formal saving, formal borrowing, and formal insurance) associated with household consumption?
- What is the relationship between mobile payments and household entrepreneurship, and to how does informal finance (i.e *Iddir*) moderate this relationship?
- How is mobile payment associated with household-level financial inclusion indicators, including access to formal saving, borrowing, insurance, and bank account ownership?
- What is the association between financial inclusion (participation in both formal and informal financial systems) and household entrepreneurial decisions?

1.5 Scope of the Study

1.5.1 Time Coverage

The study's time coverage limits to the year 2018/19, Wave 4 of the Ethiopian Socioeconomic Survey (ESS4). Although five ESS waves are available (2011/12 to 2021/22), Wave 4 is used alone because it has extensive and thorough data on financial inclusion and digital finance. Earlier waves (Waves 1 to 3) have a limited number of variables on access to digital and traditional financial services at the household level, while Wave 5 was skipped due to missing financial modules when the research was

conducted. Thus, the study provides cross-sectional information based on the most relevant and available data at hand.

1.5.2 Data Coverage

The analysis takes advantage of nationally representative cross-sectional data from the Central Statistical Agency (CSA) of Ethiopia and the World Bank under the Living Standards Measurement Study Integrated Surveys on Agriculture (LSMS-ISA) program, covering ESS Wave 4. The data provide rich household-level data on financial behaviour, business ownership, consumption, and access to mobile technology. It includes variables covering both formal financial products such as bank accounts, savings, credit, and insurance and informal financial systems such as *Iddir*, a popular community-based insurance tradition in Ethiopia. It includes variables covering digital financial tools, e.g., mobile phone holding and mobile phone usage for bill payment, and all relevant socio-economic and demographic data of the household head.

1.5.3 Geographic Scope

Geographic representation features both urban and rural households across all regions of Ethiopia, enabling analysis that is sensitive to regional variation and urban-rural differences in access to financial services and technology. Representation of households from all administrative regions provides greater applicability and the scope to identify location-based financial inclusion gaps and consumption behaviour.

1.5.4 Methodological Scope

The study is quantitative, demand-side in nature and does not involve institutional or supply-side information. Univariate and Multivariate Probit models are used for the testing of household decisions on the use of formal and informal financial services. Simultaneous Quantile Regression (SQR) is also used to analyse the extent to which the effect of financial inclusion and FINTECH usage increases with variations in household consumption levels. This methodological approach allows the investigation of heterogeneity in impact by income and demographic groups.

1.5.5 Analytical Focus

The primary focus of the study is to examine the relationship between mobile payments, financial inclusion (formal and informal), and household-level outcomes i.e. entrepreneurship and consumption. The study seeks to establish how digital financial services interact with traditional financial institutions like *Iddir* in influencing economic conduct and welfare at the household level. It also decomposes results along broad demographic categories like gender, age, education, and geographic locations in an effort to uncover inequality of access and impacts.

1.6 Significance of the study

This research has robust theoretical, practical, and social significance related to understanding Ethiopia's fast-evolving financial landscape. Theoretically, this study further contributes to the growing literature that investigates the relationships among mobile payment adoption, financial inclusion, entrepreneurship, and household consumption using an inclusive national sample. In contrast to past literature that separately studies these dimensions, this study takes an integrated and multi-dimensional approach, while highlighting the critical role of digital finance especially mobile payment as a driver of economic decision-making at the household level.

Practically, the study captures how households' choices at both formal financial institutions (including bank accounts, savings, borrowings, insurances, and mobile financial services) and informal financial institutions such as *Iddir* shape household-level decisions in both entrepreneurship and consumption. This wave of analysis enhances a comprehensive understanding of how households engage with both formal and informal mechanisms and how such financial systems work in tandem to shape economic implications.

The research also investigates the heterogeneity of these effects among demographic groups and illustrates how mobile payment, financial inclusion, and consumption vary based on gender, educational level, age, and geographic location. The results illustrate that mobile payment does not replace informal institutions but supplements the pre-existing ones, demonstrating how digital finance and work done in *Iddir's* can work

together to lead to increased entrepreneurial involvement and improved welfare for households.

Socially, the research explains that expanded access to digital and community-based financial systems can empower marginalized groups, improve social trust, and elevate living conditions. These findings, therefore, provide an important evidence base for policymakers and development practitioners, as relevant when designing inclusive financial development strategies that merge technology with established financial practices to support equitable economic growth, poverty reduction, and sustainable economic development.

1.7 Organization of the Study

This thesis consists of five chapters. Chapter One contains the introduction which includes background of the study, statement of the research problem, objectives, research questions, scope, significance, and organization of the study. Chapter Two discusses pertinent theoretical and empirical literature, integrates research gaps, and provides the conceptual framework. Chapter Three deals with methodology, i.e., data source, variable descriptions, and econometric models like Univariate Probit, Multivariate Probit, and Simultaneous Quantile Regression. Chapter Four provides explanations and analysis of the findings. Chapter Five summarizes key findings, policy implications, recommendations, conclusions and limitations and future research directions.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.1 Theoretical Framework: Integrating Behavioural and Technological Perspectives

There is a conceptual link between financial technology, financial inclusion, entrepreneurship, and household consumption through an integrated behavioural–technological lens. Behavioural references explain how digital payment option reshapes individual financial behaviour and psychologically driven decision-making processes, while the technological adoption is concerned about how financial technology innovations are adopted by populations to shift their access to finance and capability for entrepreneurship. The interplay between the two theoretical frameworks is concerned about how technological adoption acts to both moderate and amplify the behaviours and how changes in behaviour occur to accelerate technology-induced financial inclusion and entrepreneurship.

2.1.1 Behavioural Mechanisms: Psychological Foundations of FINTECH-Induced Consumption

At the micro level, behavioural economics offers insights into how digital payments drive consumption and savings decisions. Conditioning theory suggests that with continued exposure to mobile payment systems, consumers start forming connections in their minds between payment and consumption, leaving them conditioned to consider mobile payments as a cue for spending (Boden et al., 2020; Feinberg, 1986; Meyll & Walter, 2019). With time, mobile payments users also develop habitual and rewarding emotional patterns of consumption as payments become simpler and instantaneous.

In support of this, the pain-of-paying theory (Zellermayer, 1996) explains how electronic payments diminish the emotional disquiet of spending. Mobile payments are intangible and show less transparency which allows consumers to feel less pain in payment digitally than paying with cash (Quispe-Torreblanca et al., 2019; Raghbir & Srivastava, 2008). Empirical studies also show that having less payment salience increase spending and decreases decision time (Shah et al., 2016; Soman, 2001). When payment frictions decrease the pleasure-of-paying effect will happen within the user of the digital payment

leading to satisfaction and convenience further reinforcing consumption tendencies(Ma et al., 2024).

The mental accounting framework (Prelec & Loewenstein, 1998) brings these mechanisms together showing that people maintain separate psychological accounts for consumption utility, and payment disutility. By separating payment, especially with a delay or obscured from view (as a mobile transaction would), the negative utility of payment is diminished, thereby maximizing overall satisfaction(Morewedge et al., 2007). All of this welfare-enhancing behavioural mechanism incrementally increases household consumption and indirectly contributes positively to entrepreneurial consumption since digital payments lower the perceived risk of spending and induce less liquidity strain.

2.1.2 Technological Mechanisms: Innovation Diffusion and Financial Inclusion

On a macro level, technological theories describe the structural transformation that FINTECH provides to expand financial inclusion and entrepreneurship. Disruptive innovation theory(Christensen, 1997) suggests that FINTECH innovations, such as mobile money, e-wallets, and digital credit apps, erode traditional financial intermediaries by offering lower costs, increased access, and customer centricity. These technologies overcome traditional finance barriers, especially for unbanked or rural households.

According to technology diffusion theory (Rogers, 2003), the diffusion process for households to utilize digital payment systems is contingent on perceived relative advantage, compatibility, and perceived ease of use. Substantial households will access formal savings, borrowing, and insurance, as digital payments and digital finance continue to diffuse in society. Such diffusion enhances financial inclusion and correlates with improved consumption smoothing, risk protection, and financial investment for entrepreneurial endeavours(Allen et al., 2016; Demirgüç-Kunt et al., 2018; Jack & Suri, 2014; Suri & Jack, 2016).

The interplay of behavioural and technological mechanisms builds a dual pathway connecting FINTECH, financial inclusion, entrepreneurship, and consumption. For the direct pathway, the behavioural effects of lessening payment pain and conditioned consumption behaviour translate the technological ease of digital payments of higher household consumption. For the indirect pathway, the diffusion of FINTECH

technologies broadens financial inclusion to allow households to save, borrow and invest in entrepreneurship. The increase in income that follows further feeds back into the capacity for households to consume.

Importantly, the acceptance of technology mediates behavioural responses; in other words, as technologies for digital payments are easier to use and better integrated into people's daily lives, they exacerbate behavioural tendencies to consume and invest. On the flip side, behavioural adoption in turn facilitates technological use, as ease and reduced pain of payment lead consumers to use FINTECH services more often. This reciprocal process creates a self-reinforcing loop where psychological comfort leads to greater technological uptake, which, in turn, leads to greater financial participation.

This realization is repeated in the empirical literature. For example, the use of mobile money in Kenya has been found to enhance household resilience, moderate consumption, and facilitate entrepreneurship (Suri & Jack, 2016). Likewise, digital credit and mobile financing in developing countries lowered transaction costs and furthered formal financial inclusion (Aker & Mbiti, 2010; Allen et al., 2016). Collectively, this empirical work supports the theoretical assertion that FINTECHs behavioural influence is strengthened by its technological capacity for lowering access barriers and encouraging inclusion. Therefore, in summary, the behavioural theories (e.g. conditioning, pain of paying, mental accounting) explain the 'why' someone shifts their spending behaviour as a consequence of digital payment systems, while the technological theories (e.g. disruptive innovation, diffusion) explain 'how' the technology scales and transforms access to finance.

Their interaction creates an integrated framework for understanding the directly and indirectly observed influences of FINTECH on household behaviour. The extant literature suggests that FINTECH directly influences consumer psychology by lowering payment frictions while increasing the convenience and frequency of consumption. Indirectly, FINTECH can promote financial inclusion by broadening access to financial services, which supports entrepreneurship and income generating activity that sustains higher levels of consumption. This interaction is also mutually reinforcing, whereby the adoption of a new technology will reinforce territorial behavioural effects by refining one's attitudes or behaviours related to managing their financial resources, while at the same time, behavioural adaptation to FINTECH will spur the assimilation of FINTECH-based

innovations more quickly and productively. This integrated framework thus creates a pathway for understanding the interconnected behavioural and technological processes through which FINTECH promotes financial inclusion, stimulates entrepreneurship, and ultimately enhances consumption at the household level.

2.1.3. A Social Capital Theory Perspective: The Moderating Role of *Iddir*

This study is founded on the Social Capital Theory, which emphasizes how trust, networks, and norms of reciprocity facilitate cooperation and resource access within a community (Coleman, 1988; Putnam, 2000). In the FinTech-entrepreneurship relationship, social capital enables sharing of information, reduction of transaction costs, and the development of confidence in the adoption of digital financial services (Cavoli, Khan & Ullah, 2025; Zhao & Li, 2021). Especially in developing economies like that of Ethiopia, where formal financial institutions remain minimal and community-based trust plays the dominant role, social capital may be seen as part of traditional associations. It serves as a critical mechanism that strengthens financial participation and entrepreneurial outcomes (Mahato, Jha & Verma, 2023; Doh & Zolnik, 2012). Therefore, in line with the social capital theory, a FINTECH-entrepreneurship linkage will tend to function better in a setting that is supported by robust social networks promoting greater trust and collaboration.

2.2 Empirical Literature

2.2.1 FINTECH and Household Consumption

As it has been documented by (T. Yang & Zhang, 2022) , FINTECH adoption , through payment facilitation could not only increase online transaction as (Agrawal et al., 2019)show, but also improve household consumption as a whole. The role of payment facilitation is reducing shopping time by reducing travel distance as in (Bachas et al., 2018) , thereby enhancing household level consumption. Digital finance can make costs of financial transaction lower, it also expands financial inclusion by promoting consumption growth in economically underdeveloped areas (Durai & Stella, 2019; Siddik & Kabiraj, 2019).

There is additional evidence about the fact that FINTECH can encourage household level consumption. On the other side, intermediary variables of FINTECH that promote

consumption are online shopping, electronic payment and lending via online mode (J. Li et al., 2020). According to other studies, FINTECH negatively contributes to household level consumption smoothness. With the focus on coverage, wideness and intensity, the negative effect exists(Lai et al., 2020).The study conducted by (X. Yang et al., 2022) showed that mobile payments made via mobile phones are conducive in that they promote the consumption upgrading of rural households as they significantly improve their enjoyment consumption. The study provides new insight into the role of technical progress in promoting total consumption and consumption upgrading in rural areas.

As further noted by (T. Yang & Zhang, 2022), payment facilitation helps reduce the time cost of travelling to shops and banks and increases household consumption. It also helps those who consumed less before the arrival of FINTECH platforms. They also confirmed that consumption is positively and significantly related to FINTECH. Even when controlling for household heads' demographic and socioeconomic factors, the result remains strong and significant. The empirical evidence obtained by (T. Yang & Zhang, 2022) have shown that FINTECH adoption fosters both macro-level and household level consumption by means of facilitating payment and credit constraint alleviation. This finding is especially important for developing countries like Ethiopia. Digital financial inclusion has a significantly positive effect on household consumption (J. Li et al., 2020). In addition, mobile payments can significantly stimulate household consumption through a “mental account”. According to the theory the psychological loss that digital transactions cause is lower than the psychological loss cash transactions cause(Thaler, 1980) .

A study conducted in China by (J. Li et al., 2019) suggests that digital finance can promote household consumption significantly for households that possess fewer assets, lower income and minimal financial literacy. The results obtained imply that digital finance has promoted household consumption mainly through online shopping, digital payment and obtaining loans via the Internet, purchasing financing products on the Internet, and buying commercial insurance. Similar studies have found out that FINTECH can help Kenyan farmers through two channels: payment facilitation and smooth consumption (Grossman & Tarazi, 2014). Further studies conducted in developing

countries on mobile payments have shown that users of mobile phones can prevent consumption decline during the impact of natural disasters(Riley, 2018).

Studies done by (J. Li et al., 2020; T. Yang& Zhang, 2022) showed that digital finance has the potential to influence household consumption through various mechanisms. Digital finance also contributes to increased household consumption by reducing transaction costs (Dong & Zang, 2024). One such mechanism is its ability to alleviate liquidity constraints and stimulate consumption(D. Hu et al., 2023; W. Wang & Yan, 2025). Traditional financial services often involve high transaction costs, requiring consumers to invest significant time and incur transportation fees and service charges. In contrast, digital finance offers diversified trading platforms and modes that effectively lower transaction costs, thereby influencing household consumption behaviour(J. Li et al., 2020; T. Yang & Zhang, 2022).

The study done by (W. Jiang et al., 2024) , on the effects of digital financial inclusion on household consumption in China provide compelling evidence that digital financial inclusion significantly benefits household consumption. (S. Luo et al., 2022) also prove that FINTECH innovation can significantly promote household consumption at the nationwide level in the study made in China.

Mobile payments and Household Consumption

The use of mobile payments benefits rural consumers by decreasing transaction fees for purchasing goods and services, while also increasing the ability for consumers to obtain items which were otherwise limited due to distance and other market barriers. Mobile payment systems also create an environment where rural consumers have more options to purchase items (Aker & Mbiti, 2010; Jack & Suri, 2014). Research has also demonstrated that the positive consumption effects of mobile payment systems are even greater for rural households headed by older, higher-educated individuals, indicating that there are differences (in mobile payment usage) depending on demographic characteristics (Kikulwe et al., 2014). Therefore, in order to maximize the benefits of mobile payments in rural locations, there is a need to expand mobile payment infrastructure, increase smartphone usage in rural areas and increase financial education for rural consumers (Demirgüç-Kunt et al., 2018; Suri & Jack, 2016).

As an example of these findings, (Jack & Suri, 2014) uses a study conducted by (Munyegera & Matsumoto, 2016) to demonstrate how the use of mobile money helps the Kenyan household in mitigating "consumption shocks." Similarly, the study conducted by (Munyegera & Matsumoto, 2016) illustrates the benefits of mobile money to rural homes in Uganda, whereby the ability to receive remittances via mobile money increases their level of welfare (measured by real per capita consumption). Mobile payment tools – which are critical tools for achieving financial inclusion – also often provide users a means of obtaining consumer credit. This characteristic plays a key role in facilitating the improvements to household consumption structures (Emara & Zhang, 2021).

Several empirical studies indicate that consumers who utilize mobile payment services sees an increase in consumer spending due to the resolution of liquidity constraints, facilitation of remittance flows, reduction of transaction costs, and general increase in convenience which both support survival and discretionary spending habits. An example of this is the initial causal studies conducted in Kenya, where it was demonstrated that the expansion of the M-PESA platform dramatically increased per-capita consumption at a sustained rate and decreased the incidence of extreme poverty for female-heads-of-household (Suri & Jack, 2016). Panel and quasi-experimental studies also yield data that mobile payment services help households smooth consumption patterns in the aftermath of negative shocks to household income, making households more flexible when faced with the volatility of household incomes (Jack & Suri, 2014; Riley, 2018).

Recent reports out of China indicate that mobile payment services have provided the rural populace with an opportunity to increase their household level of consumption through reducing transaction costs, providing access to liquidity, and decreasing consumer mental accounting losses(Zhao et al., 2022). Studies of digital finance, which includes mobile payment platforms, have also found that digital finance has provided a means for increased consumption at the household level that is particularly beneficial for low-income, financially underserved demographic groups (N. Hu & Hou, 2024a; J. Li et al., 2020). Overall, while the benefits of using mobile payment services are numerous and varied individually to an individual based on their circumstance, there is substantial anecdotal and empirical evidence to suggest that the use of mobile payment services is a considerable benefit to individuals who utilize them.

2.2.2 Financial Inclusion and Household Consumption

Existing literature remains limited, scarce, and even mixed regarding the existence of strong empirical bits of evidence on the nexus between financial inclusion and individuals' consumption behaviours, particularly in developing countries. For example, (X. Li et al., 2011) explored the impact of microcredit on household consumption in rural China and found out that households with access to microcredit has significantly higher levels of consumption compared to those without access.

Recent empirical evidence has offered strong evidence that financial inclusion has a substantial impact on household-level consumption, particularly in developing nations like Ethiopia. (Arebo et al., 2025) constructed a multidimensional financial inclusion index for Ethiopia and determined a huge increase in the inclusion rate from 10.89% in 2015 to 52.18% in 2023. This rise, driven by both conventional banking growth and digital financial services, has enabled broadened access to savings, credit, and insurance, which has consequently led to enhanced household welfare and consumption ability. This is supported by (Abdella, 2024), based on evidence from the Ethiopian Socio-Economic Survey, who found that financial inclusion significantly raises adult equivalent monthly household consumption and poverty incidence decreases. His findings are consistent with the argument that access to finance enables households to allocate resources more efficiently, smooth consumption, and invest in long-run well-being.

Similar trends have been documented beyond Ethiopia (Abokyi & Bettin, 2025) in Ghana observed that formal financial inclusion changes consumption patterns because it leads households to invest more in long-term activities such as housing and education and less in short-term consumption. Their article points out how access to financial institutions reshapes financial choices. To contribute to the stock of evidence, (Koomson, Acheampong, et al., 2023) depicted a strong negative relationship between financial inclusion and food insecurity in Sub-Saharan Africa. Their research reconfirmed that households with access to financial services are more susceptible to shocks and have stable and sufficient levels of consumption, particularly food consumption.

The effects of financial inclusion that benefit household finances have taken the attention of large number of researchers. Evidence shows that the increase in financial inclusion causes a more varied pattern of spending outside of food. Consequently, people with more access to finance services can invest on things apart from their basic needs and also utilize their resources so effectively in such a way that boosts their overall consumption (Chakrabarty & Mukherjee, 2021). Recently, some studies highlighted that greater financial inclusion improves households' welfare in both rural and urban areas in India by diversifying their consumption baskets (e.g. Chakrabarty & Mukherjee, 2022). On the opposite, few studies, however, found a weak or even negative relationship between financial inclusion and household consumption behaviours. For instance, (Burgess & Pande, 2005) conducted a study in India and found that although increased access to formal credit led to higher durable consumption levels, it had no significant impact on non-durable consumption.

These conflicting results stem from varying degrees of financial development, institutional settings, and regulatory systems in various countries. The organization and structure of financial services, and household wealth, may also have some influence on the effect on household spending patterns (Burgess & Pande, 2005). The existence of insurance and savings products in combination with credit has the power to empower the household with a better ability to cope with financial risk as well as improving their consumption patterns. Level of education, income level, and household financial literacy play significant roles in determining consumers' behaviour in relation to financial inclusion (Demirgüç-Kunt et al., 2018; L. Xu & Zia, 2012).

Similar studies have shown that financial literacy is positively correlated with higher consumption levels among financially included households (Lusardi & Mitchell, 2014). Similarly, households with higher income may have a greater capacity to take advantage of financial services and use them to enhance their consumption patterns. When people that have lower income status open accounts in financial institutions and when they use financial services and accounts at an increasing rate, they will ultimately have increased consumption (Dupas & Robinson, 2013).

The study conducted by (Compaoré & Sawadogo, 2024) found that financial inclusion can influence consumption stability through access to savings accounts. Individuals can save when there is more income and use it when income is less, thereby smoothing consumption. Moreover, institutional credit providers enable households to access financing for investments or urgent needs thereby helping to smooth consumption over time. Access to formal insurance products can also protect households from the adverse effects of shocks resulting from unexpected events, protecting household consumption levels against income shocks.

Empirical evidence for Ethiopia indicates that overall, food, utility, and education expenditure by households with access to financial services are greater than those without access, and this is disclosed by the contribution of financial inclusion to greater household welfare (Hussen & Mohamed, 2023). Similarly, a Kenyan study proved that greater access to credit and financial services improves financial welfare at home, increasing consumption smoothing as well as investment opportunities (Mwangi & Sichei, 2011). Additionally, proof from Ghana illustrates that the availability of savings accounts, loans, and insurance facilities enhances household well-being, with access to bank accounts resulting in much greater spending on consumption (Iddrisu & Danquah, 2021).

Household survey data shows that the improvement in financial inclusion has direct effect in the improvement of the welfare of households. This can be gained when consumption is facilitated to be ready for unanticipated and negative shocks (Sakyi-Nyarko et al., 2022). Those who experience financial inclusion are more likely to engage in sending and receiving payments that family and friends send than those who do not have that experience (Jack & Suri, 2014). Consequently, household consumption would fall less for financially excluded individuals (Jack & Suri, 2014b; Mbiti & Weil, 2011; Sakyi-Nyarko et al., 2022).

Studies done by (Abokyi & Bettin, 2025) on financial inclusion & household consumption in Ghana revealed that informal financial inclusion (i.e. credit access from informal sources like relatives, friends etc.) seems to have no substantial effect on households' consumption behaviour, whereas formal financial inclusion significantly affects it. Moreover, the findings of (Chakrabarty & Mukherjee, 2022) showed that financial inclusion affect saving and borrowing behaviour, which can then improve

consumption smoothing, possibly leading to widening of the consumption basket. They find robust evidence that households diversify their consumption expenditure as a result of increase in access to formal financial system.

A study conducted by (Ekmen & Karatepe, 2024) shows the positive impact on economic growth and consumption caused by digital banking and financial inclusion at household level in Turkey. In their study, (Cavoli & Gopalan, 2023) also highlighted that access to banking system and markets increase as a result of financial inclusion and households then turn to use financial instruments in an appropriate manner and become able to have diversified consumption. They came up with strong evidence to suggest that the financial inclusion facilitates consumption in emerging and developing economies.

(Hussen & Mohamed, 2023) in their study suggest that in Ethiopia the increase in access to formal financial institutions positively contributes to the household level welfare that is caused by the capacity households' gain from access to financial services to manage their expenses better so that they can allocate resources to cater for their basic needs like food and utilities. That also includes their capacity to make essential investments toward education. The findings of the study suggest that policies that are made to improve the access that households have to formal financial institutions are so important that they enhance the welfare of households.

The financial inclusion is the process that provides a means of saving, making payments, acquiring credit and managing risk. The literature indicates that access to formal financial services assists households in managing their consumption and dealing with unexpected fluctuations in their income. Evidence indicates that households have been able to use financial services to better manage their consumption after a sudden shock and that digital service like mobile money are able to reduce the costs associated with making remittances, and ultimately reduce volatility in consumption. Data from Jack and Suri's (2014) study in Kenya demonstrated that households with access to mobile money were able to continue to maintain their consumption levels after suffering an adverse shock; whereas the consumption levels of households that did not use mobile money were significantly decreased.

Longitudinal data also demonstrate that mobile money led to increased per-capita consumption and the ability to escape extreme poverty for households, particularly for those led by women, thereby providing evidence of the welfare-enhancing impacts of mobile money (Suri & Jack, 2016). Experimental evidence of access to formal savings indicates that by reducing financial constraints, households' economic behaviours and welfare are improved, and consequently, higher and more stable consumption is indirectly supported by improved income management (Dupas & Robinson, 2013). In summary, a large body of literature demonstrates that financial inclusion, especially via digital and mobile financial services, positively enhances household consumption through improved income smoothing, resilience to shocks, and improved welfare.

2.2.3 Diverse Influence of FINTECH and financial inclusion on consumption

Urban-Rural & Regional differences

The research conducted by (Huang et al., 2023; J. Luo & Li, 2022) showed that FINTECH adoption has effects on consumption and that significantly differs between urban and rural settings. The adoption of FINTECH mostly affects the spending in urban areas relating to service. On the other side, the impact in rural areas relating to consumption is not that significant. For them the difference is caused by the rate of low internet coverage and infrastructure in rural areas might affect consumer choice as it is underdeveloped.

Besides, they showed that the adoption FINTECH is not likely to reduce the precautionary saving behaviour of rural residents because of their consumption decisions for additional uncertainties and potential risks they face when making them. An empirical evidence obtained by (W. Jiang et al., 2024) revealed that the effects of digital financial inclusion in China vary across different regions and consumption levels. Heterogeneity analysis shows that in eastern and rural areas the inclusion of digital financial has a more distinct impact on consumption. (X. Yang et al., 2022) also investigates that mobile payments have a significant impact on rural household consumption.

A study conducted by (S. Luo et al., 2022) shows the significant role that FINTECH plays in promoting the consumption of urban households and not in the consumption of rural ones. This may be because of the long-standing differences that are there in urban and rural areas in China. Consequently, it means that in rural areas the effect of FINTECH on

inclusion has not been fully realized and there is a low level of breadth, depth and digitization of the utilization of FINTECH.

Furthermore, the empirical evidence provided by (T. Yang & Zhang, 2022) identified that FINTECH adoption mainly exists in urban areas and the coefficients of FINTECH adoption on consumption inequality in rural area are insignificant due to low internet coverage rate, under developed infrastructure and higher uncertainties and risks when making consumption decisions. The location of the residence is also likely to play a fundamental role, with rural households often unable to access basic financial services (Burgess & Pande, 2005).

Age Differences

The research done by W. Jiang et al., (2024) showed that the effect of FINTECH adoption and financial inclusion on consumption may differ across household heads age. Younger household heads are more likely to master information and communication technology (ICT), while elderly household heads tend to be less likely to learn and use new technology. Therefore, younger households are more likely to consume online or make payments through mobile apps and thus, FINTECH adoption is expected to affect consumption inequality more among younger household heads. Furthermore, digital financial inclusion is more conducive to the consumption at individual level as those less than 60 years old and married individuals.

A study conducted by (T. Yang & Zhang, 2022) revealed that the consumption of younger age groups are easily affected by the adoption of FINTECH as they are open to new technology. Elderly age groups are insensitive to FINTECH adoption and thus the consumption distribution of elderly age groups within a village is barely affected. For elderly members they found out that the coefficients of FINTECH adoption remains insignificant. The young could consume more through FINTECH because they are usually credit constrained than the elderly and FINTECH could provide them with additional credit opportunities to add to their current consumption capacity.

Gender Differences

The heterogeneous impact of financial inclusion on different household types by taking into account the gender of the household head and the location (rural vs urban) where households are currently living. Large evidence has been provided in the literature on the gender gap in financial inclusion as an important dimension of the overall existing socio-economic disparities between females and males, especially in developing countries (Ghosh & Vinod, 2017).

Most of the women-headed households in the low- and middle-income nations are institutionally disadvantaged to access formal financial institutions due to socio-cultural biases, limited asset ownership, lower financial literacy, and mobility constraints. Women, (Demirgüç-Kunt et al., 2018) found, are 9 percentage points less likely than men worldwide to have a bank account, and the disparity is still greater in South Asia, the Middle East, and North Africa. These disparities are likely to be exacerbated in the rural setting, where patriarchal norms are more firmly established and financial institutions are limited.

Evidence has proven that financial inclusion bears a greater effect on male-headed or urban households with higher access to banking services and digital infrastructure in the form of increased savings, improved consumption smoothing, and entrepreneurship (Sanyal et al., 2015). Female-headed households, on the other hand, are likely to face not only supply-side constraints (e.g., distance from financial institutions) but also demand-side constraints like lower digital, financial illiteracy and lack of identification documents. Additionally, the gender gap in mobile money use an important FINTECH innovation towards financial inclusion in the Third World is vast. (Aker & Wilson, 2013) determine that female populations within rural communities are significantly less likely to own mobile phones or engage in mobile money service usage, due to lower levels of literacy and socio-cultural constraints.

(Dupas & Robinson, 2013) find that access to simple savings accounts allowed female market vendors in Kenya to save more and invest more money in their businesses, yielding higher returns. This suggests that elimination of gender-specific barriers to financial inclusion can unlock enormous economic potential in female-headed households. Consistent with these findings, controlling for gender heterogeneity is

necessary in order to estimate the policy effect of financial inclusion. Overlooking these differences may lead to the neglect of the distinctive issues of women and might result in interventions that inadvertently reinforce current inequalities.

Educational Differences

Education is one of the determinants of how families interact with digital financial products. With a study by (X. Yang et al., 2022), the level of education among rural families', the greater the chances of using mobile payments, there by having greater influence on consumer spending. This means that differences in levels of education significantly determine the way in which citizens interact with digital finance platforms.

Illiteracy is one of the key contributing factors to the digital divide, which restricts exposure to and benefits from FINTECH services (Juniu, 2005; Le Roux & Evans, 2011). The digital divide impacts the extent to which FINTECH shapes household consumption. (L. Xu & Zia, 2012) argue that differences in the capacity of individuals to access and process useful information are the results of this digital divide, and thus their financial services and consumption. Similarly, (Zhu & Chen, 2013) note that the digital divide prevents equitable access to online financial services, especially among lower-educated groups.

Empirical proofs also confirm this relation : (Amin-Smith & Attanasio, 2020) confirm that levels of education rise significantly to drive household consumption. Additionally, (Wu & Peng, 2024) mention that financial literacy, having education influencing it to some degree, is a mediator via which digital finance affects household consumption, going further to say that enhanced education strengthens the ability to comprehend and utilize financial technologies. These findings collectively emphasize the significance of education in identifying whether or not FINTECH intervention is effective in order to increase household consumption.

Education at a higher level facilitates the constructive role of education in empowering use and access to digital financial services. For instance, (Wu & Peng, 2024) affirmed that higher levels of education play an important role in utilizing mobile payments in the rural regions of China through enabling the potential users to learn and utilize digital

technology. Likewise, (T. Yang & Zhang, 2022) found that education lowers cognitive FINTECH adoption barriers, digital finance becomes more inclusive and more effective in household welfare maximization.

Furthermore, (Mao, 2024; T. Yang & Zhang, 2022) indicate that educational inequality could be a moderator for the effect of digital financial inclusion on consumption smoothing and poverty alleviation. The more educated have greater capacities to examine financial data, forecast risk, and make sensible consumption decisions.(T. Yang & Zhang, 2022) also went on to state that consumer expenditure in the household was greatly boosted with the assistance of digital financial services, particularly among households that possess educated members because they can effectively utilize FINTECH tools within economic decision-making. The available evidence does not just show that education influences digital financial instrument exposure but also the magnitude of digital financial instrument exposure influencing household consumption outcomes.

Mobile payments, financial inclusion and heterogeneous effect on Consumption

Evidence from empirical studies indicates that the adoption of mobile payments and digital financial inclusion increases overall household consumption, while different socioeconomic groups experience these effects indifferent ways. Based on nationally representative data from China, (Hu & Hou, 2024) used statistical methods to demonstrate that as consumers gain better access to mobile payment options, they tend to increase their total household consumption levels. Their findings also suggest that mobile payments have a strong impact on development- and hedonic-based spending, as opposed to basic survival needs, which both indicate a higher level of consumption and reveal changes in how consumption is structured.

Additionally, Hu & Hou, 2024's analysis showed that there are many variations among the effects of mobile payment use on household consumption, even among households within each respective socioeconomic group (eg. Households with greater wealth vs. households with limited wealth). Complementing these findings, (T. Yang & Zhang, 2022) conducted research in rural China and discovered that mobile payment adoption led to increased household consumption through two avenues: reducing consumption/economic credit constraints and facilitating greater financial inclusion

through mobile payment systems, thus increasing the breadth of household consumption and reducing consumption inequality across socioeconomic groups. When comparing findings from studies of mobile money use across multiple developing countries, (Apeti, 2023) noted that households utilizing mobile payment systems showed lower levels of consumption volatility, suggesting increased consumption stability/ welfare as it relates to financial inclusion. In rural Uganda, panel data indicate that access to mobile money has resulted in higher levels of real per capita household consumption through increased remittance activity between sending and receiving households, another method by which digital financial services facilitate increased household consumption.

The evidence in Sub Saharan Africa further confirms these conclusions.(Jack & Suri, 2014) indicated that Mobile Money provides increased opportunities for Risk Sharing and Protecting Consumption Against Shocks amongst poorer and rural households in Kenya by facilitating use of mobile money transactions. In addition, (Kikulwe et al., 2014)find those smallholder farmers who utilize Mobile Money benefit from improved Income and Welfare Outcomes which allows for higher and more predictable consumption patterns. These studies support the assertion that Mobile Payments and Digital Financial Inclusion increase not only household Consumption Levels, but also dramatically increase the Degree of Stability of Household Consumption. However, the impact of mobile payment technology on the aforementioned outcomes varies among people by Gender, Age, Education, Income, and Location (Urban or Rural). Hence, it is critical to conduct a thorough Subgroup Analysis when examining the impact of Mobile Payments and Financial Inclusion on household consumption in developing countries like Ethiopia.

2.2.4 Financial Inclusion and Household Entrepreneurship

The financial inclusion literature often makes a distinction between access to and usage of formal and informal financial services, where formal is defined to be financial services provided by a bank or other financial institution that is subject to the regulations of a country's central bank or other supervisory authorities (e.g., A. Lyons & Contreras, 2017). Formal financial services were defined to include those provided by banks, insurance companies, microfinance institutions (including cooperatives), non -banking savings institutions (post offices, etc.), and money transfer operators (Money Gram, Western Union, etc.). Informal financial services included those that were provided by informal financial operators outside of a country's formally-regulated financial sector

such as community-based financing associations (*Equib* and *Iddir* in Ethiopian case), money lenders, and financing from friends and relatives (Kedir et al., 2011)

Financial inclusion is a concept that brings all groups into the financial net in such a way that they enjoy fair and sustainable financial services, especially low-income groups and vulnerable groups with financing difficulties (L. Jiang et al., 2019). Inclusive finance is a formal way of getting access to formal financial services including credit, remittance, insurance and saving opportunities, which has been regarded as a critical engine of entrepreneurial activities through value creation and innovative finance (Claessens & Perotti, 2007; Sethi & Acharya, 2018). (Sarma & Pais, 2011) further stated that the financial inclusion mechanism ensures that all entrepreneurs have easy access to and use the formal financial system.

Financial inclusion plays a vital role in developing entrepreneurship by providing access to finance, enhancing financial literacy, and promoting business management skills (Abor et al., 2018). It helps reduce the costs of starting a business for individuals who lack self-financing or access to external funds and supports business expansion (Beck & Demirguc-Kunt, 2006). It can also increase the innovative capacity of businesses (Ayyagari & Maksimovic, 2007). However, financial constraints are significant barriers for entrepreneurs, particularly in developing countries (World Bank, 2014).

Financial inclusion lessens credit constraints by reducing information asymmetry in financial transactions, particularly in industries with low barriers to entry (Fan & Zhang, 2017). It ensures equitable access to financial services, including credit, remittances, insurance, and savings, particularly for low-income and vulnerable groups (L. Jiang et al., 2019). It has been regarded as a key driver of entrepreneurial activities, fostering value creation and innovative finance (Claessens & Perotti, 2007; Sethi & Acharya, 2018). Financial inclusion mechanisms, such as formal access to financial services, facilitate entrepreneurial growth (Sarma & Pais, 2011). An enterprise development depends largely on access and use of financial services. A large body of literature discovers that within developing countries, financial inclusion, plays a crucial role in supporting the formation and growth of micro and small enterprises (Beck et al., 2009; Fan & Zhang, 2017; Kairiza et al., 2017). Better access, particularly to conventional financial services, may lead to a

greater possibility that micro and small enterprises are able to become self-sufficient and flourish in the long run.

In developing countries, financial inclusion is crucial in supporting the formation and growth of micro and small enterprises (Beck & Demirguc-Kunt, 2006; Fan & Zhang, 2017). It can help micro and small businesses become self-sufficient and thrive in the long term, particularly when accessing conventional financial services (Kairiza et al., 2017). A key distinction exists between formal and informal financial services, with formal services provided by regulated institutions like banks, microfinance institutions, and insurance companies, while informal services come from unregulated providers such as community-based associations and moneylenders (A. M. Kediret et al., 2011; A. C. Lyons et al., 2022). The findings of (Fareed et al., 2017) from a study in Mexico suggest that financial inclusion is positively related to entrepreneurship and can lead to economic opportunities for women entrepreneurs. However, this positive relationship does not apply to women operating in the informal sector. This result is not surprising given that the degree of informality is strongly associated with the entrepreneur's ability to access financial services.

A more recent study by (Fan & Zhang, 2017) tested the impact of financial inclusion on entrepreneurship using industry data from China for the period 2005-2014. Using a multi-dimensional index of financial inclusion, they looked at 19 different industries in China and found that greater financial inclusion led to significant increases in entrepreneurship. The effects were heterogeneous across industries. Those sectors with lower barriers to entry were the most likely to be positively affected. (Ajide, 2020) used a sample of 13 African countries to demonstrate how financial inclusion can foster entrepreneurial development. The results show that financial inclusion has a significant and positive effect on entrepreneurship in Africa. (Goel & Madan, 2019) whose work concludes that financial inclusion plays a major role in increasing the number of women in entrepreneurial activities, as financial inclusion can open up economic opportunities for women entrepreneurs in both the formal and informal sectors. (Koloma, 2021) argues that financial inclusion has the same beneficial effect on the level of entrepreneurial intention among youth.

Despite these positive findings, some studies, like those by (Matindike & Mago, 2022), show mixed results. For instance, while South Africa has high financial inclusion, entrepreneurial activity remains relatively low. Additionally, some studies have found microfinance and other inclusive financing measures to have limited impact on the growth of microenterprises (Meager et al., 2003). These contradictions may arise from inadequate data or the endogeneity of financial inclusion indicators (Fan & Zhang, 2017). The study done by (Newman et al., 2017) , showed that financial inclusion positively affect entrepreneurship due to increased access to financial services. An increase in financial inclusion by 1-per cent point would increase the entrepreneurship in Africa by 39.8 per cent point.

