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The Effects of Financial Inclusion on Poverty in Ethiopia: Micro Data Analysis

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Abstract: To investigate the effects of financial inclusion on poverty in Ethiopia, I used poverty as the dependent variable and financial inclusion index as the independent variable. Poverty includes various indicators of measuring multidimensional poverty, which consist of agricultural inputs (lack of access to DAP, urea, and irrigation), housing (poor-quality construction materials like floors, walls, toilets, absence of electricity, and phone), health and nutrition (absence of medical consultations and hospital visits), water and sanitation (lack of clean water and proximity to the household), and education (inability to read and write before the age of 16). Numerous studies have explored the utilization and accessibility of financial institutions in Ethiopia; however, poverty has received less attention. Therefore, I used data from the Ethiopian Socio-Economic Survey 2018–19 to conduct a comprehensive analysis of the impact of financial inclusivity on poverty in Ethiopia, and I also employed the Two-Stage Least Squares model (2SLS). In a linear regression framework, two-stage least squares has been used to handle models with endogenous explanatory variables. The study's explanatory variable has an endogeneity issue; thus, I used the nearest transportation cost's (in kilometers) distance as an instrumental variable to address this issue. According to the study's findings, households without access to agricultural inputs experience a 2.7% decrease in poverty. It also reduces poverty by 0.4% for households without access to health and nutrition services and by 3.2% for households that used lower-quality building materials to construct their dwellings. On the other side, financial inclusion has decreased poverty by 0.13% in households without access to good water and sanitation and 0.11% in households with children under the age of 16 who cannot read or write. Moreover, male-headed and urban households perform marginally better at reducing poverty than female-headed and rural households. I have concluded that financial inclusion has played a role in alleviating poverty in Ethiopia. I recommend that the National Bank of Ethiopia continue implementing the National Financial Inclusion Strategy of 2017, which aims to aggressively enhance the incorporation of individuals into the financial system. Furthermore, commercial banks should focus on expanding their branches, improving infrastructure, and conducting public awareness campaigns to sustain the progress of poverty alleviation.

Keywords: Financial Inclusions, Poverty Indicators, Credit, Banks, Microfinance Institution

1. Introduction

Financial inclusion (FI) refers to the provision of convenient and affordable financial goods and services to individuals and businesses to meet their needs, such as payments, transactions, savings, credit, and insurance [40]. Financial inclusion (FI) is a key to achieving inclusive growth and requires promoting access to and use of financial services, especially among disadvantaged groups. The World Bank advocates for women's financial inclusion to advance gender equality and eradicate poverty [17]. In line with Sustainable Development Goal 1, the 2030 Agenda aims to protect people, especially those vulnerable to poverty [37]. As such, financial inclusion is considered one of the key sectors to eradicate poverty and promote prosperity [41].

Poverty reduction through financial inclusion has been widely recognized in empirical analyses [10], financial inclusion reducing poverty the most in low-income countries [32]. Use of financial inclusion tools, such as checking, savings, or term deposit accounts, is more important than access to credit and money or insurance to reduce poverty. [24] Financial inclusion contributes to reducing national poverty

and increasing household access to the formal financial sector.

Despite financial inclusion contributing to the reduction of poverty, around 1.7 billion adults worldwide in 2017 remained unbanked, and most of the unbanked live in developing countries with limited economic, political, and social power [15]. In Asian and African countries such as Pakistan, Bangladesh, Ghana, Nigeria, and Uganda, people still have a long way to go to integrate into the financial services system. Global index data shows that 21% of Pakistanis were actively using financial tools in 2017, 50% of Bangladesh were integrated into the financial system in 2017, 63.2% of Nigerians had online checking accounts and bank accounts, and 48% of Ghanaians consider themselves integrated into the financial system.

Ethiopia has shown improvement in financial inclusivity, as the proportion of individuals with a bank account rose from 22% in 2014 to 35% in 2017. Furthermore, there was an increase in the number of adults saving and borrowing from financial institutions during 2017. Specifically, the percentage of adults with savings accounts rose from 14% in 2014 to 26% in 2017, while the percentage of individuals borrowing from financial institutions increased from 7% in 2014 to 11% in 2017.

In spite of the increase in financial inclusivity in Ethiopia from 2014 to 2017, the country is still behind its neighboring countries. For instance, in Kenya, 82% of adults possess an account, while in Rwanda, the ownership of accounts stands at 50%. Furthermore, in the entire region, 43% of adults possess an account. Women are disproportionately represented in the population without accounts, and this gap has been widening since 2017. In 2017, 41% of men had an account, in contrast to 29% of women, and the ownership of accounts remained relatively stable in 2014, with 23% of men and 21% of women having accounts. The number of male account holders nearly doubled in three years, from 2014 to 2017, but the number of female account holders only increased by 8 percentage points [26].

Financial inclusion is one essential component to reducing poverty and boosting economic growth in the modern economy; however, there is a long way to go to integrate developing countries like Ethiopia into the financial system. Some researchers address the problems that slow down the growth of financial inclusion in Ethiopia.

There are barriers to financial inclusion such as lack of money, distance, fixed costs, and documentation, and insufficient infrastructure hinders the provision of various services in parts of the country, which prevents financial institutions from expanding their operations [4].

Despite considerable efforts, the academic literature on financial inclusion in Ethiopia remains unsatisfactory. The reason for the unsatisfactory results is that several studies have been focused on access and usage in Ethiopia. [4] The study has examined barriers to access to and usage of financial services in Ethiopia [36] and also examined using secondary data on the usage and access of financial inclusion. Further, [33] conducted the gender decomposition of financial inclusion, empowering women with financial inclusion but less considering poverty. So, for the first time, I intended to systematically examine how financial inclusion affects poverty rates in Ethiopia using data from the Ethiopian Socio-Economic Survey 2018–19, conducted by the Ethiopian Central Bureau of Statistics in collaboration with the World Bank.

The study's findings will assist the National Bank of Ethiopia in its strategy of evaluating financial inclusion on a national level, as well as researchers who can use it as a springboard for research.

