ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

SCHOOL OF GRADUATE STUDIES

THE EFFECT OF TELECOMMUNICATIONS SERVICES ON URBAN HOUSEHOLD POVERTY REDUCTION IN ETHIOPIA: THE CASE OF DEBRE BIRHAN CITY

BY

ADDISU MANDEFRO

JUNE 2021

ADDIS ABABA, ETHIOPIA

THE EFFECT OF TELECOMMUNICATIONS SERVICES ON URBAN HOUSEHOLD POVERTY REDUCTION IN ETHIOPIA: THE CASE OF DEBRE BIRHAN CITY

By

Addisu Mandefro

Advisor

Abdurezack Hussein (Ph.D)

A Master Thesis Submitted to the College of Business and Economics of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Masters of Science in Economics (Development Economics)

Addis Ababa University

Addis Ababa, Ethiopia

June 2021

DECLARATION

I, Addisu Mandefro, Registration Number/I.D. Number GSE/6796/11 do hereby declare that this thesis is my original work. It has not been submitted partially or in whole by any other person for an award of a degree in any other university/institution. All the sources I used or quoted have been indicated and acknowledged by complete references.

Full Name _____

Signature _____

Date _____

This Thesis has been submitted for examination with my approval as College supervisor.

Name of Advisor_____

Signature _____

Date _____

Addis Ababa University

The undersigned certify that they have read and now recommend to the Addis Ababa University to accept the Thesis submitted by Addisu Mandefro, entitled "The Effect of Telecommunications Services on Urban Household Poverty Reduction in Ethiopia. The case of Debre Birhan City.", in partial fulfillment of the requirements for the award of a Master's Degree in (Development Economics).

APPROVAL SHEET

Chairperson, Department	Signature	Date
Advisor	Signature	Date
External Examiner	Signature	Date
Internal Examiner	Signature	Date

ACKNOWLEDGEMENTS

First, I would like to express my sincere gratitude to my research advisor, Abdurezack Hussein (Ph. D.), for his continued & direct support, encouragement, and invaluable guidance throughout this research also like to thank him for his friendship and empathy.

Many thanks to my colleagues, Mulugeta Belay & Abay Abebe; the data gathering could not have been accomplished without their support. I also want to thank my friends Workineh Ayenew, Tigistu Alemu & Biruk Marshet for their continuous encouragement and support.

I do not want to end my acknowledgment without appreciating all my relatives, friends, course mates and all people around me for their help and my side during data collection.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

CSA:	Central Statistics Authority
EEA:	Ethiopian Economic Association
GDP:	Gross Domestic Product
HDI:	Human Development Index
HH:	Household
HHH:	House Hold Head
HICE:	Household income and consumption expenditure survey
MoFED:	Ministry of Finance and Economic Development
MPI:	Multidimensional Poverty Index
NIE:	New Institutional Economics
OPHI:	Oxford Poverty and Human Development Initiative
PHSC:	Potential health services coverage
SSA:	Sub-Saharan Africa
UNDP:	United Nations Development Program
WB:	World Bank

ABSTRACT

This paper evaluates the Effect of telecommunications services on urban household poverty reduction in Ethiopia in Debre Birhan. In this study, we selected a total sample of 202 households using a systematic sampling technique. The data collection instrument was face-to-face interviews using structured closed and open-ended questionnaires. The study applied Multidimensional Poverty Index to set a poverty line. This study used a binary logit model and descriptive statistics to investigate the effect of telecommunications services on urban household poverty reduction. 21.37 percent of telecom service users (both internet and mobile) are poor, and 78.63 percent of telecom service users in the study area were non-poor. The result of the econometric estimation shows telecom service positively and significantly impacts household poverty in a favorable direction; the marginal effect suggests that households with access to the internet and mobile phones decrease the likelihood of being MPI poor by 25.6percent. In addition, other covariates like household head education level, household head age, credit access, and household income were found to reduce household poverty. Thus, the study showed that increasing access to telecom services is crucial in reducing household poverty. Therefore, any intervention in providing more telecom services like the internet and access to cell phones and improving the service quality will induce households to engage in activities that will enhance households' wellbeing.

Keywords: Poverty, Multidimensional Poverty Index, Logistic Regression, Telecommunications

Paper type Research paper

CHAPTER ONE

1 INTRODUCTION

1.1 Background of the Study

Poverty is considered a lack of shelter, food, and access to education and health service (Berhanu, 2020). In addition, poor households are exposed to violence in some instances and find themselves in states of unemployment, vulnerability, and powerlessness. Since poverty in its broad concept is a multidimensional phenomenon, various indicators such as consumption, income levels, exposure to risks, political access, and participation must be looked at.