The findings indicate that inclusive finance is strongly and positively linked to entrepreneurial development (Ajide, 2020). This result supports previous empirical findings in other regions/countries that financial inclusion improves entrepreneurial development (Fareed et al., 2017; Goel & Madan, 2019). (Fan & Zhang, 2017)also prove that a country with various financial access points such as POS terminals, bank branches and ATM has opened a gateway for its entrepreneurs to explore the opportunities that come through financial services, which encourage business development.

Increasingly, financial inclusion is understood to provide large and small enterprise (SME) entrepreneurial opportunities on the African continent through increased opportunity and risk management. For example, a study of over 44,000 adults across Africa demonstrates that financial inclusion has a strong effect on entrepreneurship; specifically, it affects the relationship between contextual factors, such as labour market engagement and labour market conditions, and the willingness to start a business. In addition, the researchers noted that while financial access is critical to encouraging entrepreneurship, it is much more important to focus on financial inclusion by using the services of the financial institution (Elouaourti & Ibourk, 2024). Evidence from Uganda also supports the notion of the importance of financial inclusion in promoting entrepreneurship; research found that micro, small and medium enterprises (MSMEs) benefit disproportionately from increased access to finance than large businesses ,and therefore have greater credit constraints and responsiveness to financial inclusion (Lakuma et al., 2019).

Direction of Casualty: Financial Inclusion as a driver of Household Entrepreneurship.

In order to counter the possible endogeneity of financial inclusion and entrepreneurship in the sense of reverse causality this paper has a theoretically motivated design where financial inclusion is employed as a source of household entrepreneurial activity that is exogenous. Structural constraints like a deficiency of access to formal financial institutions, underdevelopment of banking infrastructure, and high transaction costs limit individuals from initiating or growing firms in the context of Ethiopia. Thus, financial inclusion in terms of account holding, saving from formal institutions, borrowing from formal institutions, and insurance facilitate entrepreneurship by relaxing credit constraints, allowing investment, and minimizing income shocks (Beck & Demirgüç-Kunt, 2006; Demirgüç-Kunt et al., 2015).

Ideally, access to financial instruments is often a prerequisite for business initiation, particularly in low-income and rural communities where households own no capital and risk protection facilities. This favours the supply-leading hypothesis that holds that financial development (and inclusion) is a cause and facilitator of real sector outcomes like entrepreneurship (Patrick, 1966). Additionally, empirical evidence from developing countries has consistently shown that financial inclusion increases business start-up levels, especially among credit-constrained households (Ayyagari & Maksimovic, 2007; Bruhn & Love, 2014). While it is true that entrepreneurs benefit from improved access to finance, in contexts like Ethiopia where the financial system is underdeveloped, the expansion of financial access is primarily a driving force for entrepreneurship rather than a consequence of it.

To keep residual endogeneity levels constant, the model keeps constant those big household and demographic controls for e.g., level of income, education, gender, region, age, financial literacy, and rural/urban residence that might influence either entrepreneurship or financial inclusion. While the cross-sectional nature of the ESS4 data makes it impossible to rule out simultaneity bias altogether, or to use instrumental variables, the required causal direction is guided by situational facts as well as prior

literature. The findings are thus considered in theoretical reserve and empirical rigour, and the two-way nature of the relationship is accepted in the study constraints.

In light of these controversial empirical results, the question of the relationship between financial inclusion and entrepreneurship seems to be still not fully resolved. In the literature, the reason put forward to explain the ambiguity of the empirical results: the use of inappropriate data on access to financial services by individuals and households that do not allow for a careful examination of the relationship (Fan & Zhang, 2017).

2.2.5 Financial Technology (FINTECH) and Financial Inclusion

There is an increasing body of literature by prominent scholars and international institutions that supports the role of FINTECH, positive and significant in terms of ensuring financial inclusion, especially in developing economies. According to (Demirgüç-Kunt et al., 2022), online financial services and mobile payments in particular have triggered an account-ownership explosion that reduced the number of unbanked individuals globally significantly since 2011. Mobile money services, for example, such as M-PESA in Kenya, have been highly effective in raising savings and coping ability of poor households; with research from (Suri & Jack, 2016) showing that exposure to mobile money services increased financial inclusion and moved thousands out of poverty. (Beck et al., 2007), observe that increased access to finance through innovation disproportionately benefits the poor, reducing inequality and enabling a greater share in economic activity. The (GSMA, 2019), also documents how mobile money products in Sub-Saharan Africa have significantly expanded financial access for women and the rural population and hence closed significant demographic gaps. Together, these studies find a robust and consistent link between FINTECH and better financial inclusion outcomes in account ownership, savings, credit, and insurance.

Research consistently highlights FINTECH as a key driver of financial inclusion (Gosavi, 2018; Jack & Suri, 2014; Tchamyu et al., 2019). A strong correlation exists between mobile phone penetration and financial inclusion both across and within countries (Andrianaivo & Kpodar, 2012). Mobile money usage, in particular, has been positively associated with greater financial access for households and firms. Households with

mobile money accounts are more likely to be banked, receive and send remittances more frequently, and accumulate higher savings (Jack & Suri, 2014; Morawczynski & Pickens, 2009; Ouma et al., 2017). Mobile money also promotes financial inclusion among small and medium-sized enterprises (SMEs) by improving their access to bank credit (Gosavi, 2018). In a study of 25 African countries, (Chinoda & Mashamba, 2021) found that FINTECH significantly contributes to financial inclusion, especially in terms of bank account ownership and the expansion of bank branch networks.

Mobile payments generally fall into two broad categories: daily transactions and payments for bills or credit obligations (Lu, 2019). By enabling faster, more efficient payment platforms, FINTECH reduces transaction costs and enhances access to financial services for underserved populations, including low-income groups, rural communities, and the unbanked (Kedir & Kouame, 2022). As such, FINTECH plays a transformative role in expanding access to formal finance, despite facing persistent challenges such as the digital divide (Odei-Appiah et al., 2022). The literature on financial inclusion distinguishes between access to and usage of both formal and informal financial services. Formal services are offered by institutions such as banks, insurance companies, microfinance institutions, cooperatives, post offices, and money transfer operators.

Financial inclusion is a multidimensional concept. It encompasses the ability of individuals and firms to save, borrow, obtain credit, purchase insurance, and access various payment systems, including digital platforms (Gerald et al., 2022; Kabakova & Plaksenkov, 2018; Zins & Weill, 2016). In essence, financial inclusion means ensuring that individuals and businesses can access useful, affordable financial products, such as savings, credit, payments, and insurance, delivered responsibly and sustainably. Full financial inclusion also implies providing customers with the education and support needed to make informed financial decisions (Aduda & Kalunda, 2012). The following chart indicates the scope of financial inclusion.

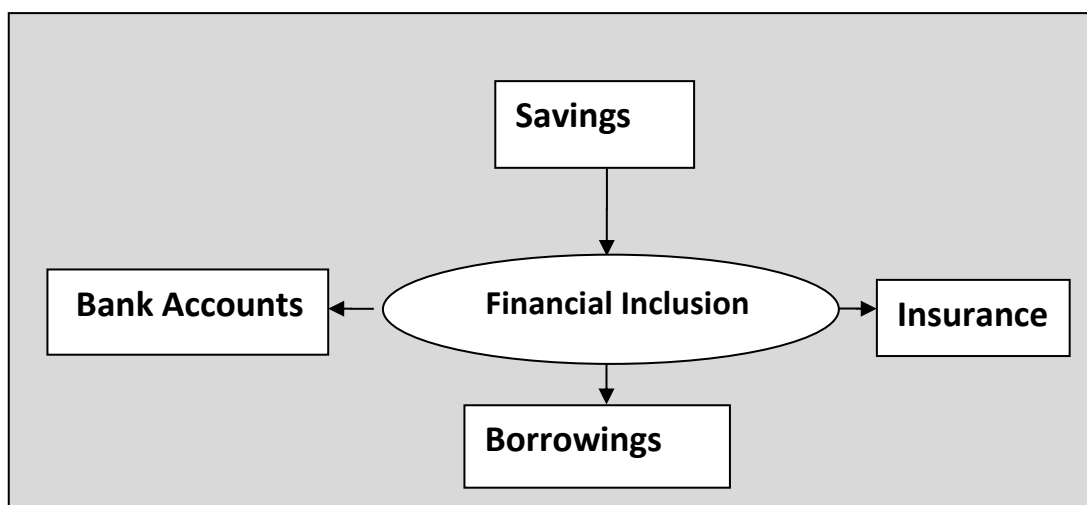


Fig. 2.1 Scope of Financial Inclusion

Source: Adopted from (Aduda & Kalunda, 2012)

The rise of financial technology (FINTECH) has transformed the landscape of financial services, particularly in emerging and developing economies where traditional banking systems face limitations in reaching underserved populations. FINTECH innovations ranging from mobile money and digital banking to peer-to-peer lending and block chain have increasingly been recognized as key drivers of financial inclusion (Demirgüç-Kunt et al., 2022; Ozili, 2023). These technologies lower transaction costs, reduce geographical and infrastructural barriers, and enable access to financial services for marginalized groups (Barajas et al., 2020; Bazarbash & Beaton, 2020).

Several recent studies demonstrate that FINTECH positively affects financial inclusion by lowering transaction costs, reducing geographical and infrastructural barriers, and enabling access to financial services for marginalized groups. According to (Ozili, 2023), FINTECH platforms have expanded access to financial products for unbanked and under banked individuals by digitizing payment systems, promoting micro-savings, and easing credit access, especially in Sub-Saharan Africa and South Asia.(Ozili, 2018) highlights that mobile money services like M-Pesa in Kenya have played a crucial role in advancing financial inclusion by expanding access to financial services for underserved populations.

Similarly, (Demirgüç-Kunt et al., 2022) in the *Global Findex Database* report that digital financial services are associated with higher levels of financial inclusion. Their findings show that mobile money has significantly increased account ownership, especially in low-income economies, with women and rural populations benefiting the most. (Bazarbash & Beaton, 2020) find that FINTECH can close gaps in financial access by offering alternative credit-scoring methods and expanding the availability of loans to informal sector workers. Their research highlights that FINTECH firms tend to serve riskier borrowers who are often excluded by traditional banks.

Moreover, (Barajas et al., 2020) assert that FINTECH adoption correlates positively with improvements in financial access, particularly when regulatory frameworks are supportive. Their cross-country analysis reveals that a well-developed digital infrastructure and proactive regulation enhance the financial inclusion effect of FINTECH. In Ethiopia, the expansion of mobile money services such as M-BIRR and Telebirr has shown promising signs of enhancing financial inclusion. (Entele, 2019) report that mobile payment usage is positively associated with formal financial service uptake, especially among rural households and youth, supporting the argument that FINTECH can overcome conventional barriers to access.

However, some scholars caution that the effect of FINTECH on financial inclusion is not automatic. (Sahay et al., 2020) argue that while digital tools increase access, usage gaps remain significant due to digital literacy, affordability issues, and trust deficits. They recommend comprehensive digital financial education and consumer protection measures to maximize the inclusion potential of FINTECH.

Mobile payments and Financial Inclusion

Mobile payment systems have developed as an effective way to provide access to financial services for previously unbanked individuals in developing nations (Kim et al., 2018), through the usage of a mobile device. Mobile financial services (MFS) refer to the use of a mobile device to access various financial products, such as payments and remittances, savings accounts and transactions, etc., via mobile phones. Over time, the expansion of MFS has provided an innovative method to provide access to formal financial products to people who previously did not have access to a bank (Sihvonon,

2006). Mobile payments are an example of MFS that provide payment functionality either face-to-face at the point of sale or using a mobile device remotely. Initially, mobile payments gained popularity in the developed world, but with rapid innovation in developing regions, mobile money innovation continues to provide formal financial access to the greater majority of the unbanked population and are largely viewed as pathways to scaled inclusive financial services (Lashitew et al., 2019).

Furthermore, in addition to the rapid growth of mobile phone penetration, the reduction of transaction costs associated with mobile payments can positively influence the provision of financial services for both the low-income and low-wealth population, as well as non-low-/non-wealth populations, via mobile payments. Mobile money has significantly contributed to extending financial access to those living in poverty or those without banks by removing cost barriers associated with financial transactions and geographical constraints, and allowing people to manage basic financial needs via their mobile devices (Aker & Mbiti, 2010). The research has also shown that mobile payment systems allow the transfer of money to be accomplished safely and at a lower cost, as well as enable households to belong to a larger risk-sharing community than is feasible without (Jack & Suri, 2014) . Mobile payment users are therefore in a position to better smooth their spending patterns during economic turmoil and have access to timely remittances and financial resources (Riley, 2018). Furthermore, through providing access to savings, credit and insurance products, mobile money enhances financial inclusion throughout the continent of Africa (Bongomin et al., 2018).

Evidence from a longitudinal study conducted in Kenya demonstrates that mobile money positively impacts household well-being, decreases levels of extreme poverty and provides substantial gain to the overall economy for women (Suri & Jack, 2016). Beyond Kenya, there is a plethora of evidence confirming the positive contributions of mobile payment systems to financial inclusion and the establishment of small business development in a wide variety of developing economies; of the countries with the greatest contributions, those that have supportive agent networks and/ or regulatory environments tend to experience the most impact (Donovan, 2012; Ozili, 2018). Recent literature reviews continue to note that even though mobile payment systems provide the above

benefits, many users remain at risk for the same fraudulent practices that other types of electronic payments present.

Direction of Causality: FITNECH as driver of Financial Inclusion

It is significant to realize the direction of causality between FINTECH and financial inclusion when interpreting evidence empirically. Wherever FINTECH, in the form of mobile money service, has shown up in the majority of low-income and underserved settings, e.g., in Ethiopia, it has acted as an exogenous driver of financial inclusion (Sahay et al., 2020; World Bank, 2022). The traditional banking industry is unable to reach rural or disadvantaged groups due to the lack of physical infrastructure, operating costs, and institutional limitations (Demirgüç-Kunt et al., 2022; Zins & Weill, 2016). In such a situation, FINTECH technologies offer a cost-efficient and scalable approach to offering financial products (Beck et al., 2018; Suri, 2017).

Mobile financial services are usually the first point of access to the formal financial sector, where households can pay and receive wages, save digitally, borrow, and purchase insurance sometimes before they even deal with conventional banks. Causality along the chain has evidence. For example, (Jack & Suri, 2014) demonstrated that the introduction of mobile money in Kenya significantly increased financial access and economic resilience for poor families. Similarly, (Demirgüç-Kunt et al., 2018) argue that digital financial products have a key role in deepening finances in emerging economies in lowering transaction costs and structural frictions based on documentation, distance, and institutional trust.

In response to these theoretical and empirical considerations, in this research, FINTECH is considered an exogenous driver of financial inclusion. This is highly applicable in the context of Ethiopia where banking services are underdeveloped and digital finance is being increasingly considered as the main means of deepening financial access. Overall, the literature seems to verify that FINTECH digital financial services and particularly mobile money exert a positive and significant influence on financial inclusion, especially in developing and under banked economies. But the size and consistency of this impact will be a function of all sorts of context variables ranging from the quality of financial regulation to digitally and financially literate populations, access to mobile telephone and

internet infrastructure, and levels of trust in digital systems (Demirgüç-Kunt et al., 2018; Ozili, 2018b; Suri & Jack, 2016). In countries like Ethiopia, where bank penetration is weak in rural towns by traditional banking standards, FINTECH offers a unique opportunity for such financial gaps to be bridged, although its efficiency varies from one demography and geography to another.

2.2.6 Financial Technology (FINTECH) and Entrepreneurship

FINTECH reduces barriers to financial access, which fosters entrepreneurship by improving savings, credit access, and payment mechanisms (Demirgüç-Kunt et al., 2022; Suri & Jack, 2016). *Iddir* serves as a form of informal community-based insurance and plays a key role in promoting financial resilience and entrepreneurial risk-taking in Ethiopia (Dercon et al., 2005; Gugerty, 2007). Informal and formal financial systems often complement each other, with informal institutions like *Iddir* filling gaps left by formal finance (Beck et al., 2009; Karlan & Zinman, 2010). Community-based finance mechanisms can co-evolve with FINTECH, potentially moderating its effect by enabling risk-sharing and reducing transaction frictions (Bateman et al., 2019). Although there are few studies that specifically address informal finance as a moderator, theoretical arguments and fragmented empirical evidence imply that FINTECH and informal finance complement one another. Informal groups such as *Iddir* provide reputation management, social collateral, and risk mitigation services, all of which can increase people's willingness to accept and effectively use FINTECH tools in business. Furthermore, the usefulness of FINTECH varies and frequently depends on contextual enablers such as trust, social networks, and informal safety nets (Bateman et al., 2019).

Individuals who are members of *Iddir* may be more likely to take risks in FINTECH-enabled entrepreneurial enterprises since they know they have community-based support. As a result, *Iddir* may increase the effect of FINTECH by lowering the perceived risk and uncertainty associated with entrepreneurship. This is consistent with the notion of institutional complementarities, which holds that formal and informal institutions may complement one another in creating economic results (Beck et al., 2009). In Ethiopia, where informal and formal institutions coexist, *Iddir* may increase FINTECH's influence on entrepreneurship by filling trust and knowledge gaps that digital platforms alone cannot bridge.

A growing body of empirical evidence shows that FINTECH has a favourable influence on entrepreneurship. (Alraqeb et al., 2022) discovered that digital finance considerably increases self-employment in China, with digital banking having a greater influence in rural regions and digital financial services in urban areas. Similarly, (Hau et al., 2021) utilized an advanced regression technique to discover that FINTECH loans increased sales and transactions by 13.1% and 10.6%, respectively, while significantly promoting female entrepreneurship. (A. Kedir & Kouame, 2022) used FinScope data from Burkina Faso and Cameroon to demonstrate that mobile money usage promotes both male and female entrepreneurship, particularly among young. (X. Yang et al., 2022) verified that digital financial inclusion encourages female entrepreneurship in China by lowering lending limitations and closing financial information gaps, particularly for vulnerable women in rural regions.

According to (tasak, 2022), FINTECH improves the financial health of SMEs in developing nations and supports entrepreneurship through infrastructure investment, customer demand, and innovation. Similarly, (Olanrele, 2025) discovered that owning a mobile money account enhances the chance of starting a business in various African nations, including Kenya and Nigeria. (F. Xu et al., 2024) stressed FINTECH's significance in supporting farmers' entrepreneurial activities, whereas (Asongu et al., 2018) demonstrated that mobile governance enhances the business climate in Sub-Saharan Africa. (Abdullah et al., 2025) found that FINTECH adoption is associated with greater levels of national entrepreneurship. According to (Amha et al., 2015), 53% of Ethiopian adults are prospective entrepreneurs, with age, education, urban location, and social networks all having a major impact on entrepreneurial goals. Gender inequities remain. (Cuberes et al., 2019) discovered that, even after adjusting for socioeconomic characteristics, women are 5.2 percentage points less likely than males to engage in entrepreneurship across 44 nations. According to studies conducted by (A. Koko & Kachalla Mohammed, 2019; Krasniqi, 2009), being male, educated, urban, and from a bigger family promotes entrepreneurial activity. According to (Backman & Karlsson, 2013), age, education, and gender are important predictors of entrepreneurial aptitude.

The literature on entrepreneurship has uncovered differences in the rate of entrepreneurship between men and women, with women generally displaying lower entrepreneurial activity than men. The findings reveal that female entrepreneurial rates

are significantly lower than for males. For the first time, differences in the characteristics of female and male entrepreneurs are examined, revealing that female entrepreneurs tend to be slightly older, more often at home or not working, have lower income and education levels, and have less access to business networks compared to their male counterparts (Llusa, 2010). As per (Nwibo & Okorie, 2013), age, educational status, experience, annual income, household size, household entrepreneurial history, and source of investment capital have positive effect on entrepreneurship .

In Ethiopia, *Iddir* is a long-standing, culturally integrated system of informal insurance and community-based mutual assistance. While *Iddir* is initially intended to pay burial expenses, it is frequently expanded to include emergency bills, health crises, and, in certain situations, informal financing (Dercon et al., 2005). It also promotes trust, reciprocity, and collective identity, all of which are important kinds of social capital that may be used for entrepreneurial activity (Gugerty, 2007). Empirical research reveals that such informal institutions frequently replace formal mechanisms when they are weak or missing. Community-based organizations, such as rotating savings and credit associations (ROSCAs) and *Iddir*, for example, facilitate financial intermediation through locally trusted networks, eliminating informational asymmetries and enforcement issues typical in credit markets (Gugerty, 2007; Karlan & Zinman, 2010).

Traditional mutual-aid societies (*Iddir*) play an important regulatory role in moderating the relationship between FINTECH and entrepreneurship. As organizations, they afford informal insurance, social safety nets, and credit to enhance household resilience and stimulate risk-taking entrepreneurial activities. Therefore, this should be taken into account with considerations towards (Alemayehu, 2024a; Aredo, 2010; Baron, 2025; Dercon et al., 2005; Gugerty, 2007). Furthermore, *Iddir* that complement formal financial institutions and fill the void left by the formal sector (Beck et al., 2009; Karlan & Zinman, 2010) also enable different mechanisms of community finance that can co-evolve with FINTECH. Digital financial innovations, such as mobile payments and online credit platforms, may utilize trust, social capital, and cooperative norms, held in the *Iddirs* to facilitate a reduction in transaction frictions, increase access to capital, and improve the expansion of successful entrepreneurial activities. As a result, the incorporation of

indigenous institutions, such as *Iddir*, into FINTECH-enabled financial systems becomes essential to ensure entrepreneurship in Ethiopia is inclusive, resilient, and sustainable.

The disruptive potential of financial technology (FINTECH) has attracted rising levels of development literature, most notably for its potential to increase financial inclusion as well as small business activity for poor households. FINTECH innovations such as mobile money, digital lending, online savings platforms, and crowd funding reduce transaction costs, increase convenience and access to financial services, and encourage the presence and expansion of micro and household level business enterprises (Beck et al., 2015; Demirgüç-Kunt et al., 2018). These technologies are especially powerful in regions like Sub-Saharan Africa, where formal financial institutions have limited coverage, and a vast majority of the people are unbanked in the traditional sense (Suri & Jack, 2016; Zins & Weill, 2016). Based on digital technology, FINTECH provides an alternative infrastructure that can close the financial gap and serve as a stimulus to inclusive economic development.

In addition, FINTECH makes the most efficient utilization of financial decision-making and cash flow management necessary to the viability of entrepreneurial ventures. (Y. Wang, 2024; Xie & Chen, 2025) are in consensus that digital finance promotes entrepreneurship through facilitating smooth, easy-to-use services appropriate to the financial behaviour of low-income households, especially where bank facilities are of poor quality. Various empirical evidence supports FINTECH's capacity to facilitate household entrepreneurship. For example, (Suri & Jack, 2016) aimed to validate that mobile money (M-Pesa) cut the level of Kenyan poverty by half and enhanced business establishment by enhancing remittances and savings mechanisms. From their longitudinal data, they found that mobile money users were likely to have businesses and engage in multiple sources of income.

Similarly, (Zins & Weill, 2016) depicted that mobile money uptake is positively associated with household entrepreneurship in Sub-Saharan Africa, particularly for female-headed and rural households. According to their findings, digital payments reduce cash shortage and contribute to informal sector development. In South Asia, (Demirgüç-Kunt et al., 2022) quoting Global Findex statistics, argue that digitally provided financial services improve business at the household level by encouraging

mobilization of savings and reducing forced disposal of assets in periods of income shocks. It improves resilience and encourages investment in small-enterprises. While a slow adopter of FINTECH, Ethiopia has witnessed mobile money business develop very rapidly since the liberalization of its telecommunication industry. Firms like Telebirr, introduced by Ethio Telecom in 2021, have expanded access to digital financial services among Ethiopians by millions. Empirical evidences show that such phenomena influence entrepreneurial patterns at an increasingly increasing level. Also, (Abebe & and Kegne, 2023) mention that financial products digitalized reduce the reliance on informal credit markets, which are usually restrictive, costly, or discriminatory in nature. They find that digital finance especially enables women business owners by enabling private, autonomous management of monies, and increasing self-employment and household level business entrepreneurship.

There are remaining challenges, however, (Entele, 2019) explains that digital illiteracy, scarcity of agent networks in rural and remote places, and regulatory limitations hinder the scalability and impacts of FINTECH services. The majority of entrepreneurs are still limited by poor internet connectivity and low levels of trust in digital systems, which limits the full potential of FINTECH to entrepreneurship stimulation. As a general rule, evidence points to the fact that FINTECH encourages entrepreneurship and effects vary by population and urban-rural location. Informal finance, such as *Iddir*, also plays a vital moderating role to strengthen the FINTECH-entrepreneurship nexus.

Mobile payments and Entrepreneurship

Evidence from Sub-Saharan Africa shows that mobile payment systems are crucial in helping to support new businesses by decreasing the cost of doing business, providing greater access to money when needed, and offering aid to small business owners. In two separate studies that used data collected over time (from 2007-2018) from Kenya (Jack & Suri, 2014; Suri, 2017), the authors demonstrated the impact of mobile money systems on the ability of households to create and expand their businesses by facilitating quicker payment methods, greater sharing of risks, and more potential to save money, thereby freeing up family labour for to create non-agricultural business.

Using data from East Africa (Koomson, Martey, et al., 2023) showed the same effect when evaluating the effect that mobile money had on Kenyan, Tanzanian, and Ugandan

small business entrepreneurs, pointing out the importance of saving and providing mobile money credit through a bank; this way mobile money established an indirect link to entrepreneurship activity. According to (Moyi, 2019) Mobile Financial Services improved the likelihood of becoming self-employed due to reducing barriers to becoming entrepreneurs. (Aker & Wilson, 2013) and (Beck et al., 2018) illustrated the positive effect of mobile payment systems on the operations of small businesses (e.g., micro and informal) by: increasing market participation; decreasing cash-handling risks; and increasing financial links between small businesses and other firms. As a result, research shows that mobile payments are an enabling financial innovation that facilitates entrepreneurship in areas where access to formal banking is limited.

Table 2.1 Summary of Empirical Literature

Theme / Focus	Key Studies	Outcome	Observed Effect	Key Insights
FINTECH & Household Consumption	Yang & Zhang (2022); J. Li et al. (2020); Jiaping Zhang et al. (2021); Debao Hu et al. (2023); Wei Jiang et al. (2024); Luo, Sun & Zhou (2022); Huang et al. (2023)	Household consumption, inequality, consumption upgrading	+	Positive effects across all studies; stronger for low-income, rural, less financially literate households; traditional financial infrastructure amplifies effects.
Mobile Payments & Rural Households	Yang et al. (2022); Riley (2018); Jiaping Zhang et al. (2021); W. Wang & Y. Yan (2025)	Rural consumption, consumption smoothing	+	Smooths consumption during shocks; boosts economic well-being; effect mediated by convenience and access.
Financial Inclusion & Entrepreneurship	Ajide (2020); Fan & Zhang (2017); Fareed et al. (2017); Kedir & Kouame (2022); Iyabo Olanrele (2025); Shadreck Matindike & Stephen Mago (2022)	Entrepreneurship (formal & informal)	+/-	Generally positive for formal entrepreneurship; gaps remain in informal sector and specific regions; women benefit but face barriers.

FINTECH & Entrepreneurship	Xu et al. (2024); Ozili (2023) ; Kedir&Kouame (2022)	Entrepreneurial activity, especially farmers	+	Alleviates credit constraints, reduces information barriers; mostly fosters survival entrepreneurship among low-income and less-educated households.
<i>Iddir</i> mechanisms moderating FINTECH– Entrepreneurship relationship	Alemayehu (2024); Aredo (2010); Dercon et al. (2005); Gugerty (2007); Beck et al. (2009); Karlan&Zinman (2010)	Risk-sharing, improved access to finance and entrepreneurial activity , and social support	+	<i>Iddir</i> leverages social capital and informal finance to support entrepreneurship and digital financial inclusion
Digital Finance, Economic Growth & Welfare	Ekmen & Karatepe (2024); Demirgüç-Kunt et al. (2022); Chakrabarty & Mukherjee (2021); Xia Li et al. (2011)	Household consumption, economic growth, welfare	+	Enhances consumption and growth; effects vary by income, gender, and region.
Gender & Digital Finance	GSMA (2019); Kedir & Kouame (2022); Ozili (2023)	Women’s access, entrepreneurship, mobile usage	+/-	Persistent gender gap; bridging it improves entrepreneurship and financial inclusion; women face barriers in access and adoption.

The table highlights a consistent positive relationship between FINTECH, digital financial services, and household-level economic outcomes, with especially strong benefits for low-income, rural, and underserved populations. Informal finance like *Iddir* complements formal systems by providing social protection and risk-sharing. Persistent gaps remain in gender and informal sector inclusion, suggesting that policies promoting equitable access, digital literacy, and supportive infrastructure are critical for inclusive economic development.

2.3 A Summary of Key Literature Gaps

In spite of increasing demand for understanding the nexus between financial technologies, financial inclusion, and household well-being, literature gaps are substantial, especially in low-income economies such as Ethiopia. Most existing studies based on middle-income or Asian nations, e.g., China, India, or Ghana, are infrequently addressing specific socioeconomic and institutional contexts of Sub-Saharan Africa. There is very little micro-level evidence from Ethiopia on the effects of various financial services like mobile payments, saving, credit, insurance, and bank account ownership on entrepreneurship as well as household expenditure. The majority of the studies treat financial inclusion as one variable without distinguishing between formal and informal channels or examining the effect of mobile-based financial technology separately, despite its prevalent use in low-income settings.

Moreover, most research focuses on individual factors education, gender, or location alone, without seeing the interplay between them, or how they operate towards affecting financial behaviour and outcomes. Social support institutions like *Iddir*, which are significant avenues of social risk-sharing and trust within Ethiopia, would be likely to be overlooked, even if they complement or moderate financial technology effects on consumption and entrepreneurship. In addition, while financial technology is determined to reduce the cost of transactions and ease credit constraints, minimal analysis is available that addresses its effect on marginalized groups like women, the youth, and informal workers, or accounts for issues like digital literacy, trust, and poor infrastructure.

Another significant gap is that there is limited prior research that investigates how financial technology and informal institutions in combination affect entrepreneurship,

particularly across different household forms and urban-rural areas. Most of the prevailing analysis is macro-oriented and fails to account the broader social and institutional context. As the mixed and inconclusive findings released in the literature, there exists a clear need for further precise, context-focused, and integrative studies to improve better comprehension of financial technology and formal and informal financial inclusion on household consumption and entrepreneurial activity in Ethiopia.

2.4 Research Hypotheses

Building on behavioural theories , such as the pain of paying theory (Zellermayer, 1996), conditioning theory (Feinberg, 1986; Meyll & Walter, 2019), and double-entry mental accounting (Prelec & Loewenstein, 1998), this study recognizes that using mobile payments make spending less noticeable and simplify the convenience of consumption in the mind. Technologically, the Diffusion of Innovations theory(Rogers, 2003) explains diffusion of financial technology on the basis of relative advantage, simplicity, and ability to overcome barriers to financial access. Schumpeter's theory of innovation (Schumpeter, 1934)similarly explains how innovative new technology is able to transform entrepreneurial activity and economic organization, although in Ethiopia financial technology complements rather than disrupts traditional systems like *Iddir* (Dercon et al., 2005).

H1: Mobile payment is significantly and positively associated with household consumption.

This hypothesis is based on behavioural theories that detail the effects of consumption via digital payment systems. Conditioning Theory (Feinberg, 1986; Meyll & Walter, 2019) outlines how continually experiencing a stimulus alongside a positive behaviour, will change a behaviour. Mobile payments are both easy and fast; mobile payments create a positive reinforcement loop whereby households spend more often. In tandem to the preceding paragraph, Pain of Paying Theory (Shah et al., 2016; Soman, 2001; Zellermayer, 1996) explains that spending cash is painful leading to decreased consumption. Mobile payments can diminish the pain by distorting payment, where it becomes less tangible to spend, and purely psychological payment pain is lessened. Functionally, as here from the model proposes, these theories are modelled with variables such as mobile payments usage, financial literacy, distance to nearest financial

institutions, and socio-demographics about household heads. This suggests that FINTECH reduces transaction frictions after consumption decisions, thereby supporting cost saving.

H2: Financial inclusion is positively and significantly associated with household consumption.

This hypothesis uses the DOI Theory (Rogers, 2003) to explain how diffusion in the spread of innovations in a given population affects behaviour. In this case, the financial inclusion innovations-which include formal financial products, like savings, credit, and insurance-are adopted by households to enhance their financial management and increase access to such resources. According to the Diffusion of Innovation (DOI) Theory, factors such as perceived relative advantage, compatibility with existing practices, and ease of use foster broader access to financial services.

Operationally, in this study, the channels through which financial inclusion influences household consumption are proxied by a set of variables that include owning a bank account, access to savings, borrowings and insurance, financial literacy, distance to the nearest financial institution, and socio-demographic characteristics of household heads. These variables reflect the extent to which households have adopted financial innovations and hence are able to exploit these opportunities to smooth consumption and manage economic uncertainties. Empirical studies support this link by showing that households with access to more formal finance can maintain more stable consumption patterns, especially in the face of shocks (Allen et al., 2016; Demirgüç-Kunt et al., 2018; Jack & Suri, 2014).

Operationalizing DOI Theory through these variables, the study links theoretical adoption mechanisms with measurable household behaviours that justify the expected positive association between financial inclusion, as measured by account ownership, savings, borrowings, and insurance, and household consumption.

H3: Gender, residence (Urban/Rural), education, and age moderate the combined effect of mobile payment and financial inclusion on household consumption.

This hypothesis draws from both behavioural economics theories, namely, Conditioning Theory, Pain of Paying Theory, and Double-Entry Mental Accounting, and technological perspectives such as the Diffusion of Innovation Theory by Rogers (2003). While behavioural theories explain how financial technology and financial inclusion lower transaction friction and psychological barriers, hence fostering consumption, technological theories focus on issues of adoption dynamics, relative advantage, and perceived ease of use.

In this study, the combined effects is operationalized through mobile payments, access to savings, credit, and insurance, financial literacy, distance to the nearest financial institution, and socio-demographic characteristics of household heads. It also finds evidence that the impacts of financial technology and financial inclusion are stronger in urban areas because of better infrastructure (Huang et al., 2023; J. Luo & Li, 2022), are heterogeneous across regions (W. Jiang et al., 2024; X. Yang et al., 2022), higher for younger households, increasing with the rise in educational levels (J. Li et al., 2020; Wu & Peng, 2024; X. Yang et al., 2022), and lower for female-headed households (Aker & Wilson, 2013; Demirgüç-Kunt et al., 2018; Ghosh & Vinod, 2017). This integrated framework captures how socio-demographic factors moderate the combined influence of FINTECH and financial inclusion on household consumption.

H4: Financial inclusion has a positive and significant influence on household-level entrepreneurship, leading entrepreneurial choices to increase.

This hypothesis is based on Diffusion of Innovation Theory (Rogers, 2003), which provides insight into the manner in which innovations diffuse through populations and, in turn, come to alter behaviour. Within this context, financial products such as savings, credit, and insurance are innovations that are adopted by households to reduce financing constraints and promote entrepreneurial activities. Access to capital and risk-mitigating mechanisms, provided by financial inclusion, allows households to invest in productive activities and seize entrepreneurial opportunities. By linking DOI Theory to measurable

financial inclusion indicators, the study demonstrates how access to financial services facilitates entrepreneurship and shapes household-level entrepreneurial choices.

H5: Financial inclusion for households in Ethiopia is improved positively and significantly through the adoption of mobile payment.

This hypothesis is based on the Diffusion of Innovation Theory, developed by (Rogers, 2003) to describe the process by which innovations are spread within a population and the methods of influence on adoption behaviour. Mobile payments fall under financial innovations, purportedly enjoying the advantage of easing access barriers to formal saving, credit, and insurance services. By providing an easy and accessible way of conducting financial transactions, financial technology facilitates household participation in formal financial systems and, therefore, increases the likelihood of adopting financial services.

The variables put forward to operationalize the adoption of financial technology in this study are mobile phone use for bill payments, financial literacy, distance to the nearest financial institution, and socio-demographic characteristics of household heads. Major obstacles to formal financial participation are captured in a series of variables that show how households overcome such challenges to increase their access to savings, credit, and insurance. Such an operationalization clearly presents the pathway through which the adoption of FINTECH increases financial inclusion within the Ethiopian context.

H6: Mobile payment has a positive and significant influence on household entrepreneurship, and the influence is moderated by institutions of informal finance such as *Iddir*.

Iddir's moderating role is now grounded in Social Capital Theory, which purports that trust, reciprocity, and social networks strengthen cooperation in accessing financial opportunities. (Thomas et al., 2024; Walle, 2023) also pointed out that in the Ethiopian context; *Iddir* represents a dense network of social capital, which is essential for building trust and encouraging collective responsibility. These are mechanisms that help increase the adoption and productive use of digital finance. According to (Aredo,

2010), *Iddir* operates to provide informal insurance and mutual assistance to sustain economic resilience through solidarity.

(Alemayehu, 2024a) has taken a step further and demonstrated how *Iddir* is evolving to become a hybrid social enterprise by connecting traditional mutual support with new emerging financial innovations. The complementary roles of *Iddir* to mobile payment involve embedding digital tools within trusted social structures, where *Iddir* enhances entrepreneurial engagement and financial inclusion (Girma & Huseynov, 2024; Haroun & Yusoff, 2025). This theoretical synthesis positions *Iddir* as a trust-based moderating institution that promotes the mobile payment and entrepreneurship relationship through embedded social capital rather than direct reinforcement.

2.5 Research Implications

From a critical analysis of the literature, this study summarizes some of the common research implications of the contributions of mobile payment and financial inclusion, particularly in relation to affecting entrepreneurship and household spending. Worth mentioning is the fact that the influence of mobile payment on financial inclusion is not uniform across financial services; it affects it differently depending on specific activities such as saving, borrowing, insurance, or having an account. This requires the use of disaggregated measures of financial inclusion in empirical frameworks to identify the marginal effect of mobile payment. Regional, socioeconomic, and demographic conditions also influence the usage and availability of mobile phone technology. Hence, research at the national level such as this research in all nine regional states and two city administrations of Ethiopia becomes unavoidable to unearth such spatial and contextual heterogeneities.

Notably, the work contributes to the growing literature on mobile payment and financial inclusion's influence not just on formal entrepreneurship but also on household entrepreneurship. Digital finance access can potentially lower the entry cost for low-end as well as informal entrepreneurs, primarily in rural or underserved regions. At the household level, mobile payment and financial inclusion play a crucial role in providing consumption smoothing, asset building, and insurance against economic shocks, all of which lie at the center of gains in long-term well-being. Through promoting greater

access to credit, saving instruments, and payment systems, mobile payment can contribute towards improving the management of finances at the household level and facilitate households to build home-based businesses. These impacts are particularly pertinent to women, the youth, and poor households that are otherwise confronted with structural limitations in traditional financial systems.

For policy-makers, the results provide guidance in the establishment of inclusive and regionally oriented financial policy conducive to household consumption as well as entrepreneurship. For financial institutions and mobile phone technology innovators, the study highlights the importance attached to context-specific innovations that extend to excluded groups of individuals and generate sustainable economic activity. In academic literature, the study advances knowledge of the detailed role of mobile payment and financial inclusion on household consumption behaviour and entrepreneurial choices through household-level findings within a broader structural and regional context.