2. Theoretical and Empirical Literature Reviews

2.1. Theoretical Literature Reviews

2.1.1. Global Unbanked Population

Unbanked people are not connected to any type of financial institution. The most commonly cited reasons for being unbanked are not having enough money, account expenses, the distance of financial services, and insufficient documentation. The highest numbers of unbanked people are in Morocco, Vietnam, Egypt, the Philippines, and Mexico [14].

According to a study recently published by the UK research platform [27], the developing countries have the highest proportions listed at the global level in terms of financial exclusion: in the Middle East and Africa, 50% of the population is financially excluded, South and Central America follow at 38%, Eastern Europe and the former Soviet republics at 33%, and Asia Pacific's share stands at 24%.

In Western and Central Europe, a relatively low 6% of the population experiences a measure of financial exclusion; the proportion reaches 21% in North America—a figure that closely mirrors a 2019 report by the Federal Reserve showing that 22% of adults in the United States (or 63 million) were unbanked (16%) or fully unbanked (6%). Rwanda and Kenya are the leading countries in east Africa with the highest proportion of their adult populations accessing financial services. In both countries, close to 90 percent of the population is accessing the formal and informal sectors, and Uganda and Tanzania follow at 78 percent and 72 percent, respectively, in 2019 [28].

Most women in developing countries are unbanked and may face traditional gender barriers to integrating into financial institutions. Financial inclusion can hasten economic growth while also assisting in lifting individuals out of poverty, and by bringing more women into the economic mainstream; it can maximize their contributions to society [34]. Inclusion empowers women to improve their financial self-esteem, bargaining power, and independence while reducing exposure to risk [2]. Saving products leads to an increase in female decision-making power within the household [30]. Financial services may be able to better control their income and cover women's personal and productive expenses [25]. However, gender gaps still exist in the financial inclusion systems in most developing countries [34]. Males have advantages over females in financial inclusion [6], and women also face greater

and more systematic barriers to accessing formal financial services.

The social norm presents the challenge of gender inclusion [18]. Sometimes financial literacy makes it difficult for women to open and manage accounts or unpaid household chores, and education barriers prevent many women from earning enough money to access financial services [21]. Financial literacy can be considered an important determinant of women's economic empowerment.

2.1.2. Developments in Financial Sector in Ethiopia

Banks, insurance companies, and microfinance institutions are the main financial institutions operating in Ethiopia. The number of banks reached 25 at the end of 2021/22, with seven new branches opening in the fiscal year 2022, increasing the total number of bank branches to 8,944 from 339 in 2003. About 34.5% of bank branches are located in Addis Ababa (the capital city of Ethiopia). Thus, a bank branch serves approximately 14,000 people.

In June 2021, the total capital of the banking sector increased by 36.2% to reach 153.7 billion birr. Similarly, the number of insurance companies increased to 690 in 2022 after the opening of 27 new branches from 105 in 2003. About 54.6% of insurance branches are located in Addis Ababa, and 85.8% are private insurance companies.

The total capital of insurance companies increased by 14.7% to 11.1 billion birr, of which the share of private insurance companies was 73.6% and the share of public insurance companies, was 73.6% to 26.4%. The number of microfinance institution branches reached 981, and at the end of 2021/22, total capital and total assets increased by 43.4% and 13.8% to 27.9 billion birr and 105 billion birr, respectively.

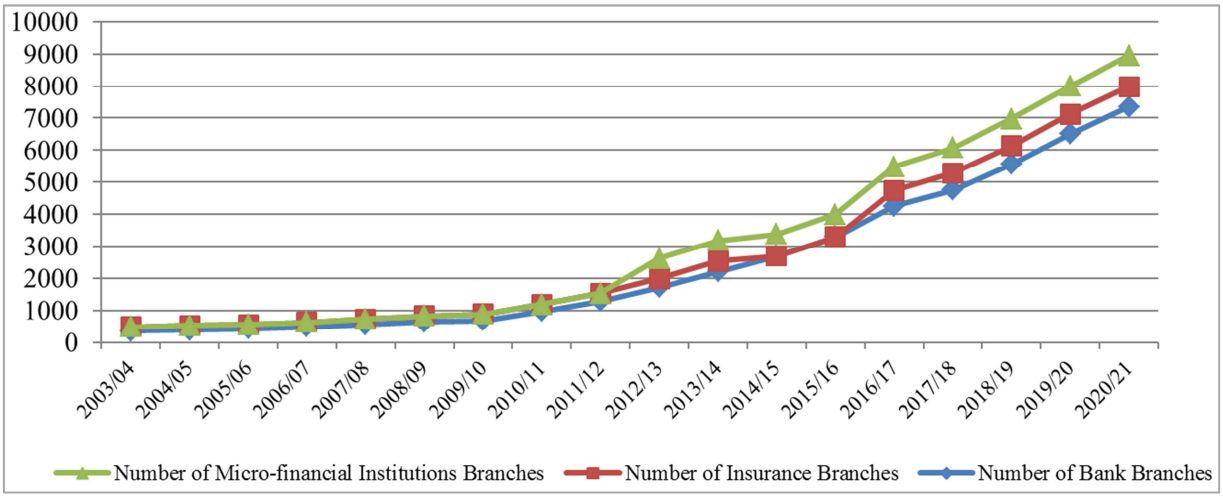

Figure 1. *Development of Financial Sector of Ethiopia.*

2.1.3. Financial Inclusion Using Financial Innovation Financial Service Process

Advanced technology makes the financial services market more manageable, reduces errors, improves communication, and facilitates processing. Emerging industries have made great steps in financial inclusion and financial technology [12]. (FINTECH) can be described as the technological innovation of financial services processes and products.