Poverty covers the most extensive parts of the world, becoming a threat for humankind in the 21st century. Know a day it becomes a significant encounter for economic development. Cheng (2017), Poverty and how to eradicate/reduce it remains the most pressing dilemma in the international development debate.

According to the global Multidimensional Poverty Index (MPI, 2014), the Sub-Saharan Africa (SSA) countries which are home to 91 percent of the population of the region using the 2010 population data Alkire et al., (2014), a total of 462 million people were living in multidimensional poverty or 58.5 percent of all people living in these countries. Nearly 30 percent of the total MPI poor of the world (out of 108 countries analyzed) live in SSA (Alkire et al., 2014). Of these 462 million people, 36.3 percent live in West Africa, 36 percent in East Africa, 14.5 percent in Central Africa, and 13.3 percent in Southern Africa.

By 2030, Ethiopia has projected to lift 22 million people out of extreme poverty. However, this rate has expected to reach below 5 percent, with a slight growth rate; these economies could also have expected to make radical poverty history by 2030 (Kristofer el al, 2019)**.**

Though Poverty in Ethiopia is predominantly rural, urban headcount poverty cannot significantly reduce so far because of the rural-urban migration, Urban Unemployment, Corruption, Political unrest, and other factors. Moges (2013)**,** 'Poverty is a central public policy challenge in Ethiopia. It has multiple causes related to production, distribution, policy, political and institutional factors in the system'.

Currently, Telecommunications services have existed everywhere in varied forms. Up to the mid-1990s, telecom services were observed as luxury goods, unavailable, and considered unaffordable to low-level households; generally, Telecommunications had relatively considered a small role in social contribution and economic development. However, since the mid-1990s, including the World Bank and the United Nations Development Program, Telecommunications have emphasized their development strategies (*Global Trends and Policies*, 2006).

The last few years have witnessed the exhibits of a remarkable development in telecom services provisioning in the world. According to Baron (2010) and Kefela (2011), this explosive growth has been observed in both the developed and the developing world. Therefore, telecommunications such as mobile telecom have a promising and fundamental impact and can change households' lives, especially for developing countries since mobile telecom has a growing stage.

According to Oshota (2019), despite the enormous developments in the quality of telecom services and overall technological advancement, the gap between poor and rich is ever-widening for both the world's rich and developing nations. Since the poor cannot participate and contribute effectively to development efforts, poverty reduction trends have worsened even in the face of macroeconomic growth. Oshota (2019), the effect of ICTs (such as mobile telecom)on economic development, together with targeted policy interventions to increase their impact on poverty alleviation, also helped to relieve the plight of those in absolute poverty and improve the well-being of citizens; hence, the government should encourage better access to information through investment in ICT technology to raise people's standard of living above the poverty line**.**

On their findings, Bayes et al. (1999) suggest that the availability of phones provides fast and effective communication, which contributes to a more efficient product price for outputs and inputs. Furthermore, Individuals used mobile telecom services to maintain the relationship by contacting friends, family, and partners for business purposes and accessing the internet.

Mobile communication alleviates poverty by increasing economic growth (Waverman et al., 2005), (De Silva & Zainudeen, 2007), (Rashid & Elder, 2009). In addition, households with mobile access can reduce income poverty than unconnected households (Mpogole et al., 2008).

Internet access also has an essential means of poverty reduction (Mora-Rivera & García-Mora, 2021).

Given the above statement of the contributions of telecom services to the alleviation of poverty, this paper intends to investigate the ability of telecom services towards poverty reduction at the urban household level.

1.2 Statement of the Problem

Poverty is the most pervasive social problem and the primary issue in the world, especially in third-world countries. It exists in all directions and corners except countries that use sophisticated science, technology, and the opportunity to create an asset. Poverty based on its occurrence remains severe and permanent.

In Ethiopia, previous literature on poverty has mainly and dominantly focused on rural rather than urban areas. For example, study the status of rural poverty in Ethiopia by taking the income portfolios and food entitlements of households. Bevon and Joermen (1997), cited in Ayalneh (2005), adopt a sociological approach to analysis rural poverty. They explored the importance of social class and family relationships, including the extended family, fighting against poverty. They found that in Ethiopia, social capital is essential to poverty reduction.

As Sridhar (2015) finds out, urban poverty imposes significant challenges; raise inequality, increase in poverty incidence, increment in the share of the poor. Another finding by Abbi (2005) suggests urban households living standard has declined due to high food prices, homelessness, high levels of unemployment and underemployment.