2.6 Conceptual Model

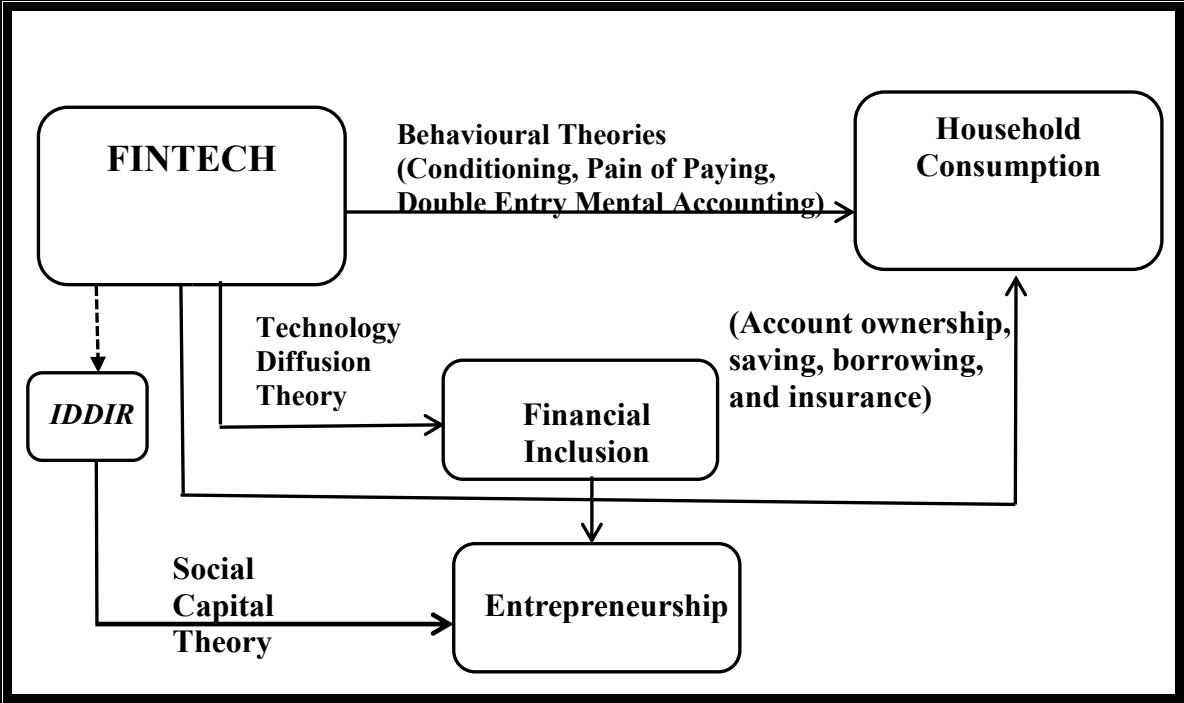


Fig. 2.2 Conceptual Model

The various relationships identified within the conceptual framework are guided by specific theories that have been operationalized. Conditioning Theory, Pain of Paying Theory, and Double-Entry Mental Accounting Theory explain how FINTECH affects household consumption through reduced payment friction, shaping of spending habit, and mental accounting, respectively. The Diffusion of Innovation Theory supports the pathways from FINTECH adoption to financial inclusion, and then from financial inclusion to consumption and entrepreneurship, in terms of perceived advantage, compatibility, and ease of adoption that influence technology adoption. Finally, *Iddir* is supported to moderate the FINTECH–entrepreneurship relationship through Social Capital Theory, which is operationalized here in terms of trust, reciprocity, and community networks that are beneficial to both digital financial services adoption and entrepreneurial engagement. In this way, the conceptual framework becomes one that is theoretically grounded and empirically testable rather than merely illustrative.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Philosophy

This study adopts a positivist research paradigm, which assumes that reality exists independently of human perception and can be objectively identified, measured, and quantified (Bryman, 2016; Creswell, 2018; Saunders et al., 2003). Empirical evidences and objective facts are used in empirical observation by positivism to find patterns, formulate hypotheses, and identify cause-and-effect relationships (Kothari, 2004). This philosophical stance supposes that adoption of FINTECH, financial inclusion, entrepreneurship, and household consumption, as social phenomena, could be researched similarly to natural sciences through systematic observation and measurement (Bryman, 2016; Creswell, 2018) .

To be a positivist in approach supports the quantitative research methodologies employed within this research that employ statistical modelling and econometric analysis of existing data (Bryman, 2016; Creswell, 2018; Saunders et al., 2003). Positivist research methodologies provide strict procedures to investigate and measure cause-and-effect relationships and associations between study variables of interest and enable practitioners' bias to be managed through standardized data collection and analytic procedures(Johnston, 2014). In the country of Ethiopia where the study is currently being conducted, the positivist paradigm can be used to examine quantifiable, observable instances of digital financial services and economic activity at the household level (Bryman, 2016; Cresswell, 2014).

Using nationally representative survey data and advanced econometric specifications, this research seeks to produce objective and generalizable findings that guide theory and policy making(Johnston, 2014; Kothari, 2004). Positivist philosophy in most cases guides the methodological framework in this research to enable scientific and systematic examination of the effect of FINTECH uptake and financial inclusion on entrepreneurship and consumption patterns.

3.2 Research Approach

This study employs a deductive method that begins with the development of broad theoretical models and hypotheses from an extensive reading of the existing literature on mobile payment, financial inclusion, entrepreneurship, and household consumption. Deriving specific hypotheses from these given theories and previous empirical findings deductively is the deductive method. The empirical study is guided by testable hypotheses. Second, the research utilizes nationally representative and richly collected secondary data from the Ethiopian Socioeconomic Survey (ESS4) for empirically testing these hypotheses (Johnston, 2014).

By adopting such a methodology, the research has a step-by-step progression from the general and abstract concepts and hypothesized relationships to the specific and concrete observable data and measurable results. This allows for systematic testing of the relevance and validity of hitherto existing theories to the Ethiopian context, i.e. the influence of mobile payment and financial inclusion on entrepreneurship and consumer consumption behaviour (Bryman, 2016; Creswell, 2018).

Deductive research approach is in line with the positivist research tradition, in which objectivity, replicability, and empirical testing through measurement are highlighted (Saunders et al., 2003). Positivism supports the application of quantitative research approaches in which variables are measured and compared against one another through the application of statistical and econometric techniques. This is a paradigm particularly well-suited to this study since it aims to test or falsify theoretical statements on the basis of observable and quantifiable phenomena as represented in the ESS4 dataset (Bryman, 2016; Creswell, 2018). Employment of deductive logic and positivist philosophy ensures a systematic and rigorous research process with the potential to yield credible and generalizable findings (Kothari, 2004).

3.3 Research Design

The research applied a quantitative research methodology to examine the role of mobile payment and financial inclusion on six significant dimensions: First, the influence of mobile payment on household consumption; second, the influence of financial

inclusion on household consumption; third, combined influence of mobile payment and financial inclusion on household consumption by addressing age, gender, urban/rural, education, and regional heterogeneity; fourth the influence of financial inclusion on entrepreneurship; fifth, the influence of mobile payment on financial inclusion; and finally sixth, the influence of mobile payment on entrepreneurship. This study design enables identification of cause-and-effect relationships through systematic information and strong econometric models (Kothari, 2004; Saunders et al., 2003).

Secondary data analysis is applied in the study, a common social science research practice whereby a large-scale survey database is analysed (Johnston, 2014). The study drew exclusively from the World Bank's analysis of the Ethiopian Socioeconomic Survey (ESS4) in combination with Ethiopia's Central Statistical Agency. The data is rich in nationally representative household-level information on digital technology usage, financial conduct, and socioeconomic outcomes. A time dimension cross-section was assumed, based on one wave of the ESS4 data to observe household financial processes at a point in time. This captures the intensity of financial behaviour and financial outcomes at one time point (Saunders et al., 2003).

To estimate the relationships as required, several econometric techniques were employed. The role of mobile payment adoption on entrepreneurship, which is constructed as a dummy variable to reflect whether the household engages in a trading business, was estimated via a univariate probit model. A multivariate probit (MVProbit) was defined in order to estimate the influence of mobile payment on certain measures of financial inclusion, i.e., bank account holding, formal saving, formal lending, and formal insurance, while controlling for correlation between these binary outcomes. The same MVProbit model was also employed to examine the role of financial inclusion indicators on various household-level entrepreneurship outcomes which include owning a trading business, owning a non-agricultural business, owning a bar or restaurant, and owning professional offices. For consumption at a household level, a quantile regression was also specified to capture heterogeneous influence of mobile payment and financial inclusion on the entire distribution of consumption. Finally, analysis of heterogeneity applied the method of quantile regression to analyze how the influence of mobile payment and financial inclusion differ by age, gender, education,

urban/rural and region. The approach helped to uncover whether and how the effect differed across different socio-demographic populations, and yielded more policy-informed results.

3.4 Data Source

3.4.1 Ethiopian Socioeconomic Survey Wave 4 (ESS4)

Data for the analysis were accessed from the 2018/2019 Ethiopian Socioeconomic Survey, Wave4 (ESS4), available on the World Bank's Micro Data Library <https://microdata.worldbank.org/index.php/catalog/3823>. Due to restrictions on access to data, the original dataset of ESS4 is not presented in this paper. The dataset is, however, available for public use after registration at the World Bank Micro Data Library. ESS4 is a national representative household survey that was jointly conducted by the World Bank and Central Statistics Agency (CSA) of Ethiopia as part of the overall Living Standards Measurement Study (LSMS) program with the objective of gathering detailed information on household welfare, socioeconomic conditions, and livelihoods.

The ESS4 sample design uses a two-stage stratified sampling technique, which is spread over a total of 565 Enumeration Areas (EAs), consisting of 316 urban and 249 rural. The initial plan was to interview some 7,527 households from these EAs. However, due to the security reasons, the household module was not conducted in 30 EAs, and hence the final sample size was 6,770 households in 535 EAs for which both household and agricultural data were collected successfully.

ESS4 is an extremely rich multi-dimensional dataset covering a number of the dimensions in this study, including household demographic information, economic activities, financial access and entrepreneurship, consumption, and technology use. Operating with this dataset allows for stringent empirical analysis based on nationally representative and high-quality data, which renders research outcomes generalizable to the overall Ethiopian population.

3.4.2 Sampling and data cleaning

In order to ensure the validity and reliability of the empirical exercise, the sample was filtered to derive household heads with complete and valid information on variables of prime interest, i.e., mobile payment, financial inclusion indicators, entrepreneurship status, and household consumption. Missing value cases were dealt with in a systematic manner by using the relevant imputation methods: for continuous variables, mean imputation was used to fill in missing values, and for binary variables, mode imputation was used. In general, the imputation rate among variables was below 5%, a commonly considered cut-off in quantitative research that guarantees the reduction of bias and maintenance of data quality (Graham, 2009; Little & Rubin, 2019).

Observations with extreme or structurally missing data particularly on important dependent or independent variables were excluded from the ultimate data set so as not to cause distortions in the analysis. Additionally, rigorous diagnostic processes were executed to identify and remove extreme outliers that will heavily influence the estimation outcomes. These filtering steps of the data were done to enhance the validity as well as the robustness of the results.

In the data of the ESS survey, data was obtained at two levels: individual-level information (e.g., demographic attributes, individual opinions, etc.) and household-level information, often supplied by the selected household head. Because the main unit of analysis in this research was the household head, suitable individual-level information must be merged with the dataset of household level.

This was achieved by performing a many-to-one merge using the Stata software. In this, multiple individual records (many) were matched to one household head record (one) on the basis of a common household identifier. This added each household head's data with corresponding details from other household members without compromising attention on the household head as the focus analysis unit.

After these treatments, the resulting analytical sample is 4,498 (66%) household observations (from a total of 6,770 observations) that are still substantial and representative of the intended population in Ethiopia by the Ethiopian Socioeconomic Survey (ESS4). The duly cleaned and processed sample forms the foundation of all econometric analyses in this study and allows for positive inferences on the inter-linkages between mobile payment, financial inclusion, entrepreneurship, and household consumption.

3.5 Variables

3.5.1 Dependent variable

Consumption Quantile is a dependent variable of Simultaneous Quantile Regression (SQR) model and log consumption is a dependent variable of OLS model. Due to the probable non-normality of the dependent variable of OLS model, it was transformed to logarithms in the regression. In the process, the probable outliers were treated in the sense that 9 upper outliers and 3 lower outliers were discarded.

Entrepreneurship refers to the process of discovering, generating, and engaging in business opportunities to start and grow new ventures. In general terms, entrepreneurship can be viewed as the creation of something new with value, wilfully expending time and effort, accepting the financial, social and personal risks for financing the venture, and reaping the associated direct and indirect rewards (Chakuzira et al., 2024) . In this study, entrepreneurship is operationalized as self-employment, with emphasis on either owning or co-owning a micro-, small, and medium-scale enterprise. This aligns with previous literature that has used self-employment as a proxy for entrepreneurship, especially in developing countries where most enterprises are at the informal and micro levels(Davis et al., 2023; Fareed et al., 2017).

Entrepreneurship is measured as a binary variable indicating whether the household head owns or co-owns a small, medium, or microenterprise, capturing household-level entrepreneurial activity. The ESS4 data include yes/no questions to the household if they had owned a trading business, bar/restaurant, non-agricultural business, or professional office in the preceding 12 months. Entrepreneurship is handled as a binary

variable in which it takes the value 1 if the household possesses any of these businesses and 0 if not.

They are referred to by (A. Kedir & Kouame, 2022) as those who own their respective firms. Entrepreneurship is again a dependent variable in the univariate probit model, operationalized as self-employment, i.e., owning or co-owning of a micro or small or medium firm (Fareed et al., 2017). There are yes and no responses in the ESS4 data that ask whether the households had a trading business in the previous 12 months. Entrepreneurship is a binary variable and takes the value of 1 if the household has trading businesses and 0 otherwise.

Financial inclusion is a multidimensional concept: people's access to and the usage of formal financial services. Financial inclusion has normally been measured based on some proxy indicators such as bank account ownership, formal savings, formal borrowings, and formal insurance. (Demir et al., 2022; Gosavi, 2018) highlighted that these different dimensions bring about an increase in affordable access to financial resources, and thus they contribute to reducing inequality in the distribution of income and support economic development. On one hand, formal financial inclusion decreases poverty and facilitates the use of digital financial services. All these different measures together give the complete understanding of how individuals interact with the formal financial system. Financial inclusion measures are considered a binary variable, where 1-if household head possesses bank account, has formal savings, borrowings, and insurance products, and 0 otherwise (ESS4)

3.5.2 Key explanatory variable

The variables of interest in the simultaneous quantile regression model are financial technology, financial inclusion and *Iddir*. Financial technology is measured by mobile phone to pay bills (Demir et al., 2022; A. Kedir & Kouame, 2022) and financial inclusion measured by bank account, formal saving, formal borrowing and formal Insurance (Demir et al., 2022). Financial technology and financial inclusion are closely linked, particularly in enhancing access to financial services in emerging markets. Financial technology adoption is often measured by the use of mobile phones for bill payments, reflecting the uptake of digital financial services that reduce barriers to

formal financial participation (Demir et al., 2022; A. Kedir & Kouame, 2022). Mobile money and other digital platforms facilitate low-cost, accessible financial transactions, supporting entrepreneurship and income-generating activities, especially among underserved populations (A. Kedir & Kouame, 2022). Financial inclusion, in turn, is typically measured through proxies such as bank account ownership, formal savings, formal borrowings, and formal insurance, which indicate individuals' engagement with formal financial systems and their ability to manage financial risks (Demir et al., 2022). Together, these measures illustrate how mobile payment can enhance financial inclusion, promote economic empowerment, and contribute to more equitable income distribution. Region is used as regional dummy in an attempt to observe the difference between regions in looking at the influence of mobile payment and financial inclusion on consumption.

Under the multivariate probit model, financial inclusion is the main explanatory variable employed to examine its effect on various household-level entrepreneurial activities, including operating a trading business, owning a non-agricultural business, owning a bar or restaurant, and owning professional offices. Financial inclusion is used and measured by applying financial indicators such as savings, borrowings, account ownership, and insurance (Adera & Abdisa, 2023; Asuming et al., 2019; Irankunda & Van Bergeijk, 2020). The ESS4 questionnaire asked respondents if they had utilized the following service: formal borrowing, formal savings, formal insurance, or bank account ownership. If Households responded 'Yes' to any of the questions below, they are financially included. Financial inclusion is normally segregated as formal financial service use and access.

Formal financial services are those provided by conventional banks and other formal financial services (A. C. Lyons et al., 2022). To study the influence of financial inclusion on entrepreneurship, financial inclusion is measured as having accessed at least one formal financial service, i.e., bank account, formal savings, formal borrowing, or formal insurance during the previous 12 months. Financial Inclusion Index was thus created using these four binary indicators (Refer to Appendix D). Every one of the indicators is coded 1 if 'yes' and 0 otherwise. The index is built by employing logical OR functions in stata 15 statistical software with a value of 1 if the

household responded 'yes' to any of the indicators (inclusion) and 0 if the household responded 'no' to any of the indicators (exclusion). The index provides a summary of financial inclusion. The most significant independent variable is the use of FINTECH, which is proxied using mobile payments for financial transactions in the univariate probit model for estimating the influence of FINTECH on entrepreneurship proxied by having trading business.

3.5.3 Moderating Variable

In Ethiopia, *Iddirs* (traditional mutual-aid societies) function as an intermediary moderator in the relationship between FINTECH and entrepreneurship through the provision of informal insurance, social safety nets, and community credit that enhance household resilience and promote entrepreneurial risk-taking activities (Alemayehu, 2024b; Aredo, 2010; Baron, 2025; Dercon et al., 2005; Gugerty, 2007). Such institutions act in a complementary function to formal financial systems, where banks and other formal providers leave gaps that can be filled by mechanisms of community finance, able to co-evolve with digital financial innovations in mobile payments or online credit platforms. By leveraging social trust, cooperative norms, and communal support, *Iddir* contributes to lowering transaction frictions, improving access to capital, and fostering the growth of sustainable and inclusive entrepreneurial activities (Beck et al. 2009; Karlan & Zinman 2010).

3.5.4 Control variables

Socio-demographic and economic factors are known in the literature to be key determinants of households' consumption behaviours, financial inclusion outcomes, and entrepreneurial activity. For example, (W. Jiang et al., 2024; J. Li et al., 2020) point to several factors impacting consumption and financial decisions, such as age, sex, level of education completed, marital status, residence (urban/rural), financial literacy (Cole et al., 2011), and household size. These socio-demographic and economic characteristics contribute to the determination of households' ability and willingness to adopt digital financial technologies, manage financial risk, and participate in formal financial systems regarding FINTECH, access to finance and all aspects of financial inclusion. Among these characteristics, household head risk attitude, exposure to financial shocks, and participation in informal community-based associational

memberships as *Iddir*, an informal mediation or insurance mechanism to financially participate and create knowledge about investments in Ethiopia, are also considered in this study. Out of these same characteristics, asset ownership is considered particularly central as it tracks the resource endowment of the household and is anticipated to indeed directly affect both financial inclusion and consumption behaviours (Jappelli & Padula, 2013).

Empirical evidence suggests that demographic factors such as gender, age, education, marital status, family size, residence, and income are fundamental factors that significantly influence consumption behaviour and entrepreneurial engagement (A. Koko & Kachalla Mohammed, 2019; Amha et al., 2015; Backman & Karlsson, 2013; Fareed et al., 2017; Krasniqi, 2009; Nwibo & Okorie, 2013). These factors influence access to finance, social capital, and entrepreneurial opportunities and shape how households engage with FINTECH platforms for business creation and income generation.

Social and cultural factors, including entrepreneurial perception, community networks, and local unemployment levels, further act to mediate the nexus between financial inclusion and entrepreneurship. Consistent with the FINTECH–financial inclusion framework, both demographic and socio-economic features define both the level of mobile financial technologies adoption and their efficiency in fostering inclusive growth and entrepreneurial activity. Although relevant, data limitations could not include psychological and attitudinal factors such as risk perception and personal attitude towards entrepreneurship as factors influencing entrepreneurial activities (OCED, 2016). Overall, putting together demographics, socio-economics, and community variables provides an aggregate view of how FINTECH-driven financial inclusion is translated into increased household capacity for consumption and entrepreneurial activities in Ethiopia.

3.5.5 Variables, Definitions & Measurements

Table 3.1 Variables Summary Table

S. N	Variable Name	Definition	Type	Category	Measurement
1	Entrepreneurship (ENTRP)	Own Trading Business	Binary	Dependent	= 1 if the household own trading business ; = 0 if otherwise
		Own Non-Agricultural Business	Binary	Dependent	= 1 if the household own Non-Agricultural business; = 0 if otherwise
		Own Professional Offices	Binary	Dependent	= 1 if the household own Professional Offices; = 0 if otherwise
		Own a bar or a restaurant	Binary	Dependent	= 1 if the household own a bar or a restaurant ; = 0 if otherwise
2	Financial Inclusion (FI)	Formal Insurance	Binary	Dependent / Independent	=1 if the household head uses formal insurance , 0 if otherwise
		Formal Saving	Binary	Dependent / Independent	= 1 if the household head is saving in any way ,0 if otherwise
		Formal Borrowing	Binary	Dependent / Independent	= 1 if the household head borrowed at least 150 Birr , 0 if otherwise
		Bank Account Ownership	Binary	Dependent / Independent	=1 if the household head opened an account at Formal Financial Institution ,0 if otherwise

3	Household Consumption	Consumption Quantile	Continuous	Dependent	Annual total Consumption divided in to five equal parts. Each Quantile represents 20% of the data.
4	Mobile Payment	Use of mobile phones to access digital financial services such as paying bills	Binary	Independent	=1 if the household uses mobile phone to pay bills=0 if otherwise
5	Informal Finance (<i>Iddir</i>)	Participation in traditional community – based insurance system	Binary	Moderating / Control	=1 if the household head is an <i>IDDIR</i> member =0 if otherwise
6	Household Size (HHS)	The total number of individuals living in the household	Continuous	Control	Number of people living in the household
7	Gender (GDR)	Gender of the household head	Binary	Control	=1 if the individual in the household is male =0 if the individual in the household is female
8	Marital status (MART)	Whether the household head is married or not	Binary	Control	=1 if the household head is married =0 if otherwise (single, divorced, widowed, separated)

9	Age (AG)	The age of the household head	Continu ous	Control	The age of the household head between 17 to 99
10	Education (EDU)	Whether the individual in the household has some education level	Binary	Control	=1 if the household has attended any school =0 if otherwise (no schooling at all)
11	Financial Capability (FINCAP)	Household's ability to manage financial matters like borrowings	Binary	Control	=1 if the household try to borrow & was turned down in the last 12 months=0 if otherwise
12	Religion (RLG)	Religion of the household head	Binary	Control	= 1 if the household is Christians and others = 0 if Muslims
13	Asset Ownership (AOWN)	whether the household owns financial assets	Binary	Control	=1 if the household head owns a financial asset = 0 if otherwise
14	Mobile Phone Ownership (MPOW)	whether a household owns a mobile phone	Binary	Control	= 1 if the household owns mobile phone = 0 if otherwise
15	Saving for Old Age (SOAG)	whether a household actively saves money for retirement or old age	Binary	Control	= 1 if the households saves for the old age , = 0 if otherwise

16	Annual Consumption (logANCON)	A logarithm of the household's total annual consumption expenditure.	Continuous	Control	Total annual food and non-food consumption
17	Financial Literacy (FLT)	Reflects basic financial knowledge and familiarity with formal financial institutions	Binary	Control	=1 if the household head knows how to open bank accounts , 0 if otherwise
18	Urban - Rural Residence (RSD)	whether a household or individual resides in an urban or rural area	Categorical	Control	=1 if the household head lives in Rural area, 0 if the household head lives in Urban area
19	Financial shock (FINShock)	an unexpected and adverse event that negatively affects a household's economic situation	Binary	Control	= 1 if the household head is worried about being able to cover unexpected expenses, 0 if otherwise
20	Distance to the nearest Financial Institutions (DIST)	physical proximity to the closest formal financial service provider	Continuous	Control	The number of kilometers covered

21	Region (RG)	first-level administrative unit within Ethiopia	Categor ical	Control	To measure heterogeneity in use of FINTECH and Financial Inclusion for promoting consumption
Source: Ethiopian Socio-economic Survey 2018/ 2019(Wave 4)					

3.6 Econometric Model Specification

This thesis utilizes different econometric models to analyse the role of mobile payment adoption and financial inclusion on household consumption and entrepreneurship in Ethiopia. The models are utilized depending on the type of dependent variable and whether the results are interdependent or not. The particular strategies are described below:

To analyse the influence of mobile payment and financial inclusion on household consumption, a quantile regression strategy is primarily applied. It allows for the estimation of the association at different points along the consumption distribution (i.e., among low, median, and high-consumption households) and hence provide a richer description than mean-based specifications. For comparison, a simple Ordinary Least Squares (OLS) regression is also presented. While OLS provides the average effect, quantile regression provides distributional heterogeneity and hence better fits this study.

To quantify the influences of financial inclusion on different forms of entrepreneurship, a multivariate probit (MVProbit) model is used. Entrepreneurship is defined by four mutually exclusive groups: (i) owning a trading business, (ii) owning a non-farm business, (iii) owning a professional office, and (iv) owning a restaurant or bar. Entrepreneurial outcomes are estimated simultaneously in order to allow the potential unobserved heterogeneity to be operating on more than one outcome. A univariate probit is then run, but the MVProbit is employed since it can account for correlation in the binary responses and enable joint estimation better.

To test the influence of mobile payment on various facets of financial inclusion, the multivariate probit (MVProbit) model is again employed. The dependent variables are four dummy variables: (i) bank account ownership, (ii) formal savings, (iii) formal borrowing, and (iv) formal insurance. The MVProbit model is preferred instead of separate probit models since it accounts for the likely correlation between these financial behaviours, in response to evidence that household makes such decisions simultaneously.

To quantify the influence of mobile payment on entrepreneurship, and the moderation role of *Iddir* (community-based informal insurance), a univariate probit model is estimated. Entrepreneurship is represented using a dummy variable (business ownership) and mobile payment is the main regressor. An interaction term between mobile payment and *Iddir* membership is introduced to verify whether *Iddir* strengthens the relationship between mobile payment and Entrepreneurship. The existence of such interaction is used to reveal the complementary role demonstrated by informal finance in raising the efficiency of mobile payment to improve entrepreneurship. Control variables are also added to all models as controls, such as household income, education, age, gender, household size, and urban/rural. Standard errors are also clustered at the regional level where necessary. Regional dummies are brought into control geographic variation and fixed regional effects.

This thesis employs four empirical models. The model specifications are given below.

Model1: A Simultaneous Quantile Regression Model to estimate the role of mobile payment and Financial Inclusion on Household Consumption

To provide an estimate of the influences of mobile payment and financial inclusion on household spending, a quantile regression is employed as a primary estimation approach, while ordinary least squares (OLS) is used to test the robustness of the results. In quantile regression, the conditional quantile of the dependent variable is estimated rather than the conditional mean of the dependent variable in ordinary least squares regression (Koenker & Bassett, 1978). The estimation employs different quantiles, i.e., lower (10th, 20th, 30th), middle (40th, 50th, 60th), and upper (70th,

80th, 90th) percentiles. Quantile regression is less vulnerable to the outliers in the dependent variable since it considers other characteristics of the distribution instead of the mean. The initial quantile regression model for a quantile τ (where $\tau \in (0,1)$) is the quantile of interest

$$Y_i = X_i' \beta(\tau) + U_i(\tau), \dots \dots \dots (1)$$

Where:

- Y_i is the dependent variable, consumption quantile of household head i
- X_i is the vector of explanatory variables,
- $\beta(\tau)$ is the vector of parameters specific to the τ -th quantile,
- $u_i(\tau)$ is the error term, such that the τ -th quantile of $u_i(\tau)$ (conditional on X_i) is zero:

$$Q_{u_i(\tau) | X_i} = 0.$$

Quantile regression estimates the parameters by minimizing the weighted average sum of absolute residuals, as given by :

$$\min_{\beta} \sum_{i: y_i \geq X_i' \beta} \tau | y_i - X_i' \beta | + \sum_{i: y_i < X_i' \beta} (1 - \tau) | y_i - X_i' \beta | \dots \dots (2)$$

Where $\tau \in (0,1)$ represents the quantile of interest.

The third equation include the interaction terms between age, gender, education, and urban-rural with mobile payment and financial inclusion. This equation models how these factors influence household consumption at a specific quantile τ . The quantile regression equation with these interaction effects is provided below:

$$\begin{aligned}
Q\tau(\text{Consumption} | \text{Mobile Payment}, \text{Financial Inclusion}, \text{Age}, \text{Gender}, \text{Urban/Rural}, \\
\text{Education}) = \beta_0(\tau) + \beta_1(\tau) \cdot \text{Mobile Payment} + \beta_2(\tau) \cdot \text{Financial Inclusion} + \beta_3(\tau) \cdot \text{Age} \\
+ \beta_4(\tau) \cdot \text{Gender} + \beta_5(\tau) \cdot \text{Urban/Rural} + \beta_6(\tau) \cdot \text{Education} + \beta_7(\tau) \cdot (\text{Age} \times \text{Mobile} \\
\text{Payment}) + \beta_8(\tau) \cdot (\text{Age} \times \text{Financial Inclusion}) + \beta_9(\tau) \cdot (\text{Gender} \times \text{Mobile Payment}) + \\
\beta_{10}(\tau) \cdot (\text{Gender} \times \text{Financial Inclusion}) + \beta_{11}(\tau) \cdot (\text{Urban/Rural} \times \text{Mobile Payment}) + \\
\beta_{11}(\tau) \cdot (\text{Urban/Rural} \times \text{Financial Inclusion}) + \beta_{12}(\tau) \cdot (\text{Education} \times \text{Mobile Payment}) + \\
\beta_{12}(\tau) \cdot (\text{Education} \times \text{Financial inclusion}) + \\
\epsilon(\tau) \dots \dots \dots (3)
\end{aligned}$$

OLS is also estimated as:

$$Y_i = \beta_0 + \beta_1 \text{MobilePayment}_i + \beta_2 \text{Financial Inclusion}_i + \gamma X_i + \epsilon_i \dots \dots \dots (4)$$

Where Y_i is the dependent variable and measured by Log annual consumption, mobile phone for payment of bills, and $\text{Financial Inclusion}_i$ includes financial inclusion indicators such as formal saving, borrowing, insurance, and account ownership. X_i is a vector of control variables including household characteristics and regional dummies, and ϵ_i is the error term. This model is estimated using OLS and serves as the basis for further analysis.

Quantile regression is justified for this research objective because it takes into account how mobile payment, financial inclusion, and *Iddir* influence consumption at various levels of consumption distribution rather than the mean. Quantile regression is efficient in dealing with skewness in data and outliers and yields more complete information on consumption behaviour heterogeneity (Koenker & Bassett, 1978).

Model 2: Multivariate Probit Model for the Influence of Financial Inclusion on Entrepreneurship Choices

To examine how financial inclusion is related to different types of entrepreneurship choices, a multivariate probit (MVProbit) model is employed. Let Y_{ij} be a binary indicator for whether household head i engages in entrepreneurial activity j :

$Y_{ij}^* = \alpha_j + \beta_j FII_i + \gamma_j X_i + \epsilon_{ij} \dots\dots\dots (5)$ $Y_{ij} = 1 \text{ if } Y_{ij}^* > 0; 0 \text{ otherwise}$

Where ;

Y_{ij}^* is a binary variable indicating whether household head i engages in entrepreneurship type j . Where ;

j_1 = Owns a trading business

j_2 =Owns a non-agricultural business

j_3 = Owns a professional office

j_4 = Owns a bar or restaurant

The financial inclusion index (FII) is constructed in accordance with a logical OR rule across four binary indicators: Bank account ownership, formal savings, formal borrowings, and formal insurance (See Appendix D). A household is said to be financially included if it makes use of one or more of such services, that is, if any one of the four indicators is equal to 1; otherwise, FII is equal to 0. It goes with the World Bank definition of financial inclusion, which considers a person as included if he or she has access to any one formal financial service. Utilizing the OR logic avoids overestimating the extent of inclusion because it does not require people to use more than one service concurrently is something not feasible in most developing economies (World Bank, 2020).

X_i , control variables including demographic and socio-economic factors such as age, gender, marital status, Iddir , financial shock, etc. ; and ϵ_{ij} : error terms, assumed to follow a multivariate normal distribution with zero means and correlated errors.

The MVProbit model is appropriate because entrepreneurship choices (eg. Having trading firm, a non- farm business, a restaurant or bar, or a professional office) are binary outcomes which may be correlated. A household may choose multiple entrepreneurial activities simultaneously, and the latent factors affecting these choices (e.g., risk attitude, capital endowment, or business experience) are likely to be correlated across outcomes.

As opposed to separable Univariate Probit models, MVProbit accounts for this structure of correlation between the error terms (ϵ_{ij}) and jointly estimates the probability of numerous entrepreneurship outcomes. Joint estimation improves the efficiency of the estimate and avoids skewed outcomes produced by the exclusion of cross –equation correlations (Cappellari & Jenkins, 2003; Chib & Greenberg, 1998).

Model 3: Multivariate Probit Model for the Influence of Mobile Payment on Financial Inclusion Indicators

To examine the influence of mobile payment on financial inclusion outcomes, a Multivariate Probit (MVProbit) model is estimated where the dependent variables are binary indicators for four financial inclusion outcomes:

$$F_{ij} = \alpha_j + \beta_j \text{ Mobile Payment}_i + \gamma_j X_i + \epsilon_{ji} ; \quad j=1,2,3,4 \dots\dots\dots(5)$$

Where:

- F_{ij} is a binary variable indicating household i 's likelihood of financial inclusion in dimension j
 - FI1: Bank account ownership
 - FI2: Formal saving
 - FI3: Formal borrowing
 - FI4: Formal insurance
- Mobile Payment_i is a binary for mobile phone payment
- X_i is a vector of household controls (age, education, gender , household size, etc)
- ϵ_{ji} are jointly normally distributed error terms
- The observed outcome $F_{ij}=1$ if $F_{ij} > 0$, and 0 otherwise.

The MVProbit model is mainly appropriate because financial inclusion is a multi-dimensional phenomenon in which the four results (Ownership of a bank account, saving, borrowing, and insurance) are strongly likely to be interdependent. For example, individuals who own a bank account are more likely to engage in formal saving or obtain access to credit, and these financial decisions are inherently interdependent (Cappellari & Jenkins, 2003; Chib & Greenberg, 1998). A univariate probit model for each dimension would be disregarding such correlations and could even lead to biased and inefficient estimator. The MVProbit procedure allows us to test the differential effect of mobile payments adoption on all the dimensions of financial inclusion while being controlled for the correlations pattern of unobserved determinants of these choices (Greene, 2018). This modelling technique has been used in comparable studies examining multidimensional financial inclusion (Lenka & Sharma, 2017) and has been identified as the most optimal when working with household level survey data with binary outcomes .

Model 4: Univariate Model for the Influence of Mobile Payment on Entrepreneurship with *Iddir* as Moderating Variable

To test whether *Iddir* membership moderates the influence of mobile payment on entrepreneurship, a univariate probit model is estimated with an interaction term:

$$P(Y_i=1) = \Phi (\beta_0 + \beta_1 \text{ Mobile Payment}_i + \beta_2 \text{ Iddir}_i + \beta_3 (\text{ Mobile Payment}_i \times \text{ Iddir}_i) + \gamma X_i) \dots \dots \dots (6)$$

Where:

- Y_i : equals 1 if the household owns a trading business; 0 otherwise
- $\Phi (.)$: standard normal cumulative distribution function (Probit)
- Mobile Payment_i : Mobile phone to pay bills
- Iddir_i : *Iddir* membership (informal insurance)
- $\text{ Mobile Payment}_i \times \text{ Iddir}_i$: interaction effect
- X_i : vector of control variables

The dependent variable Y_i , which is business ownership by the household, is binary (1 if household owns a trading business, 0 otherwise). Linear probability models (LPM) for binary responses can generate estimated probabilities outside the interval $[0,1]$ and do not permit the nonlinear covariate effect on probability (Wooldridge, 2010). Conversely, probit models are tailored exactly for dichotomous outcomes so that the predicted probabilities are bounded between 0 and 1 through the use of the cumulative standard normal distribution function (Greene, 2018). The univariate probit model is applicable here since our interest lies in one entrepreneurial outcome (business ownership) as opposed to more than one correlated outcome that would necessitate a multivariate setup. This parsimonious estimation simplifies the estimation but performs well in accounting for the nonlinear probability relationship (Long, 1997).

Furthermore, the inclusion of an interaction term ($\text{Mobile Payment}_i \times \text{Iddir}$) allows one to test for the moderating effect of *Iddir* in the FINTECH-entrepreneurship relationship, which is pivotal to understanding how informal insurance arrangements moderates the adoption of mobile payment for entrepreneurial uses (Ai & Norton, 2003). This modelling approach has widely been used in micro-level entrepreneurship, financial inclusion, and informal networks research where the response of interest is dichotomous and the aim is to both estimate direct and interaction effects (Coad & Tamvada, 2012; Lenka & Barik, 2018).

3.7 Estimation Techniques Used and Statistical Software Used

Estimation of all econometric models in this study was carried out using Stata 15, a recognized statistical software package for cross-sectional and panel data analysis (StataCorp, 2017). The choice of estimation technique depended on the nature of the dependent variables as well as the objectives of the study. Quantile Regression (QR) is fitted by quantile minimization to minimize the weighted sum of absolute residuals to estimate conditional quantiles of household consumption (Koenker & Bassett, 1978). Simultaneous Quantile regression model is employed in order to control heterogeneity in the level of consumption, fitting several quantiles at the same time.

The approach identifies the distributional effects of Mobile Payment and *Iddir*, rather than the mean. The Multivariate Probit (MVProbit) is estimated using Maximum Simulated Likelihood (MSL), which is computationally efficient for multivariate binary outcomes with correlated error terms (Cappellari & Jenkins, 2003). This renders it computationally efficient while making it possible to estimate multiple entrepreneurship outcomes simultaneously. The Univariate Probit is estimated using Maximum Likelihood Estimation (MLE), which is computationally efficient for a single binary outcome such as household entrepreneurship. MLE generates consistent and efficient parameter estimates under assumptions of regularity (Wooldridge, 2010). Both the univariate and multivariate probit models have marginal effects that are estimated to find the changes in mobile payment adoption and *Iddir* membership that influence financial inclusion and entrepreneurship outcomes. Such effects provide more direct interpretation of the probit model estimates.

3.8 Ethical Considerations

This study is based on anonymized secondary data from the Ethiopian Socioeconomic Survey (ESS4), which were collected in strict adherence to ethical standards by the World Bank and the Ethiopian Central Statistical Agency (CSA)(World Bank, 2020). The survey protocols entailed obtaining respondents' informed consent, confidentiality, and anonymization of data procedures before public disclosure. Therefore, there are no identifiable personal data or sensitive individual information in the dataset. The analysis is complete in accordance with the established research ethics, including the use of data responsibly, being accurate, and avoiding misrepresenting the findings (Resnik, 2020). Since there was no initial data collection or direct interaction with participants, no harm can be caused to the persons involved and no other ethical clearance was required other than the procedures followed by the original data collectors.

3.9 Reliability and Validity Checks

This research uses data from the Ethiopian Socioeconomic Survey (ESS4), a representative country-level dataset collected by the Central Statistical Agency of Ethiopia in collaboration with the World Bank after applying strict multi-stage sampling and standardized protocols (World Bank, 2020). The dataset has strict

quality control mechanisms like field supervision, data verification, and consistency checks, providing highly reliable variables for analysis. Methodologically, the use of Stata 15 and standard econometric models, namely simultaneous quantile regression (SQR), multivariate probit (MVProbit), and univariate probit, improves the robustness and replicability of the research results (Cappellari & Jenkins, 2003; Koenker & Bassett, 1978). The probit models feature robust standard errors for adjusting heteroskedasticity, whereas bootstrap standard errors are used in SQR models to facilitate more accurate inference, particularly in non-standard error distributions.