Fintech offers a solution to many problems rooted in financial exclusion. A fundamental problem is not having the time or money to travel to distant financial institutions. Fintech allows users to access their accounts and financial services on mobile devices. [31] Since the start of the COVID-19 pandemic, fintech has gained relevance, with contactless banking and transactions lowering the risk of COVID-19 transmission and encouraging individuals to use digital payments in their professional and personal routines. Leaders in the fintech industry are demonstrating that it is possible to use fintech to reach underrepresented communities. This makes a significant contribution to the monetary security of the exclusion group. Women make up 48 percent of the population of Pakistan, but just 6.3 percent of the formal economy is produced by Oraan. As a result, Oraan is a woman-led fintech startup fighting for financial equality in Pakistan. A tool that helps digital savings groups Savings organisations are financial instruments in and of themselves; therefore, they can assist in empowering women and achieving financial equality. Despite the positive sides of fintech, there were negatives affecting the growth of sales [8].

2.1.4. Financial Inclusion Tackling Poverty and Boosting Economic Growth

Financial inclusion theoretically positively affects economic growth, and some scholars findings show that [22] there is a positive relationship between financial inclusion and economic growth. Financial inclusion is vital to active, inclusive growth and a prerequisite for sustainable economic growth and development [17]. Financial inclusion is seen as an important way to fight poverty and inequality and achieve the Sustainable Development Goals (SDGs) [1]. Although about half of the worlds unbanked people, who come from the poorest, most inaccessible financial service areas, are at risk of poverty and have limited political, economic, and social

power and influence.

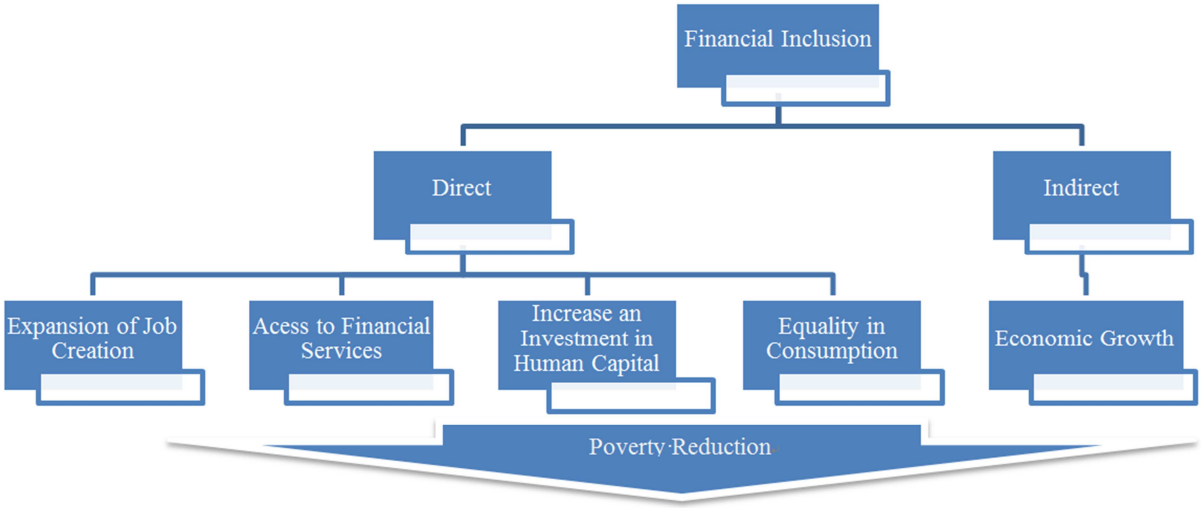

Figure 2. *Financial Inclusion Tackling Poverty and Boosting Economic Growth.*

Financial inclusion can fight poverty as it opens doors for people to improve their lives. As Figure 2 above stated, financial inclusion would help the expansion of job creation, equality in consumption, access to financial services, and increase investment in human capital, which leads to economic growth and poverty reduction [5]. As financial inclusion can fight poverty, digitised financial services are an effective way to improve access and inclusion.

Online banking and Islamic banking empower individuals and open opportunities for economic growth. Overall accessibility to Islamic financial products is positively correlated with the level of financial inclusion in the Muslim-majority country Qard Hassan and its theoretical potential to reduce poverty and boost shared prosperity [3]. The digital economy has the benefit of keeping a clear record of financial activities, which banks can use when underwriting loans [31]. Loans are among the financial tools that are essential to financial growth and the reduction of poverty.

2.1.5. Poverty Types and Indicators

There are several types of poverty, including absolute poverty and relative poverty. There are various other categories, including primary poverty, secondary poverty, urban poverty, rural poverty, etc. In all cases of poverty, insufficient income is always at the root. In most emerging and underdeveloped economies around the world, a lack of employment opportunities and resulting income disparities contribute to mass poverty [31].

Income is one of the poverty measurement indicators; some literature combining absolute and relative measures to measure income poverty [7] indicates that the appropriate time period is not clear; for example, it is one year, less than one year, or more than one year [9]. It is difficult to accurately measure some income, such as farm income or the value of housing services, and it is varied across regions. However, it is easy to measure components of income, such as wages and salaries [16].

The other measurement of poverty is consumption and expenditure; it includes purchased services and basic products supplied by own producers. Some scholars argue that the expenditure measurement is better than income indicators because it indicates precisely whether a person has enough to meet current basic needs [9]. Expenditure poverty indicators are easier to understand than income poverty indicators, which come mainly from irregular, informal sources and self-employment [9].

Expenditure measures of welfare may be denoted by:

$$Yi = P.Q.\ (P, X, U) \quad (1)$$

Where Yi is the consumption measure for the household,

P is the price of goods and services.

Q is the quantity of goods and services consumed.

X is household characteristics,

U is the level of utility or well-being achieved by the household.

The widely accepted measurement is the Multidimensional Poverty Index, created by the United Nations Development Programme and the Oxford Poverty and Human Development Initiative in 2010. It has three dimensions: education, health, and living standards [35]. Multidimensional poverty measurement is listed below by BPS-Statistics Indonesia.