Based on Habtamu (2016), the poverty level of urban Ethiopia in 2000 was 11 percent, but in 2011, it was raised to 14 percent. This shows poverty increases slightly. But the number of poor in urban areas stayed constant from 2005 to 2011, which means around 3.2 million people in Ethiopia live in poverty. Though the poverty rate reduces from 35 percent to 26 percent, Schimidt and Kedir (2011) and Tamirat & Sivakumar (2020) found in their study the incidence of poverty in the surveyed Household in the study area, 45 percent headcount ratio, 0.08, poverty gap, and 0.03 poverty severity respectively on his study area.

In Ethiopia, Telecom service is weak in monitoring the behavior of the monopoly operator, low quality of service, setting and enforcing tariffs, and inability to retain and attract skilled workforce (Adam, 2010). However, users of telecom services are growing due to its convenience, broad reach, and ability to support other poverty reduction practices like education, health, child and maternal mortality, productivity, and the like.

The study of the relationship between Telecommunications services on poverty reduction in the imperfect world has attracted the literature; it has remained one of the focusing areas to investigate the extent of the contribution of Telecommunications to poverty reduction.

As suggested by Souter et al. (2005), nevertheless, public phone services are significantly used by the poor; low-income groups spent a higher proportion of their income on telephony than high-income groups. A good deal of spending on telephone use by the poor is likely to be more important (such as emergencies) and in ways that save money (for example, by replacing the need to travel). But the poorest groups also say that the telephone had a negative financial value for them (unlike the wealthiest groups, who thought it positively beneficial.

Rohman (2013) finds out that access to a mobile phone has a higher likelihood of earning a 27 USD household income than those of the unconnected ones. The study also found the productive uses of mobile phones to contribute a 39 USD household income more than those who never access these services. Also, the effect of mobile access is more visible in an urban area where economic activities are more available. As a comparison, the study also replicates the investigation on the key to the banking account and found a visible and more significant impact on income**.**

Sife et al. (2010)**,** telecom service, particularly mobile telephones, contributes to reducing Poverty so that it improves and shortens the money transfer and receiving schedule and secures better prices and market services. It also has the advantage of expanding and strengthening social networks, increases people's ability to deal with emergencies, and working together, thereby reducing costs and increasing productivity. And also, mobile phones enable to cut down travel costs; minimize physical risks; maximize the outcomes of necessary journeys; increase temporal accessibility; amplify the efficiency of activities, and send and receive money. Finally, mobile

phones help traders and farmers to secure better markets and prices, save time and money, and promptly communicate business-related information.

The economic impact of Telecommunications services on poverty alleviation in developing countries has received little attention in the literature Sridhar, (2007). Satterthwaite (2004), most of the prior studies have used income and consumption as tools to set the poverty line, but Poverty measures have beyond the consumption-based analysis; it also includes the lack of essential services and other deprivations.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective is to examine the Effect of Telecommunications Services on Urban Household Poverty Reduction.

1.3.2 Specific Objectives

i. To investigate the effect of Telecommunications services on household poverty status.
ii. Measure the poverty level changes in urban Households as a result of Telecommunications Services usage.

1.4 The Hypothesis of the Study

The null hypothesis was tested and hypothesized as:

H_o: There is no significant relationship between Telecommunications service and household poverty status (all β equals zero)

Ha: At least one β does not equal zero, which means that the logistic regression equation predicts the probability of the outcome better than the mean of the dependent variable Y.

1.5 Significance of the Study

Poverty reduction and growth without telecom service and technology support can't be imaginable.

In this regard, the previous studies conducted outside Ethiopia have not measured and found the contribution of Telecommunications services to the MPI poverty alleviation at the household level in their studies. Moreover, no empirical studies were conducted in the Ethiopia case as far as the researcher's knowledge.

This provides the motive for further studies to come with a clear and more specific finding. The finding was to develop a precise result with a different methodology, expecting a positive and significant contribution of Telecommunications services on the urban poor Household's welfare improvements.

After accomplishing and finalizing this study, the results will open new insights for future research and may be used as a hypothesis for further quantitative investigation on poverty alleviation studies.

Policymakers can use the research regarding how the telecom service can be playing as a tool of extreme poverty alleviation.

1.6 Scope of the Study

This study was limited geographically and thematically. Geographically, it emphasized only four (4) Kebeles Debre Birhan City. Thus, woreda 01, 03, 05, and 07. This study has focused on the economic contributions of Telecommunications services at the household level and its contribution to reducing urban Poverty in Debre Birhan city. The city is becoming an emerging industry center of Ethiopia.