Furthermore, ordinary least squares (OLS) models used in later analyses meet normality assumptions, which were verified by residual diagnostics. Internal validity is further strengthened via correct model specification: MVProbit accommodates potential correlation among a range of financial inclusion outcomes, and quantile regression accommodates distributional heterogeneity in consumption levels in mobile payment adoption and *Iddir* membership effects. To ensure model validity, diagnostic tests including multicollinearity tests (VIF) and robustness tests are performed. Finally, the use of nationally representative data ensures external validity, and as such, the findings can be extrapolated to the larger Ethiopian population.

CHAPTER FOUR: DATA ANALYSIS AND EMPIRICAL RESULTS

4.1 Analysis by Research Objectives

This chapter presents the empirical analysis of the research with the objective of analysing the role of mobile payment and financial inclusion on household's consumption behaviour and entrepreneurship choices in Ethiopia. According to the theoretical framework and methodology presented in the previous chapters, this chapter is devoted to investigating the six specific research objectives by appropriate econometric techniques.

Objectives one and two examine the separate influence of mobile payment and financial inclusion on household consumption using Simultaneous Quantile Regression (SQR). The reason is that the method provides exact insight into how such determinants influence consumption at various points in the distribution of consumption, rather than the average effect. The third objective supports this research by examining the combined influence of mobile payment and financial inclusion on spending, controlling for heterogeneity in terms of gender, age, rural or urban residence, regional variations, and education.

The fourth, fifth, and sixth objectives shift the focus on the nexus between mobile payment, financial inclusion, and entrepreneurship. Specifically, objective four investigates the influence of mobile payment on financial inclusion using a multivariate probit regression model that captures the joint determination of multiple binary outcomes. Objective five investigates the influence of financial inclusion on entrepreneurship using the same multivariate probit methodology, while objective six investigates the direct influence of mobile payment on entrepreneurship using a univariate probit model.

4.2 Summary of Study Variables

Table 4.1 Summary Statistics Table

Variable	Obs	Mean	Std. Dev.	Min	Max
Bank Account Ownership	4498	.618	.486	0	1
Formal Saving	4498	.531	.499	0	1
Household Size	4498	4.191	2.28	1	19
Distance to the nearest FI	4498	17.219	99.702	0	6000
Marital status	4498	.688	.464	0	1
Financial Literacy	4498	.691	.462	0	1
Financial Asset Ownership	4498	.068	.252	0	1
Mobile phone ownership	4498	.69	.463	0	1
Formal Borrowings	4498	.116	.321	0	1
Gender	4498	.713	.453	0	1
Formal Insurance	4498	.062	.242	0	1
Urban/ Rural	4498	.295	.456	0	1
Mobile Payment	4498	.109	.312	0	1
Saving for Ole Age	4498	.097	.297	0	1
<i>Iddir</i>	4498	.442	.497	0	1
Age	4498	40.331	14.15	17	99
Religion	4498	.659	.474	0	1
Financial Shock	4498	.556	.497	0	1
Financial Capability	4498	.414	.493	0	1
cons quint	4498	3.693	1.329	1	5
Education	4497	0.702	.457	0	1

logANCON	4498	10.951	.642	7.65	13.949
Own Trading Business	4498	.051	.22	0	1
Own Non- Agricultural Business	4498	.146	.353	0	1
Own Professional Offices	4498	.011	.104	0	1
Own Bar or Restaurant	4498	.012	.11	0	1
Region	4497	8.063	5.126	1	15

Source: Ethiopian Socio-economic Survey 2018/2019 (Wave 4)

The observations include 4,498 and a wide list of financial inclusion, demographic, entrepreneurship, and household welfare variables in Ethiopia (see also Appendix A). Under financial inclusion, 61.8% are banked, 53.1% with formal savings, 11.6% formal borrowings, and 6.2% formal insurance. In addition, 10.9% have access to mobile services, such as mobile payments, 9.7% save for retirement, and 44.2% are covered by *Iddir*, an informal group-based insurance. Financial literacy is quite good as 69.1% of the respondents are aware of how to open an account, and 41.4% of the respondents are financially competent and capable enough to carry out daily finance. Financial asset ownership continues to be low at 6.8%. Approximately 55.6% of respondents have experienced a financial shock. 69% of the respondents own a mobile phone, which can result in digital financial inclusion.

Demographically, 71.3% are male and 68.8% are married. The average age of the respondents is around 40 years of age and range from 17 to 99. The respondents have a mean household size of 4.2 members and 29.5% of the respondents report living in rural areas, so the sample is largely urban. Among the 4,497 respondents, 70.2% have some education, yielding a mean of 0.702. The standard deviation is 0.457, reflecting the variability in educational attainment within the sample. Large religious association is 65.9% of the population as per the dominant religion, non-Muslims. The average distance to the closest financial institution is 17.2 kilometers with high heterogeneity and a maximum distance of 6,000 kilometers, which is a high physical heterogeneity in access to finance.

Entrepreneurial activity is modest, at 5.1% with a business in retailing or trading business, 14.6% in non-agricultural enterprise, 1.1% in professional offices, and 1.2% in restaurants or bars. Average consumption Quantile is 3.69, indicating a middle-income household consumption distribution. Mean log of annual consumption, or logANCON, is 10.95, indicating modest levels of household consumption. The sample geographically covers all the main regions of Ethiopia, and the regional variable achieves 8.06 on average out of 15 possible regions, indicating wide geographic coverage. In total, the data indicates a population that is moderately financially included with low usage of formal financial services and high variation in demographic, geographic, and economic profile.

Adults with bank accounts in Ethiopia grew to more than 46% as of 2022, compared to 22% in 2014. Formal financial inclusion, however, lags behind other nations in the East African region. Rural-urban disparity is extremely large as 75% of the population resides in rural areas. Less educated and poor Ethiopians stand the risk of lagging behind the formal banking services. They are reached mostly through the rural regions. The 2018-2019 Ethiopia Living Standards Measurement Survey (LSMS) revealed that 59% of urban and just 18% of rural adults possessed an account in a bank. Data from Global Findex show that 39% of women and almost 55% of men possess a formal financial account. More than 21,000 community-based SACCOs provide minimal financial services, and the government's National Financial Inclusion Strategy (2021–2025) aims to increase formal account ownership to 70% by 2025 with a target of bridging the gender and urban –rural gap in formal financial inclusion (GSMA, 2023).

4.2.1 Household Distribution by Region, Residence and Gender

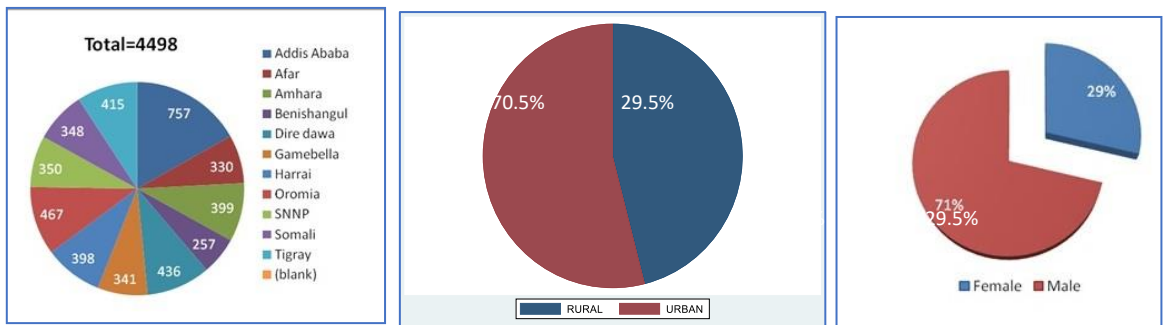


Fig. 4.1 Regional, Urban/Rural and Gender Distribution of Household Heads

The pie chart in Fig. 4.1 identified the Ethiopian regions involved in the research: Afar, Oromia, Benishangul Gumuz, Gambela, Amhara, Harari, SNNP, Somali, Tigray, DireDawa and Addis Ababa. This defines the geographic scope of the research to include regional states and two city administrations. The presentation is a basic manual for the regions of the study, but it could be improved by adding some study-related data like criteria for inclusion or regional characteristics related to the study. The choice of regions here appears to focus on mixed geographic locations in Ethiopia, likely based on differing geographic or demographic contexts. The pie chart in Fig. 4.1 also implies that more of the population is concentrated in urban settings than in rural settings. This, too, is perhaps indicative of the urban biases in the sample. Therefore, it is important to consider the financial inclusion and penetration of mobile phone payments in these urban areas. The data also demonstrate a predominance of male respondents. This may indicate men are more likely to either be users of financial services or have access to mobile payment tools than women.

4.2.2 Household Distribution by Total Annual Consumption

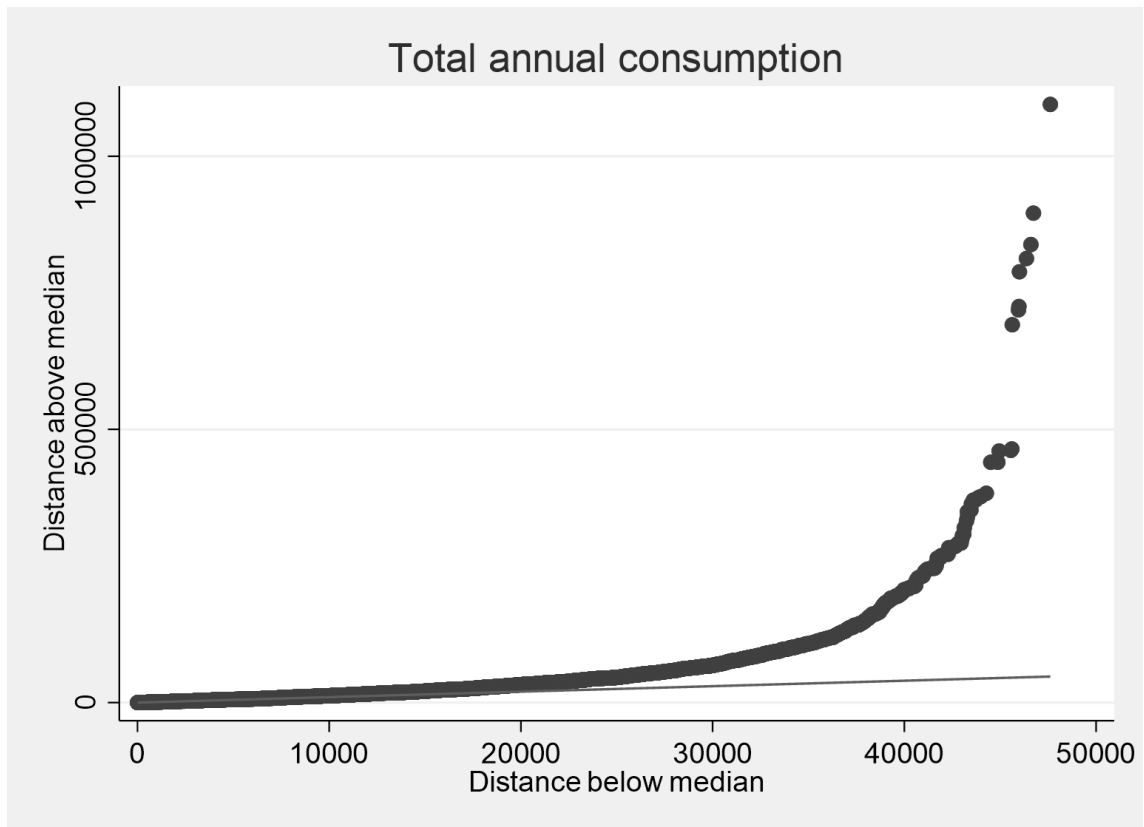


Fig.4.2 Symmetric Quantile - Quantile (QQ) plot

The QQ plot shows the overall yearly consumption distribution on a symmetry (mirror) plot around the median. It exhibits a very strong right skewness, i.e., few households use much more than the majority. The below-median distances are small and uniform, while the above-median distances are increasing sharply, especially in the upper range of the distribution. This means that there is an outlier with extremely high consumption. That the majority of values are way above the line of 45 degrees is also proof that total annual consumption is asymmetrically distributed and is skewed by high consumers. Such bias holds important economic analysis implications in the sense that it reflects underlying inequality and suggests that relying on mean values alone may mask the true consumption distribution among households.

4.2.3 Household Distribution by Consumption Quintiles

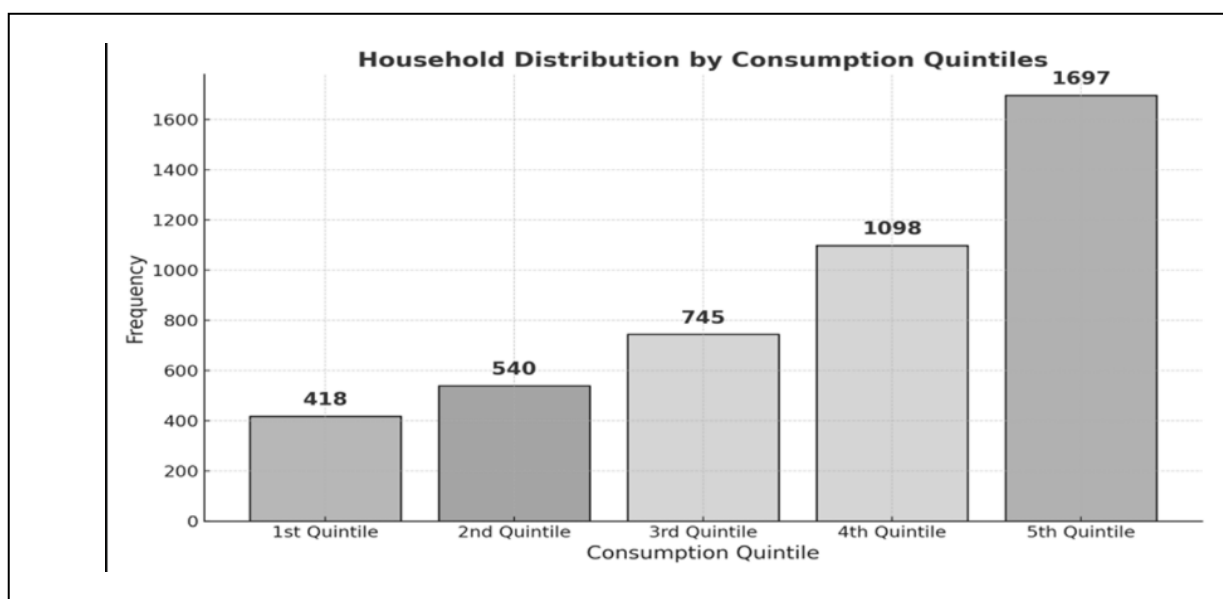


Fig. 4.3: Household Consumption Quintile

The bar graph shows the number of households in five consumption quintiles, and it describes the consumption pattern in the sample. The 1st quintile or lowest level of consumption comprises 418 households. It then increases gradually through the 2nd quintile (540 households) and the 3rd quintile (745 households) which represents the progressive rise in household numbers as consumption levels increase. The growth is steeper in the 4th quintile at 1,098 households, and the 5th quintile, which is the highest consumption group, is in the lead with 1,697 households. This is a right-skewed pattern of classification where most households are clustered in the higher consumption quintiles. This type of pattern of classification where most households are clustered in the higher consumption quintiles. This type of pattern signifies extreme disparity in the magnitude of consumption at the household level with fewer households proportionately in the lower quintiles and a higher proportion enjoying greater magnitudes of consumption. This bias aligns with the quantile regression application as well, because it allows for the investigation of the variation of the effects of significant variables (such as FINTECH adoption and/or financial inclusion) across point in consumption distribution, mainly between low and high consumption households.

4.3 Results & Discussions by Research Objectives

4.3.1 The link between Mobile Payment and Household Consumption

It is an empirical analysis that began with the investigation of the influence of Mobile Payment on household consumption. The hypothesis is that household heads that used mobile phones more often had a greater propensity to use mobile payment to satisfy their demand of consumption and thus consume more. The quantile regression's findings in Table 4.2 provide a more detailed analysis on how mobile payment and other economic and demographic factors influence consumption at different levels of consumption distribution. This findings is in line with others in the literature (W. Jiang et al., 2024) who studied the influence of digital financial inclusion on household consumption. The key variable in this study is essentially mobile phone usage for bill payment (mobile payment in short) as a measure of financial technology. This correlates with financial technology's definition in the literature that often include the use of mobile for transactions (Demir et al., 2022; Gosavi, 2018; Iddrisu et al., 2022; A. Kedir & Kouame, 2022; Mbiti & Weil, 2016)

The regressions result revealed that mobile payment has a negative and significant influence on consumption in the OLS model with a coefficient of -0.410^* ($p < 0.01$). In quantile regression, mobile payment has a positive and significant influence on consumption quantile in lower to middle quantiles, with coefficients like 0.520^* at q10 and 0.333^* at q20 to q70, though it provides an insignificant value at higher quantiles (at q80 and q90). In short, quantile regression suggests that marital status, education, and mobile payment are strong positive drivers of household spending mainly for lower to middle-income household heads. These findings are consistent with the work of the following scholars : (Agarwal & Chua, 2020; Aydin & Burnaz, 2016; Boden et al., 2020; L. Jiang et al., 2019; W. Jiang et al., 2024; Lai et al., 2020; Liu et al., 2023; S. Luo et al., 2022; Nursafarina & Firmialy, 2023; T. Yang & Zhang, 2022; X. Yang et al., 2022; Zhang et al., 2022).

The findings described above are different in that the size of households, financial shocks, and ownership of assets disclose mixed effects. Age and financial literacy do not seem to affect consumption at household level in different quantiles. The above

findings contradict the findings of(Dong & Zang, 2024; W. Jiang et al., 2024; Liu et al., 2023) . In their study, they reported that age and financial literacy positively affect consumption. The urban-rural disparity has a negative and significant effect on consumption at lower quantiles. That is rural household heads experience lower consumption than urban households. These findings are similar with the findings of(X. Yang et al., 2022; Zhang et al., 2022) .

Moreover,(S. Luo et al., 2022) further explained that mobile payment plays a higher influential role in enhancing urban household consumption than rural counter parts. Gender does not significantly affect consumption at all quantiles. Our findings imply that there is a negligible gender-based difference in consumption. Religion negatively affects consumption at lower quantiles but declines at higher quantiles, indicating that the effect of religion is more evident between lower-consumption households. The effect of social group or informal insurance (*Iddir*) is negative in OLS model, but it becomes positive at middle to higher consumption quantiles, which implies that informal insurance plays a more beneficial role in consumption for wealthier households.

Table 4.2. The Link between Mobile Payment and Household Consumption: Simultaneous Quantile Regression Results.

VARIABLES	Log Consump	Cons-quant (Lower Order)			Cons-quant (Middle Order)			Cons-quant (Higher Order)		
	OLS	q10	q20	q30	q40	q50	q60	q70	q80	q90
Mobile Payment	-0.410*** (0.0273)	0.520*** (0.107)	0.333*** (0.100)	0.346*** (0.0400)	0.246*** (0.0530)	0.167*** (0.0611)	0.167*** (0.0430)	0.163*** (0.0411)	-0 (0.0463)	0 (0)
Urban-Rural	-0.196*** (0.0204)	-0.774*** (0.0768)	-1*** (0.0417)	-1.017*** (0.0671)	-1.004*** (0.0651)	-0.889*** (0.0736)	-0.833*** (0.0695)	-0.827*** (0.0604)	-1*** (0.180)	0 (0)
Household Size	-0.0266*** (0.00429)	-0.312*** (0.0187)	-0.333*** (0.0121)	-0.323*** (0.0171)	-0.310*** (0.00936)	-0.278*** (0.00977)	-0.250*** (0.0117)	-0.200*** (0.0100)	0 (0.0554)	-0 (0)
Gender	0.0842*** (0.0227)	-0.00202 (0.102)	0 (0.0404)	-0.0206 (0.0604)	-0.0114 (0.0404)	0 (0.0269)	0 (0.0329)	-0.0209 (0.0327)	-0 (0.0195)	-0 (0)
Religion	-0.0182 (0.0194)	-0.353*** (0.0625)	-0.333*** (0.0904)	-0.166** (0.0807)	-0.164*** (0.0405)	-0.111*** (0.0395)	-0.0833** (0.0413)	-0.0756* (0.0444)	0 (0.0177)	0 (0)

Marital Status	0.110***	-0.00403	-0	0.0141	0.0919**	0.111***	0.167***	0.192***	0	0
	(0.0237)	(0.0875)	(0.0411)	(0.0566)	(0.0445)	(0.0411)	(0.0398)	(0.0192)	(0.0488)	(0)
Education	0.113***	0.627***	0.667***	0.624***	0.593***	0.556***	0.500***	0.297***	-0	0
	(0.0206)	(0.0609)	(0.0900)	(0.0705)	(0.0712)	(0.0763)	(0.0869)	(0.0668)	(0.0875)	(0)
<i>Iddir</i>	-0.0902***	0.0766	-0	0.0997	0.0919***	0.111***	0.167***	0.142***	-0	0
	(0.0177)	(0.0813)	(0.0565)	(0.0797)	(0.0320)	(0.0386)	(0.0480)	(0.0443)	(0.0482)	(0)
Financial shock	-0.191***	-0.296***	-0.333***	-0.180**	-0.130***	-0.111***	-0.0833*	-0.100**	0	-0
	(0.0173)	(0.0643)	(0.0450)	(0.0801)	(0.0427)	(0.0420)	(0.0458)	(0.0448)	(0.0310)	(0)
Asset Ownership	-0.513***	0.298**	0.333**	0.228*	0.147***	0.111**	0	0.00455	-0	0
	(0.0339)	(0.141)	(0.138)	(0.121)	(0.0541)	(0.0506)	(0.0321)	(0.0268)	(0.0339)	(0)
Save for Old Age	-0.0843***	0.276**	0.333**	0.158*	0.168***	0.111*	0.0833	0.0647	0	-0
	(0.0289)	(0.136)	(0.134)	(0.0929)	(0.0649)	(0.0590)	(0.0706)	(0.0480)	(0.0445)	(0)
Age	0.00386***	0.00202	0	0.00108	0.00143	0	-0	0.000911	0	-0
	(0.000612)	(0.00233)	(0.00154)	(0.00173)	(0.00143)	(0.00120)	(0.00103)	(0.00104)	(0.000668)	(0)

Financial Literacy	0.250***	0.0181	0	0.00542	0.0248	0	0	0.0109	0	-0
	(0.0189)	(0.0596)	(0.0384)	(0.0570)	(0.0394)	(0.0423)	(0.0258)	(0.0243)	(0.0215)	(0)
Constant	10.82***	3.534***	4.333***	4.484***	4.681***	4.833***	4.917***	5.063***	5***	5***
	(0.0430)	(0.148)	(0.116)	(0.144)	(0.0950)	(0.113)	(0.129)	(0.0693)	(0.0387)	(0)
Observations	4,485	4,497	4,497	4,497	4,497	4,497	4,497	4,497	4,497	4,497
R-squared	0.192									

Bootstrap Standard errors in parentheses

p<0.01, ** p<0.05, * p<0.1

4.3.2 The influence of Financial Inclusion Variables on Household Consumption

Table 4.3 provide evidence on the influence of financial inclusion variables on consumption of household heads. Bank account ownership, while insignificant in the OLS model, it shows a positive and significant influence from the 20th to 80th quantiles, convincing readers that access to a bank account is affecting consumption of households positively almost at all consumption levels. Formal saving has a consistent positive and significant influence at all quantiles, implying that households with higher saving behaviour show increased consumption, especially among lower-consumption groups. Formal insurance also significantly and positively influences consumptions of household heads, particularly at lower and middle quantiles, indicating its significance for lower- to middle-income households. Our findings are consistent with prior research findings by (Abokyi & Bettin, 2025; Burgess & Pande, 2005; Cavoli & Gopalan, 2023; Chakrabarty & Mukherjee, 2022, 2021; Compaoré & Sawadogo, 2024; Dupas & Robinson, 2013)who investigated that financial inclusion positively and significantly affect household consumption.

On the other hand, formal borrowing is having a negative influence on consumption in the OLS but a positive influence on the lowest consumption quantile (q10) only in evidence, revealing its differential association at various consumption levels. Our finding agrees with the findings of (X. Li et al., 2011)that concluded while they found a household where there is availability of micro-credit having much higher consumption levels than a household without access. Urban-rural divide always has a large adverse influence on rural households' consumption who all consume at every quantile. Household size produces negative coefficient at higher sizes, with lower consumption which is seen through significant negative coefficients at every quantile.

Gender inequalities seem to influence consumption in middle and high consumption quantiles, where female at upper quantile spend lower than male. Religion has strong but negative influence at low to middle quantiles, which influences more for low-consumption families. Marital status has positive and significant effects at upper

quantiles. Our finding is an indication of the higher consumption of married families at higher income quantiles. Education plays a positive role in consumption at all quantiles. *Iddir* plays a stronger role among wealthier households with a positive and significant role at higher quantiles.

Financial shock has a significant but adverse influence on all quantiles. It is also observed that it has the most intense influence on low-income families. Holding assets does have a positive influence on consumption from the 30th Quantile and indicates that it is more beneficial in higher-income families. Savings during old age has a negative effect at lower Quantiles of consumption but a positive influence for upper groups of consumption, starting from 40th to 90th Quantile . Age has minor but positive influence at lower income Quantiles, reducing at upper quantiles. Financial literacy is more pronounced in the lower-income groups, with a tremendous positive influence at lower quantiles.

Table 4.3 The Link between Mobile Payment and Household Consumption: Simultaneous Quantile Regression Result

VARIABLES	Log Consumption	Cons-Quint (Lower Order)			Cons –Quint (Middle Order)			Cons-Quint (Higher Order)		
	OLS	q10	q20	q30	q40	q50	q60	q70	q80	q90
Bank Account	-0.0116	0.250**	0.333***	0.411***	0.481***	0.358***	0.303***	0.200***	0.119**	-0*
	-0.0241	-0.102	-0.116	-0.0934	-0.0656	-0.0587	-0.0531	-0.0468	-0.047	0
Formal Saving	-0.0252	0.438***	0.333***	0.385***	0.269***	0.235***	0.218***	0.200***	0.122***	0
	-0.0224	-0.0975	-0.0516	-0.0551	-0.0612	-0.05	-0.0379	-0.0324	-0.0473	0
Formal Insurance	-0.0201	0.313***	0.333***	0.135	0.197**	0.199***	0.160**	0.200***	0.107**	0**
	-0.0362	-0.11	-0.112	-0.12	-0.0979	-0.0725	-0.0658	-0.0646	-0.054	0
Formal Borrowing	-0.0852***	0.187**	0	0.0415	0.0134	0.033	0.00987	0	-0.0384	0
	-0.0271	-0.0865	-0.1	-0.0565	-0.0515	-0.0571	-0.0346	-0.0445	-0.0422	0
Urban –Rural	-0.201***	-0.750***	-1***	-0.874***	-0.818***	-0.748***	-0.748***	-0.700***	-0.532***	0
	-0.0215	-0.0619	-0.116	-0.0884	-0.0882	-0.0842	-0.0669	-0.0795	-0.151	0

House hold Size	-0.0252***	- 0.312***	- 0.333***	-0.312***	-0.278***	-0.263***	- 0.235***	- 0.200***	-0.131***	0
	-0.0044	-0.0101	-0.0112	-0.0136	-0.0118	-0.0108	-0.0129	-0.0106	-0.0382	0
Gender	0.0783***	0	0	-0.0424	-0.0690**	-0.0537*	-0.0661*	- 0.1000** *	-0.0564**	0*
	-0.0233	-0.1	-0.0742	-0.0508	-0.0326	-0.0323	-0.0343	-0.0339	-0.0262	0
Religion	-0.0176	- 0.437***	- 0.333***	-0.278***	-0.267***	-0.205***	- 0.164***	- 0.1000** *	-0.0763**	0
	-0.0201	-0.0651	-0.0317	-0.0438	-0.0417	-0.0412	-0.037	-0.0353	-0.0349	0
Marital Status	0.111***	0	0	0.0632	0.0701	0.116**	0.182***	0.200***	0.116***	0
	-0.0243	-0.0997	-0.0593	-0.0472	-0.0517	-0.0464	-0.0414	-0.041	-0.0436	0
Education	0.117***	0.437***	0.333***	0.358***	0.432***	0.380***	0.342***	0.200***	0.177***	0
	-0.022	-0.0708	-0.0708	-0.0469	-0.049	-0.0537	-0.0508	-0.0556	-0.0621	0
<i>Iddir</i>	-0.0777***	0.0625	0	0.0158	0.0336	0.0921**	0.109***	0.1000**	0.0794***	0
	-0.0182	-0.0612	-0.0348	-0.0234	-0.0422	-0.0402	-0.0388	-0.0408	-0.0278	0
Financial Shock	-0.181***	- 0.250***	- 0.333***	-0.218***	-0.121***	-0.113***	- 0.101***	- 0.1000** *	-0.0544**	0
	-0.0178	-0.0497	-0.0311	-0.0648	-0.0345	-0.0296	-0.0305	-0.0369	-0.0243	0

Asset Ownership	-0.514***	0	0	0.119*	0.0597	0.00767	-0.0412	0	0.0129	0
	-0.0351	-0.154	-0.148	-0.071	-0.0384	-0.0265	-0.0367	-0.0588	-0.0439	0
Saving for Old Age	-0.103***	0.187*	0	0.109	0.0701	0.0503	0.0627	0	0.0667	0
	-0.0299	-0.104	-0.121	-0.071	-0.0517	-0.0573	-0.0517	-0.0491	-0.0453	0
Age	0.00412***	0	0	0.000906	0.00187	0.00115	0.000858	0	0.00085	0
	-0.000627	-0.00202	-0.00158	-0.00109	-0.00129	-0.000926	-0.000834	-0.0012	-0.000834	0
Financial Literacy	0.256***	0	0	-0.0154	0.0183	0.0549*	0.0339	0	-0.00227	0
	-0.0193	-0.0547	-0.0443	-0.0451	-0.047	-0.0292	-0.0284	-0.0375	-0.0282	0
Constant	10.78***	3.500***	4.333***	4.300***	4.301***	4.525***	4.676***	5***	5.041***	5***
	-0.0447	-0.151	-0.181	-0.173	-0.0972	-0.0781	-0.0707	-0.0701	-0.0527	0
Observations	4,485	4,497	4,497	4,497	4,497	4,497	4,497	4,497	4,497	4,497
R- Squared	0.154									

Bootstrap Standard errors in parentheses;
p<0.01, ** p<0.05, * p<0.1

4.3.3 Link Between Mobile Payment, Financial Inclusion, and Household Outcomes with Heterogeneity Analysis

Regional and Urban- Rural Heterogeneity

Table 4.4 presents the heterogeneity of regional and urban-rural in mobile payment and financial inclusion relationship on household consumption. The result of estimation indicates the positive link between mobile payment and financial inclusion in urban areas. The mobile payment and financial inclusion coefficients for consumption are negative in rural citizens. Mobile payment use fails to increase the precautionary reason to save for rural citizens. This is illustrated by the work of (T. Yang & Zhang, 2022) as they explored mobile payment adoption and financial inclusion on Chinese domestic consumption. The results are supported by (Dong & Zang, 2024; Huang et al., 2023; S. Luo et al., 2022) indicating that digital finance had a greater influence in shaping residents' service consumption who reside in cities. The World Bank's Ethiopia Living Standards Measurement Survey (LSMS 2018–2019) also reported rural-urban disparity with 59% of urban and just 18% of rural adults stating they have a bank account (GSMA, 2023).

The analysis of mobile payment, financial inclusion and urban/ rural interactions indicates that the relationship between these variables and household consumption differs between rural and urban areas of Ethiopia. Mobile payment and rural area interaction show contrasting association: it is a negative related to consumption at lower quantiles (q25) but positively related at higher quantiles (q60 and q75). This means that the heads of rural households are more benefited by mobile payment, especially for middle-to-higher-income households.

The interaction between account ownership and rural residence indicates that account ownership is more strongly associated with household consumption in rural areas at middle quantiles (q50, q60, q75), while the association is weaker at lower quantiles. Savings and rural location interaction is positively related to consumption for higher quantiles, and for lower quantiles (q10, q25) it is negatively related.

Insurance and rural location interaction is negatively related to consumption for rural households, for all quantiles. The results reveal that insurance can still not have the impact to boost consumption, primarily because of the fact that either there is little access to insurance products, or its awareness is minimal. The interaction between borrowing and rural residence is positively associated with household consumption among higher-income rural households (q60 and q75), suggesting that access to borrowing is more strongly related to consumption for these households, whereas the association is weaker or non-significant for lower-income rural households.

Regional dummies for two administrative cities and nine regional governments are also included in Table 4.4. Coefficients of the relative consumption of the regions are shown relative to the base region, Tigray. Consumption coefficients for Dire Daw and Addis Ababa cities are the largest in almost all quantiles, more so q10 (2.267 for Dire Daw and 1.701 for Addis Ababa). Urban areas likely enjoy better access to mobile phone technology, finance, and banking, and thus higher household consumption. Gambella, Harar, and SNNP zones indicate higher consumption at lower quantiles (e.g., q10). Afar, Amhara, and Somali regions indicate higher regional variation in the consumption outcome across income quantiles. In the Amhara region, the relationship is strongest at the lower quantile (q10) and weaker or non-significant at higher quantiles (q50, q60, q75). Oromia and Somali regions record relatively lower consumption levels for most income Quantiles, especially higher quantiles. Benishangul Gumuez and Gambella regions record relatively higher consumption levels, especially for lower income quantiles (q10). Overall, the findings indicate that adaptive financial inclusion policy aimed at improving both urban-rural and regional gaps is a necessary condition to enable enhanced pro-poor household consumption improvement in Ethiopia.

Table 4.4 Regional and Urban/ Rural Differences in the relationship between Mobile Payment, Financial Inclusion, and Household Consumption - Simultaneous Quantile Regression Result

	Log Consumption	Cons-Qunit	Cons-Qunit	Cons-Qunit	Cons-Qunit	Cons-Qunit
VARIABLES	OLS	q10	q25	q50	q60	q75
Mobile payment	-0.00205	0.429***	0.217**	0.139***	0.103***	0.103**
	-0.00758	-0.111	-0.0878	-0.0456		-0.0464
Bank Account	-0.000854	0.484***	0.543***	0.257***	0.215***	0.0902**
	-0.00634	-0.101	-0.0893	-0.0637		-0.0351
Formal Saving	-0.00523	0.493***	0.373***	0.251***	0.164***	0.102***
	-0.00576	-0.139	-0.126	-0.0569		-0.0279
Formal Insurance	0.00539	0.403**	0.224*	0.267***	0.287***	0.212***
	-0.0101	-0.176	-0.124	-0.0982		-0.0666
Formal Borrowing	-0.0253***	0.0589	0.0846	0.0139		-0.0156
	-0.00729	-0.162	-0.0715	-0.0369		-0.03
Mobile Payment Urban/Rural	0.0176	-0.203	0.153	0.296**	0.424***	0.121
	-0.014	-0.151	-0.182	-0.146		-0.0986

Bank Account _Urban/ Rural	-0.0163	-0.388**	-0.333*	0.246*	0.286**	0.264*
	-0.0118	-0.185	-0.174	-0.128		-0.151
Saving _Urban/ Rural	0.0200*	-0.214	-0.11	-0.0495		0.397***
	-0.0116	-0.194	-0.189	-0.117		-0.139
Insurance _Urban / Rural	-0.0413**	-0.321	-0.187	-0.577***	-0.459*	-0.406**
	-0.017	-0.242	-0.115	-0.187		-0.194
Borrowing _Urban/ Rural	0.0167	0.184	0.0964	0.235*	0.169*	0.13
	-0.0133	-0.163	-0.138	-0.139		-0.093
Urban/ Rural	-0.00132	-0.458***	-0.695***	-0.910***	-0.976***	-0.916***
	-0.00708	-0.102	-0.114	-0.0751		-0.107
Household Size	-0.000924	-0.295***	-0.307***	-0.260***	-0.241***	-0.170***
	-0.00101	-0.0109	-0.0123	-0.0119		-0.00965
Gender	-0.0109**	-0.0056	-0.0104	-0.0574*		-0.0554**
	-0.00529	-0.0954	-0.0725	-0.0325		-0.0276
Religion	0.00231	-0.411***	-0.272***	-0.201***	-0.163***	-0.0882***
	-0.00463	-0.0706	-0.0503	-0.0433		-0.0262

Marital Status	0.00612	-0.00529	0.0525	0.115**	0.170***	0.161***
	-0.00548	-0.0984	-0.0737	-0.0447		-0.0307
Education	0.0023	0.400***	0.343***	0.394***	0.344***	0.180***
	-0.00497	-0.06	-0.0546	-0.055		-0.0546
<i>Iddir</i>	-0.0033	0.059	-0.0461	0.0853**	0.112***	0.0792***
	-0.00414	-0.0544	-0.0495	-0.0333		-0.0285
Financial Shock	0.00392	-0.290***	-0.197***	-0.0987***	-0.0918***	-0.0701***
	-0.00441	-0.0697	-0.0599	-0.0339		-0.0208
Asset Ownership	0.00685	-0.0146	0.0985	0.0238		-0.0209
	-0.00818	-0.184	-0.133	-0.0446		-0.0437
Saving for Old Age	0.00295	0.15	0.0765	0.0387		0.0447
	-0.00733	-0.138	-0.0863	-0.0463		-0.0669
Age	-0.000253*	0.00224	0.00300*	0.00128		0.00082
	-0.000143	-0.00242	-0.00175	-0.000812		-0.00072
Financial Literacy	0.00446	0.043	0.00861	0.0244		-0.00082
	-0.00468	-0.0685	-0.0489	-0.035		-0.0288
Base Region : Tigray						

Afar Region	0.413***	-0.0697	0.181	0.0709	0.0361	
	-0.00986	-0.174	-0.118	-0.0813	-0.0627	
Amhara Region	0.621***	0.0406	0.133	0.134*	0.177**	
	-0.00959	-0.163	-0.135	-0.0739	-0.0774	
Oromia Region	0.805***	-0.0606	0.0842	0.0768	0.0989	
	-0.00993	-0.154	-0.101	-0.0644	-0.0753	
Somali Region	0.965***	-0.139	-0.00223	0.024	0.0141	
	-0.0112	-0.156	-0.101	-0.087	-0.0999	
Benishangul Gumuez	1.070***	-0.158	-0.0306	0.0265	0.0667	
	-0.0107	-0.124	-0.111	-0.0698	-0.0935	
SNNP Region	1.178***	-0.0366	0.0187	0.0452	0.0463	
	-0.00986	-0.134	-0.114	-0.0938	-0.0879	
Gambella Region	1.294***	0.037	0.059	0.0395	0.0889	
	-0.00992	-0.163	-0.119	-0.0709	-0.0725	
Harar Region	1.431***	-0.111	0.0592	0.0397	0.0554	
	-0.00968	-0.136	-0.0756	-0.0627	-0.0657	

Addis Ababa City	1.701***	-0.257**	-0.115	0.0587	0.0855	
	-0.00867	-0.122	-0.101	-0.059	-0.0572	
Dire Daw City	2.267***	-0.15	-0.0901	0.0361	0.0878*	
	-0.00964	-0.128	-0.118	-0.0768	-0.0519	
Constant	9.839***	3.228***	3.861***	4.518***	4.724***	
	-0.0135	-0.208	-0.19	-0.0812	-0.0881	
Observations	4,485	4,497	4,497	4,497	4,497	
R-Squared	0.958					

Bootstrap Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Gender Heterogeneity

Table 4.5 presents the estimation of the huge gender gap in the Mobile Payment -financial inclusion relationship on household spending with SQR specifications. According to Global Findex data, only 39% of women, versus close to 55% of men, have an account with a formal financial institution (GSMA,2023).The gender-disaggregated Simultaneous Quantile Regression estimator captures considerable heterogeneity of the influence of Mobile Payment and financial inclusion on household spending across consumption quantiles in Ethiopia. Mobile payments are pro-poor and are positive and statistically significant at lower quantile of expenditure ($q_{10} = 0.417$, $p < 0.01$), however the association diminishes moving towards higher quantiles and is not statistically significant at more than the 25th percentile. Contrary to expectations, although the association between mobile payment usage and consumption is negative in the overall OLS estimation ($\beta = -0.444$, $p < 0.01$), indicating lower consumption among users, the interaction between gender and mobile payment usage becomes positive at the median ($q_{50} = 0.125$, $p < 0.1$) and the 60th percentile ($q_{60} = 0.178$, $p < 0.05$). This indicates that women mobile payments platform consumers whose consumption is relatively high have a significantly higher consumption, showing how mobile payment makes the otherwise negative gender gap in consumption shrink out among relatively poor customers.