Table 1. *Multidimensional Poverty Measurment.*

№	Basic Needs	Examples of Indicators
1	Empowerment and participation	1. Extent of knowledge of local projects and district budgets 2. Participation in general and local election voting
2	Health and Nutrition	1. Life expectancy 2. Percentage of population died before 40 years of age 3. Immunization rates

№	Basic Needs	Examples of Indicators
		4. Infection rates
		5. Health service usage
		6. Malnutrition rate
		7. Child Mortality rate
		1. Literacy rate c. Enrolment rate
3	Education	2. Percentage of people age 7-15 years that not go to school
		3. Survival to final primary school grade
		1. Percentage employment work in informal sector
4	Employment	2. Percentage of employment work < 15 hours a week
		3. Open unemployment rate
		1. Percentage of household by size of floor per capita < 8 m2
5	Housing	2. Percentage of household with no access to electricity
		3. Percentage of household with dirt floor
		1. Proportion of households with no access to sanitary toilet facilities
6	Water and Sanitation	2. Proportion of households with no access to drinking water

Source: BPS-Statistics Indonesia

2.2. Empirical Literature Review

Most of the existing studies have used secondary sources to determine the extent of financial inclusion in poverty, and their study results show that it is contributing to reducing poverty.

Md Abdullah Omar et al., using a fixed effects model, examine the impact of financial inclusion on reducing poverty and income inequality and the determinants and conditional effects thereof in 116 developing countries. The analysis is carried out using unbalanced annual panel data for the period of 2004–2016, and their study result shows that financial inclusion significantly reduces poverty rates and income inequality in developing countries [24].

Cyn-Young Park et al., using a cross-sectional approach that focused on developing countries in Asia, developed a proprietary financial inclusion indicator to assess various macroeconomic and country-specific factors affecting the level of financial inclusion for individual development in countries in Asia. The results of their study show that per capita income, rule of law, and demographic characteristics significantly influence financial inclusion in Asian developing countries [10].

In addition, Adegbola Dare et al. found that financial inclusion significantly reduces poverty, and there is also evidence that it reduces income inequality [42]. The study aimed to determine the role of financial inclusion in poverty alleviation and economic growth in an emerging economy using panel data analysis from 2006 to 2015 within a log-linear specification model. The result of the study was that the number of active ATMs, bank branches, and government spending, selected from three African countries, were the most reliable predictors of financial inclusion for poverty reduction in emerging markets.

Similarly, applying the same model [23], his study result shows that the majority of ATMs in emerging markets is outdated and therefore requires technological upgrades to have a significant impact on rural areas' poverty. K. Ratnawti, the study focused on financial inclusion in economic growth, poverty, income inequality, and financial stability in 10 Asian countries. The result of the study shows that dimensions of financial stability simultaneously have a significant influence on economic growth, poverty, income inequality, and financial stability [19]. However, the finding [13] is conflicting. The results of his study show that long-term estimates indicate that financial inclusion variables do not have a significant effect on poverty reduction in the long run.

3. Methodology

3.1. Data and Source

To assess the impact of financial inclusion on poverty in Ethiopia, I used data from the Ethiopian Socioeconomic Survey 2018–2019, conducted by the Ethiopian Central Statistical Agency in collaboration with the World Bank. The Ethiopian Socioeconomic Survey 2018-2019 is a nationally representative survey conducted in nine states and two city administrations (Addis Ababa and Diredawa).

The respondents who were asked about all socio-economic characteristics such as level of household education, health, and nutrition, the proportion of households with access to drinking water, the proportion of households without electricity, the quality of walls and roofs, percentage of employment in the formal and informal sectors, participation in political life, access to financial institutions, etc.

3.2. Empirical Model of the Study

I applied the Two-Stage Least-Squares model (2SLS); Two-Stage Least Squares has been used to fit models with endogenous explanatory variables in a linear regression framework to examine the effects of financial inclusion on poverty in Ethiopia [43].

Model Specifications: -

Reduced Form Equation (1st stage)

$$FIs_i = \beta_0 + \beta_1 Dist_i + \beta_2 Age_i + \beta_3 Fem_i + \beta_4 Ru_i + \beta_5 Edu_i + \beta_6 hhsize_i + \beta_7 Emsta_i + \beta_8 reg_i + \beta_9 Married_i + \varepsilon_i \quad (2)$$

Two Stage Least Squares

$$PR_i = \beta_0 + \beta_1 FI_i + \beta_2 Age_i + \beta_3 Fem_i + \beta_4 Ru_i + \beta_5 Edu_i + \beta_6 hhsize_i + \beta_7 Emsta_i + \beta_8 reg_i + \beta_9 Married_i + \varepsilon_i \quad (3)$$

Where, FIs_i is financial inclusions on houshold i, PR_i re present poverty (Agricultural inputs, Housing, Health & Nutrition, Water & Sanitation, and Education), $Dist_i$ is distance to the nearest bank in kilometres, Age_i is the age of the household head, Fem_i is a binary variable that is coded as 1 for female and 0 for male, Ru_i is a binary variable for the location of the household (1=rural and 0=urban), Edu_i is a binary variable (1= educated and 0 otherwise), $Married_i$ is a binary variable (1= married and 0 otherwise), $Emsta_i$ is a categorical variable for the employment status of the household head, $hhsize_i$ represents household size, and reg_i represents regional dummies.

I suspected that the explanatory variable of the study has an endogeneity problem, so the distance to the nearest price of transportation cost (in kilometers) is used as an instrument to solve the problem. In order to be valid, an instrument must meet the conditions under which it is directly related to a potentially endogenous variable but not directly related to the dependent variable [44].

The distance to the nearest bank fulfills both conditions because it is directly related to the availability of financial services [45]. On the other hand, distance to the nearest bank affects poverty only through its impact on financial inclusion.

The instrumental variable's validity can also be justified in terms of rural-urban relations by citing the government's policy of expanding the distribution of rural and urban banks in Ethiopia to meet the needs of the rural poor. In addition, microfinance institutions are widespread and meet the financial needs of rural communities by offering a variety of specialised financial products and services.