1.7 Limitations of the Study

Though Poverty is a national phenomenon, due to financial and time limitations, the study has intended to conduct in the urban area of Debre Birhan only. The financial shortfalls have limit hiring people for data collection and rewarding participants with products or giveaways for participating in the study. Moreover, COVID-19 Pandemic has also played a significant limiting role in accessing the library's literature review.

CHAPTER TWO

2 REVIEW OF RELATED LITERATURE

2.1 Introduction

2.2 History of Telecommunications in Ethiopia

The Ethiopian Telecommunications Corporation is the sole national and international telecommu nications services provider since it's introduced in Ethiopia, 1894. The first telephone line installation was from Addis Ababa to Harar. Later, by long-distance voice communication with the assistance of/Operator, the service has expanded to the other parts of the essential elements of the 'empire' (*History - Ethiotelecom*, n.d.) and (*Telecommunications History in Ethiopia _ Ethiopian Communications Authority*, n.d.).

In 1906 the telegraph services from Dire Dawa to Djibouti started, improving the service radio stations installed for international and domestic services in 1952. The service has transformed into International communication' through Earth Satellite Station during the year 1979-1987. Later, other services have been introduced, such as Digital microwave and fiber cable communication systems initiated in 1989, Internet service in 1997, and Mobile service in 1999. Roaming service in 2003, Broadband multimedia service launched in 2004, Third Generation (3G) network, and others in 2007, and the company advances the uses and launch 4G/LTE in Addis Ababa (2015). LTE advanced introduced in selected areas of Addis Ababa in 2020 (*Profile - Ethiotelecom*, n.d.).

Reports, in 2020, the company makes the service accessible to 95percent of the total population with 85.4percent geographical coverage and 50percent teledensity. By the same year, total subscribers have reached 50.7 million, with an 11.2 percent growth rate from the previous year. The mobile subscribers take the highest share with 48.9 million subscribers, followed by data and internet subscribers as 23.5 million. The lowest is Fixed Broadband as 309.4 Thousand subscribers; Fixed Voice reached 981 thousand subscribers. Also, smartphone device penetration is 43.74 percent, with 8.5M LTE supporting devices (Ethio telecom 2013 EFY (2020/21) First Half Business Performance Summary Report, 2020).

The company provides different services currently such as the internet (both mobile and broadband internet), Voice calls, Roaming, etc. It also aims to be accessible to all citizens and support the multifaceted development to the highest level. To achieve the mission, the company involves in social responsibilities like: - support for government initiative (health net, school net, etc.), National Special Projects Support, support a green legacy to protect and reserve environment, Humanitarian Participation (Support community and shortcode bulk SMS), and others.

Know a time the authorized capital of Ethio telecom raised to Four Hundred Billion ETB, and targets to engage in the digital financial services like Mobile money, involve forming an entity, participating in any equity investment both domestically and at international level.

2.3 Theoretical Literature Review

2.3.1 Poverty Definitions and Concepts

Different literature provides many different interpretations on the definition of poverty**.** For instance, Poverty is "the inability to attain a minimum standard of living.” World Bank (2007). Lipton & Ravallion (1995) define that poverty exists when one or more persons fall short of a level of economic welfare believed to comprise a reasonable minimum.

Poverty is multifaceted and has no single generally accepted definition (Ibrahim et al., 2008). Indeed, it is multidimensional. As a result, literature on the concept of poverty shows various interpretations in institutional, economic, political, social, cultural, and environmental contexts.

Many writers agree that poverty is an economic phenomenon. Still, they also state that the concept of poverty should include other aspects to grasp the real and complete meaning of the concept. For example, according to Asilhan and Heman (2006), poverty encompasses both income/consumption dimensions and other dimensions relating to human development outcomes, including insecurity, vulnerability, powerlessness, and exclusion.

Generally, Poverty is a threat to the world, especially in developing countries. International institutions and governments have tried to understand the nature of poverty and its reduction mechanisms. In recent development literature, poverty reduction is a crucial policy debate. Many

development economics researchers have argued that for a nation's sustainable economic growth, the fight against poverty is a necessary condition (Zinabu et al., 2019).

Based on welfare school, poverty can be defined as society's economic well-being or individually obtained from satisfaction information. In this manner, an individual or community is being in poverty when the minimum level of economic well-being standard was not attained (Sen 1983).

Moreover, based on the three schools of thought, poverty can be defined as follow. Thus, on the basic needs approach, poverty is defined as lacking a minimum quantity of such things as food, clothing, shelter, water and sanitation, access to primary education and health services and security to prevent ill health, undernourishment, and being unemployment (Streeten et al. 1981).