Similarly, bank account ownership is associated with consistently higher consumption across all quantiles, particularly at q_{25} ($\beta = 0.642$, $p < 0.01$) and q_{50} ($\beta = 0.370$, $p < 0.01$), indicating a prevalent and robust positive association with access to formal finance. The gender interaction in bank account ownership is also highly significant and positive at q_{50} ($\beta = 0.281$, $p < 0.01$), q_{60} ($\beta = 0.385$, $p < 0.01$), and q_{75} ($\beta = 0.426$, $p < 0.01$). These findings support the argument that women benefit most from bank account ownership, as their household consumption increases—possibly because they become more financially independent, save for specific purposes, or achieve greater economic security. Regarding formal saving, the combined association remains strong across all quantiles from q_{25} to q_{75} , while the gender interaction is not statistically significant, suggesting that both women and men are equally better off when using formal saving services.

In contrast, gender interaction with formal insurance has a positive and statistically significant influence only in the lowest quantile ($q_{10} = 0.750$, $p < 0.05$), which suggests formal insurance particularly increases the consumption of the poorest female-headed households. The interactions with formal borrowing are not statistically significant in any of the quantiles, suggesting no or even minimal gender-differentiated effects. Overall, these results highlight the significance of mobile payment and formal financial services in influencing household consumption, especially of women, and necessitate gender-sensitive policy interventions that can offer inclusive access to digital and formal financial products. Gender gaps are largest at the middle and high quantiles, with women being users of mobile payments and formal accounts having the largest relative increases in consumption, suggesting that financial empowerment interventions among women would have potentially large welfare and consumption smoothing benefits.

The finding shows that men are likely to spend more through mobile payment technology. This is confirmed by the high and positive coefficient for men are 0.178. Men are also likely to own a bank account. The positive and high coefficients (0.281, 0.385, 0.426) confirm that. Gender does not appear to statistically significantly influence formal saving behaviour. Men are significantly more likely than women to have formal insurance. That is clearly indicated by the high positive coefficient (0.750). Gender does not have a significant influence on formal borrowing behaviour. Lastly, men seem to be more engaged in mobile payments, bank account ownership, and formal insurance. But gender does not appear to influence formal borrowing much.

The size of households and gender are significant in determining consumption, with larger households and women having lower consumption. Education increases consumption at all levels of income. *Iddir*, holding financial assets and financial shocks also influence consumption, but the magnitude of the influence differs across all quantiles.

Table 4.5. Gender Heterogeneity in Mobile Payment, Financial Inclusion and Household Consumption Nexus: A simultaneous Quantile Regression Result

	Log Consumption	Cons-Quint	Cons-Quint	Cons-Quint	Cons-Quint
VARIABLES	OLS	q10	q25	q50	q60
Mobile Payment	-0.444***	0.417***	0.208*	0.0882	0.0271
	-0.0547	-0.145	-0.117	-0.0795	-0.0636
Bank Account	0.0599	0.417**	0.642***	0.370***	0.198**
	-0.0408	-0.162	-0.146	-0.106	-0.0828
Formal Saving	-0.0428	0.667***	0.361***	0.180***	0.153***
	-0.0399	-0.173	-0.104	-0.0551	-0.0435
Formal Insurance	-0.0195	-0.583*	0.129	0.231*	0.204***
	-0.075	-0.336	-0.302	-0.132	-0.0715
Formal Borrowing	-0.0374	0	-0.0488	-0.0035	0.0323
	-0.0501	-0.121	-0.122	-0.0922	-0.0956
Mobile Payment_Gender	0.0473	0.0833	0.171	0.125*	0.178**
	-0.0632	-0.211	-0.113	-0.0684	-0.0776
Bank Account_Gender	-0.0448	0.0833	0.0436	0.281***	0.385***
	-0.0481	-0.199	-0.135	-0.107	-0.084
Formal Saving_Gender	0.0485	-0.333	-0.0277	0.0998	0.101
	-0.0473	-0.224	-0.142	-0.0903	-0.0744
Formal Insurance_Gender	-0.00104	0.750**	-0.137	-0.0776	-0.0576
	-0.0851	-0.356	-0.28	-0.167	-0.156

Formal Borrowing _Gender	-0.0701	0	0.154	0.0165	-0.063
	-0.0592	-0.184	-0.143	-0.0969	-0.0994
Household Size	-0.0312***	-0.333***	-0.331***	-0.272***	-0.244***
	-0.00432	-0.0132	-0.0133	-0.0127	-0.0108
Distance to the Nearest FI	-0.000225***	0	0.000241	8.21E-05	3.32E-05
	-8.62E-05	-0.000504	-0.000382	-0.000294	-0.000372
Gender	0.0665*	0	-0.203*	-0.434***	-0.519***
	-0.034	-0.0838	-0.11	-0.0993	-0.0866
Religion	-0.00875	-0.333***	-0.300***	-0.202***	-0.144***
	-0.0199	-0.0734	-0.0545	-0.0416	-0.0347
Marital Status	0.100***	-0.167**	-0.0211	0.103**	0.137***
	-0.024	-0.0688	-0.0514	-0.0484	-0.0335
Education	0.159***	0.500***	0.550***	0.558***	0.510***
	-0.0214	-0.0878	-0.0792	-0.0379	-0.0519
<i>Iddir</i>	-0.0972***	0	-0.0152	0.048	0.0752*
	-0.0179	-0.0699	-0.0515	-0.0323	-0.0409
Financial Shock	-0.174***	-0.167***	-0.197**	-0.0699*	-0.0894***
	-0.0174	-0.0622	-0.0813	-0.039	-0.0281
Asset Ownership	-0.510***	-0.167	0.0605	-0.00199	-0.0462
	-0.0346	-0.135	-0.121	-0.0264	-0.037
Saving for Old Age	-0.0856***	0.0833	0.0966	0.0185	0.0646

	-0.0296	-0.114	-0.0658	-0.0466	-0.0562
Age	0.00401***	0	0.000869	0.00161	0.00159**
	-0.000618	-0.00204	-0.00204	-0.00106	-0.000718
Financial Literacy	0.256***	0.0833	0.0349	0.0589	0.0546
	-0.0191	-0.0756	-0.0705	-0.036	-0.0473
Constant	10.74***	3.083***	3.778***	4.322***	4.574***
	-0.0467	-0.162	-0.176	-0.135	-0.106
Observations	4,480	4,492	4,492	4,492	4,492
R-Squared	0.18				

Bootstrap Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Age Heterogeneity

Various age groups that are found in a family may have various demands and preferences when it comes to consumption. The age structure of the family will influence the demand and preferences for consumption within the family. This will influence the consumption behaviour at family level (W. Jiang et al., 2024). Table 4.6 reveals significant differences in how various financial factors influence consumption across different age groups.

The joint quantile regression of mobile payment and household consumption in Table 9 provides full characterizations of the linkages age moderates between FINTECH, financial inclusion, and household consumption across the consumption distribution of Ethiopia. The influence of age on the adoption of mobile payments is not statistically significant across all quantiles q10 ($\beta = -0.00636$, $p > 0.1$), q25 ($\beta = -0.00206$, $p > 0.1$), q50 ($\beta = -0.000156$, $p > 0.1$), q60 ($\beta = -0.000810$, $p > 0.1$), and q75 ($\beta = -0.00205$, $p > 0.1$) and that the influence of mobile payment on consumption does not rely on the age irrespective of the household's location in the consumption distribution. On the other hand, bank account holding by age has a positive but weakly significant influence at the 25th percentile ($\beta = 0.00877$, $p < 0.1$), but is statistically insignificant at higher quantiles (e.g., q50: $\beta = -0.00113$, q60: $\beta = -0.00312$, and q75: $\beta = 0.00179$), which suggests that

young people in the lower-middle segment of consumption distribution have marginally greater consumption increases from bank account holding than older people. Contrarily, at the lower quantile (q10), the interaction is positive but not statistically significant ($\beta = 0.0101$, $p > 0.1$) that indicates inconsistency in the influence of age across quantiles.

For formal saving, its correlation with age is negative and statistically significant at the 25th percentile ($\beta = -0.00777$, $p < 0.1$), indicating that people of younger age at this consumption level gain more from formal saving than those of older age. At all other quantiles (q10: $\beta = -0.00653$, q50: $\beta = -0.000963$, q60: $\beta = 0.00164$, q75: $\beta = 0.00152$), the influence are statistically zero, though the negative sign at q10 is also suggestive of declining saving gains with age in the lower part of the distribution. The formal borrowing-age relationship remains inappreciable at all quantiles (e.g., q10: $\beta = -0.000389$, q25: $\beta = -0.00491$, q50: $\beta = -0.000581$), which means there is no consumption differential influence of borrowing on age. Similarly, the insurance-conventional age interaction is insignificant across all quantiles (e.g., q10: $\beta = -0.00725$, q25: $\beta = 0.00553$, q75: $\beta = -0.00267$), suggesting a uniform influence of insurance on consumption across different ages.

The analysis suggests that both mobile payment and financial inclusion have differential influences on consumption among Quantiles. There is also an association that is stronger for lower consumption groups. Furthermore, age interactions suggest mobile payments and bank accounts have stronger influences on the older population and middle-income households. Financial shocks, on the other hand, have negative influences on consumption. Education has positive influences on consumption in the lower- and middle-income groups. Household size, religion and gender, however, have negative consequences on consumption for larger households and females.

In brief, the quantile regression findings show that age influences the relationship between financial inclusion instruments such as bank accounts and formal savings primarily across the lower quantiles, with significant associations at the 25th percentile, where the youth gain most. The relationships are heterogeneous and weak across the distribution, and mobile insurance, lending, and payments do not show statistically

different age-related variations. The necessity to develop age-sensitive financial inclusion strategies, particularly for low-consumption households, necessarily leads toward developing more efficient financial instruments that are effective in promoting welfare gains.

Table 4.6 Age Heterogeneity in the relationship between Mobile Payment, Financial Inclusion and Household Consumption: A simultaneous Quantile Regression Result

	Log Consumption	Cons-Quint	Cons-Quint	Cons-Quint	Cons-Quint	Cons-Quint
VARIABLES	OLS	q10	q25	q50	q60	q75
Mobile Payment	-0.483***	0.703**	0.406**	0.178	0.191	0.177
	-0.0849	-0.344	-0.163	-0.11	-0.117	-0.136
Bank account	0.178***	0.0869	0.329	0.655***	0.569***	0.171
	-0.0671	-0.257	-0.225	-0.16	-0.146	-0.124
Formal Saving	-0.0922	0.701**	0.642***	0.292**	0.159	0.109
	-0.0645	-0.28	-0.177	-0.126	-0.122	-0.109
Formal Saving	-0.0225	0.427	-0.164	0.222	0.041	0.269***
	-0.104	-0.575	-0.337	-0.174	-0.131	-0.0916
Formal Borrowing	-0.121	0.0135	0.299	0.0447	-0.0612	-0.122
	-0.0801	-0.277	-0.207	-0.163	-0.156	-0.123
Mobile Payment_Age	0.00183	-0.00636	-0.00206	-0.000156	-0.00081	-0.00205
	-0.00202	-0.00812	-0.00306	-0.00234	-0.00297	-0.00313
Bank account_Age	-0.00373**	0.0101	0.00877*	-0.00113	-0.00312	0.00179
	-0.00158	-0.00703	-0.00518	-0.00368	-0.00346	-0.00258

Saving_Age	0.00211	-0.00653	-0.00777*	-0.000963	0.00164	0.00152
	-0.00152	-0.00678	-0.00408	-0.00293	-0.00284	-0.00239
Borrowing_Age	0.000793	-0.000389	-0.00491	-0.000581	0.00112	0.00154
	-0.00181	-0.00606	-0.00424	-0.00396	-0.00412	-0.00276
Insurance_Age	4.35E-05	-0.00725	0.00553	-0.000784	0.00367	-0.00267
	-0.00237	-0.0128	-0.00854	-0.0054	-0.0037	-0.00192
Household Size	-0.0307***	-0.340***	-0.331***	-0.272***	-0.253***	-0.174***
	-0.00432	-0.0229	-0.017	-0.00924	-0.00929	-0.0136
Distance to the nearest FI	-0.000225***	0.000347	0.000248	0.000128	7.13E-05	1.72E-05
	-8.61E-05	-0.000536	-0.000376	-0.000162	-0.000139	-0.000141
Gender	0.0626***	-0.138	-0.150***	-0.112***	-0.142***	-0.0977**
	-0.0229	-0.0886	-0.0576	-0.0432	-0.0518	-0.044
Religion	-0.00723	-0.364***	-0.297***	-0.199***	-0.142***	-0.0636*
	-0.0199	-0.0624	-0.0576	-0.0374	-0.0468	-0.0339
Marital Status	0.0981***	-0.0857	-0.00879	0.104**	0.147***	0.148***
	-0.0239	-0.0722	-0.0665	-0.0508	-0.057	-0.0402
Education	0.157***	0.551***	0.523***	0.560***	0.461***	0.369***
	-0.0213	-0.0692	-0.0637	-0.0524	-0.0688	-0.068
<i>Iddir</i>	-0.0981***	0.00583	-0.00739	0.036	0.0671*	0.0701**
	-0.0179	-0.046	-0.0514	-0.0303	-0.0377	-0.0317

Financial Shock	-0.174***	-0.113*	-0.157***	-0.0667**	-0.0705**	-0.0451
	-0.0174	-0.0636	-0.0505	-0.0296	-0.0348	-0.03
Asset Ownership	-0.510***	-0.141	0.00703	0.00444	-0.0519	-0.0333
	-0.0346	-0.153	-0.103	-0.0289	-0.0363	-0.0621
Saving for Old Age	-0.0851***	0.0606	0.146*	0.0132	0.0367	0.0817
	-0.0295	-0.15	-0.0861	-0.0589	-0.0611	-0.0509
Age	0.00496***	6.16E-05	0.000133	0.00356	0.00234	0.000644
	-0.00107	-0.00386	-0.0041	-0.00353	-0.00323	-0.00295
Financial Literacy	0.257***	0.0536	0.0285	0.0566	0.0442	0.00627
	-0.0191	-0.0754	-0.0453	-0.0487	-0.0357	-0.0376
Constant	10.71***	3.117***	3.746***	3.974***	4.372***	4.760***
	-0.0562	-0.244	-0.226	-0.201	-0.168	-0.167
Observations	4,480	4,492	4,492	4,492	4,492	4,492
R- Squared	0.181					

Bootstrap Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Education Heterogeneity

The estimates in Table 4.7 reveal significant heterogeneity in the relationship between Mobile Payment and financial inclusion and household consumption across education levels, as reflected in the SQR interaction terms. The most compelling evidence is found with mobile payment adoption, where there is a highly significant positive influence on consumption in all but the lowest quantiles (e.g., 0.672 at the 25th percentile and 0.471 at the median, both highly significant at the 1% level). This positive influence, however, is much weaker in educated household. The education interaction term for mobile payment is negative and statistically significant at the 25th (-0.414) and 50th (-0.360) quantiles of consumption both at the 1% level, and at the 60th quantile (-0.229, $p < 0.05$). This would mean that mobile payments increase consumption by lower- and middle-income families but that the marginal influence diminishes with increases in education levels, perhaps due to increasingly diversified financial resources or risk-averse consumption by the educated. This is consistent with findings reported by (Jack & Suri, 2014), who showed that mobile money had its largest influence on financial security and smoothing consumption by less-educated poor households in Kenya. Also, (Demirguc-Kunt et al., 2018) put across that mobile money had the most influence on financial inclusion on Sub-Saharan Africa's less educated due to the fact that they are more likely to have access to the existing traditional financial products.

In the context of ownership of bank accounts, schooling's influence is also opposite on the consumption path. For the 10th quantile, the interactive term is positive and significant (0.333, $p < 0.05$), which implies that in the context of the very poor household, education stimulates the consumption-increasing influence of bank account ownership. It implies that educated poor families are better placed to make proper use of formal financial products in order to live well. But the same pattern is observed in the opposite direction for the richer segment of the distribution. At the 75th percentile, the interaction term is significant and negative (-0.319, $p < 0.05$), which indicates that in richer families, educational attainment decreases the value of having a bank account in terms of consumption. This could be because of the law of diminishing marginal utility of inclusion for already highly educated and high-income individuals who may already enjoy greater access to a broader range of financial instruments and better consumption smoothing arrangements. These trends are consistent to a great extent with

(Allen et al., 2016), who state that whereas education increases use among the poor, its effect on others who are already financially well-off is less.

Moreover, there are adverse interaction influences of formal borrowing with education in the lower quantiles. Interaction terms are weakly significant and negative (-0.333, $p < 0.1$) at both percentiles of 10 and 25. This suggests that within poor households, the positive effect of formal borrowing on consumption is less for those who are more educated. This may be interpreted as having a greater proportion of educated people in poor groups either being risk-averse or more prudent in borrowing, or, on the other hand, being exposed to lower levels of credit access irrespective of education level. This is also highlighted by (Banerjee et al., 2015), who provided evidence that access to microcredit is not necessarily accompanied by consumption growth, especially among those people that assess risks more negatively. The educational interaction terms with the other two financial inclusion variables formal saving and formal insurance, are not statistically significant in all quantiles.

That is, the marginal influence of education on such financial instruments' contributions to household spending is negligible or does not fluctuate significantly enough to be detected. Yet, it has a direct, substantial, and positive influence at the 10th (0.333, $p < 0.05$) and 75th (0.222, $p < 0.1$) quantiles, showing some generalized consumption benefits from saving, mainly for the poorest and the richest households. Estimation presents strong evidence of heterogeneity by education in FINTECH and financial inclusion influences on Ethiopian consumer spending.

Specifically, education enhances the consumption influences of financial inclusion for the poorest segments (e.g., usage of a bank account) but reduces the influences of FINTECH (use of mobile money) and formal credit along lower and middle quantiles. These results underscore the necessity of formulating differentiated financial inclusion policies taking into account both household education and consumption. These policies are needed for achieving maximum welfare gains from financial technology and inclusion efforts, especially in the context of developing countries. In summary, the evidence supports strong empirical evidence for education heterogeneity in the FINTECH-household consumption relationship, financial inclusion-household

consumption relationship in Ethiopia. Education reinforces the influences of financial inclusion on consumption for vulnerable households (e.g., bank account holding), but undermines the marginal effects of usage of mobile payments and formal credit usage for low- and middle-income households. In this regard, these results underscore the need for formulating differentiated financial inclusion policies that will take into account the education level of the affected population, in addition to the income and availability. In this respect, (Suri & Jack, 2016; Zins & Weill, 2016) and others call for education-sensitive FINTECH and financial inclusion in low-income countries to avoid further expansion of existing disparities.

Table 4.7 Education Heterogeneity in the Influence of Mobile Payment and Financial Inclusion on Household Consumption: Evidence from Simultaneous Quantile Regression

VARIABLES	Log Consumption	Cons-Quint	Cons-Quint	Cons-Quint	Cons-Quint
	OLS	q10	q25	q50	q60
Mobile Payment	-0.407***	0.444***	0.672***	0.471***	0.333***
	-0.0556	-0.172	-0.123	-0.15	-0.101
Bank account	-0.000537	0.222*	0.666***	0.659***	0.665***
	-0.0416	-0.127	-0.158	-0.131	-0.176
Formal Saving	-0.0266	0.333**	0.165	0.204	0.179
	-0.0434	-0.133	-0.134	-0.151	-0.153
Formal Insurance	-0.0139	0	-0.0261	-0.12	0.197
	-0.0678	-0.255	-0.274	-0.334	-0.223
Formal Borrowing	-0.0921*	0.222	0.319*	0.165	0.0676
	-0.0499	-0.155	-0.182	-0.149	-0.185

Mobile Payment _Education	-0.00498	0	-0.414***	-0.360***	-0.229**
	-0.064	-0.239	-0.152	-0.132	-0.0988
Bank account _Education	0.0449	0.333**	0.0482	-0.0968	-0.263
	-0.0498	-0.164	-0.174	-0.177	-0.208
Formal Saving _Education	0.0228	0.222	0.202	0.058	0.0627
	-0.05	-0.221	-0.154	-0.165	-0.172
Formal Borrowing _Education	0.00648	-0.333*	-0.333*	-0.165	-0.0826
	-0.059	-0.187	-0.195	-0.151	-0.195
Formal Insurance _Education	-0.0109	0.111	0.0868	0.318	-0.0158
	-0.0794	-0.402	-0.327	-0.349	-0.255
Household Size	-0.0310***	-0.333***	-0.333***	-0.275***	-0.250***
	-0.00432	-0.0133	-0.00931	-0.0136	-0.0131
Distance to the nearest FI	-0.000224***	0	0.000251	0.000119	6.97E-05
	-8.62E-05	-0.000809	-0.000335	-0.000259	-0.000173
Gender	0.0605***	-0.111	-0.124**	-0.125**	-0.121***
	-0.0229	-0.0957	-0.0612	-0.0494	-0.026
Religion	-0.00622	-0.333***	-0.290***	-0.195***	-0.152***

	-0.0199	-0.0948	-0.0672	-0.0527	-0.0435
Marital Status	0.0980***	-0.111	-0.0384	0.111*	0.128***
	-0.0239	-0.102	-0.0771	-0.0633	-0.0347
Education	0.129***	0.333***	0.491***	0.627***	0.637***
	-0.0305	-0.112	-0.116	-0.0916	-0.111
<i>Iddir</i>	-0.0964***	0	0.00022	0.0468	0.0681**
	-0.018	-0.0602	-0.0405	-0.0365	-0.0322
Financial Shock	-0.173***	-0.111*	-0.183***	-0.0839*	-0.0858**
	-0.0175	-0.0583	-0.0603	-0.0449	-0.034
Asset Ownership	-0.511***	0	0.0608	0.012	-0.0644*
	-0.0346	-0.153	-0.124	-0.0311	-0.0376
Saving for Old Age	-0.0822***	0.111	0.103	0.0259	0.0341
	-0.0296	-0.138	-0.108	-0.0452	-0.0587
Age	0.00402***	0	0.000603	0.00205	0.00114
	-0.000618	-0.00192	-0.00197	-0.00136	-0.00152
Financial Literacy	0.256***	0	0.0296	0.0659*	0.0553
	-0.0191	-0.0782	-0.0627	-0.037	-0.0342
Constant	10.76***	3.222***	3.758***	4.018***	4.265***
	-0.0446	-0.184	-0.16	-0.0927	-0.133
Observations	4,480	4,492	4,492	4,492	4,492
R-Squared	0.18				

Bootstrap Standard errors in parentheses

***** p<0.01, ** p<0.05, * p<0.1**

4.3.4 Financial Inclusion & Entrepreneurship

The average marginal effects estimate in Table 4.9 presents some of the most important determinants of business ownership. Financial inclusion has a significant positive influence on the probability of being entrepreneurial in nature. The result indicates that one –unit increase in financial inclusion index (FI_Index) is linked with 18.5 percentage point increase in the probability of owning a business (Refer to Appendix D for the details on Index construction). The estimate is statistically significant at 5% level. This implies that, there is sufficient proof that financial inclusion influences entrepreneurship in a positive and significant manner. The result is consistent with (Ajide, 2020; Fan & Zhang, 2017; Fareed et al., 2017; Goel & Madan, 2019; Neumark et al., 2011) who demonstrate the positive and significant influence of financial inclusion on *Table* entrepreneurship in both informal and formal sector.

Table 4.8 The Influence of Financial Inclusion on Household Entrepreneurship: A Multivariate Probit Result.

Variables	Own Trading Business	Own Non-Agricultural Business	Own Professional Offices	Own Bar or Restaurant
FI_index	0.185**	0.149**	0.393**	0.280*
	(0.0813)	(0.0595)	(0.176)	(0.159)
Mobile Payment	-0.117	-0.104	-0.180	-0.103
	(0.110)	(0.0789)	(0.198)	(0.182)
Log household Size	0.159**	0.277***	-0.0235	0.291**
	(0.0675)	(0.0491)	(0.118)	(0.114)
Log Distance	0.0117	-0.0690***	-0.0730*	0.00637
	(0.0221)	(0.0170)	(0.0433)	(0.0387)
Marital Status	-0.0621	-0.0262	-0.0150	-0.0544
	(0.0894)	(0.0661)	(0.161)	(0.148)
Financial Literacy	-0.0119	-0.0128	0.101	0.226
	(0.0897)	(0.0671)	(0.193)	(0.181)
Asset Ownership	0.124	0.254***	0.231	0.345**
	(0.120)	(0.0882)	(0.175)	(0.169)
Gender	0.0967	0.0618	0.160	-0.210

	(0.0866)	(0.0641)	(0.160)	(0.142)	
<i>Iddir</i>	0.196***	0.114**	0.0140	-0.238*	
	(0.0707)	(0.0514)	(0.126)	(0.122)	
Age	-0.00796***	-0.00329	0.00136	0.00949**	
	(0.00288)	(0.00202)	(0.00497)	(0.00460)	
Religion	-0.143**	-0.0824	0.164	0.260*	
	(0.0726)	(0.0543)	(0.145)	(0.143)	
Education	-0.0663	0.0449	0.000873	0.103	
	(0.0863)	(0.0650)	(0.176)	(0.161)	
Financial Shock	0.120*	-0.0302	0.0138	-0.159	
	(0.0673)	(0.0487)	(0.116)	(0.111)	
Urban – Rural Area	-0.434***	-0.313***	-0.149	-0.201	
	(0.0964)	(0.0718)	(0.193)	(0.175)	
Financial Capability	-0.00136	0.0917*	0.117	0.147	
	(0.0735)	(0.0540)	(0.130)	(0.126)	
Constant	-1.591***	-1.311***	-2.920***	-3.370***	
	(0.170)	(0.126)	(0.344)	(0.328)	
Observations	4,421	4,421	4,421	4,421	
atrho21	atrho31	atrho41	atrho32	atrho42	atrho43
-0.00780	-0.0850	0.299***	-0.0739	-0.113	0.198**
(0.0378)	(0.0914)	(0.0813)	(0.0757)	(0.0783)	(0.101)
Log likelihood = -3126.0747					
Wald chi2(60) = 267.16 ; Prob > chi2 = 0.0000					
Likelihood ratio test of rho21 = rho31 = rho41 = rho32 = rho42 = rho43 = 0:					
chi2(6) = 24.8766 ; Prob > chi2 = 0.0004					
Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1					

Table 4.9 Average Marginal Effects of Financial Inclusion on Household Entrepreneurship

Variables	Marginal Effects	Std.Err.	Z	P>z	[95%Conf	Interval]
FI_Index *	0.185	0.081	2.280	0.023	0.026	0.345
Mobile Payment	-0.117	0.110	-1.060	0.290	-0.332	0.099
Log Household Size	0.159	0.067	2.360	0.018	0.027	0.292
Log Distance	0.012	0.022	0.530	0.596	-0.032	0.055
Marital Status	-0.062	0.089	-0.690	0.487	-0.237	0.113
Financial Literacy	-0.012	0.090	-0.130	0.894	-0.188	0.164
Asset Ownership	0.124	0.120	1.030	0.302	-0.111	0.359
Gender	0.097	0.087	1.120	0.264	-0.073	0.266
<i>Iddir(informal insurance)</i>	0.196	0.071	2.770	0.006	0.057	0.334
Age	-0.008	0.003	-2.760	0.006	-0.014	-0.002
Religion	-0.143	0.073	-1.970	0.049	-0.285	-0.000
Education	-0.066	0.086	-0.770	0.443	-0.236	0.103
Financial Shock	0.120	0.067	1.790	0.074	-0.012	0.252
Urban – Rural Area	-0.434	0.096	-4.500	0.000	-0.623	-0.245
Financial Capability	-0.001	0.074	-0.020	0.985	-0.145	0.143
*Authors Computations (Stata 15 Statistical Software)						

According to Table 4.9 , a one unit increase in an *Iddir* (community based informal insurance) is related to a 19.6 percentage point increase in the probability of engaging in own business. The result is significant at 1% level. It shows that evidence for the positive effects of participations in informal community insurance on household level

entrepreneurship is strong. The influence is economically (19.6%) and statistically significant (1% level of significance). The result reveals that informal financial networks provide an essential safety net that encourages individuals to take risk in pursuing entrepreneurial activities.

A rise in age by one year is linked to a 0.8 percentage point drop in the likelihood of business ownership. This suggests that with advancing age, people are less likely to be involved in their own businesses (Bernat et al., 2017; Llisterri et al., 2006). The finding holds at the 1% level of significance which indicates that there is sufficient proof that age has a negative influence on entrepreneurship.

Christian or other religions (non-Muslim) is associated with a 14.3 percentage point lower probability of business ownership than Muslim. The finding is consistent with the fact that Muslims are more likely to be entrepreneurs than Christians and others. The finding is statistically significant at the 5% level. The implication is that there is evidence that makes sense logically that religion matters in entrepreneurship.

Living in a rural area is associated with a 43.4 percentage point lower probability of engaging in entrepreneurship compared to living in an urban area. This suggests that individuals in rural areas are much less likely to engage in entrepreneurial activities than those in urban areas (A. Lyons et al., 2017; Sykes et al., 2016). The result is statistically significant at the 1% level. This shows that there is strong evidence that living in a rural area negatively influences the likelihood of entrepreneurship. The finding suggests that factors like infrastructure, access to markets, education, and financial services might be hindering entrepreneurship in rural areas.

A one-unit increase in the log of household size is associated with a 15.9 percentage point increase in the probability of engaging in entrepreneurship. This suggests that larger households are more likely to engage in entrepreneurial activities. Our finding shows that there is strong evidence that household size positively influences entrepreneurship. Larger households are more likely to engage in entrepreneurship, and this relationship is statistically significant at the 5% level.

A one-unit increase in asset ownership is associated with a 12.4 percentage point increase in the possibility of engaging in entrepreneurship. Evidence suggests that a positive relationship between asset ownership and entrepreneurship. However, asset ownership does not have a statistically significant influence on entrepreneurship in our model. The p-value of 0.302 suggests that asset ownership may not be a strong determinant of entrepreneurship. Distance shows a very weak and statistically insignificant association with entrepreneurship. The p-value of 0.596 suggests that distance does not significantly influence the possibility of entrepreneurship in this model.

Being married is associated with a 6.2 percentage point lower possibility of owning own business compared to being single. This suggests that marital status has a small negative influence on the likelihood of entrepreneurship and does not have a statistically significant influence on entrepreneurship, as shown by the high p-value. The finding tells us that whether a person is married or not does not meaningfully influence their likelihood of starting or running a business in this model. Being male is associated with a 9.7 percentage point increase in the possibility of engaging in entrepreneurship as compared to female. This suggests that males are slightly more likely to engage in entrepreneurial activities than females. The result is not statistically significant. This indicates that gender does not have a statistically meaningful influence on entrepreneurship in the model. Overall the findings reveal that, financial inclusion, household size, *Iddir* participation, age, and urban-rural are critical for business ownership. However, mobile payments, education, and financial literacy show weaker or insignificant influences.

4.3.5 Mobile Payment & Financial Inclusion

Findings of multivariate probit regression in Table 4.11 provide strong evidence about the influence of mobile payment and other determinants on financial inclusion in Ethiopia. FINTECH, at the national level, has a positive and statistically significant influence on take-up of formal saving and formal insurance. Specifically, it increases the probability of formal saving ($\beta = 0.192$, $p < 0.01$) and insurance coverage ($\beta = 0.200$, $p < 0.05$), which indicates its potential to expand coverage of these products. FINTECH positively, though statistically insignificant, influences on bank account ownership ($\beta = 0.0422$) and formal borrowing ($\beta = 0.0246$), which suggests other than digital access barriers may be hampering higher financial inclusion.

The results validate previous single country results that had reported the presence of a positive relationship between mobile payment and financial inclusion for African countries (Gosavi, 2018; Mbiti & Weil, 2016) and previous cross-country results (Demir et al., 2022). Aside from mobile payment, other household behaviours are also strong determinants of financial inclusion. Household size with larger household sizes is associated with lower chances of having a bank account and formally saving (Soumaré et al., 2016). Increased distance from banks and other financial institutions greatly reduces access to accounts, savings, and insurance (Abel et al., 2018; Mossie, 2022). Financial literacy is significant, positive financial inclusion determinant for everyone but nearly all indicators, such as borrowing (Abel et al., 2018; Akileng et al., 2018; Akudugu, 2013).

A significant gender difference is observed, with woman showing a higher likelihood of having formal savings. Urban residents are more financially included compared to rural residents, again reflecting persistent geographic differentials (Soumaré et al., 2016). Informal financial network membership in groups like *Iddir* has a very strong positive effect on all dimensions of inclusion, highlighting the complementary role to formal systems. Education (Abel et al., 2018; Mossie, 2022; Soumaré et al., 2016) and financial literacy extend inclusion even more, particularly in the likes of account ownership and savings. The influence of mobile payment at the regional level, however, is not quite dissimilar from Tigray (the reference category), and there are trends.

The SNNP zone is more likely to save, and urban cities such as Addis Ababa, Dire Dawa, and Harar also have negative but statistically insignificant correlations with financial inclusion. But Oromia and Benishangul have negative influence on borrowing and insurance. Areas such as Amhara, Afar, Somali, and Gambella show little deviation with Tigray in the mobile payment influence, yet Amhara has a greater engagement in saving and lending. On average, mobile payment has a significant contribution to formal insurance and savings, which contributes to Ethiopia's financial inclusion. It's access to borrowing and account holding remains low and maybe by disparity of infrastructure, geography, access to finance, and digital proficiency.

Table 4 10: The Influence of Mobile Payment on Financial Inclusion : A Univariate Probit Estimation Result

VARIABLES	(1)	(2)	(3)	(4)
	Bank Account Ownership	Formal Saving	Formal Borrowing	Formal Insurance
Mobile Payment	0.0526	0.201***	0.0267	0.200**
	(0.0754)	(0.0708)	(0.0788)	(0.0897)
Household size	-0.0377***	-0.0424***	0.00375	0.0180
	(0.0118)	(0.0111)	(0.0130)	(0.0160)
Distance to the nearest FI	-0.00184***	-0.00234***	3.32e-05	-0.00381**
	(0.000570)	(0.000567)	(0.000245)	(0.00150)
Marital status	-0.0592	-0.0333	-0.0554	0.0793
	(0.0613)	(0.0567)	(0.0653)	(0.0862)
Financial Literacy	1.443***	1.029***	-0.0239	0.366***
	(0.0550)	(0.0545)	(0.0649)	(0.0869)
Gender	-0.0466	0.0481	0.128	0.207
	(0.156)	(0.144)	(0.165)	(0.239)
Urban or Rural	-0.375***	-0.0815	-0.00310	0.317***
	(0.0553)	(0.0539)	(0.0621)	(0.0774)
<i>Iddir</i>	0.163***	0.175***	0.138***	0.219***
	(0.0494)	(0.0461)	(0.0532)	(0.0651)
Age	0.00373**	0.000102	-0.00906***	0.00317
	(0.00187)	(0.00175)	(0.00212)	(0.00252)
Religion	0.300***	0.278***	0.124**	0.318***
	(0.0504)	(0.0478)	(0.0573)	(0.0752)
Financial Capability	0.325***	0.679***	-0.0849	0.133**
	(0.0481)	(0.0442)	(0.0525)	(0.0641)
Education	0.430***	0.327***	-0.0570	-0.102
	(0.0577)	(0.0560)	(0.0663)	(0.0835)
Base Year : Tigray				
Afar	0.183	0.0396	-0.0988	0.190
	(0.111)	(0.105)	(0.123)	(0.160)

Amhara	0.247**	-0.0237	-0.0417	0.0724
	(0.107)	(0.100)	(0.115)	(0.160)
Oromia	0.0887	0.0261	0.0123	-0.136
	(0.145)	(0.135)	(0.156)	(0.233)
Somali	0.180	-0.00620	-0.130	-0.163
	(0.187)	(0.174)	(0.199)	(0.281)
Benishangul	0.173	0.0903	-0.0547	-0.139
	(0.194)	(0.180)	(0.205)	(0.288)
SNNP	0.0924	0.0257	-0.180	0.0607
	(0.187)	(0.174)	(0.200)	(0.276)
Gambella	0.267	0.0793	-0.112	-0.0632
	(0.189)	(0.175)	(0.200)	(0.280)
Harar	0.269	0.236	0.0262	-0.104
	(0.186)	(0.173)	(0.195)	(0.278)
Addis Ababa (city)	0.160	0.0377	-0.137	-0.129
	(0.177)	(0.165)	(0.189)	(0.269)
Dire Dawa (city)	0.293	0.204	-0.198	-0.0681
	(0.185)	(0.171)	(0.197)	(0.276)
Constant	-1.322***	-1.284***	-0.878***	-2.583***
	(0.129)	(0.122)	(0.138)	(0.190)
Observations	4,497	4,497	4,497	4,497

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4.11 The Influence of Mobile Payment on Financial Inclusion: A Multivariate Probit Result

VARIABLES	Bank Account Ownership	Formal Saving	Formal Borrowing	Formal Insurance
Mobile Payment	0.0422	0.192***	0.0246	0.200**
	(0.0752)	(0.0696)	(0.0789)	(0.0898)
Household Size	-0.0364***	-0.0415***	0.00340	0.0171
	(0.0117)	(0.0110)	(0.0129)	(0.0160)
Distance to the nearest FI	-0.00179***	-0.00243***	2.60e-05	-0.00378**
	(0.000585)	(0.000561)	(0.000243)	(0.00150)
Marital Status	-0.0614	-0.0411	-0.0554	0.0809
	(0.0607)	(0.0556)	(0.0652)	(0.0861)
Financial Literacy	1.446***	1.032***	-0.0208	0.370***
	(0.0554)	(0.0542)	(0.0649)	(0.0868)
Gender	-0.0587	0.0282	0.125	0.213
	(0.157)	(0.145)	(0.165)	(0.240)
<i>Iddir</i>	0.160***	0.173***	0.138***	0.218***
	(0.0492)	(0.0453)	(0.0532)	(0.0651)
Age	0.00368**	-0.000151	-0.00900***	0.00317
	(0.00186)	(0.00173)	(0.00211)	(0.00253)
Religion	0.287***	0.279***	0.122**	0.320***
	(0.0504)	(0.0474)	(0.0572)	(0.0752)
Education	0.429***	0.326***	-0.0577	-0.104
	(0.0579)	(0.0554)	(0.0663)	(0.0835)
Financial Capability	0.318***	0.676***	-0.0845	0.132**
	(0.0479)	(0.0435)	(0.0525)	(0.0642)
Urban /Rural	-0.370***	-0.0667	-3.32e-05	0.320***
	(0.0555)	(0.0535)	(0.0621)	(0.0773)
Base Region : Tigray				
Afar	0.206*	0.0654	-0.0935	0.192
	(0.111)	(0.103)	(0.123)	(0.160)
Amhara	0.253**	-0.0441	-0.0404	0.0706

	(0.106)	(0.0980)	(0.115)	(0.160)	
Oromia	0.125	0.0442	0.0165	-0.147	
	(0.146)	(0.136)	(0.156)	(0.235)	
Somali	0.202	0.00763	-0.129	-0.168	
	(0.187)	(0.174)	(0.199)	(0.283)	
Benishnagul	0.218	0.0972	-0.0521	-0.140	
	(0.195)	(0.179)	(0.205)	(0.289)	
SNNP	0.107	0.0361	-0.178	0.0559	
	(0.187)	(0.173)	(0.200)	(0.277)	
Gambella	0.302	0.115	-0.107	-0.0679	
	(0.189)	(0.174)	(0.200)	(0.281)	
Harar	0.302	0.246	0.0296	-0.109	
	(0.186)	(0.172)	(0.195)	(0.279)	
Addis Ababa (City)	0.190	0.0525	-0.134	-0.135	
	(0.178)	(0.165)	(0.189)	(0.271)	
Dire Dawa(City)	0.316*	0.218	-0.190	-0.0742	
	(0.185)	(0.171)	(0.197)	(0.277)	
Constant	-1.337***	-1.286***	-0.881***	-2.585***	
	(0.129)	(0.121)	(0.138)	(0.190)	
Observations	4,497	4,497	4,497	4,497	
atrho21	atrho31	atrho41	atrho32	atrho42	atrho43
0.661***	0.0920***	0.0769*	0.0206	0.0728*	-0.00967
(0.0304)	(0.0332)	(0.0409)	(0.0312)	(0.0384)	(0.0430)
Log likelihood = -6590.3141					
Wald chi2(88) = 2327.06 Prob >chi2 = 0.0000					
Likelihood ratio test of rho21 = 0.000 ; rho31 =0.005 ; rho41 =0.059 ; rho32 =0.511; rho42 =0.057 ; rho43 = 0.822					

Standard errors in parentheses

*** p<0.01, ** p<0.05, *<0.1

4.3.6 Mobile Payment & Entrepreneurship

The univariate probit model, which was estimated using robust standard errors based on a sample of 4,486 observations, gives useful information about the determinants of the probability of becoming an entrepreneur. The model, through the heteroskedasticity control by the application of robust standard errors, renders the inference more consistent and therefore more appropriate for better understanding the key drivers of entrepreneurial activity.