3.3. Variable Indicators

In this research, my main focus is on the indicators that determine the variables of individuals identified as vulnerable to poverty within the context of achieving the Sustainable Development Goals. Specifically, those identified by USAID's Poverty Assessment Tool (PAT) for Ethiopia in 2010 [38]. In the case of Ethiopia, USAID (2011) identified several poverty indicators such as the number of rooms with toilets and kitchens, the main types of roofs in the dwellings, the main supply of lighting in the dwellings, the main gas for cooking, the main supply of drinking water, households that currently own livestock, households that currently own livestock, households that currently own a farm axe, households that currently own blankets, households that currently own a radio, households that currently own a television set, households that currently own video recorders, and so on., and the indexes of financial inclusion.

Table 2. *Indicators used in generating the FI index, and Poverty.*

	Units	Mean	Std. Dev.
Financial Inclusion Indicators			
Ownership of Private Banks accounts	Categorical	0.9840581	0.1252509
Ownership of Public Banks Accounts	Categorical	0.9954653	0.0671874
Ownership of Micro finances accounts	Categorical	0.9784624	0.1451682
Ownership of SACCO accounts	Categorical	0.9786253	0.1446302
Using ATM	Categorical	0.9850443	0.1213757
Using Online Banking	Categorical	0.9779253	0.1469268
Using Mobile Banking	Categorical	0.9795587	0.1415046
Using Agent Banking	Categorical	0.9770888	0.1496207
Using Interest Fee Banking	Categorical	0.9794926	0.1417282
Using Private Insurances	Categorical	0.9968653	0.0559003
Using Public Insurances	Categorical	0.9991239	0.0295864
Measurement of Poverty Indicators			
Percentage of Household with no visited Health centre	Categorical	0.9862022	0.116651
Percentage of Household with no access farm land	Categorical	0.9705597	0.1690374
Percentage of Household with no access Irrigation last 12 months	Categorical	0.9705597	0.1690374
Percentage of Household with no access Urea last 12 months	Categorical	0.9968345	0.0561736
Percentage of Household with no access DAP last 12 months	Categorical	0.998032	0.0443182
Percentage of Household with no access quality water in 1 km.	Categorical	0.9019979	0.2973181
Percentage of Household with no access phone	Categorical	0.9677377	0.1766964
Percentage of household with no access to Safe water	Categorical	0.9951835	0.0692335
Percentage of Household with no having livestock	Categorical	0.9509285	0.2160178
Percentage of Household with no access quality toilet	Categorical	0.0165538	0.1275925
Percentage of household with no access to electricity	Categorical	0.0165538	0.1275925
Percentage of Household with no access quality dwelling roof	Categorical	0.9561852	0.2046832
Percentage of household with no access to gas for cooking	Categorical	0.9561852	0.2046832
Percentage of Household with no access quality wall	Categorical	0.0383555	0.1920535

Source: Ethiopian Socio-Economic Survey and USAID's Poverty Assessment Tool (PAT)

4. Regression Result and Analysis

4.1. The Regression Results for Effect of Financial Inclusion on Poverty

The estimation result of Table 3 focuses on the impact of financial inclusion on poverty indicators such as agricultural inputs, housing services, health and nutrition, water and sanitation, and education.

The regression results for the first stage are presented in panel A. As shown in Table 3, the distance to the nearest household from a financial institution is strongly correlated with poverty, and the test of the F-statistic of the first stage is greater than 10, leading to the rejection of the weak instrumental null hypothesis [46].

Moreover, the Durbin and Wu-Hausman tests proved that the variable could be considered exogenous, which mainly led to not rejecting the null hypothesis, indicating that at least one instrument is exogenous [47]. The test results show that I can reject the null hypothesis because the p-value is less than 0.05. Therefore, I can conclude that financial inclusion is endogenous and that the 2SLS model estimates appropriately.

In panels B and C of Table 3, I applied ordinary least squares and two-stage least squares to estimate the effects of financial inclusion on poverty indicators such as lack of access to agricultural inputs, lack of access to water and sanitation, housing, health, and nutrition, and being unable to read and write under the age of 16.

The OLS estimation result in Table 3 in Panel B shows that all variables were negative and statistically significant at the 1% level, which indicates that financial inclusion currently reduces poverty by about 1.1% because households will not have access to agricultural inputs (see Column 1 of Table 3).

In column 2 of Table 3, the poverty rate was reduced by 1.3% for households that built their house with poor-quality materials, and it was also reduced by 0.1 percentage points for households without access to water and sanitation (see Column 3 of Table 3).

Table 3. *The regression results for effect of Financial Inclusion on poverty.*

Variables	Dependent Variable: Financial Inclusions				
	(1')	(2')	(3')	(4')	(5')
Panel A: First Stage Regression Results					
Nearest Financial Institutions	-8.0086***	-8.0086***	-8.0086***	-8.0086***	-8.0086***
	(0.02042)	(0.02042)	(0.02042)	(0.02042)	(0.02042)
	(-392.08)	(-392.08)	(-392.08)	(-392.08)	(-392.08)
Household Characteristics	Yes	Yes	Yes	Yes	Yes
R-Squared	0.3770	0.3770	0.3770	0.3770	0.3770
Regional Fixed Effects	Yes	Yes	Yes	Yes	Yes
F-Statistics	9983.17	9983.17	9983.17	9983.17	9983.17
Observations	263938	263938	263938	263938	263938
Variables	Agricultural Inputs	Housing Services	Water & Sanitation	Health & Nutrition	Education No Read & Write
Panel B: OLS Regression Results					
Financial Inclusion Indexes	-0.0114***	-0.0136***	-0.00157***	-0.000573***	-0.00472***
	(0.00091)	(0.0010)	(0.00047)	(0.00006)	(0.00014)
	(-12.43)	(-13.43)	(-3.33)	(-8.21)	(-32.77)
Household Characteristics	Yes	Yes	Yes	Yes	Yes
R-Squared	0.0301	0.0134	0.4770	0.0133	0.0686
Regional Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	263,938	263,938	263,938	263,938	263,938
Variables	Agricultural Inputs	Housing Services	Water & Sanitation	Health & Nutrition	Education No Read & Write
Panel C: 2SLS Regression Results					
Financial Inclusion indexes	-0.0269***	-0.0321***	-0.00399***	-0.00134***	-0.0119***
	(0.0015)	(0.00167)	(0.00077)	(0.0011)	(0.00023)
	(-17.72)	(-19.21)	(-5.13)	(-11.62)	(-49.88)
Household characteristics	Yes	Yes	Yes	Yes	Yes
R-Squared	0.0259	0.0101	0.4769	0.0114	0.0550
Durbin (score) chi2(1) test	173.745***	210.917***	13.9854***	76.3351***	1573.29***
Wu-Housman test	173.848 ***	211.071***	13.9851***	76.352***	1582.61***
Observations	263,938	263,938	263,938	263,938	263,938