According to the capability approach, poverty has been defined as a lack of choices and opportunities for living tolerable life (Lister, 2004). Thus, it consists of functioning, capabilities, and freedom (Sen, 1999).

Overall, the conventional definition of poverty distinguishes 'absolute poverty and 'relative poverty.' Absolute poverty is associated with individuals or groups who do not attain their minimum necessities, while relative poverty is associated with the other society (Devas, 2004). Poverty in its absolute terms by Bellù & Liberati (2005) identifies poverty in its fundamental terms as poor if the person cannot enjoy the predetermined minimum standard of living. As this has fixed over time and space, it allows for monitoring the living standard of the society over time (Mok, 2009).

A relative poverty line is set as an arbitrary proportion (often around 50 percent) of the mean or median of living standards. Such a poverty line was varying with the central tendency of the distribution of living standards; and was not be the same across regions and time Duclos, (2002). Such a poverty line examines the living condition of the people compared to another sand one may be categorized as inferior or non-poor depending on the economic wellbeing of others in the society.

Beyond the direct economic impact of telecom services on household livelihoods as an essential tool for businesses, its contribution to environmental sustainability, social changes, and

technological forecasts have indispensable (Asongu et al., 2018). Moreover, the service has a positive contribution to socio-economic development (Obijiofor, 2009). In addition, the internet and mobile phone service contribute positively to the flow of information and reduce the cost of searching so that telecom service has a positive link with economic development (Njoh, 2018).

Though postulates in different natures, exogenous and endogenous growth theory recognizes the positive impact of technology (ICT), an integral part of Telecommunications, on economic development.

By incorporating the theory of information and institutions into economics, NIE assures that, together with technology deployment, institutions can determine the costs of transaction and thereby ICT by providing an easy flow of information to reduce imperfection in the economic system. Furthermore, the easy flow of information develops the rational behavior of individuals and economic efficiency, thus reducing transaction costs (Richter, 2005).

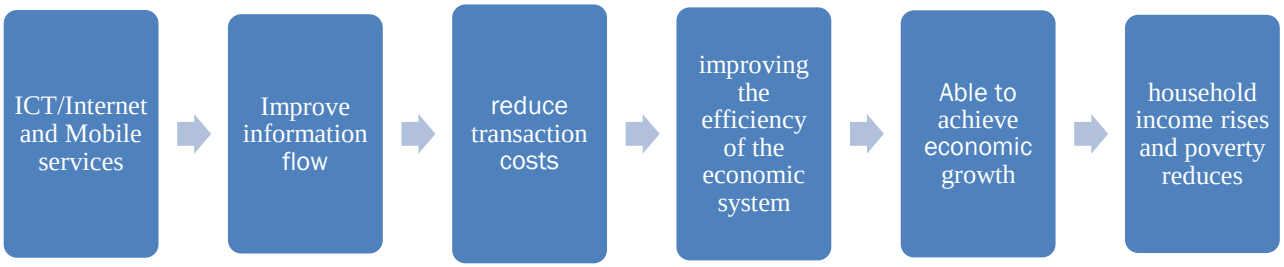


Figure 2.1: A conceptual flow of Telecom services towards poverty reduction

Source: computed by the researcher

2.3.2 Characteristics of Poverty

As much literature shows that poverty has many distinguishing characteristics both in rural and urban areas. Even though the level of poverty varies from country to country, region to region geographically and there is a difference between rural and urban poverty. Thus, in general characteristics of poverty according to Todaro & Smith (2003), poverty is characterized in rural by landlessness and small and fragmented land size, low agricultural productivities, lack of

herds, illness, lack of education, in overall, poverty is characterized by lacking to fulfilling the minimum necessities of the society and living in a lower level of living standard.

In the same way, poverty in Ethiopia is also characterized by World Bank (2020), an older household head, a high dependency rate, and few educated people. The poor mainly engage in agriculture and casual labor for their livelihoods, are relatively isolated from critical infrastructure, and have more limited access to essential services. In addition, poor households have more children and higher dependency ratios than non-poor households.

And also, rural poverty is highly correlated with education. Thus, for persons who never went to school is the likelihood of being poor is very high than primary school completed, and secondary high school completed is a relatively high chance of being poor than college and university graduates. Moreover, the poor tend to live in more remote and poorly connected areas. Since the rural poor live further away from roads, health facilities, and urban centers, for instance, in 2016, out of the total population,57 percent of the poor live more than three kilometers away from an all-weather road, 43 percent of the poor live more than three kilometers away from a health facility, in general, lousy connectivity has highly correlated with poverty (World Bank, 2020).