Table 4.12 The Influence of Mobile Payment on Entrepreneurship: A Univariate probit result

VARIABLES	Entrepreneurship (Owning Trading Business)
Mobile Payment	-0.348**
	(0.163)
<i>Iddir</i>	0.140**
	(0.0704)
Mobile Payment_ <i>Iddir</i>	0.438**
	(0.218)
Formal Borrowing	0.114
	(0.0928)
Log Annual Consumption	0.224
	(0.235)
Household Size	0.0201
	(0.0158)
Marital Status	-0.0460
	(0.0845)
Asset Ownership	0.137
	(0.119)
Mobile Phone Ownership	0.0224
	(0.0763)
Gender	-0.0679
	(0.0693)
Age	-0.00575**
	(0.00262)
Religion	-0.103
	(0.0719)
Financial Capability	0.0802
	(0.0653)

Education	0.0468
	(0.0846)
Formal Insurance	-0.0510
	(0.136)
Tigray : Base Year	
Afar	0.333*
	(0.184)
Amhara	0.0395
	(0.218)
Oromia	0.135
	(0.241)
Somali	0.247
	(0.274)
Benishangul Gumez	0.0408
	(0.306)
SNNP	-0.145
	(0.322)
Gambella	-0.282
	(0.350)
Harar	-0.129
	(0.369)
Addis Ababa	-0.0609
	(0.415)
Dire Dawa	-0.101
	(0.556)
Constant	-3.974*
	(2.324)
Observations	4,486

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4.13 Marginal effects from probit model on the influence of Mobile Payment on Entrepreneurship

Variables	Marginal Effects	Std.Err.	Z	P>z	95%Conf.	Interval]
Mobile Payment	-0.036	0.017	-2.120	0.034	-0.069	-0.003
<i>Iddir</i>	0.014	0.007	1.980	0.048	0.000	0.029
Mobile Payment <i>_Iddir</i>	0.045	0.022	2.000	0.045	0.001	0.089
Formal Borrowing	0.012	0.010	1.230	0.218	-0.007	0.030
Log Annual consumption	0.023	0.024	0.950	0.340	-0.024	0.070
Household size	0.002	0.002	1.270	0.205	-0.001	0.005
Marital status	-0.005	0.009	-0.540	0.586	-0.022	0.012
Asset ownership	0.014	0.012	1.150	0.249	-0.010	0.038
Mobile phone ownership	0.002	0.008	0.290	0.769	-0.013	0.018
Gender	-0.007	0.007	-0.980	0.328	-0.021	0.007
Age	-0.001	0.000	-2.180	0.029	-0.001	-0.000
Religion	-0.011	0.007	-1.440	0.151	-0.025	0.004
Financial Capability	0.008	0.007	1.230	0.219	-0.005	0.021
Education	0.005	0.009	0.550	0.581	-0.012	0.022
Insurance	-0.005	0.014	-0.380	0.706	-0.033	0.022
Tigray: Base Year						
Afar	0.044	0.022	2.030	0.043	0.001	0.087
Amhara	0.004	0.022	0.190	0.851	-0.039	0.048
Oromia	0.015	0.024	0.640	0.521	-0.032	0.063

Somali	0.031	0.028	1.080	0.279	-0.025	0.086
Benishangul Gemuz	0.004	0.032	0.140	0.891	-0.058	0.066
SNNP	-0.013	0.032	-0.410	0.682	-0.077	0.050
Gambella	-0.023	0.034	-0.690	0.492	-0.089	0.043
Harar	-0.012	0.036	-0.330	0.743	-0.083	0.060
Addis Ababa	-0.006	0.042	-0.140	0.886	-0.087	0.076
Dire Dawa	-0.010	0.053	-0.180	0.856	-0.114	0.094

Note: dy/dx for factor levels is the discrete change from the base level.

Results of the univariate probit model (Table 4.12) and marginal effects of the model (Table 4.13) are of specific interest to reporting entrepreneurship determinants among Ethiopian households, with specific focus on mobile payment and non-institutional financial network impacts. Individual level and household level determinants are conveniently identifiable under this model as those exerting significant influence on entrepreneurial participation probability. The key explanatory variable, mobile payment also has a statistically significant negative coefficient with entrepreneurship. That is, households that utilize mobile phone payment have less opportunity to be entrepreneurial. The effect is at 5% level and marginal effect is the reduction by about 3.6 percentage points of being an entrepreneur. This counterintuitive finding suggests that even though mobile payment is widely promoted as a force for economic empowerment and financial inclusion, in reality, its utilization will more be prone to support consumption than business investment. This focuses the need on comprehending the use of mobile payment in a compounded and further complicated setup for different groups of individuals.

This aligns with the data from the Ethiopia Socioeconomic Survey (ESS) by CSA and the (World Bank, 2020), which established that the use of mobile money in Ethiopia is largely settling household bills and receiving remittances over productive purposes like the setting up of businesses. As for this aspect, (Demirgüç-Kunt et al., 2022) further emphasized that adoption of digital financial services in Ethiopia is limited to basic necessities, such as occasional use in either entrepreneurship or an investment.

Similarly, other Sub-Saharan African contexts also show the same outcomes. For instance, (Batista & Vicente, 2020) found in Mozambique that as mobile money had raised access to finance, it also raised consumption smoothing and had modest effects on the establishment of new businesses. In Kenya, (Suri & Jack, 2016) demonstrated that M-Pesa played a vital role in household well-being in the management of everyday money and not business investment. Indian studies by (Ghosh, 2016) inform us that mobile banking adoption in itself has no bearing on the development of microenterprises unless it is supported by access to credit and financial literacy.

These findings suggest that without complementing services such as start-up capital, digital financial literacy, and entrepreneurial mentorship, mobile payment alone might not be adequate to foster entrepreneurship. In other cases, it might even be discouraging it by enabling short-term consumption or leading to over-indebtedness, as has been seen in the digital credit markets in East Africa (CGPA, 2021). This reflects the need to employ a more sophisticated and multi-faceted framework in exploring mobile phone technology's contribution in different segments of society. On the other hand, however, the informal community-based insurance, *Iddir*, is positively and significantly linked to entrepreneurship. A household that is engaged in *Iddir* is about 1.4 percentage points more likely to be entrepreneurial. The finding agrees with the hypothesis that institutions of informal finance perform overall risk reduction and safety net roles which initiate entrepreneurial activity particularly where formal financial markets are underdeveloped or inaccessible.

This is approved by evidence given in (Dercon et al., 2005; Fafchamps & Lund, 2003), who demonstrate that insurance schemes in Ethiopia and other Sub-Saharan countries relieve families from shocks to income through the facilitation of entrepreneurship. Similarly, (Hogarth et al., 2005) emphasize the relief of liquidity shortages and encouragement of self-employment offered by community-based arrangements. Furthermore, the mobile payment_ *Iddir* interaction term is also a high positive determinant of entrepreneurship. Its marginal effect indicates that, among the already active households in *Iddir*, mobile phone payment increases the probability of being an entrepreneur by 4.5 percentage points. The above can be interpreted as a complementary relationship, where *Iddir*'s social capital and risk-sharing mechanisms support and

supplement the lead of mobile payment in entrepreneurship venture. This synergy is based on empirical evidence from (Cull et al., 2012), who believe that digital financial products are more successful when combined with credible informal institutions like savings groups.

(Batista & Vicente, 2020) further find that mobile payment services enable household investment activities most in Mozambique if supported by good informal networks. Similarly, in the context of Ethiopia too, the (World Bank, 2020) recommends that digital financial services of which mobile payment is a part, function optimally if they are framed within traditional community frameworks. More broadly, (Suri & Jack, 2016) argues from Kenya that access to mobile financial services like M-Pesa stimulated business ownership and moved poor households out of poverty, while (Demirguc-Kunt et al., 2018) admit that digital financial services aim to empower entrepreneurship by improving financial resilience. The above findings highlight the importance of the institutional environment most importantly the configuration between informal networks and digital innovation when digital financial services are in demand.

Amongst the control variables, Formal Borrowing has a positive but statistically no significant coefficient, showing that access to formal credit per se does not significantly influence entrepreneurial activity. Similarly, Log Annual Consumption, as a measure of household income, has a positive but no significant association with entrepreneurship. Maybe this suggests that wealthier households can demand greater resources but that wealth itself is not paralleled by business activity except in the absence of other intervening variables.

Household size also has a positive but not statistically significant coefficient and would indicate that bigger households may be having more support or labour resources to utilize but are not significantly distinct from one another when it comes to entrepreneurship. Marital Status is inversely related to entrepreneurial activity but not statistically significant, i.e., married or unmarried status has no proven effect here. When it comes to asset ownership, it is positively related to entrepreneurship but lack of statistical significance. Mobile Phone Ownership, as it could be interpreted to replace the presence of information and communication technology, has a weak positive yet

insignificant relationship, indicating that mobile phone ownership by itself would not be sufficient to induce entrepreneurial activity in the absence of complementing capabilities or resources.

Gender has a negative but not statistically significant coefficient and is thus potentially not stronger in making women less likely to be entrepreneurs, though this is not robust. But Age is negatively and statistically significant at 5%. The marginal effect is that with each extra year of age, the likelihood of being an entrepreneur declines by some 0.1 percentage points. This finding might be seen as an indication of more entrepreneurial activity in the younger cohort who would be more risk-tolerant or are more receptive to innovation. Religion is in negative and insignificant correlation, indicating religious faith or membership does not in practical terms influence entrepreneurial decision-making in this sample. Similarly, Financial Capability, defined in terms of knowledge and self-efficacy in relation to money, is positive but insignificant in relation to entrepreneurship. Education is found to be positive but statistically insignificant influence. This would mean that while education plays an important role, factors such as access to capital or social networks might play a more important role in determining entrepreneurial decisions.

Formal Insurance has a negative correlation with entrepreneurship, but the effect is statistically insignificant. This finding could be a result of low coverage or value perceived for formal insurance products by entrepreneurs. Lastly, regional dummies reveal that, relative to the base category Tigray, Afar is alone with a statistically significant and positive entrepreneurship coefficient. Afar households are approximately 4.4 percentage points more likely to be entrepreneurs, suggesting regional heterogeneity in economic opportunities, infrastructure, or policy support. The rest of the regions, Amhara, Oromia, Somali, Benishangul-Gumuz, SNNP, Gambella, Harar, Addis Ababa, and Dire Dawa, don't exhibit statistically differently entrepreneurial participation levels from Tigray. The findings indicate that independent use of FINTECH has a negative correlation with entrepreneurship. However, has a strong positive effect when employed in conjunction with other informal financial institutions such as *Iddir*. The latter can be understood as emphasizing the institutional and contextual supporting roles in achieving the potential efficiency of digital financial services. Apart from that, the limited explanatory power of most socio-demographic

variables indicates that encouraging entrepreneurship in Ethiopia would have to be more focused with the inclusion of formal and informal financial mechanisms, building institutional trust, and considering regional differences.

4.4 Model Selection and Robustness Check

The choice of the appropriate model for the analysis was accomplished by directly comparing Ordinary Least Square (OLS) with Simultaneous Quantile Regression (SQR). This is because Simultaneous quantile regression has a number of advantages when dealing with heterogeneous data or where one needs to determine more than the mean. While, OLS gives a point estimate of the mean relationship of predictors to the dependent variable, quantile regression allows the estimation of effects at various points (quantiles) of the distribution. It also allows a better insight of the data (Koenker, 2005). Quantile regression is not as sensitive to outliers and non-normality. It also provides robust estimates even when faced with heteroscedastic or skewed data (Iddrisu et al., 2022; Koenker, 2005).

It also offers greater flexibility in terms of the ability to capture non-linear effects and examining how predictors affect different segments of the population low, middle, and high income segments (Koenker & Hallock, 2001). Quantile regression is also useful for policy analysis. That is because it is able to reveal the way interventions can influence various subgroups such as low- or high-income families. In addition, by estimating several quantiles at once, Simultaneous Quantile Regression (SQR) is more effective on large datasets than performing separate regressions for every quantile(Koenker, 2005).

The validity of the test results for multivariate probit model is confirmed by several statistical tests. Wald chi-square test produces a significant finding of 267.16 ($p = 0.0000$) exhibiting the significance of the model and the practical contribution of independent variables to the dependent variables. Likelihood ratio test for correlation coefficients (rho values) gives $\chi^2(6) = 24.8766$ ($p = 0.0004$). The result shows significant interdependence between error terms. It also merits the application of a multivariate model. Additionally, the coefficients for atrho41 (0.299) and atrho43 (0.198) are significant at levels 1% and 5% respectively ($p = 0.01$ and 0.05). The result in this case means that the paired equations have a significant relationship. A log-likelihood value of

-3126.0747 implies that the model is a good fit. The findings suggest that the model is reliable to explain variable interactions and identify interdependence in error terms.

To test the robustness of the findings, the results of the Univariate Probit model is compared with the results of Multivariate Probit model (See table 4.10 and table 4.11). They both present the same findings on the influence of mobile payment on financial inclusion indicators. In both models, mobile payment has a positive and significant effect on formal saving and formal insurance. Despite similar results for the two models, the Multivariate Probit model is a better fit in this analysis since it is able to capture possible interdependence between financial inclusion indicators. For example, individuals who use one type of formal finance, such as saving, are more likely to use others, such as borrowing or insurance. Estimating the indicators together, multivariate probit yields more efficient and accurate estimations. Hence, it is the preferred choice to predict the main study. To account for potential heteroskedasticity, the probit model was re-estimated using robust standard errors. The direction and significance of the main coefficients, including mobile payment and *Iddir*, remained unchanged, in favour of the robustness of the results (Refer to Appendix B).

4.5 A Summary of Research Hypotheses and Empirical Findings

This section summarizes the key hypotheses and empirical findings on the influence of mobile payment, financial inclusion and informal finance on household consumption and entrepreneurship in Ethiopia. Using models like OLS, simultaneous quantile regression and interaction terms, the results confirm how these financial tools influence different population groups. The tables below compare expected associations with actual outcomes, showing where evidence supports or contradicts the hypotheses. The summary also underscores the importance of heterogeneity across gender, age, education, region, location and financial access in shaping household economic behaviour.

Table 4.14 Summary of Hypothesis and Empirical Findings: H1

Hypothesis (H1)	Model	Expected Association	Empirical Result	Conclusion
H1: There is a positive and significant relationship between mobile payments and household consumption.	OLS	Positive & Significant	Negative and significant ($\beta = -0.410$, $p < 0.01$)	Contradicts hypothesis i.e mobile payments linked with lower Consumption overall in linear model.
	Quantile q10	Positive & Significant	Positive and significant ($\beta = 0.520$, $p < 0.05$)	Mobile payments increase consumption for lowest consumption households
	Quantile q20	Positive & Significant	Positive and significant ($\beta = 0.333$, $p < 0.05$)	Positive effect continues among lower-middle consumption groups
	Quantile q50	Positive & Significant	Positive and significant (exact coefficient not specified)	Positive effect sustained at median consumption levels
	Quantile q80	Positive and significant	Not significant	Mobile payments do not affect consumption among higher consumption households
	Quantile q90	Positive and significant	Not significant	No effect observed among top quantile; supports heterogeneity in FINTECH effect.

Table 4.15 Summary of Hypothesis and Empirical Findings: H2

Influence of Financial Inclusion on Household Consumption (H2)	Model	Expected Association (H2)	Empirical Result	Conclusion
Bank Account Ownership	OLS	Positive and significant	Negative & Insignificant	Contradicts hypothesis in linear model.
Bank Account Ownership	Quantile q20–q80	Positive and significant	Positive and significant (from q20 to q80)	Supports H2; account access boosts consumption at most income levels.
Formal Saving	OLS	Positive and significant	Negative & insignificant effect	Not directly mentioned, but effect is consistently positive in quantile model.
Formal Saving	Quantile q10–q90	Positive and significant	Positive and significant at all quantiles	Strong support for H2; saving increases consumption especially for low-consumption households.
Formal Insurance	OLS	Positive and significant	Negative & Insignificant	Effect mainly visible in quantile results.
Formal Insurance	Quantile q10–q50	Positive and significant	Positive and significant at lower and middle quantiles	Formal insurance enhances consumption among low- to middle-income groups.
Formal Borrowing	OLS	Positive and significant	Negative but significant result	Contradicts hypothesis; borrowing reduces consumption overall.
Formal Borrowing	Quantile q10	Positive and significant	Positive effect at q10 only	Borrowing helps only low-income households; may worsen outcomes for others.

Table 4.16 Summary Hypothesis and Empirical Findings:H3

Influence of mobile payment and financial inclusion on demographics (H3)	Expected Results (H3)	Actual Findings and Conclusions
Gender	The influence of mobile payment and financial inclusion on household consumption varies by gender.	Mobile payments positively influence women’s consumption at higher quantiles; bank account ownership benefits women significantly; formal insurance improves poorest female-headed households’ consumption; borrowing influence is insignificant
Age	The influence of mobile payment and financial inclusion on consumption varies by age.	The influence of mobile payment is not significant across ages; bank account holding increases consumption for younger people at lower-middle quantiles; formal saving benefits younger people at low quantiles; borrowing and insurance show no age variation.
Education	The influence of mobile payment and financial inclusion on consumption differs by education level.	Mobile payments raise consumption mostly for less-educated; education reduces mobile payments’ marginal effect at middle quantiles; bank accounts raise consumption in poor educated but less so for richer educated; borrowing’s influence is negative for educated poor.
Urban vs Rural	The influence of mobile payment and financial inclusion on	Mobile payment and financial inclusion increase consumption in urban areas; negative or weak influences in rural areas; mobile payment has negative influences at

	consumption varies by urban-rural location.	low rural quantiles but positive for middle-to-high quantiles; formal saving and insurance weaker in rural areas.
Regional Variation	Regional heterogeneity exists in the relationship between mobile payment, financial inclusion and consumption.	Dire Dawa and Addis Ababa show highest consumption gains across quantiles; Gambella, Harar, SNNP better at low quantiles; Afar and Amhara show mixed association; Oromia and Somali lag behind in consumption across most quantiles.

Table 4.17 Summary of Hypothesis and Empirical Findings: H4

Hypothesis	Variable	Expected Association	Empirical Result	Conclusion
H4: Financial inclusion positively and significantly influences household-level entrepreneurship.	FI_Index (An Index for Formal Finance) (See Appendix D)	Positive and significant	0.185**, statistically significant at 5%	Strong support for H3; financial inclusion increases probability of business ownership by 18.5%.
	<i>Iddir</i> (Informal Finance)	Positive and significant	0.196***, statistically significant at 1%	Strongly supports that informal finance encourages entrepreneurship by reducing risk.

Table 4.18 Summary of Hypothesis and Empirical Findings:H5

The influence of mobile payment on Financial Inclusion Indicators (H5)	Hypothesized Association (H5)	Actual Empirical Result	Conclusion
Bank Account Ownership	Positive and significant influence of mobile payment on account holding	$\beta = 0.0422$; Not statistically significant	Partially supports H4 – Positive but insignificant relationship
Formal Saving	Positive and significant influence of mobile payment on formal saving	$\beta = 0.192$; Statistically significant at 1% level (**)	Supports H4 – Strong and significant positive relationship
Formal Borrowing	Positive and significant influence of mobile payment on formal borrowing	$\beta = 0.0246$; Not statistically significant	Partially supports H4 – Positive but insignificant relationship
Formal Insurance	Positive and significant influence of mobile payment on formal insurance uptake	$\beta = 0.200$; Statistically significant at 5% level (**)	Supports H4 – Significant positive contribution

Table 4.19: Summary of Hypothesis and Empirical Findings:H6

Influence of mobile payment on Entrepreneurship (H6)	Hypothesized Association (H6)	Actual Empirical Finding	Conclusion
Mobile payment	Positive and significant influence on entrepreneurship	Negative coefficient (significant at 5%); marginal effect: -3.6 percentage points	FINTECH used alone reduces likelihood of entrepreneurship
<i>Iddir</i>	Positive and significant moderation of mobile payment's influence; encourages entrepreneurship	Positive and statistically significant influence; marginal effect: +1.4 percentage points	<i>Iddir</i> promotes entrepreneurship
Mobile payment × <i>Iddir</i>	Mobile payment's positive influence on entrepreneurship is stronger when combined with <i>Iddir</i>	Positive and statistically significant interaction term; marginal effect: +4.5 percentage points	<i>Iddir</i> moderates the effect of Mobile payment on entrepreneurship
Formal Borrowing	Expected to support entrepreneurship	Positive but statistically insignificant	Credit access alone not a strong determinant

CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Summary of Key Findings

This research examines mobile payment usage as one measure of financial technology, in relation to financial inclusion and informal finance, specifically *Iddir*, and their joint influences on household consumption and entrepreneurship in Ethiopia. It utilizes a mixture of ordinary least square and simultaneous quantile regression models for household consumption and the probability models to estimate the influences of the study variables on financial inclusion and entrepreneurship. These methods identify a number of interesting findings.

1) Role of Mobile Payments on Consumer Spending

This study investigates the relationship between mobile payment usage and household consumption in Ethiopia using Ordinary Least Squares (OLS) and Quantile Regression (QR) models. The result from OLS gives a negative and statistically significant relationship between mobile payment usage and overall consumption. But the quantile regression provides a more complex and richer picture. Specifically, mobile payments have positive and substantial consumption influence at lower and middle quantiles (Q10 and Q20), but the relationship declines and ceases to be statistically significant at upper quantiles (Q80 and Q90). This suggests that mobile payments are particularly valuable for lower- and middle-income consumers, quite possibly by alleviating liquidity constraints and improving access to funds for day-to-day finance

2) Role of Socioeconomic Determinants in Shaping Consumption

Socioeconomic determinants play an important role in explaining consumption behaviour at the household level. Education and marital status are uniformly strong positive determinants of consumption, particularly at lower quantiles. This can be explained by the general contribution of human capital and household stability to economic well-being. Determinants such as age, financial knowledge, family size, and ownership of assets exhibit mixed or statistically weak effects on the distribution of consumption. Interestingly, rural consumers spend much less than urban consumers, particularly at lower quantiles, reflecting underlying geographic disparities. Religion has a negative

impact on consumption at lower levels, but gender does not significantly affect any quantile, indicating little difference in consumption spending based on gender.

3) Informal Institutions and Consumption Smoothing

The social institution's function, in this instance *Iddir*, is complex. OLS estimates are that membership of *Iddir* has a negative correlation with consumption, but quantile regression detects a turning point for positive effect at higher and middle quantiles of consumption. This implies that *Iddir* is acting to cushion consumption for better-off households but perhaps is less accessible or of lesser effect for poorer households. These findings indicate the constraints of informal finance instruments towards addressing consumption needs for the most vulnerable, as well as how they continue to be appealing to more secure, higher income groups.

4) Financial Inclusion and Household Consumption

Principal financial inclusion indicators, bank account holding, saving, borrowing, and insurance, have heterogeneous consumption effects. Bank account holding is statistically insignificant in the OLS regression but has a significant and positive consumption relationship with respect to the 20th to 80th quantiles. Saving is a stronger push factor in the context of poorer households, underscoring the significance of saving habits in enhancing household welfare. Similarly, formal insurance helps poor and middle-class households smooth their consumption. Formal credit is negatively correlated in OLS but positively correlated in lower quantiles, suggesting that credit is good for the very poor if targeted well.

5) Heterogeneity by Demographic and Geographic Characteristics

FINTECH and financial inclusion vary in their effects across geographic and demographic segments. Urban consumers benefit more from mobile payments, savings, and lending under better financial infrastructure and digital availability. Poorer rural consumers feel weaker or even negative impacts. However, middle- and wealthier rural consumers also benefit from mobile payment technology and savings products. Regional wise, major cities like Addis Ababa and Dire Dawa have bigger consumption, while more underdeveloped regions of the country like Oromia and Somali lag behind, especially among better-off groups, which indicate that regional disparities continue.

6) Gender, Age, and Educational Variation in Outcomes

There are gender gaps in consumption patterns observed i.e men use more frequently mobile payments, insurance, and banking products. These do not extend, however, to great differences in consumption. Women and more populous households spend less on average, aggravating the underlying socio-economic gaps. Age has limited capacity for explaining variation in financial outcomes. While bank account usage benefits middle-age segments, other financial behaviour such as saving, borrowing, and insurance is largely age-insensitive. Education is a key driver, as educated households are more careful in using online services and formal financial products and even more cautious when it comes to borrowing

7) Mobile payment, Informal Finance, and Entrepreneurship

This paper also examines the influence of financial inclusion and demographics on household entrepreneurship. One of the findings is the strong positive effect of *Iddir* membership on business ownership - households with *Iddir* membership are 19.6 percentage points more likely to be entrepreneurs. This provides evidence for the importance of informal networks in their role in providing risk-sharing mechanisms that enable business activity. On the other hand, mobile payments are associated with a reduction in the probability of business ownership, which remains substantial. This suggests that mobile payment alone may not serve as an entrepreneurial catalyst unless it is complemented by adequate training, access to capital, market opportunities, trust in digital systems, digital literacy, and support from informal community-based insurance mechanisms such as *Iddir*.

8) Determinants of Entrepreneurship: By Demographics and Location

Entrepreneurship is strongly influenced by demographics and geography. Young adults are far more likely to be entrepreneurs, consistent with youth's ability to be flexible enough to take on entrepreneurial risk. Religious identity plays a role too i.e Christians and other religious groups are 14.3 percentage points below their probability to be entrepreneurs compared to Muslims, consistent with cultural and normative influences. Rural residence lowers the likelihood of business ownership by 43.4 percentage points, reflecting structural barriers such as inadequate infrastructure, unfavourable access to

market, and exclusion from formal financial institutions. Larger household sizes are positively related to entrepreneurship, whose plausible explanation lies in labour availability and income diversification requirements.

9) Limitations of Formal Financial Tools in Promoting Entrepreneurship

Not surprisingly, formal access measures such as account holding, formal borrowing, insurance, and even mobile payments have little or statistically insignificant effects on entrepreneurship. Also, gender and marital status do not appear to be predictors. It shows that formal financial service is not sufficient to trigger entrepreneurial activity without supportive ecosystems that incorporate skill training, infrastructure, and informal safety nets. The research highlights the unique contribution of informal institutions like *Iddir* to enhance mobile phone technology for business development, especially in resource-poor environments.

5.2 Conclusions

Ethiopia's financial inclusion strategy must be regionally adapted, demographically aware, and culturally crafted. The intersection of digital innovation and informal institution resilience as *Iddir*, with attention to gender equality and infrastructure limitation (especially in rural and underserved areas), is the best path towards inclusive growth. Linking technology, education, community outreach, and inclusive finance will relieve household inequality, entrepreneurship, and improve economic prosperity for all.

5.3 Specific recommendations

1) Tailoring Mobile Payment Systems to Ethiopia's Context

In order to expand mobile payment usage in Ethiopia, solutions must address the socio-economic and technological environment in the country. While there is growing mobile phone penetration, it is still the fact that extensive rural areas lack a stable network connection and electricity supply. The government and telecom regulators should enhance infrastructure, preferably through public-private partnership, and promote mobile coverage in un-served areas. Mobile payment systems must also be linguistically and culturally inclusive, providing local-language interfaces to accommodate Ethiopia's

linguistic heterogeneity and low literacy levels. To address affordability issues, services must be affordable, support USSD-based functionality, and be compatible with basic phones. National awareness campaigns led by well-regarded community institutions must create digital trust and inform users about the safety of mobile payments.

2) Expanding Formal Savings and Micro-Insurance for Vulnerable Groups

Ethiopia's income volatility and economic vulnerabilities necessitate tailor-made financial services. Banks and FINTECH providers must develop flexible savings products, such as step-up savings plans (which allow deposits to start small and gradually increase with income) and commitment savings plans (where households commit to saving regularly or until a set date), that reflect seasonal income patterns. Low-cost micro-insurance products must be affordable, culturally appropriate, and made available. Distribution of these products through *Iddir* groups can support community trust and increase take-up, especially in rural communities with shocks. Consumer protection has to be strengthened by transparent regulation and oversight by the National Bank of Ethiopia in order to provide fair prices and transparency in savings and insurance markets for building confidence among financially less educated segments.

3) Leveraging *Iddir* as a Bridge between Informal and Formal Finance

Ethiopia's socially based informal insurance institution, *Iddir*, has to be legally recognized and supported by capacity and legal institutions. The policymakers must facilitate the creation of hybrid financial products linking *Iddir* to formal institutions so that members are able to access savings and credit through mobile channels without losing social trust mechanisms. Rural *Iddir* groups can also be mobilized for entrepreneurship training, business development, and financial literacy, closing the gap due to the absence of formal banking coverage. It is recognizing the wide coverage of *Iddir*, especially in rural societies, that will lead inclusive access to finance.

4) Reducing Geographic and Gender Inequities in Access

To address long-standing disparities, policy interventions must target underdeveloped areas such as Oromia, Somali, Afar, and SNNPR. Local governments and communities must be at the forefront of scaling FINTECH, investing in infrastructure, and improving access to social protection in these areas. Urban-rural connectivity i.e transport, market

access, and communication improvement - can facilitate mobile commerce and reduce rural economic isolation. Financial inclusion initiatives must also target women, who are bound by mobility and cultural constraints. Gender-specific programs e.g., mobile training, customized loan products, and women-only savings groups must be co-designed with religious and community groups to promote cultural acceptability and access.

5) Embedding Financial Literacy in Educational and Cultural Systems

Sustained financial inclusion relies on mainstreaming financial and digital literacy within Ethiopia's national curriculum, taking into consideration regional variations and languages. Education should be accessible through community-based approaches involving churches, mosques, *Iddir* associations, and youth groups, offering localized education in money management and mobile technology. Alternative methods such as radio programming and community drama can have an effective penetration even among low-literacy individuals. They need to be prioritized in digital skill building due to demographic prevalence and prevailing disparities in financial access, thereby boosting overall financial capacity and FINTECH solution uptake.

6) Supporting Entrepreneurship through Inclusive and Adaptive Approaches.

To foster entrepreneurship, specifically among youth, specialized programs backed by start-up capital, mentorship, and incubation must be enhanced in urban and peri-urban centers. *Iddir* (informal social networks) can serve as a basis for risk-sharing and peer lending where formal collateral is lacking. Entrepreneurship in rural areas requires investment in infrastructure, market access, and mobile connectivity to improve local business growth. The policy changes should reduce administrative obstacles, simplify company registration, improve access to land, and raise a secure, transparent business climate encouraging enterprise development in all parts of the country.

7) Crafting Financial Products Responsive to Household Circumstances

The financial products must capture Ethiopia's household-level behaviour, foremost informal work and income uncertainty. Credit products must have flexible term repayment, grace, and low loan amounts that match changing cash flows. Savings-

linked credit products can increase borrower credit development and ease access. Finally, culture-sensitive products, such as Islamic-compliant finance, must be available in high Muslim-populated regions such as Somali and Afar to make services respectful and religion-sensitive.

8) Institutional Coordination and Political Commitment Strengthened

Deep financial inclusion requires collaborative effort by national institutions. The Ministries of Finance, Innovation and Technology, and the National Bank of Ethiopia must harmonize their policies and programs to improve their effectiveness and efficiency in the use of resources. Political stability, rule of law, and good governance are required to instil confidence and make investment in the financial sector attractive. Donor agencies and other overseas partners need to be engaged in fostering financial technology infrastructure, education, and innovation for the benefit of the national development aspirations of Ethiopia. They can offer valuable technical and financial contributions.

5.4 POLICY IMPLICATIONS

Generally, the findings underscore the need for context-specific financial inclusion policy responsive to consumption and entrepreneurial heterogeneity across households. The policies ought not to use the one-size-fits-all policy but give interventions specific to regional, urban-rural, gender, age, and educational heterogeneities. Investing in broader mobile infrastructure, integrating informal institutions like *Iddir* in overall financial policy, and institutionalizing saving and insurance channels are of utmost importance. Above all, mobile phone technology must be supplemented by investment in financial literacy, infrastructure, and social capital if it is to be transformative. Well-designed inclusive policy can turn mobile phone technology and financial inclusion into drivers of household welfare and inclusive economic growth in Ethiopia.

Future research should integrate behavioural finance and technology adoption theories to better understand mobile technology's impact on household consumption and entrepreneurship, further examine the role of informal institutions like *Iddir*, and adopt diverse methodologies, including longitudinal or mixed-method designs, to address causality and dynamic effects.

Financial institutions and mobile money providers should expand mobile phone technology access in rural areas, while community-based organizations like *Iddir* adopt digital systems for efficiency. Households should receive training in digital finance and entrepreneurship, use budgeting tools to optimize consumption, and leverage mobile payment technology for cooperative micro-investments to enhance income and welfare.

5.5 LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This study has several potential limitations that could be the basis for future research. First, the cross-sectional data does not allow for causal inference since there is the possibility of a bidirectional relationship between financial technology adoption, financial inclusion, and entrepreneurship. Therefore, it would be beneficial to use panel data or another technique that is able to capture these dynamics, such as longitudinal or experimental methods. Second, it might be judged that focusing on Ethiopia does not allow for generalizability of the findings. Therefore, future studies could be conducted that compare the situation in various Sub-Saharan Africa countries, possibly including institutional factors such as legal and regulatory systems.

Future research could add a more holistic view. Moreover, priority research gaps with particular reference to the Ethiopian context are less elaborated than they might otherwise be, e.g., rural-urban inequalities, gender relationships to digital finance uptake, utilization of informal financial institutions like *Iddir*, the influence of digital literacy, and the effectiveness of current policy interventions. Addressing these gaps would substantially enhance our knowledge of how financial technology can play a role in inclusive economic growth.

REFERENCES

- A. Koko, M., & Kachalla Mohammed, B. (2019). *Determinants of Participation in Entrepreneurial Activities Among Rural Households: Evidence From Borno State, Nigeria* (SSRN Scholarly Paper No. 3481068). Social Science Research Network.
- Abdella, M. (2024). *The Impact of Financial Inclusion on Household Wellbeing in Ethiopia*. 7(1).
- Abdullah, M., Wali Ullah, G. M., Sulong, Z., & Fuszder, H. R. (2025). The Impact of Fintech on Global Entrepreneurship and Business Development. In M. Moussa & A. McMurray (Eds.), *The Palgrave Handbook of Breakthrough Technologies in Contemporary Organisations* (pp. 399–414). Springer Nature Singapore. https://doi.org/10.1007/978-981-96-2516-1_31
- Abebe, A., & and Kegne, M. (2023). The role of microfinance on women's entrepreneurship development in Western Ethiopia evidence from a structural equation modeling: Non-financial service is the way forward. *Cogent Business & Management*, 10(3), 2256079. <https://doi.org/10.1080/23311975.2023.2256079>
- Abel, S., Mutandwa, L., & Le Roux, P. (2018). A review of determinants of financial inclusion. *International Journal of Economics and Financial Issues*, 8(3), 1.
- Abokyi, E., & Bettin, G. (2025). Financial inclusion and household consumption behaviour in Ghana. *Journal of Financial Economic Policy*, 17(3), 378–412. <https://doi.org/10.1108/JFEP-02-2024-0048>
- Abor, J. Y., Amidu ,Mohammed, & and Issahaku, H. (2018). Mobile Telephony, Financial Inclusion and Inclusive Growth. *Journal of African Business*, 19(3), 430–453. <https://doi.org/10.1080/15228916.2017.1419332>
- Adera, & Abdisa. (2023). *Full article: Financial inclusion and women's economic empowerment: Evidence from Ethiopia*. <https://www.tandfonline.com/doi/full/10.1080/23322039.2023.2244864>
- Aduda, J., & Kalunda, E. (2012). Financial inclusion and financial sector stability with reference to Kenya: A review of literature. *Journal of Applied Finance and Banking*, 2(6), 95.
- AFI. (2021). *Alliance for Financial Inclusion (AFI). (2021). Gender Inclusive Finance Policy Framework*.