(Std. Err. adjusted for 11 clusters in region) t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001 Notes: Regressions include such as age, sex, household size, marital status, employment status, and others. Poverty includes the indicators of multidimensional poverty measurement which are agricultural inputs (no access to DAP, Urea and Irrigation), Housing (low-quality of construction materials such as floors, and wall, electric city, phone), Health& Nutrition (no access to consultation, and no visit to hospital), Water & sanitation (no access of clean water, no access of nearest to house, etc.) and education (unable to read& write under 16). Data Source: 2018/19 Ethiopia Socioeconomic Survey.

On the other hand, financial inclusion reduced poverty by 0.05% for households that did not use health and nutrition services (see Column 4 of Table). In addition, column 5 of the regression results in Table 3 shows that financial inclusion

reduces poverty by 0.04% for households unable to read and write under the age of 16.

The 2SLS estimation result shows that columns 1, 2, 3, 4, and 5 of Table 3 are negative and statistically significant at the 1% level. It suggests that financial inclusion reduces the poverty of the households that will not have access to agricultural inputs by 2.7%, and it reduces the poverty by 3.2% of households that built their house with poor quality materials, and also households without access to health and nutrition services have reduced their poverty by 0.4%, as well as by 0.1% of households that do not have access to quality water and sanitation. Additionally, it indicates that poverty was reduced by 1.2% of households less than 16 years old who could not read or write. Unlike the results of the OLS estimation, the outcomes of the 2SLS estimation are consistent with the OLS estimation results; notwithstanding, the variable coefficient is twice as large due to the inclusion of the instrumental variable. This outcome is consistent with the study conducted by [48], which employed the IVprobit model to examine the influence of financial inclusion on poverty in Ghana.

4.2. The Gender Dimension of Financial Inclusion's Effect on Poverty

I examined whether the effects of financial institutions differ by gender, taking into account the gender gap in financial inclusion in Ethiopia. In this study, I regressed on the dimension of gender to see whether the result was consistent or not. The estimated results in Table 4 variables are statistically negative at the 1% level, i.e., the OLS regression results for the coefficients of male-headed households show a decrease of -0.0115 for agricultural inputs, -0.00133 for housing, -0.00173 for health and nutrition, -0.00564 for water and sanitation, and -0.00443 for education. However, the coefficients for female-headed households are -0.1147 for agricultural inputs, -0.0132 for housing, -0.00172 for health and nutrition, -0.00561 for water and sanitation, and -0.00442 for education. This shows that male-headed households have a slight advantage over female-headed households in reducing poverty.

Table 4. *The gender dimension of Financial Inclusion's effect on poverty.*

Variables	Dependent Variable: Financial Inclusions									
	Female Headed Household					Male Headed Household				
	(1')	(2')	(3')	(4')	(5')	(1')	(2')	(3')	(4')	(5')
Panel A: First Stage Regression Results										
Nearest	-8.0083***	-8.0083***	-8.0083***	-8.0083***	-8.0083***	-8.008***	-8.008***	-8.008***	-8.008***	-8.008***
Financial	(0.02043)	(0.02043)	(0.02043)	(0.02043)	(0.02043)	(0.0204)	(0.0204)	(0.0204)	(0.0204)	(0.0204)
Institutions	(-391.91)	(-391.91)	(-391.91)	(-391.91)	(-391.91)	(-391.87)	(-391.87)	(-391.87)	(-391.87)	(-391.87)
Household Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.3770	0.3770	0.3770	0.3770	0.3770	0.3770	0.3770	0.3770	0.3770	0.3770
Regional Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-Statistics	9395.9	9395.9	9395.9	9395.9	9395.9	9396.1	9396.1	9396.1	9396.1	9396.1
Observations	263,938	263,938	263,938	263,938	263,938	263,938	263,938	263,938	263,938	263,938
Variables	Agricultural Inputs	Housing Services	Water & Sanitation	Health & Nutrition	Education no Read & Write	Agricultural Inputs	Housing Services	Water & Sanitation	Health & Nutrition	Education no Read & Write
Panel B: OLS Regression Results										
Financial	-0.01147***	-0.0132***	-0.00172***	-0.000561***	-0.00442***	-0.0115***	-0.0133***	-0.00173***	-0.000564***	-0.00443***
Inclusion	(0.00091)	(0.000101)	(0.00047)	(0.00069)	(0.00014)	(0.00092)	(0.000101)	(0.000471)	(0.00069)	(0.00014)
indexes	(-12.49)	(-13.05)	(-3.65)	(-8.05)	(-30.71)	(-12.57)	(-13.11)	(-3.67)	(-8.10)	(-30.74)
Household Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.0301	0.0132	0.4770	0.0133	0.0646	0.0302	0.0133	0.4770	0.0133	0.0646
Regional Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	263,938	263,938	263,938	263,938	263,938	263,938	263,938	263,938	263,938	263,938
Variables	Agricultural Inputs	Housing Services	Water & Sanitation	Health & Nutrition	Education no Read & Write	Agricultural Inputs	Housing Services	Water & Sanitation	Health & Nutrition	Education no Read & Write
Panel C: 2SLS Regression Results										
Financial	-0.0281***	-0.0332***	-0.00411***	-0.00140***	-0.0119***	-0.0282***	-0.0333***	-0.00412***	-0.00141***	-0.01192***
Inclusion	(0.0015)	(0.0016)	(0.00077)	(0.0011)	(0.00023)	(0.0014)	(0.0017)	(0.00077)	(0.0011)	(0.00022)
indexes	(-18.56)	(-19.83)	(-5.28)	(-12.16)	(-49.96)	(-18.63)	(-19.88)	(-5.30)	(-12.20)	(-49.99)
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.0290	0.0119	0.4770	0.0128	0.0550	0.0291	0.0120	0.4770	0.0129	0.0550
Durbin (score) chi2(1) test	191.355***	225.266***	14.8624***	83.9422***	1578.74***	191.939***	225.833***	14.9055***	84.1683***	1580.3***