In another way, the poor in Ethiopia is characterized by different factors of poverty. Natural resource deficiencies in the resource base of the Productive forces have become critical cons in alleviating the poverty situation. In addition, absences of how the poor can address their problems and enhance their active participation in decision-making have hindered their attempts to move out of the state of deprivation (Asmamaw, 2004).

However, Ethiopia's rural and urban poverty has declined based on five years' interval household income and consumption expenditure survey show HICE (1995/1996-2015/2016). Rural poverty in 2015/2016 finds that headcount and poverty gap index decline by 15.8 percent and 7.5 percent respectively, and the severity declines by 3.13 percent in 2015/2016 with that of 2010/201. And also, the urban poverty trend shows a decline between 2010/201 and 2015/2016. Hence poverty headcount and poverty gap declined by 42 percent and 46 percent, respectively, and poverty severity also decreases by almost half.

2.3.3 Setting Poverty Lines

2.3.3.1 Multidimensional Poverty Index

Multidimensional Poverty Index (MPI) is developed in 2010 by the UNDP & The Oxford Poverty and Human Development Initiative (OPHI) for the UNDP prize publication of the Human Development Report 2010 (Alkire & Santos, 2012).

Recently MPI is the most popular measure to set the poverty line. MPI is preferred to measure Poverty because the standard calculations of poverty based on income/consumption cannot be adequately measured Poverty (United Nations, 2015). First, income is imperfectly calculated. Secondly, and even more importantly, the advantages provided by a given amount of income significantly differ depending on circumstances (Little gain from food for a diseased person; or high-income Household with high intra-household differences, or no education of all members). Poverty cannot be adequately measured by income/consumption alone (IBID).

When people have multiple deprivations, MPI takes into justification that there are adversative interaction effects. Despite the poverty level reported by Income poverty indices, worse Poverty can be seen by merely adding separate deprivations (not income alone) for the whole country.

The MPI is founded on three essential dimensions of well-being: Health, Education, and the Standard of Living. The three dimensions (health, education, and standard of living) and each of their corresponding indicators are selected because they reflect problems often mentioned by the poor; they have been long considered necessary by the development community, mainly as reflected in the Millennium Development Goals or Sustainable Development Goals (SDG). They are well established philosophically as human rights or basic needs.

Headcount ratio (H), also called the incidence of multi-dimensional Poverty: - Measures the share of the multi-dimensionally poor population.

$$\mathbf{H} = \frac{q}{n}$$

Here n is the total surveyed Household, and q is the number of households that are being multidimensional poor. The headcount index adds the number of people who fall below the

poverty line (often expressed as a proportion of the total population) (OPHI, 2013). When the headcount is taken as a fraction of the total population, N, we define the headcount index.

The intensity of Poverty (A): - measuring the average share of weighted indicators in which the multi-dimensionally poor people are on average deprived. It shows the joint distribution of their deprivations.

$$A = \frac{\sum_{i=1}^{n} \frac{1}{d}(Ci)}{q}$$

Where C is the degree of the contribution of each indicator

Multi-dimensional Poverty (M_0): - Is the adjusted Headcount Ratio. M_0= HxA

$$M_0 = \frac{1}{n}\sum_{i=1}^{n} \frac{1}{d}(C_i)$$

The number of multi-dimensional poverty cut-offs can be represented by K, which can be used to determine whether the Household is under multi-dimensional Poverty or not.

Where K = 1 to the maximum indicators, i.e., 10.

K=1, 2… d.

A cut-off poverty k satisfying $0 < k \leq d$, used to determine whether a person has sufficient deprivations to be considered poor. If the Household's deprivation count is $\geq k$, the Household is identified as being multi-dimensional poor. Whereas if the Household's deprivation count C_i falls below K, the Household is not considered poor. Given these, the changes in H, MPI, and A under given different K values of the study area were being calculated. To conclude, whether an individual is considered as deprived in each indicator were be determined at the household level.

Given the complexities of the poverty concept and its definition, the fundamental question that comes uppermost in the analysis of poverty is the derivation of the poverty line. In the derivation of the poverty line, scholars use different methods. The poverty line, in simple terms, is a line that delineates the poor from the non-poor. To do so, the construction of the poverty line is an

important issue (Mebrahtu, 2010). And it observes as the view of the following three poverty lines.

Based on international consent (such as the Millennium Development Goals, MDGs), in MPI, each indicator has a minimum level of satisfaction, is referred to as a deprivation cut-off. Alkire and Foster propose a new methodology with two forms of cut-off: 'one within each dimension to determine whether a person is deprived in that dimension, and a second across dimensions that identifies the poor by counting the dimensions in which a person is deprived (Alkire & Foster, 2011).