- AFI. (2024). *Alliance for Financial Inclusion (AFI). (2024). Financial inclusion at record high in Kenya: Central Bank survey reveals.*
- Agarwal, S., & Chua, Y. H. (2020). FinTech and household finance: A review of the empirical literature. *China Finance Review International*, 10(4), 361–376. <https://doi.org/10.1108/CFRI-03-2020-0024>
- Agrawal, A. K., Gans, J. S., & Goldfarb, A. (2019). *Exploring the Impact of Artificial Intelligence: Prediction versus Judgment.*
- Ai, C., & Norton, E. C. (2003). Interaction terms in logit and probit models. *Economics Letters*, 80(1), 123–129. [https://doi.org/10.1016/S0165-1765\(03\)00032-6](https://doi.org/10.1016/S0165-1765(03)00032-6)
- Ajide, F. M. (2020). Financial inclusion in Africa: Does it promote entrepreneurship? *Journal of Financial Economic Policy*, 12(4), 687–706. <https://doi.org/10.1108/JFEP-08-2019-0159>
- Aker, J. C., & Mbiti, I. M. (2010). Mobile Phones and Economic Development in Africa. *Journal of Economic Perspectives*, 24(3), 207–232. <https://doi.org/10.1257/jep.24.3.207>
- Aker, J. C., & Wilson, K. (2013). Can Mobile Money Be Used to Promote Savings? Evidence from Northern Ghana. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2217554>
- Akileng, G., Lawino, G. M., & Nzibonera, E. (2018). *Evaluation of determinants of financial inclusion in Uganda.*
- Akudugu, M. A. (2013). *The Determinants of Financial Inclusion in Western Africa: Insights from Ghana.*
- Alemayehu, E. Y. (2024a). From Coffins to Coins: Ethiopian “iddir” 1 navigating the frontier of social enterprise. In *Social Justice Innovation in Africa* (pp. 43–61). Routledge.
- Alemayehu, E. Y. (2024b). From Coffins to Coins: Ethiopian “iddir” 1 navigating the frontier of social enterprise. In *Social Justice Innovation in Africa* (pp. 43–61). Routledge.
- Allen, F., Demirguc-Kunt, A., Klapper, L., & Peria, M. S. M. (2016). *The foundations of financial inclusion: Understanding ownership and use of formal accounts.*
- Allison, T. H., Davis, B. C., Short, J. C., & Webb, J. W. (2015). Crowdfunding in a Prosocial Microlending Environment: Examining the Role of Intrinsic versus Extrinsic Cues. *Entrepreneurship Theory and Practice*, 39(1), 53–73. <https://doi.org/10.1111/etap.12108>

- Alraqueb, Z., Knaack, P., & Macaire, C. (2022). *Does FinTech Promote Entrepreneurship? Evidence from China*.
- Amha, W., Woldehanna, T., Tamrat, E., & Gebremedhin, A. (2015). *The Characteristics and Determinants of Entrepreneurship in Ethiopia. I*.
- Amin-Smith, N., & Attanasio, O. P. (2020). Consumption and Wage Inequality in the US: The Dynamics of the Last Three Decades. *Fiscal Studies*, 41(1), 7–38. <https://doi.org/10.1111/1475-5890.12209>
- Andrianaivo, M., & Kpodar, K. (2012). Mobile phones, financial inclusion, and growth. *Review of Economics and Institutions*, 3(2), 30.
- Apeti, A. E. (2023). Household welfare in the digital age: Assessing the effect of mobile money on household consumption volatility in developing countries. *World Development*, 161, 106110.
- Arebo, M. J., Hando, F. H., & Mekonnen, A. G. (2025). A Multidimensional Financial Inclusion Index for Ethiopia. *Prague Economic Papers*, 34(1), 98–136. <https://doi.org/10.18267/j.pep.886>
- Aredo, D. (2010). The IDDIR: An informal insurance arrangement in Ethiopia. *Savings and Development*, 34(1), 53–72.
- Arner, D. W., Barberis, J., & Buckley, R. P. (2015). The evolution of Fintech: A new post-crisis paradigm. *Geo. J. Int'l L.*, 47, 1271.
- Asongu, S. A., Nwachukwu, J. C., & Aziz, A. (2018). Determinants of Mobile Phone Penetration: Panel Threshold Evidence from Sub-Saharan Africa. *Journal of Global Information Technology Management*, 21(2), 81–110. <https://doi.org/10.1080/1097198X.2018.1462069>
- Asuming, P. O., Osei-Agyei, Lotus Gyamfua, & Mohammed, J. I. (2019). Financial Inclusion in Sub-Saharan Africa: Recent Trends and Determinants. *Journal of African Business*, 20(1), 112–134. <https://doi.org/10.1080/15228916.2018.1484209>
- Aydin, G., & Burnaz, S. (2016). Adoption of mobile payment systems: A study on mobile wallets. *Journal of Business Economics and Finance*, 5(1), 73–92.
- Ayyagari, M., & Maksimovic, V. (2007). *Firm innovation in emerging markets* (Vol. 4157). World Bank Publications.
- Baah, B., Kipkemboi, K., Lindsey, D., Muthiora, B., Nautiyal, A., Pathy, V., Pors, B.-J., Tricarico, D., & White, Z. (2021). *State of the Industry Report on Mobile Money 2021*.

- Bachas, P., Gertler, P., Higgins, S., & Seira, E. (2018). Digital Financial Services Go a Long Way: Transaction Costs and Financial Inclusion. *AEA Papers and Proceedings*, 108, 444–448. <https://doi.org/10.1257/pandp.20181013>
- Backman, M., & Karlsson, C. (2013). *Determinants of entrepreneurship. Is it all about the individual or the region?* The Royal Institute of technology Centre of Excellence for Science
- Banerjee, A., Karlan, D., & Zinman, J. (2015). Six Randomized Evaluations of Microcredit: Introduction and Further Steps. *American Economic Journal: Applied Economics*, 7(1), 1–21. <https://doi.org/10.1257/app.20140287>
- Barajas, A., Beck, T., Belhaj, M., Naceur, S. B., Cerra, V., & Qureshi, M. S. (2020). *Financial inclusion: What have we learned so far? What do we have to learn?*
- Baron. (2025). *Contention, Collaboration, and Subversion: “Iddir” Funerary Associations as Actors in Addis Ababa’s Urban Development | Urban Forum.* <https://link.springer.com/article/10.1007/s12132-025-09537-6>
- Bateman, M., Duvendack, M., & Loubere, N. (2019). Is fin-tech the new panacea for poverty alleviation and local development? Contesting Suri and Jack’s M-Pesa findings published in Science. *Review of African Political Economy*, 46(161), 480–495.
- Batista, C., & Vicente, P. C. (2020). Improving access to savings through mobile money: Experimental evidence from African smallholder farmers. *World Development*, 129, 104905.
- Bazarbash, M., & Beaton, K. (2020). Filling the Gap: Digital Credit and Financial Inclusion. *IMF Working Papers*, 20(150). <https://doi.org/10.5089/9781513552477.001>
- Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance*, 30(11), 2931–2943.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. *Journal of Economic Growth*, 12(1), 27–49. <https://doi.org/10.1007/s10887-007-9010-6>
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2009). *Financial Institutions and Markets Across Countries and Over Time—Data and Analysis* (SSRN Scholarly Paper No. 1414705). Social Science Research Network.

- Beck, T., Pamuk, H., Ramrattan, R., & Uras, B. (2015). *Mobile money, trade credit and economic development: Theory and evidence*.
- Beck, T., Pamuk, H., Ramrattan, R., & Uras, B. R. (2018). Payment instruments, finance and development. *Journal of Development Economics*, 133, 162–186. <https://doi.org/10.1016/j.jdeveco.2018.01.005>
- Bernat, L. F., Lambardi, G., & Palacios, P. (2017). Determinants of the entrepreneurial gender gap in Latin America. *Small Business Economics*, 48(3), 727–752. <https://doi.org/10.1007/s11187-016-9789-7>
- Blattman, C., Fiala, N., & Martinez, S. (2014). Generating Skilled Self-Employment in Developing Countries: Experimental Evidence from Uganda *. *The Quarterly Journal of Economics*, 129(2), 697–752. <https://doi.org/10.1093/qje/qjt057>
- Boden, J., Maier, E., & Wilken, R. (2020). The effect of credit card versus mobile payment on convenience and consumers' willingness to pay. *Journal of Retailing and Consumer Services*, 52, 101910. <https://doi.org/10.1016/j.jretconser.2019.101910>
- Bongomin, G., Ntayi, J. M., Munene, J. C., & Malinga, C. A. (2018). Mobile Money and Financial Inclusion in Sub-Saharan Africa: The Moderating Role of Social Networks. *Journal of African Business*, 19(3), 361–384. <https://doi.org/10.1080/15228916.2017.1416214>
- Bruhn, M., & Love, I. (2014). The Real Impact of Improved Access to Finance: Evidence from Mexico. *The Journal of Finance*, 69(3), 1347–1376. <https://doi.org/10.1111/jofi.12091>
- Bryman, A. (2016). *Social research methods* (Fifth edition). Oxford University Press.
- Burgess, R., & Pande, R. (2005). Do Rural Banks Matter? Evidence from the Indian Social Banking Experiment. *American Economic Review*, 95(3), 780–795. <https://doi.org/10.1257/0002828054201242>
- Cappellari, L., & Jenkins, S. P. (2003). Multivariate Probit Regression using Simulated Maximum Likelihood. *The Stata Journal*, 3(3), 278–294. <https://doi.org/10.1177/1536867X0300300305>
- Cavoli, T., & Gopalan, S. (2023). Does financial inclusion promote consumption smoothing? Evidence from emerging and developing economies. *International Review of Economics & Finance*, 88, 1529–1546. <https://doi.org/10.1016/j.iref.2023.07.037>

- CGPA. (2021). *CGAP: Transforming lives with financial inclusion*.
<https://www.cgap.org/>
- Chakrabarty, M., & Mukherjee, S. (2022). Financial Inclusion and Household Welfare: An Entropy-Based Consumption Diversification Approach. *The European Journal of Development Research*, 34(3), 1486–1521.
<https://doi.org/10.1057/s41287-021-00431-y>
- Chakrabarty & Mukherjee. (2021). *Financial Inclusion and Household Welfare: An Entropy-Based Consumption Diversification Approach*.
- Chakuzira, W., Okoche, J. M. M., & Mkansi, M. (2024). Refining the Definition and Typologies of Entrepreneurship in Africa: A Systematic Review. *Administrative Sciences*, 14(8), 184. <https://doi.org/10.3390/admsci14080184>
- Chib & Greenberg. (1998). *Analysis of multivariate probit models | Biometrika | Oxford Academic*. <https://academic.oup.com/biomet/article-abstract/85/2/347/298820>
- Chinoda, T., & Mashamba, T. (2021). Fintech, financial inclusion and income inequality nexus in Africa. *Cogent Economics & Finance*, 9(1), 1986926.
<https://doi.org/10.1080/23322039.2021.1986926>
- Cho, Y., & Honorati, M. (2013). Entrepreneurship programs in developing countries: A meta regression analysis. *Policy Research Working Paper Series*, Article 6402.
<https://ideas.repec.org/p/wbk/wbrwps/6402.html>
- Christensen, C. M. (1997). *The innovator's dilemma: When new technologies cause great firms to fail* (Rev., updated, and with a new chapter, [Nachdr.]). Harvard Business School Press.
- Claessens, S., & Perotti, E. (2007). Finance and inequality: Channels and evidence. *Journal of Comparative Economics*, 35(4), 748–773.
- Coad, A., & Tamvada, J. P. (2012). Firm growth and barriers to growth among small firms in India. *Small Business Economics*, 39(2), 383–400.
- Cole, S., Sampson, T., & Zia, B. (2011). Prices or Knowledge? What Drives Demand for Financial Services in Emerging Markets? *The Journal of Finance*, 66(6), 1933–1967. <https://doi.org/10.1111/j.1540-6261.2011.01696.x>
- Compaoré, A., & Sawadogo, R. (2024). Financial inclusion, household consumption instability and democracy in developing countries: A finite mixture of regressions approach. *The Journal of International Trade & Economic Development*, 1–23.
<https://doi.org/10.1080/09638199.2024.2331224>

- Cresswell. (2014). • *Creswell, J. W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* <https://www.google.com/search>
- Creswell. (2018). • *Creswell, J. W. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* <https://www.google.com/search>
- Cuberes, D., Priyanka, S., & Teignier, M. (2019). The determinants of entrepreneurship gender gaps: A cross-country analysis. *Review of Development Economics*, 23(1), 72–101. <https://doi.org/10.1111/rode.12537>
- Cull, R., Demirgüç-Kunt, & Lyman. (2012, May). *Financial Inclusion and Stability: What Does Research Show?* Washington, DC: World Bank.
- Davis, A., Hsu, E., & VanVuren, M. (2023). Self-employment, micro-entrepreneurship, and development. *STEG Pathfinding Paper*, 12.
- Demir, A., Pesqué-Cela, V., Altunbas, Y., & Murinde, V. (2022). Fintech, financial inclusion and income inequality: A quantile regression approach. *The European Journal of Finance*, 28(1), 86–107. <https://doi.org/10.1080/1351847X.2020.1772335>
- Demirgüç-Kunt, A., Klapper, L. F., Singer, D., & van Oudheusden, P. (2015). *The Global Findex Database 2014: Measuring Financial Inclusion Around the World* (SSRN Scholarly Paper No. 2594973). Social Science Research Network.
- Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2022). *The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19.* World Bank Publications.
- Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). *The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution.* Washington, DC: World Bank. <https://doi.org/10.1596/978-1-4648-1259-0>
- Demirgüç-Kunt, Singer, Ansar, & klapper. (2018). *The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution | Request PDF.* https://www.researchgate.net/publication/325072366_The_Global_Findex_Database_2017_Measuring_Financial_Inclusion_and_the_Fintech_Revolution
- Dercon, S., Hoddinott, J., & Woldehanna, T. (2005). *Vulnerability and Shocks in 15 Ethiopian Villages, 1999-2004.*
- Dong, J., & Zang, X. (2024). Digital finance's impact on household service consumption—The perspective of heterogeneous consumers. *Applied Economics*, 56(54), 7014–7029. <https://doi.org/10.1080/00036846.2023.2277691>

- Donovan, K. (2012). Mobile money for financial inclusion. *Information and Communications for Development*, 61(1), 61–73.
- Dupas, P., & Robinson, J. (2013). Why don't the poor save more? Evidence from health savings experiments. *American Economic Review*, 103(4), 1138–1171.
- Durai, T., & Stella, G. (2019). Digital finance and its impact on financial inclusion. *Journal of Emerging Technologies and Innovative Research*, 6(1), 122–127.
- Ekmen, İ., & Karatepe, Y. (2024). Examining the Nexus of Financial Inclusion, Household Consumption, and Economic Growth: A 3SLS Approach. *Ekonomi Politika ve Finans Arastirmalari Dergisi*, 9(1), 1–25. <https://doi.org/10.30784/epfad.1433921>
- Elouaourti, Z., & Ibourk, A. (2024). Empowering African entrepreneurs: The crucial role of financial inclusion in mediating the relationship between contextual factors and entrepreneurial willingness. *Emerging Markets Review*, 59, 101118. <https://doi.org/10.1016/j.ememar.2024.101118>
- Emara, N., & Zhang, Y. (2021). The non-linear impact of digitization on remittances inflow: Evidence from the BRICS. *Telecommunications Policy*, 45(4), 102112.
- Entele, B. R. (2019). Mobile banking technology in Ethiopia. *Ethiopian Journal of Science and Sustainable Development*, 6(2), 61–71.
- Ethio Telecom. (2024). (2024). *Annual Report 2023/2024*. - Google Search Ethio Telecom. <https://www.google.com>
- Fafchamps, M., & Lund, S. (2003). *Risk-Sharing Networks in Rural Philippines*.
- Fan, Z., & Zhang, R. (2017a). Financial Inclusion, Entry Barriers, and Entrepreneurship: Evidence from China. *Sustainability*, 9(2), 203. <https://doi.org/10.3390/su9020203>
- Fan, Z., & Zhang, R. (2017b). Financial Inclusion, Entry Barriers, and Entrepreneurship: Evidence from China. *Sustainability*, 9(2), Article 2. <https://doi.org/10.3390/su9020203>
- Fareed, F., Gabriel, M., Lenain, P., & Reynaud, J. (2017). *Financial inclusion and women entrepreneurship: Evidence from Mexico*.
- Feinberg. (1986). *Credit Cards as Spending Facilitating Stimuli: A Conditioning Interpretation* | *Journal of Consumer Research* | *Oxford Academic*. <https://academic.oup.com/jcr/article-abstract/13/3/348/1822480>

- Finscope survey. (2024). *96% of Rwandans are financially included*.
<https://www.minecofin.gov.rw/news-detail/96-of-rwandans-are-financially-included-finscope-survey-2024>
- Frizzo-Barker, J., Chow-White, P. A., Adams, P. R., Mentanko, J., Ha, D., & Green, S. (2020). Blockchain as a disruptive technology for business: A systematic review. *International Journal of Information Management*, *51*, 102029.
<https://doi.org/10.1016/j.ijinfomgt.2019.10.014>
- Geraldes, H. S. A., Gama, A. P. M., & Augusto, M. (2022). Reaching Financial Inclusion: Necessary and Sufficient Conditions. *Social Indicators Research*, *162*(2), 599–617. <https://doi.org/10.1007/s11205-021-02850-0>
- Ghosh, S. (2016). Does mobile telephony spur growth? Evidence from Indian states. *Telecommunications Policy*, *40*(10–11), 1020–1031.
<https://doi.org/10.1016/j.telpol.2016.05.009>
- Ghosh, S., & Vinod, D. (2017). What constrains financial inclusion for women? Evidence from Indian micro data. *World Development*, *92*, 60–81.
- Girma, A. G., & Huseynov, F. (2024). The Causal Relationship between FinTech, Financial Inclusion, and Income Inequality in African Economies. *Journal of Risk and Financial Management*, *17*(1), 2. <https://doi.org/10.3390/jrfm17010002>
- Goel, N., & Madan, P. (2019). Benchmarking financial inclusion for women entrepreneurship—a study of Uttarakhand state of India. *Benchmarking: An International Journal*, *26*(1), 160–175.
- Gomber, P., Koch, J.-A., & Siering, M. (2017). Digital Finance and FinTech: Current research and future research directions. *Journal of Business Economics*, *87*(5), 537–580. <https://doi.org/10.1007/s11573-017-0852-x>
- Gosavi. (2018). *Can Mobile Money Help Firms Mitigate the Problem of Access to Finance in Eastern sub-Saharan Africa?: Journal of African Business: Vol 19, No 3*. <https://www.tandfonline.com/doi/abs/10.1080/15228916.2017.1396791>
- Graham, J. W. (2009). Missing Data Analysis: Making It Work in the Real World. *Annual Review of Psychology*, *60*(1), 549–576.
<https://doi.org/10.1146/annurev.psych.58.110405.085530>
- Greene, W. H. (2018). *Econometric Analysis*. Pearson.

- Grimm, M., & Paffhausen, A. L. (2015). Do interventions targeted at micro-entrepreneurs and small and medium-sized firms create jobs? A systematic review of the evidence for low and middle income countries. *Labour Economics*, 32, 67–85. <https://doi.org/10.1016/j.labeco.2015.01.003>
- Grossman, J., & Tarazi, M. (2014). Serving Smallholder Farmers: Recent Developments in Digital Finance (Focus Note No. 94). *Consultative Group to Assist the Poor (CGAP)*.
- GSMA. (2019). *GSMA. (2019). The mobile economy: Sub-Saharan Africa 2019. GSMA Intelligence*.
- GSMA. (2023). *GSMA. (2023). Mobile Money in Ethiopia: Advancing Financial Inclusion and Driving Growth*. <https://www.google.com/search>
- Gugerty, M. K. (2007). You can't save alone: Commitment in rotating savings and credit associations in Kenya. *Economic Development and Cultural Change*, 55(2), 251–282.
- Ha, D., Le, P., & Nguyen, D. K. (2025). Financial inclusion and fintech: A state-of-the-art systematic literature review. *Financial Innovation*, 11(1), 69. <https://doi.org/10.1186/s40854-024-00741-0>
- Haroun, A. E. M., & Yusoff, M. E. B. (2025). The Interplay of Perceived Social Capital, Financial Inclusion, Financial Literacy, and Micro Takaful in Sudan's Post-Conflict Economic Rehabilitation. *International Journal of Research and Innovation in Social Science*, IX(I), 1772–1786. <https://doi.org/10.47772/IJRISS.2025.9010145>
- Harsono & Suprapti. (2024). (PDF) The Role of Fintech in Transforming Traditional Financial Services. *ResearchGate*. <https://doi.org/10.62207/gfzvtvd24>
- Hau, Huang, Shan, & Sheng. (2021). *Financial Technology (FinTech), Entrepreneurship, and Business Development: Proceedings of The International Conference on Business and Technology (ICBT 2021) | SpringerLink*. <https://link.springer.com/book/10.1007/978-3-031-08087-6>
- Hoddinott, J., Dercon, S., & Krishnan, P. (2005). Networks and informal mutual support in 15 Ethiopian villages. *Institutional Economics Perspectives on African Agricultural Development*, 273.
- Hogarth, J. M., Anguelov, C. E., & Lee, J. (2005). Who Has a Bank Account? Exploring Changes Over Time, 1989–2001. *Journal of Family and Economic Issues*, 26(1), 7–30. <https://doi.org/10.1007/s10834-004-1410-6>

- Hu, D., Zhai, C., & Zhao, S. (2023). Does digital finance promote household consumption upgrading? An analysis based on data from the China family panel studies. *Economic Modelling*, *125*, 106377. <https://doi.org/10.1016/j.econmod.2023.106377>
- Hu, N., & Hou, G. (2024). Mobile payment, digital inclusive finance, and residents' consumption behaviour research. *Plos One*, *19*(7), e0288679.
- Huang, Z., Tao, Y., Luo, X., Ye, Y., & Lei, T. (2023). Regional digital finance and corporate investment efficiency in China. *Applied Economics*, *55*(43), 5115–5134. <https://doi.org/10.1080/00036846.2022.2136616>
- Hussen, M. S., & Mohamed, M. A. (2023). Impact of financial inclusion on household welfare in Ethiopia. *Future Business Journal*, *9*(1), 67. <https://doi.org/10.1186/s43093-023-00243-y>
- Iddrisu, & Danquah. (2021). *The welfare effects of financial inclusion in Ghana: An exploration based on a multidimensional measure of financial inclusion* (WIDER Working Paper No. 2021; WIDER Working Paper, Vol. 2021). UNU-WIDER. <https://doi.org/10.35188/UNU-WIDER/2021/086-3>
- Iddrisu, K., Abor, J. Y., & Banyen, K. T. (2022). Fintech, foreign bank presence and inclusive finance in Africa: Using a quantile regression approach. *Cogent Economics & Finance*, *10*(1), 2157120. <https://doi.org/10.1080/23322039.2022.2157120>
- Irankunda, D., & Van Bergeijk, P. A. G. (2020). Financial Inclusion of Urban Street Vendors in Kigali. *Journal of African Business*, *21*(4), 529–543. <https://doi.org/10.1080/15228916.2019.1695182>
- Jack, W., & Suri, T. (2014a). Risk Sharing and Transactions Costs: Evidence from Kenya's Mobile Money Revolution. *American Economic Review*, *104*(1), 183–223. <https://doi.org/10.1257/aer.104.1.183>
- Jack, W., & Suri, T. (2014b). Risk sharing and transactions costs: Evidence from Kenya's mobile money revolution. *American Economic Review*, *104*(1), 183–223.
- Jappelli, T., & Padula, M. (2013). Investment in financial literacy and saving decisions. *Journal of Banking & Finance*, *37*(8), 2779–2792. <https://doi.org/10.1016/j.jbankfin.2013.03.019>
- Jiang, L., Tong, A., Hu, Z., & Wang, Y. (2019). The impact of the inclusive financial development index on farmer entrepreneurship. *PLOS ONE*, *14*(5), e0216466. <https://doi.org/10.1371/journal.pone.0216466>

- Jiang, W., Hu, Y., & Cao, H. (2024). Does Digital Financial Inclusion Increase the Household Consumption? Evidence from China. *Journal of the Knowledge Economy*, 15(4), 17333–17364. <https://doi.org/10.1007/s13132-024-01821-3>
- Johnston, M. P. (2014). Secondary Data Analysis: A Method of which the Time Has Come. *Qualitative and Quantitative Methods in Libraries*, 3(3), 619–626.
- Juniu, S. (2005). Digital democracy in higher education: Bridging the digital divide. *Innovate: Journal of Online Education*, 2(1). <https://www.learntechlib.org/d/104314/>
- Kabakova, O., & Plaksenkov, E. (2018). Analysis of factors affecting financial inclusion: Ecosystem view. *Journal of Business Research*, 89, 198–205. <https://doi.org/10.1016/j.jbusres.2018.01.066>
- Kairiza, T., Kiprono, P., & Magadzire, V. (2017). Gender differences in financial inclusion amongst entrepreneurs in Zimbabwe. *Small Business Economics*, 48(1), 259–272. <https://doi.org/10.1007/s11187-016-9773-2>
- Karlan, D., & Zinman, J. (2010). Expanding credit access: Using randomized supply decisions to estimate the impacts. *The Review of Financial Studies*, 23(1), 433–464.
- Kedir, A., & Kouame, E. (2022a). FinTech and women’s entrepreneurship in Africa: The case of Burkina Faso and Cameroon. *Journal of Cultural Economy*, 15(4), 452–467. <https://doi.org/10.1080/17530350.2022.2041463>
- Kedir, A., & Kouame, E. (2022b). FinTech and women’s entrepreneurship in Africa: The case of Burkina Faso and Cameroon. *Journal of Cultural Economy*, 15(4), 452–467. <https://doi.org/10.1080/17530350.2022.2041463>
- Kedir, A. M., Disney, R., & Dasgupta, I. (2011). *Why use ROSCAs when you can use banks? Theory and evidence from Ethiopia* (Working Paper No. 5767). IZA Discussion Papers. <https://www.econstor.eu/handle/10419/51959>
- Kikulwe, E. M., Fischer, E., & Qaim, M. (2014). Mobile Money, Smallholder Farmers, and Household Welfare in Kenya. *PLoS ONE*, 9(10), e109804. <https://doi.org/10.1371/journal.pone.0109804>
- Kim, M., Zoo, H., Lee, H., & Kang, J. (2018). Mobile financial services, financial inclusion, and development: A systematic review of academic literature. *THE ELECTRONIC JOURNAL OF INFORMATION SYSTEMS IN DEVELOPING COUNTRIES*, 84(5), e12044. <https://doi.org/10.1002/isd2.12044>
- Koenker, R. (2005). *Quantile regression* (Vol. 38). Cambridge university press.

- Koenker, R., & Bassett, G. (1978). Regression Quantiles. *Econometrica*, 46(1), 33. <https://doi.org/10.2307/1913643>
- Koenker, R., & Hallock, K. F. (2001). Quantile Regression. *Journal of Economic Perspectives*, 15(4), 143–156. <https://doi.org/10.1257/jep.15.4.143>
- koloma. (2021). *Financial inclusion and entrepreneurship willingness of youth: Evidence from Mali*. <https://onlinelibrary.wiley.com/doi/abs/10.1111/1467-8268.12539>
- Koomson, Acheampong, & Asongu. (2023). (PDF) *Financial Inclusion and Food Insecurity: Examining Linkages and Potential Pathways*. https://www.researchgate.net/publication/366949681_Financial_Inclusion_and_Food_Insecurity_Examining_Linkages_and_Potential_Pathways
- Koomson, I., Martey, E., & Etwire, P. M. (2023). Mobile money and entrepreneurship in East Africa: The mediating roles of digital savings and access to digital credit. *Information Technology & People*, 36(3), 996–1019.
- Kothari. (2004). • Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*. <https://scholar.google.com/scholar>
- Krasniqi, B. A. (2009). Personal, household and business environmental determinants of entrepreneurship. *Journal of Small Business and Enterprise Development*, 16(1), 146–166. <https://doi.org/10.1108/14626000910932935>
- Lai, J. T., Yan, I. K. M., Yi, X., & Zhang, H. (2020). Digital Financial Inclusion and Consumption Smoothing in China. *China & World Economy*, 28(1), 64–93. <https://doi.org/10.1111/cwe.12312>
- Lakuma, C. P., Marty, R., & Muhumuza, F. (2019). Financial inclusion and micro, small, and medium enterprises (MSMEs) growth in Uganda. *Journal of Innovation and Entrepreneurship*, 8(1), 15. <https://doi.org/10.1186/s13731-019-0110-2>
- Lashitew, A. A., van Tulder, R., & Liasse, Y. (2019). Mobile phones for financial inclusion: What explains the diffusion of mobile money innovations? *Research Policy*, 48(5), 1201–1215. <https://doi.org/10.1016/j.respol.2018.12.010>
- Le Roux & Evans. (2011). *Can cloud computing bridge the digital divide in South African secondary education? - C.J.B. Le Roux, N. Evans, 2011*. <https://journals.sagepub.com/doi/abs/10.1177/0266666911401502>
- Lenka, S. K., & Barik, R. (2018). Has expansion of mobile phone and internet use spurred financial inclusion in the SAARC countries? *Financial Innovation*, 4(1), 5. <https://doi.org/10.1186/s40854-018-0089-x>

- Lenka, S. K., & Sharma, R. (2017). Does Financial Inclusion Spur Economic Growth in India? *The Journal of Developing Areas*, 51(3), 215–228. <https://doi.org/10.1353/jda.2017.0069>
- Li, J., Cheong, T. S., Shen, J., & Fu, D. (2019). URBANIZATION AND RURAL–URBAN CONSUMPTION DISPARITY: EVIDENCE FROM CHINA. *The Singapore Economic Review*, 64(04), 983–996. <https://doi.org/10.1142/S0217590817450102>
- Li, J., Wu, Y., & Xiao, J. J. (2020). The impact of digital finance on household consumption: Evidence from China. *Economic Modelling*, 86, 317–326.
- Li, X., Gan, C., & Hu, B. (2011a). Accessibility to microcredit by Chinese rural households. *Journal of Asian Economics*, 22(3), 235–246. <https://doi.org/10.1016/j.asieco.2011.01.004>
- Li, X., Gan, C., & Hu, B. (2011). Accessibility to microcredit by Chinese rural households. *Journal of Asian Economics*, 22(3), 235–246.
- Li, Y., Long, H., & Ouyang, J. (2022). Digital Financial Inclusion, Spatial Spillover, and Household Consumption: Evidence from China. *Complexity*, 2022(1), 8240806. <https://doi.org/10.1155/2022/8240806>
- Little, R. J. A., & Rubin, D. B. (2019). *Statistical Analysis with Missing Data*. John Wiley & Sons.
- Liu, J., Li, Z., & Hu, X. (2023). A Study of the Impact of Mobile Payment on the Enhancement of Consumption Structure and Pattern of Chinese Rural Households. *Agriculture*, 13(11), Article 11. <https://doi.org/10.3390/agriculture13112082>
- Llisterri, J. J., Kantis, H., Angelelli, P., & Tejerina, L. (2006). *Is Youth Entrepreneurship a Necessity or an Opportunity? A first exploration of household and new enterprise surveys in Latin America*.
- Llusa, F. (2010). *Determinants of Entrepreneurship: Are Women Different?* (SSRN Scholarly Paper No. 1799334). Social Science Research Network. <https://doi.org/10.2139/ssrn.1799334>
- Long, J. S. (1997). *Regression models for categorical and limited dependent variables* (pp. xxx, 297). Sage Publications, Inc.
- Lu, Y. (2019). The blockchain: State-of-the-art and research challenges. *Journal of Industrial Information Integration*, 15, 80–90. <https://doi.org/10.1016/j.jii.2019.04.002>

- Luo, J., & Li, B. (2022). Impact of Digital Financial Inclusion on Consumption Inequality in China. *Social Indicators Research*, 163(2), 529–553. <https://doi.org/10.1007/s11205-022-02909-6>
- Luo, S., Sun, Y., & Zhou, R. (2022). Can fintech innovation promote household consumption? Evidence from China family panel studies. *International Review of Financial Analysis*, 82, 102137. <https://doi.org/10.1016/j.irfa.2022.102137>
- Lusardi, A., & Mitchell, O. S. (2014). *The Economic Importance of Financial Literacy: Theory and Evidence*.
- Lyons, A. C., Kass-Hanna, J., & Fava, A. (2022). Fintech development and savings, borrowing, and remittances: A comparative study of emerging economies. *Emerging Markets Review*, 51, 100842. <https://doi.org/10.1016/j.ememar.2021.100842>
- Lyons, A., & Contreras, S. (2017). *A Simultaneous Model of Youth Entrepreneurship and Financial Inclusion Across Developing Countries* (SSRN Scholarly Paper No. 3053615). Social Science Research Network. <https://doi.org/10.2139/ssrn.3053615>
- Lyons, A., Grable, J., & Zeng, T. (2017). *Impacts of Financial Literacy on Loan Demand of Financially Excluded Households in China* (SSRN Scholarly Paper No. 3075003). Social Science Research Network. <https://doi.org/10.2139/ssrn.3075003>
- Ma, Q., Tan, Y., He, Y., Cheng, L., & Wang, M. (2024). Why does mobile payment promote purchases? Revisiting the pain of paying, and understanding the implicit pleasure via selective attention. *PsyCh Journal*, 13(5), 760–779. <https://doi.org/10.1002/pchj.765>
- Mao, H. (2024). Digital Financial Inclusion and Inclusive Growth—Empirical evidence based on the China Household Panel Survey. *International Theory and Practice in Humanities and Social Sciences*, 1(1), 36–53.
- Matindike, S., & Mago, S. (2022). Financial inclusion on Entrepreneurship in South African Townships: Lessons for practioners and policy makers from literature. *Africa Growth Agenda*, 19(2), 22–23.
- Mbiti, I., & Weil, D. N. (2011). *NBER WORKING PAPER SERIES*.
- Mbiti, I., & Weil, D. N. (2016). 7. Mobile Banking: The Impact of M- Pesa in Kenya. In *African Successes, Volume III* (pp. 247–294). University of Chicago Press.

- Meager, N., Bates, P., & Cowling, M. (2003). An evaluation of business start-up support for young people. *National Institute Economic Review*, 186, 59–72.
- Meyll, T., & Walter, A. (2019). Tapping and waving to debt: Mobile payments and credit card behavior. *Finance Research Letters*, 28, 381–387. <https://doi.org/10.1016/j.frl.2018.06.009>
- Morawczynski, O., & Pickens, M. (2009). Poor People Using Mobile Financial Services: Observations on Customer Usage and Impact from M-PESA. *World Bank Publications - Reports*, Article 9492.
- Morewedge, C. K., Holtzman, L., & Epley, N. (2007). Unfixed resources: Perceived costs, consumption, and the accessible account effect. *Journal of Consumer Research*, 34(4), 459–467.
- Mossie, W. A. (2022). Understanding financial inclusion in Ethiopia. *Cogent Economics & Finance*, 10(1), 2071385. <https://doi.org/10.1080/23322039.2022.2071385>
- Moyi, E. D. (2019). The effect of mobile technology on self-employment in Kenya. *Journal of Global Entrepreneurship Research*, 9(1), 56. <https://doi.org/10.1186/s40497-019-0180-4>
- Munyegera, G. K., & Matsumoto, T. (2016). Mobile money, remittances, and household welfare: Panel evidence from rural Uganda. *World Development*, 79, 127–137.
- Mwangi, I. W. & Sichei. (2011). *Determinants of Access to Credit by Individuals in Kenya: A Comparative Analysis of the Kenya National FinAccess Surveys of 2006 and 2009*.
- National Bank of Ethiopia. (2020). *National Bank of Ethiopia (NBE). (2020). Digital Financial Services Strategy*. Retrieved from <https://www.nbe.gov.et>. <https://www.google.com/search>
- Neumark, D., Wall, B., & Zhang, J. (2011). Do Small Businesses Create More Jobs? New Evidence for the United States from the National Establishment Time Series. *The Review of Economics and Statistics*, 93(1), 16–29. https://doi.org/10.1162/REST_a_00060
- Newman, A., Schwarz, S., & Ahlstrom, D. (2017). Microfinance and entrepreneurship: An introduction. *International Small Business Journal: Researching Entrepreneurship*, 35(7), 787–792. <https://doi.org/10.1177/0266242617719314>
- Nursafarina, A., & Firmialy, S. D. (2023). *The Effect of Fintech Payment on Household Consumption Expenditure (Study Case in West Java)*.

- Nwibo, S. U., & Okorie, A. (2013). Determinants of entrepreneurship among agribusiness investors in South-East, Nigeria. *European Journal of Business and Management*, 5(10), 115–123.
- OCED. (2016, April 14). *Financing SMEs and Entrepreneurs 2016*. OECD. https://www.oecd.org/en/publications/financing-smes-and-entrepreneurs-2016_fin_sme_ent-2016-en.html
- Odei-Appiah, S., Wiredu, G., & Adjei, J. K. (2022). Fintech use, digital divide and financial inclusion. *Digital Policy, Regulation and Governance*, 24(5), 435–448. <https://doi.org/10.1108/DPRG-09-2021-0111>
- Olanrele. (2025). *Fintech Services and Entrepreneurship in Africa | Finance & Economics Review*. <https://riiopenjournals.com/index.php/finance-economics-review/article/view/651>
- Ouma, S. A., Odongo, T. M., & Were, M. (2017). Mobile financial services and financial inclusion: Is it a boon for savings mobilization? *Review of Development Finance*, 7(1), 29–35. <https://doi.org/10.1016/j.rdf.2017.01.001>
- Ozili. (2023). *Benefits of digital-only financial inclusion Munich Personal RePEc Archive*. <https://mpira.ub.uni-muenchen.de/118796/>
- Ozili, P. K. (2018a). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 18(4), 329–340. <https://doi.org/10.1016/j.bir.2017.12.003>
- Ozili, P. K. (2018b). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 18(4), 329–340.
- Ozili, P. K. (2020). Theories of Financial Inclusion. In E. Özen & S. Grima (Eds.), *Uncertainty and Challenges in Contemporary Economic Behaviour* (pp. 89–115). Emerald Publishing Limited. <https://doi.org/10.1108/978-1-80043-095-220201008>
- Patrick, H. T. (1966). Financial Development and Economic Growth in Underdeveloped Countries. *Economic Development and Cultural Change*, 14(2), 174–189. <https://doi.org/10.1086/450153>
- Prelec, D., & Loewenstein, G. (1998). The Red and the Black: Mental Accounting of Savings and Debt. *Marketing Science*, 17(1), 4–28. <https://doi.org/10.1287/mksc.17.1.4>

- Quispe-Torreblanca, E. G., Stewart, N., Gathergood, J., & Loewenstein, G. (2019). The Red, the Black, and the Plastic: Paying Down Credit Card Debt for Hotels, Not Sofas. *Management Science*, 65(11), 5392–5410. <https://doi.org/10.1287/mnsc.2018.3195>
- Raghubir, P., & Srivastava, J. (2008). Monopoly money: The effect of payment coupling and form on spending behaviour. *Journal of Experimental Psychology: Applied*, 14(3), 213–225. <https://doi.org/10.1037/1076-898X.14.3.213>
- Resnik. (2020). *Resnik, D. B. (2020). What Is Ethics in Research & Why Is It Important National Institute of Environmental Health Sciences. - References—Scientific Research Publishing.*
- Riley, E. (2018). Mobile money and risk sharing against village shocks. *Journal of Development Economics*, 135(C), 43–58.
- Rogers, E. M. (2003). *Diffusion of Innovations, 5th Edition*. Simon and Schuster.
- Sahay, M. R., von Allmen, M. U. E., Lahreche, M. A., Khera, P., Ogawa, M. S., Bazarbash, M., & Beaton, M. K. (2020). *The promise of fintech: Financial inclusion in the post COVID-19 era*. International Monetary Fund.
- Sakyi-Nyarko, C., Ahmad, A. H., & Green, C. J. (2022). The Gender-Differential Effect of Financial Inclusion on Household Financial Resilience. *The Journal of Development Studies*, 58(4), 692–712. <https://doi.org/10.1080/00220388.2021.2013467>
- Sanyal, P., Rao, V., & Majumdar, S. (2015). *Recasting Culture to Undo Gender: A Sociological Analysis of Jeevika in Rural Bihar, India*. World Bank, Washington, DC. <https://doi.org/10.1596/1813-9450-7411>
- Sarma, & Pais. (2011). *Financial Inclusion and Development—Sarma—2011—Journal of International Development—Wiley Online Library*. <https://onlinelibrary.wiley.com/doi/10.1002/jid.1698>
- Saunders, M., Lewis, P., & Thornhill, A. (2003). *Research methods for business students*. Essex: Prentice Hall: Financial Times.
- Schumpeter. (1934). *Schumpeter, J. A. (1934). The Theory of Economic Development An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. Harvard University Press. - References—Scientific Research Publishing.
- Sethi, D., & Acharya, D. (2018). Financial inclusion and economic growth linkage: Some cross country evidence. *Journal of Financial Economic Policy*, 10(3), 369–385. <https://doi.org/10.1108/JFEP-11-2016-0073>

- Shah, A. M., Eisenkraft, N., Bettman, J. R., & Chartrand, T. L. (2016). "Paper or Plastic?": How We Pay Influences Post-Transaction Connection. *Journal of Consumer Research*, 42(5), 688–708. <https://doi.org/10.1093/jcr/ucv056>
- Shemsu, M. (2025, January 30). *Financial Inclusion Goes Beyond Just Opening New Accounts*. Shega. <https://shega.co/news/financial-inclusion-goes-beyond-just-opening-new-accounts>
- Siddik, & Kabiraj. (2019). *Digital Finance for Financial Inclusion and Inclusive Growth* | SpringerLink. https://link.springer.com/chapter/10.1007/978-3-030-08277-2_10
- Sihvonen, M. (2006). Ubiquitous Financial Services for Developing Countries. *The electronic journal of information systems in developing countries*, 28(1), 1–11. <https://doi.org/10.1002/j.1681-4835.2006.tb00193.x>
- Soman, D. (2001). Effects of Payment Mechanism on Spending Behaviour: The Role of Rehearsal and Immediacy of Payments. *Journal of Consumer Research*, 27(4), 460–474. <https://doi.org/10.1086/319621>
- Soumaré, I., Tchana Tchana, F., & Kengne, T. M. (2016). Analysis of the determinants of financial inclusion in Central and West Africa. *Transnational Corporations Review*, 8(4), 231–249. <https://doi.org/10.1080/19186444.2016.1265763>
- Suri, T. (2017). Mobile Money. *Annual Review of Economics*, 9(1), 497–520. <https://doi.org/10.1146/annurev-economics-063016-103638>
- Suri, T., & Jack, W. (2016). The long-run poverty and gender impacts of mobile money. *Science*, 354(6317), 1288–1292. <https://doi.org/10.1126/science.aah5309>
- Sykes, J., Elder, S., Gurbuzer, Y., & Principi, M. (2016). Exploring the linkages between youth financial inclusion and job creation: Evidence from the ILO school-to-work transition surveys. *Work4Youth Publication Series*, 42. <https://www.voced.edu.au/content/ngv:74692>
- tasak. (2022). The role of financial technology and entrepreneurial finance practices in funding small and medium-sized enterprises. *Journal of Entrepreneurship, Management and Innovation*, 18(1), 7–34. <https://doi.org/10.7341/20221811>
- Tchamyou, V. S., Erreygers, G., & Cassimon, D. (2019). Inequality, ICT and financial access in Africa. *Technological Forecasting and Social Change*, 139, 169–184. <https://doi.org/10.1016/j.techfore.2018.11.004>
- Thaler, R. (1980). *To ward a positive theory of consumer choice*.