Variables	Dependent Variable: Financial Inclusions									
	Female Headed Household					Male Headed Household				
	(1')	(2')	(3')	(4')	(5')	(1')	(2')	(3')	(4')	(5')
Wu-Housman test	191.48***	225.442***	14.8622***	83.9629 ***	1588.13***	192.065***	226.01***	14.9054***	84.1891***	1589.7***
Observations	263,938	263,938	263,938	263,938	263,938	263,938	263,938	263,938	263,938	263,938

*(Std. Err. adjusted for 11 clusters in region) t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001 Notes: Regressions include such as age, sex, household size, marital status, employment status, and others. Poverty includes the indicators of multidimensional poverty measurement which are agricultural inputs (no access to DAP, Urea and Irrigation), Housing (low-quality of construction materials such as floors, and wall, electric city, phone), Health& Nutrition (no access to consultation, and no visit to hospital), Water & sanitation (no access of clean water, no access of nearest to house, etc.) and education (unable to read& write under 16). Data Source: 2018/19 Ethiopia Socio-economic Survey.*

In contrast to the results of the OLS estimation, the results of the 2SLS estimates are also negative at the 1% statistical level, suggesting that financial inclusion currently reduces the likelihood of male-headed households not having access to agricultural inputs such as urea, DAP, and irrigation by about 2.82%, and for female households, the reduction of poverty was 2.81% (in column 1 of Table 3). In column 2 of Table 4, there is a 3.3% reduction of male-headed households that built their houses with poor-quality materials, compared to 3.32% of female-headed households. In column 3 of Table 4, male-headed households without access to health and nutrition services decreased by 0.412%, but female-headed households decreased by 0.411%. In column 4 of Table 4, 0.141% of male-headed households do not have access to quality water and sanitation, but female-headed households reduce 0.140%. In column 5 of Table 4, 1.192% of headed households under 16 cannot read or write, whereas female-headed households reduce 1.119%. The findings of the 2SLS estimation align with the findings of the OLS estimation. However, the variable coefficient is twice as large due to the inclusion of the instrumental variable. Therefore, the results show that there is a slight gap between female and male-headed households. Regarding the gender gap, some empirical evidence suggests that Ethiopian women are less likely to be employed. In addition, women in Ethiopia face greater and more systematic barriers to accessing formal financial services [49]. So, this may lead to less contribution to poverty reduction in female-headed households.

4.3. The Rural and Urban Households Dimension of Financial Inclusion's Effect on Poverty

Researchers, taking into account the disparity in financial inclusion based on poverty based on location, explore the influence of financial establishments on location. For instance, in Ghana, the findings of the scholars reveal that the presence of banks in rural and urban regions differs and does not have an equal impact on poverty reduction in both areas [48]. So I ran financial inclusion in rural and urban areas to know the level of financial institution impact on poverty, and the OLS regression results showed that all variables were significant at the 1% level. The results show that households in urban areas generally perform better than those in rural areas in terms of agricultural inputs, housing, health and nutrition, water and sanitation, and education. The coefficients are -0.0114 for agricultural inputs: -0.000573 for health and nutrition, -0.00157 for water and sanitation, -0.0136 for housing, and -0.00472 for education in urban areas, but -0.0110 for agricultural inputs: -0.000552 for health and nutrition, -0.00153 for water and sanitation, -0.0133 for housing, and -0.00472 for education in rural areas.

Table 5. *The rural and urban households dimension of Financial Inclusion's effect on poverty.*

Variables	Dependent Variable: Financial Inclusions									
	Urban Household					Rural Household				
	(1')	(2')	(3')	(4')	(5')	(1')	(2')	(3')	(4')	(5')
Panel A: First Stage Regression Results										
Nearest Financial Institutions	-7.9980*** (0.0239) (-392.22)	-7.9980*** (0.0239) (-392.22)	-7.9980*** (0.0239) (-392.22)	-7.9980*** (0.0239) (-392.22)	-7.9980*** (0.0239) (-392.22)	-7.9981*** (0.0238) (-392.35)	-7.9981*** (0.0238) (-392.35)	-7.9981*** (0.0238) (-392.35)	-7.9981*** (0.0238) (-392.35)	-7.9981*** (0.0238) (-392.35)
Household Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.3797	0.3797	0.3797	0.3797	0.3797	0.3797	0.3797	0.3797	0.3797	0.3797
Regional Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-Statistics	8974.8	8974.8	8974.8	8974.8	8974.8	9502.7	9502.7	9502.7	9502.7	9502.7
Observations	263,938	263,938	263,938	263,938	263,938	263,938	2639,38	263,938	263,938	263,938
Variables	Agricultural Inputs	Housing Services	Water & Sanitation	Health & Nutrition	Education No Read & Write	Agricultural Inputs	Housing Services	Water & Sanitation	Health & Nutrition	Education No Read & Write
Panel B: OLS Regression Results										
Financial Inclusion indexes	-0.0114*** (0.00091) (-12.43)	-0.0136*** (0.0010) (-13.43)	-0.00157*** (0.00047) (-3.33)	-0.000573*** (0.00006) (-8.21)	-0.00472*** (0.00014) (-32.77)	-0.0110*** (0.00092) (-11.95)	-0.0133*** (0.00101) (-13.08)	-0.00153** (0.00047) (-3.24)	-0.000552*** (0.00069) (-7.90)	-0.00472*** (0.00014) (-32.75)