2.4 Urban Poverty in Ethiopia

Poverty is widespread in Ethiopia, with a significant proportion of the population lacking the necessities of life, such as lack of food, decent clothing, and shelter. In addition, lack of access to education and medical care, widespread unemployment, and lack of income also exacerbate the magnitude and severity of poverty in the country (Abebe, 2002). Urban poverty in Ethiopia is mainly manifested by a lack of basic facilities in and around the house. Lack of adequate shelter, poor sanitation, lack of access to safe drinking water, and absence of proper toilet facilities are characteristics of urban poverty (MOFED, 2004).

In Ethiopia, at least 70 percent of the urban population can be considered low in infrastructure and services, slum dwellers, security of tenure, and citizenship rights. Inadequate shelter, combined with poor sanitation, overcrowding, and a high proportion of vulnerable women, youth, children, elderly, and the destitute with very low incomes and high unemployment, results in an increased risk of diseases and an extreme poverty trap for many urban residents (World Bank, 2007).

Urban poverty in Ethiopia is highly connected with the lack of employment opportunities. According to a report by CSA (2010), the rate of unemployment for urban areas was 20.4 percent in the year 2009. Urban wage-earning jobs far over the number of opportunities available (EEA,1999). Expansion in education and training opportunities, barring quality problems, is an achievement in its merit. It increases general human capital and meets the fundamental rights of children and the young. Nonetheless, uncoordinated and supply-driven expansion in education and training may amount to creating an army of dissatisfied youth in the end (Getinet, 2003).

The health service coverage in Ethiopia is one of the lowest in the world. The potential health services coverage (PHSC), for instance, was limited to 51.2 percent of the population in 2000. There were only four physicians per 100,000 people in 2000. The average infant mortality rate per thousand was 106.1, and the total fertility rate was 6.8 percent (Mulat, Fantu, and Tadele, 2003).

According to MoFED (2010/2011), the proportion of poverty in Ethiopia has declined, reflecting an improvement in the country's poverty situation over the years. For example, in 2010/2011, the headcount index was 25.7 percent; a decline of about ten percentage points compared to 2004/05, and in 2015/2016, according to the report of (PDC 2018), urban poverty incidence declined to 14.8 percent and similarly, the poverty gap index was a decline in 2010/2011 and 2015/2016 from 6.9 percent to 3.7 percent, the poverty severity index declined 2.7 percent to 1.4 percent, respectively.

2.5 Empirical Literature

As Ayana (2017) forwarded, public expenditures on health, education, and road construction have positively impacted poverty reduction in Ethiopia. The study also noted that to reduce poverty in the country, the government should allocate more educational and agricultural development resources and roads by cutting defense expenditure and other administrative expenditures.

Ashenafi (2012) suggested that poor Macro-economic management of the government, drought and the traditional nature of agriculture, climate change, global economic shocks like a rise in the price of foods and oil, plus the limited ability of the government to cope up with such shocks are the main limiting factors of Poverty reduction progress ineffectiveness in Ethiopia. Similar findings by Sisay (2018) have found that poverty reduction strategies in Ethiopia have faced challenges that households have challenged by shocks in their lifetime like rising in food price, climate change, drought, flood, livestock death, and crop damage. A strategy proposed by OECD also supporting the above findings that reducing vulnerability and managing shocks in line with other complementary policy elements (Like; Pro-poor economic growth, Mainstreaming gender and enhancing gender equality, Empowerment rights, and pro-poor governance, and Mainstreaming environmental sustainability) is a way of sustainable poverty reduction strategy (Organisation for Economic Co-operation and Development., 2001).

'To truly have a positive impact, the mobile technology boom will require complimentary access to public infrastructures, such as reliable electricity, with appropriate policies that will not hinder further adoption and use, especially by the poorest. The taxes levied by national governments on these technologies have the power to make their adoption and use cost-prohibitive. For Africans living in Extreme Poverty, cell phones remain inaccessible and unaffordable. The lack of adequate transportation infrastructure is still a major obstacle. In SSA, only 29% of roads are paved, and barely 25% of the population has access to electricity. While creative and innovative mobile technology uses that benefit the world's poor economic livelihood can be attractive, complementary policies and institutional arrangements are necessary. This includes top-level, supply-side policies that ensure market competition to grow the mobile industry, such as designing appropriate antitrust laws for the industry players, as well as demand-side policies to ensure affordability and accessibility for those in need' (Shih, 2011).