- Thomas, G. N., Nur, S. M. R., & Indriaty, L. (2024). The Impact of Financial Literacy, Social Capital, and Financial Technology on Financial Inclusion of Indonesian Students. *International Research Journal of Economics and Management Studies*, 3(4). <https://doi.org/10.56472/25835238/IRJEMS-V3I4P140>
- Van Der Zwan, P., Verheul, I., & Thurik, A. R. (2012). The entrepreneurial ladder, gender, and regional development. *Small Business Economics*, 39(3), 627–643. <https://doi.org/10.1007/s11187-011-9334-7>
- Walle, Y. M. (2023). Social Cohesion and Firms' Access to Finance in Africa. *Social Indicators Research*, 167(1–3), 27–46. <https://doi.org/10.1007/s11205-023-03090-0>
- Wang, W., & Yan, Y. (2025). Effect of Digital Inclusive Finance on the Upgrading of the Consumption Structure of Rural Residents in China. *SAGE Open*, 15(2), 21582440251336119. <https://doi.org/10.1177/21582440251336119>
- Wang, Y. (2024). Digital Financial Capability and Entrepreneurship in China: A Digital Economy Perspective. *Sustainability*, 16(16), Article 16. <https://doi.org/10.3390/su16166885>
- Wooldridge. (2010). *Econometric Analysis of Cross Section and Panel Data*.
- World Bank. (2018). *The World Bank Annual Report 2018 (Vol. 1 of 3)* [Text/HTML]. World Bank.
- World Bank. (2022). •World Bank. (2022). *Ethiopia Digital Economy Diagnostic*. World Bank Group. World Bank Group.
- World Bank. (2024). *World Bank. (2024). Digital financial inclusion*. Retrieved from [World Bank website].
- World Bank. (2025). *World Bank. (2025). Keeping Score of Women's Financial Inclusion in Ethiopia*. Retrieved from: <https://blogs.worldbank.org>.
- Wu, G., & Peng, Q. (2024). Bridging the Digital Divide: Unravelling the Determinants of FinTech Adoption in Rural Communities. *SAGE Open*, 14(1), 21582440241227770. <https://doi.org/10.1177/21582440241227770>
- Xie & Chen. (2025). *A Study on the Impact of Digital Financial Literacy on Household Entrepreneurship—Evidence from China*.
- Xu, F., Sun, Y., Zhou, Y., & Yu, D. (2024). The impact of fintech development on the entrepreneurial behaviour of farmers: Evidence from the China Household Finance Survey. *Scientific Reports*, 14(1), 17505. <https://doi.org/10.1038/s41598-024-68737-5>

- Xu, L., & Zia, B. (2012). *Financial Literacy Around the World: An Overview of the Evidence with Practical Suggestions for the Way Forward* (SSRN Scholarly Paper No. 2094887). Social Science Research Network.
- Yang, T., & Zhang, X. (2022). FinTech adoption and financial inclusion: Evidence from household consumption in China. *Journal of Banking & Finance*, 145, 106668. <https://doi.org/10.1016/j.jbankfin.2022.106668>
- Yang, X., Huang, Y., & Gao, M. (2022). Can digital financial inclusion promote female entrepreneurship? Evidence and mechanisms. *The North American Journal of Economics and Finance*, 63(C).
- Zellermayer. (1996). *The pain of paying*.
- Zhang, J., Zhang, H., & Gong, X. (2022). Mobile payment and rural household consumption: Evidence from China. *Telecommunications Policy*, 46(3), 102276.
- Zhao, C., Wu, Y., & Guo, J. (2022). Mobile payment and Chinese rural household consumption. *China Economic Review*, 71, 101719.
- Zhu & Chen. (2013). *The digital divide in individual e-commerce utilization in China*. <https://journals.sagepub.com/doi/abs/10.1177/0266666912450168>
- Zins, A., & Weill, L. (2016). The determinants of financial inclusion in Africa. *Review of Development Finance*, 6(1), 46–57. <https://doi.org/10.1016/j.rdf.2016.05.001>

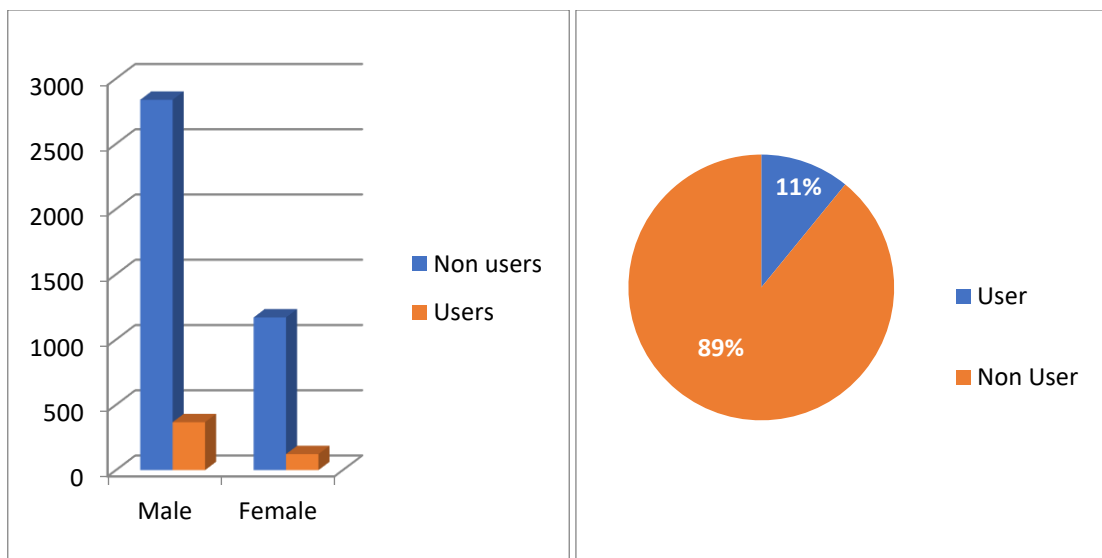
APPENDICES

Appendix A :

Usage Analysis of FINTECH as Mobile Phones for Payment of Bills

This report provides a visual analysis of the use of mobile phones for payment of bills, broken down by gender. The bar chart shows how many individuals use or do not use mobile phones to pay bills, broken down by gender. The pie chart, on the other hand, shows the proportion of mobile phone usage overall for payment of bills from the entire sample.

Fig. A1: Mobile Phone Bill Payment by Gender Fig. A2: Overall Mobile Phone Bill Payment

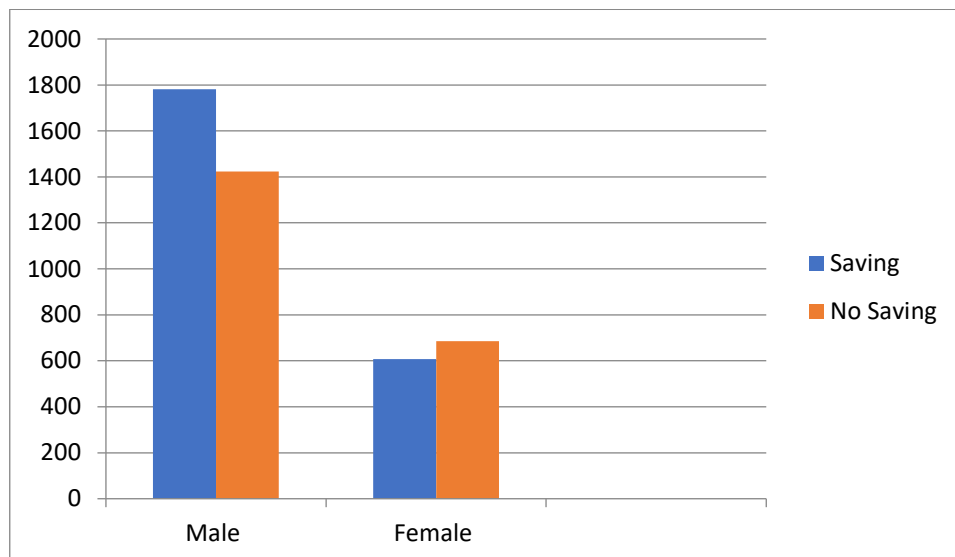


Source: Ethiopian Socioeconomic Survey 2018/2019

The bar chart entitled "Formal Saving by Gender" highlights a large gender gap in formal saving, with 1,782 males being formally saving compared to only 608 females, even though more males (1,423) than females (685) do not formally save. However, the difference between males and females is larger for those that save formally compared to those don't save, which indicates that men have more access to financial services. This points to having some degree of a gender gap in regard to financial inclusion and the reasons could be due to income differences, literacy differences and/or financial services

access differences. Access to FINTECH solutions, for example mobile banking could lead to more financial services reaching the disadvantaged genders.

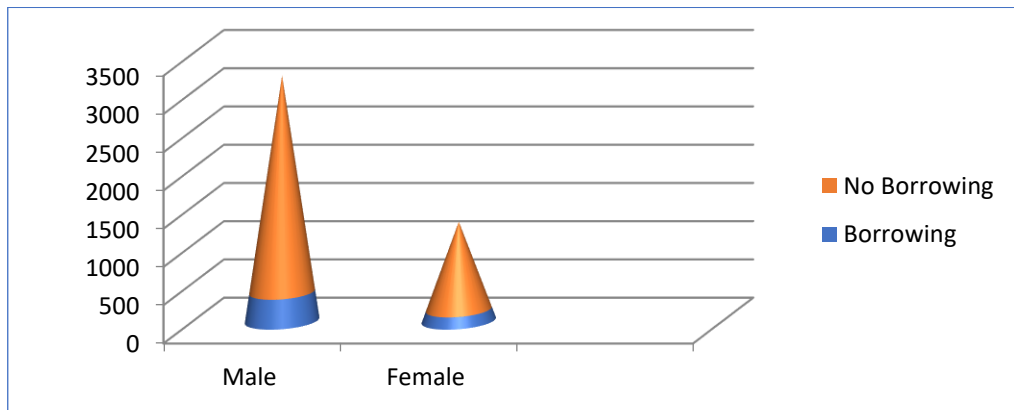
Fig. 3A : Formal savings by Gender



Source: Ethiopian Socioeconomic Survey 2018/2019

The graph below illustrates gender differences with respect to formal borrowing within the Ethiopian context. Looking at the data, for the surveyed men, there was a sample size of 3,205. Among this group, 377 (11.8%) said they had borrowed, and the vast majority 2,828 (88.2%) said they had not borrowed. For the surveyed women, out of 1,293, 147 (11.4%) said they had borrowed and 1,146 (88.6%) had not borrowed. Overall, the proportions of the two genders in use of borrowing financial product are almost similar.

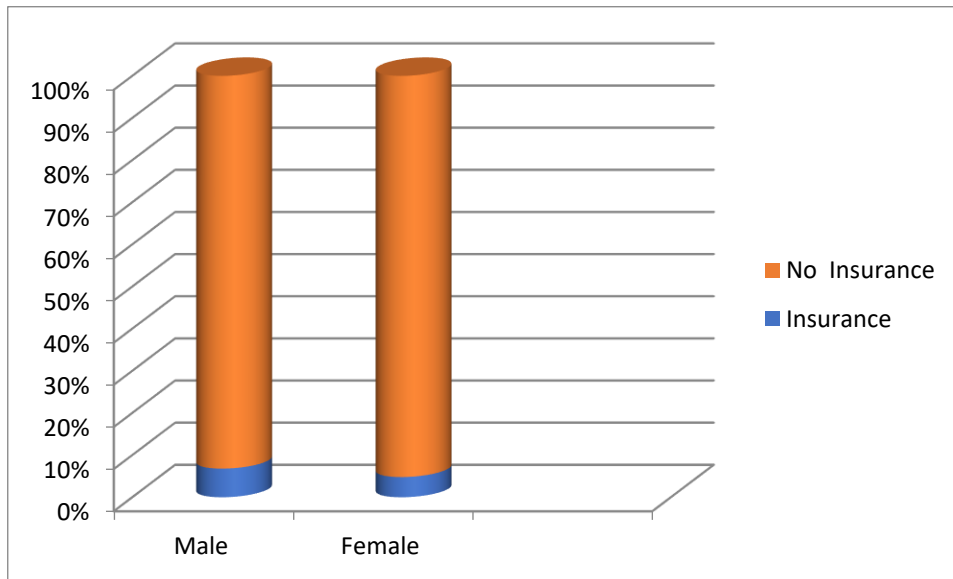
Fig. A4: Formal Borrowing by Gender



Source: Ethiopian Socioeconomic Survey 2018/2019

Data represents the distribution of formal insurance disaggregated by gender. For males the total was 3,205; with only 218 males (or, approximately 6.8%) reporting they had formal insurance. In comparison, the vast majority at 2,987 males (93.2%) reported they did not have any formal insurance coverage. For females the total was only 1,293, with formal insurance indicating only 62 females (approximately 4.8%) and no insurance indicating 1,231 females (95.2%). Formal insurance coverage is low for both the males (6.8%) and females (4.8%) which indicates there might be gender-related issues or barriers to accessing or adopting formal insurance - with women showing to be slightly less likely insured. There is a clear indication that a substantial share of both males and females remain outside of the formal insurance system illustrating a larger issue regarding limited penetration of formal insurance services across the entire population.

Fig. A5: Formal Insurance by Gender



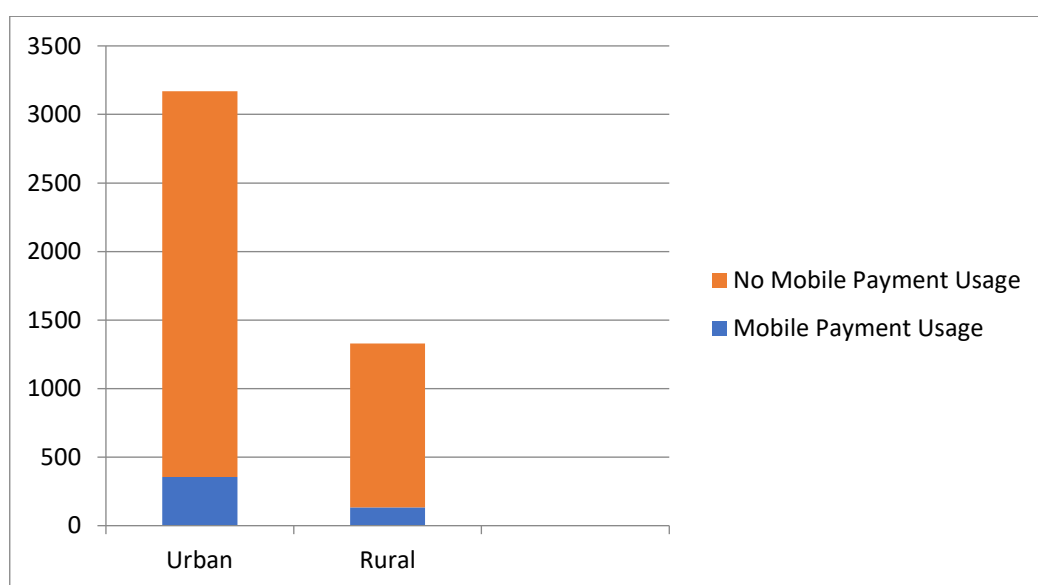
Source: Ethiopian Socioeconomic Survey 2018/2019

The data presented in the graph below shows there is a clear urban–rural gap in FINTECH utilization, and, more specifically, mobile payment utilization. The data show that fantastic usage in urban settings with 356 households using mobile payment systems compared to 2,814 that do not use mobile payment systems. While these data suggest urban dwellers are using FINTECH (and mobile payments) at a much greater rate than rural households, non-use remains the majority. When we examine the rural figures we note that rather a lot more households that do not use mobile payments than those that do it, e.g., 134 people do in fact use mobile payment systems, compared to 1,194 households that do not. These urban-rural gaps may reflect factors that are evident in rural communities, such as less mobile network access, lower levels of digital literacy, and fewer financial service providers. Overall, while we found that the rate of mobile payment use is higher in urban communities; both urban and rural households have significantly large number of households that do not yet seem to use any mobile payment systems with a strong need for specific solutions to facilitate the provision of FINTECH and uptake in different geographic locations.

In total there are 4,498 people made up of 3,170 people (70%) that were in an urban area and 1,328 people (30%) that were in a rural area. Therefore, there is a distribution of three

quarters urban (the major selection of our sample) to one quarter rural - (to smaller). This urban/rural distribution can be considered when discussing the observed financial behaviours or access to service as a bulk of the urban population may have greater access to service infrastructure, financial quick services (for example pawnshops) would typically be economic opportunity to the smaller rural population.

Fig. A6: Mobile Phone Usage to Pay Bills by Urban or Rural Residence

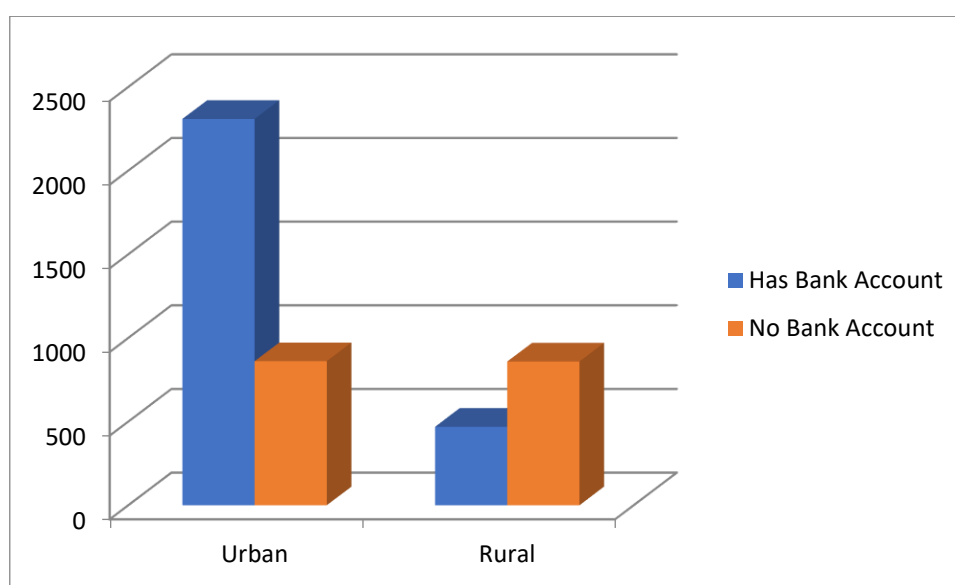


Source: Ethiopian Socioeconomic Survey 2018/2019

The data disaggregated showing bank account ownership by resident reveals a sizeable rural-urban gap to resolve. Notably, 72.8% of urban residents (2,309 of 3,170) have a bank account and just 35.3% do in rural areas (469 of 1,328); thus urban residents are over two times more likely to be banked. Conversely, the unbanked population is much larger in rural areas: 64.7% (859 of 1,328) of rural residents are not banked, while in urban areas this obviates to only 27.2% (861 of 3,170). Considering this urban-rural gap its worth speculating that rural populations are less banked than urban dwelling populations due to better banking infrastructure, increased levels of digital adoption, generally higher levels of income to increase economic mobility, and a greater sense of financial literacy in urban communities overall. Economists, government, and financial institutions may need to center their focus on improving rural banking with mobile banking options, agent networks, and financial education for residents and working population under the current infrastructure that limits financial access. Closing the urban-

rural gap in bank account ownership is a complex but necessary undertaking in order to advance equitable economic growth, mitigate financial exclusion for underserved rural communities, and ultimately create systemic change to economic opportunity overall.

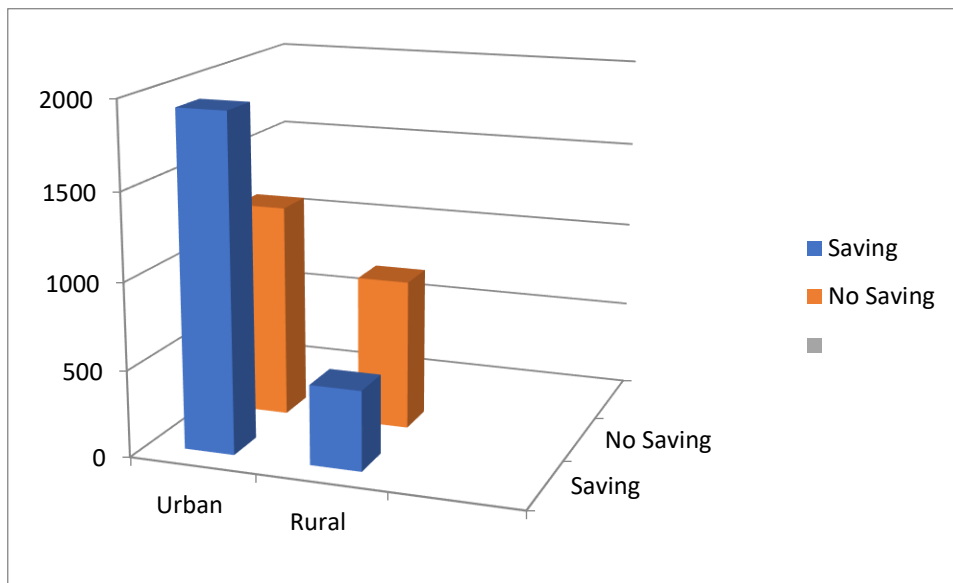
Fig. A7: Bank Account Ownership by Urban or Rural Residence



Source: Ethiopian Socioeconomic Survey 2018/2019

The data shows a significant variation in saving behavior between urban and rural populations. In urban areas 1,930 save and 1,240 do not save, as indicated, thus most urban populations save. In rural areas we see fewer savers (460) versus non-savers (868), thus saving is less common in rural populations. Thus, it indicates that urban residents are more apt to save compared with rural residents. This is likely the result of greater access to financial institutions, household income that is more conducive to saving, and more financial literacy that exist in urban areas compared to rural areas. For instance, factors such as limited access to banking, lower income levels, and reliance on alternative forms of saving and potentially informal savings methods, could generally account for these disparities. The empirical evidence is indicative of a fundamental urban and rural divide in saving behaviour which is potentially problematic for advances in financial inclusion.

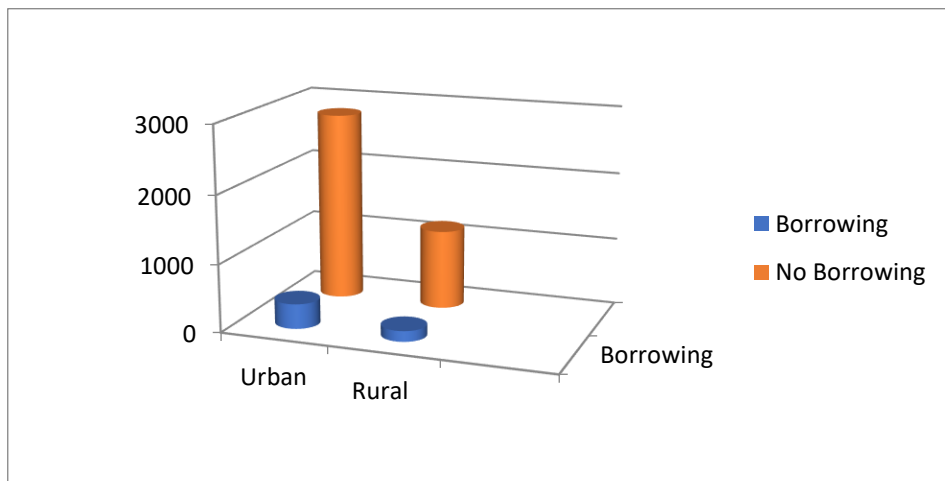
Fig. A8 Formal Saving by Residence



Source: Ethiopian Socioeconomic Survey 2018/2019

The graph below describes the borrowing patterns of urban and rural communities. In urban communities, 367 people borrowing and 2803 people not borrowing means that borrowing is probably a less common behaviour in the community even in urban communities. In rural communities, of the data available, only 157 people borrow in comparison to a larger subset of 1171 people who do not borrow. In other words, there is less borrowing behaviour exhibited by the overall population in rural communities than in urban communities. In fact, the lower borrowing levels in rural communities may be owing to situations where formal opportunities for credit imperative are very few and far between and thus lower financial literacy and higher formal or community-based lending, and informal opportunities to meet borrowing purposes. Although urban residents may borrow more often than rural ones, urban residents may still represent more borrow-never folks than borrow folks probably due to general caution, high interest rates, and being credit constrained. All these types of relative comparisons support much of what is already suspected about some urban-rural differences in borrowing behaviours, along with evidence that there is some value in improving formal access to credit for everything, including real estate improvement financing (including climate change adaptation), to support improved financial inclusion.

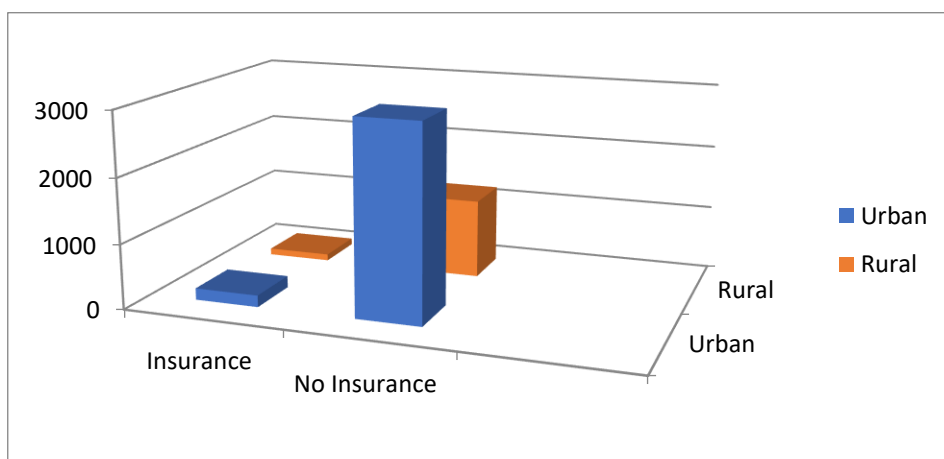
Fig . A9 Formal Borrowing by Residence



Source: Ethiopian Socioeconomic Survey 2018/2019

Based on the findings from the coverage statistics, there is a polarization in a range of types of coverage necessary for urban and rural representatives. To begin with, with respect to urban populations, there are 180 insured individuals with 2,990 uninsured individuals; thereby, less than 6% of urban residents are covered. Of greater importance, there are significantly lower numbers of rural representatives with insurance coverage. For rural areas, there are 100 insured individuals and 1,228 uninsured individuals with insurance uptake being worse than in urban populations. Lack of coverage in both types of communities is likely dampened by limited knowledge of insurance products; certain unique affordability/financial circumstances and/or some trust issues of formal insurance entities. Most importantly, there is a rural-urban coverage gap that suggests individuals living in rural communities have barriers in gaining and/or accessing insurance services than urban individuals. Collectively, it is evident that insurance has a low saturated market in both areas with greater low saturation in rural areas, so there is a pressing need to develop policies and programs aimed at increasing targeting for the benefits of insurance products to urban and rural areas and raise awareness of the lack of accessibility.

Fig. A10: Formal Insurance by Residence



Source: Ethiopian Socioeconomic Survey 2018/2019

Appendix B

1) Diagnostic Procedures for Simultaneous Quantile Regression: Bootstrapped Standard Errors

In this study, Simultaneous Quantile Regression (SQREG) was employed to estimate the effect of explanatory variables at different points (quantiles) of the conditional distribution of our outcome variable. As opposed to ordinary least squares (OLS), quantile regression does not assume homoscedasticity and normally distributed errors, meaning traditional standard error estimators may be invalid. To obtain valid statistical inference despite the potential deficiencies, bootstrapped standard errors was adopted as a robust diagnostic and estimation strategy. Bootstrapping is a nonparametric re-sampling strategy where samples are repeatedly drawn with replacement from the original data to estimate the model for each resample until a sufficiently large empirical distribution of the coefficient estimates are achieved from which standard errors and confidence intervals are calculated.

In Stata the `sqreg` command is used with the `reps ()` option as illustrated below.

Stata

```
Sqreg y x1x2x3, quantile (0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9) reps(1000)
```

For each dependent variable percentiles(10th, 20th, 30th, etc), the model is estimated with 1,000 bootstrap replications.

This number of replications provided a computationally manageable solution, while allowing the standard error estimates to stabilize. The standard errors that were obtained by means of bootstrapping are especially important for quantile regression in the examination of the data due to its non-differentiable objective function and the likelihood that the standard error is heteroskedastic toward the dependent variable. The main advantage of using a bootstrapped diagnostic approach builds the robustness of the estimated parameter estimates by:

1. Providing consistent standard errors for hypothesis testing;
2. Controlling for deviations from normality and heteroskedasticity;
3. Fundamentally support valid inference across the quantiles.

Ultimately, the bootstrap estimated standard errors used in each of the SQREG models built the empirical credibility of our findings and consistency in leveraging the quantile effects in the interpretation of the data.

2) Diagnostic Test for probit Regression Model: effect of Financial Inclusion on Entrepreneurship

The multivariate probit model's diagnostic tests indicate a good fit and justify the joint estimation approach. The likelihood ratio test for the null hypothesis that all pair wise correlation coefficients of the error terms are zero ($\rho_{21}=\rho_{31}=\rho_{41}=\rho_{32}=\rho_{42}=\rho_{43}=0$ $\rho_{21}=\rho_{31}=\rho_{41}=\rho_{32}=\rho_{42}=\rho_{43}=0$) yielded a chi-square statistic of 24.88 with 6 degrees of freedom and a p-value of 0.0004.

This provides a strong rejection of the null hypothesis which showed there are significant correlations in the error terms across the three entrepreneurship outcome equations, thus supporting the decision to use the multivariate probit model rather than separate univariate probits. Individual correlation coefficient further support this finding, with some correlations such as $\rho_{41}=0.299$ $\rho_{41}=0.299$ and $\rho_{43}=0.198$ $\rho_{43}=0.198$ being statistically significant at the 1% and 5% levels, respectively.

Overall model fit is established via a highly significant Wald chi-square statistic of 267.16 ($p < 0.001$), which indicates that the explanatory variables jointly contributed to explaining the probability of HH-level entrepreneurship activities. Robust standard errors were used for valid inference, allowing for possible heteroskedasticity and possible issues with variance. Collectively, these diagnostics demonstrated the multivariate probit model is viable and statistically valid approach for studying the simultaneous determination of multiple forms of household entrepreneurship.

3) Diagnostic Test for Probit Regression Models: Effect of FITNECH on Financial Inclusion Indicators

Multiple diagnostic tests were conducted to assess the reliability and fit of the imputed dataset univariate probit and multivariate probit models estimating the effect of FINTECH on financial inclusion outcomes. In the univariate probit models, likelihood ratio tests showed that the explanatory variables had a statistically significant improvement in model fit relative to null models. Pseudo R-squared a reasonable amount of explanatory value, and variance inflation factors (VIF) indicated that regressors did not have problematic multicollinearity among regressors. We used a robust standard error estimator to address heteroskedasticity, thereby ensuring valid inference. We assessed model predictive capability was acceptable, with area under the curve (AUC) values ranging between 0.65 and 0.75 and the residuals diagnostics did not reveal influential outliers or potential misspecification. We ran alternative models with interaction terms and corroborated the robustness of the results relating to our key findings.

The multivariate probit model, with its ability to jointly estimate multiple financial inclusion indicators, had a better fit and efficiency than separate univariate models. We also found a statistically significant and positive correlation between the error terms which confirms the interdependence of the financial inclusion behaviours and supported our use of a multivariate model. Finally, there were no multicollinearity issue, while robust standard errors accounted for heteroskedasticity in the joint estimation. The residual tests and repercussions demonstrated the model was sufficient. We found that the mvprobit results confirmed that FINTECH had a significant positive effect on both formal saving and insurance and illustrated why it was also important to model correlated

financial decisions together for more accurate estimates. Overall, these diagnostics provide evidence of the estimated models' robustness and reliability.

4) Diagnostic tests for Univariate Probit Model: Effect of FINTECH on Entrepreneurship

The diagnostic tests derived from the univariate probit regression (Table 15) and marginal effects (Table 16) presented above provide essential tests of the specification and statistical significance of the coefficients of key explanatory variables that are essential to understanding entrepreneurship. The model used robust standard errors to take account of heteroskedasticity and thus increase the level of confidence in the coefficient estimates. With out any doubts, the dataset benefits from a long enough sample of 4,498 observations to draw important conclusions. A clear indication of statistical significance was shown, and a number of important explanatory variables i.e FINTECH, *Iddir*, and their interaction term (FINTECH_ *Iddir*) were statistically significant at the 5% level which means that we would expect the probability of reporting this purely random result to be lower than 5%.

The coefficient of FINTECH (-0.348) and marginal effect (-0.036) indicate a statistically significant negative relationship with entrepreneurship when assessed alone. The positive and significant interaction term (0.438) indicated that the presence of *Iddir* reduced the negative effect of FINTECH, and improved the net impact of FINTECH on entrepreneurship. The age variable was statistically significant, but small marginal effect was observed. In sum, there were no signs of multicollinearity or model mis-specification standard error behaviour and coefficient significance patterns. Also, the marginal effects provided a clear and consistent interpretation of all 7 predictor variables' direction and magnitude.

Appendix C.

Table C1: Description of FINTECH Platforms: M-Pesa, TeleBirr, M-Birr

Feature	M-Pesa	TeleBirr	M-Birr
Launch Year	2007	2021	2017
Country	Kenya	Ethiopia	Ethiopia
Provider	Safaricom	Ethio Telecom	M-Birr PLC (private company)
Service Type	Mobile money platform	Mobile money platform	Mobile money platform
Key Functions	Money transfer, payments, airtime top-up, savings, loans	Money transfer, bill payments, airtime top-up, merchant payments	Money transfer, bill payments, airtime top-up, merchant payments
Target Users	Unbanked and under-banked populations	Ethiopian mobile users, expanding financial access	Ethiopian mobile users, focusing on underserved populations
Role in Financial Inclusion	Pioneer of mobile financial services in Africa; expanded access to financial services for millions	Expanding digital financial services in Ethiopia; improving access in rural and urban areas	Supporting Ethiopia's cashless economy; alternative to traditional banking

Source: Compiled from official websites and industry reports on M-Pesa, TeleBirr, and M-Birr. ieGSMA(2023, 2025 and NBE , 2024)

Appendix D:

Constructing the Financial Inclusion Index (FI_Index)

The Financial Inclusion Index (FI_Index) was constructed following a binary approach based on four dimensions of financial inclusion, which included bank account ownership, formal savings, formal borrowing, and coverage with insurance. All four dimensions were measured as a binary variable, where one (1) means the household reported having access

to or used that particular financial service, and zero(0) means the household either did not have access to or did not use that financial service. We used an OR logical function in STATA to classify whether a household was financially included or not financially included. If the household classified a "yes" (1) for at least one of the four financial inclusion indicators, then the household is classified as financially included (FI_Index = 1). If the household classified a "no" (0) for all four indicators, then the household is classified as not financially included (FI_Index = 0). This approach allowed for a broad and inclusive measure of financial inclusion to account the household with any form of formal financial engagement.

Stata Code for Constructing FI_Index

```
stata
```

```
* Assuming the four variables are bank_acc, savings, borrowing, insurance
```

```
* Create Financial Inclusion Index (FI_Index)
```

```
gen FI_Index = (bank_acc == 1 | savings == 1 | borrowing == 1 | insurance == 1)
```

```
* Check the distribution of FI_Index
```

```
tabulate FI_Index
```

Appendix E.

Table E1 reflects regional variation in financial inclusion and entrepreneurship in Ethiopia from the ESS4 data. The table shows that regions differ in formal access to financial services, reliance on informal mechanisms, type of entrepreneurship, and possibly the role of FINTECH in addressing those gaps.

Table E1: Regional Variations in Financial Inclusion and entrepreneurship in Ethiopia

Region	Financial Inclusion	Entrepreneurship Type	Informal Finance Use	FINTECH Potential
Addis Ababa	High formal inclusion (banking, mobile money)	Service & manufacturing, formal enterprises	Low	High potential, already advanced
Dire Dawa	High formal inclusion	Non-agricultural, urban small businesses	Low	High
Tigray	Moderate formal inclusion	Mixed: agriculture & small business	Moderate use of <i>Iddir</i>	Moderate, needs infrastructure
Amhara	Moderate formal inclusion	Informal and semi-formal businesses	High	High potential with mobile money
Oromia	Low to moderate	Agricultural and informal businesses	High	Moderate to high with mobile penetration
SNNPR	Low	Necessity-driven, rural enterprises	High	Moderate, digital literacy needed
Somali	Very low	Low entrepreneurial activity	High	Low, needs infrastructure and awareness
Afar	Very low	Low entrepreneurial activity	High	Low, high infrastructural challenges
Benishangul-Gumuz	Low	Informal micro-businesses	High	Low to moderate

Source: Author's compilation based on Ethiopia Socioeconomic Survey (ESS4) data.