Variables	Dependent Variable: Financial Inclusions									
	Urban Household					Rural Household				
	(1')	(2')	(3')	(4')	(5')	(1')	(2')	(3')	(4')	(5')
Household Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.0301	0.0134	0.4770	0.0133	0.0686	0.0269	0.0116	0.4770	0.0119	0.0686
Regional Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	263,938	263,938	263,938	263,938	263,938	263,938	2639,38	263,938	263,938	263,938
Variables	Agricultural Inputs	Housing Services	Water & Sanitation	Health & Nutrition	Education No Read & Write	Agricultural Inputs	Housing Services	Water & Sanitation	Health & Nutrition	Education No Read & Write
Panel C: 2SLS Regression Results										
Financial Inclusion indexes	-0.0281*** (0.0015) (-18.55)	-0.0334*** (0.0016) (-19.92)	-0.00405*** (0.00077) (-5.20)	-0.00140*** (0.00011) (-12.20)	-0.0121*** (0.00023) (-50.55)	-0.0269*** (0.0015) (-17.72)	-0.0324*** (0.0016) (-19.32)	-0.00393*** (0.00077) (-5.05)	-0.00134*** (0.0011) (-11.66)	-0.0120*** (0.00023) (-50.50)
Household characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.0290	0.0121	0.4770	0.0129	0.0595	0.0259	0.0104	0.4770	0.0115	0.0595
Durbin (score) chi2(1) test	192.058***	219.887***	16.0509***	82.5664***	1512***	173.672***	205.274***	15.0683***	74.7449***	1508.39***
Wu-Housman test	192.183***	220.054***	16.0507***	82.586 ***	1520.6***	173.774 ***	205.419***	15.0681***	74.7607***	1516.95***
Observations	263,938	263,938	263,938	263,938	263,938	263,938	2639,38	263,938	263,938	263,938

(Std. Err. adjusted for 11 clusters in region) t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001 Notes: Regressions include such as age, sex, household size, marital status, employment status, and others. Poverty includes the indicators of multidimensional poverty measurement which are agricultural inputs (no access to DAP, Urea and Irrigation), Housing (low-quality of construction materials such as floors, and wall, electric city, phone), Health& Nutrition (no access to consultation, and no visit to hospital), Water & sanitation (no access of clean water, no access of nearest to house, etc.) and education (unable to read& write under 16). Data Source: 2018/19 Ethiopia Socio-economic Survey.

In Table 5, the results of the 2SLS estimates are also negative at the 1% statistical level. In column 1, financial inclusion reduces the likelihood of urban households not having access to agricultural inputs such as urea, DAP, and irrigation by about 2.81% for urban and 2.7% for rural areas. In column 2, the households that built their houses with poor-quality materials experienced poverty reductions of about 3.34% for urban areas and 3.24% for rural areas. In column 3, the poverty of households without access to health and nutrition services decreased by about 0.04% in urban and 0.039% in rural areas.

Households do not have access to quality water and sanitation, which has decreased by about 0.14% in urban and 0.013% in rural areas (see column 4). households under 16 years old that cannot read or write have reduced by about 0.121% in urban and 0.12% in rural areas. The results of the 2SLS estimation are consistent with the results of the OLS estimation, and there is also a slight difference in the location dimension. The reason behind the reduction in rural areas may be a lack of infrastructure to operate financial institutions. But the author [48] found contradictory results in Ghana. The Impact of Financial Inclusion on Poverty and Vulnerability to Poverty: Using the Probit Model Their findings suggest that financial inclusion reduces poverty and vulnerability to poverty more in rural areas than in urban areas.

5. Conclusions and Recommendations

To examine the effects of financial inclusion on poverty, I used poverty as the dependent variable and financial inclusion as the independent variable. Additionally, I included covariates such as age, sex, household size, marital status, employment status, and others. Poverty includes the indicators of multidimensional poverty measurement, which are agricultural inputs (no access to DAP, urea, and irrigation), housing (low-quality construction materials such as floors, walls, toilets, no access to electricity, and phones), health nutrition (no access to consultation and no visit to the hospital), water and sanitation (no access to clean water, no access to the nearest house, etc.), and education (inability to read and write under the age of 16).

Numerous studies have explored the utilisation and accessibility of financial institutions in Ethiopia; however, poverty has received limited attention. Therefore, I used data from the Ethiopian Socio-Economic Survey 2018/19, conducted by the Ethiopian Central Bureau of Statistics in collaboration with the World Bank, to conduct a comprehensive analysis of the impact of financial inclusivity on poverty rates in Ethiopia for the first time, and I also employed the Two-Stage Least Squares model (2SLS). In a linear regression framework, two-stage least squares has been used to fit models containing endogenous explanatory variables. The study's explanatory variable may have an endogeneity issue; thus, I used the nearest transportation cost's (in kilometres) distance as an instrument to address this issue.

According to the study's findings, households without access to agricultural inputs experience a 2.7% decrease in poverty. It also reduces poverty by 0.4% for households without access to health and nutrition services and by 3.2% for households that used lower-quality building materials to construct their dwellings. On the other side, financial inclusion has decreased poverty by 0.13 percent in homes

without access to good water and sanitation and by 0.11 percent in households with children under the age of 16 who cannot read or write. Moreover, male-headed and urban households perform marginally better at reducing poverty than female-headed and rural households. I have come to the conclusion that financial inclusion has helped to lessen poverty in Ethiopia. I suggest that the National Bank of Ethiopia continue to work on a new strategy called the National Financial Inclusion Strategy of 2017, which aims to aggressively increase the inclusion of people into the financial system. Commercial banks should also work on branch expansions, infrastructure improvements, and public awareness campaigns to sustain the progress of poverty alleviation.

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