Poverty reduction programs like credit and small and micro enterprises services should be comprised of community participation and involvements in every project stage such as planning, designing, implementing, monitoring and evaluation but the awareness of the community towards those poverty reduction programs are low due to low literacy levels and limited credit access. The government should create job opportunities, training, skill acquaintance, and credit services for the community (Askale, 2011). Entrepreneurship has a significant role in the poverty reduction process (Asitik, 2016). However, the entrepreneurship process has been limited by the scarcity of financial capital.

Mok et al. (2007) recommend that to reduce urban poverty, the government should identify households with a high proportion of children to provide tax relief or educational subsidies. While urban areas can be more beneficial in the sustainable development program than rural areas, they face a multi-dimensional challenge (United Nations, 2013); the multifaceted difficulties must be addressed to realize the full potential of urban transformation.

Gebrekidan (2019), in his empirical analysis and findings, the government should address the larger population who are at risk of multi-dimensional poor, not the current poor Household. The study investigates that since the empirical analysis reveals that more significant proportions of households (80.3%) are vulnerable to future Poverty, the overall vulnerability incidence exceeds the current multi-dimensional poverty rate. Out of the total vulnerable families, 24.4%

of the currently non-poor households are at risk of becoming multi-dimensional poor. In comparison, 55.9% of households who are now poor will remain vulnerable to future multi-dimensional Poverty.

The efficient application of ICT has a direct and indirect role in changing society's socio-economic status (Tirkaso, 2011). Some of the immediate benefits believed to be obtained are sharing market and health-related information, Informal knowledge, and weather forecasts. Similarly, intensive agricultural research and development, administrative efficiency, training, and experience sharing by teachers and health professionals, e-health services are among the indirect benefits of rural households.

Galperin & Viecens (2014) reveal that internet technology increases a firm's productivity and individuals, markets are well-coordinated strengthens social and human capital. According to the study, internet technology allows the sharing of information among individuals and firms to contribute to the movement towards a competitive market.

Alleman et al. (2009) suggest that the expansion of the telecommunications sector results in a higher degree of innovation; thereby, the invention can change policy from monopoly to open entry. Finally, it paves the way for different views and offers more significant growth and profit potential by lowering the transaction cost. 'Real household income rises about 6 to 13 percent in response to the transaction cost reduction, depending on the specifics of the mode' (Singh, 2008). There is also growing evidence that internet technologies' adoption can reduce the time taken in the information exchange and contribute to market performance.

Various scholars and field experts have conducted several studies in different parts to identify poverty alleviation mechanisms. Poverty has remained a global problem; consequently, it has been studied many times at international and national levels. Literature on the concept of poverty shows various interpretations in institutional, political, economic, social, cultural, and environmental contexts. Poverty is a multidimensional and dynamic phenomenon.

Many poverty analysts in Ethiopia, including Mohammed (2017), Kedir & McKay (2005), Esubalew (2006), Tesfaye (2006), Mebrahtu (2010), Melese et al. (2017), and Biyena & Beyene (2019), used a household level analysis in their poverty studies by using a binary logit regression model. This approach is based on a simple and plausible assumption that all household members

equitably share the resources. Consequently, according to their finding, income level, unemployment, marital status, education, household size, gender of the household head, age of the household head, and dependency ratio are the significant determinants of poverty in Ethiopia, although their share was different.

A study on the determinant of poverty by Esubalew (2006), in Debre Markos city of Ethiopia, emphasizes gender by using a Logit regression model. His findings suggested that factors like being a man, being married, higher level of education, higher level of age, improvement in health status, being an employer and self-employed, having social security reduced the probability of poverty in Debre Markos. In a similar case, Kaba (2009) analyzed the determinants of poverty in Assela Town of Ethiopia, including household-level factors. He analyzed data of 300 households from 14 kebeles in the Town by logit models. His results indicated that the household level factors studied, education, socioeconomic status, age, family type, dependency ratio, marital status, and earners are connected to poverty status.

Poverty and Access to the Internet and Mobile phones

Access to telecom service is expected to reduce the probability of the HH being poor Balwant (2016), Shih (2011). Mobile phones and the internet service enhance social capital in urban slums, expand a competitive business, and lowering the cost of financial services Rangaswamy & Nair (2010); it also reduces the transaction and transportation cost, the flow of information can easing doing business, and made individuals stay connected during an emergency so that increase the sense of wellbeing (Adera et al., 2014).

Education and Poverty

Though the magnitude different in different reasons, in most empirical studies education, has a positive contribution to poverty reduction Mekonnen, Bereket and Abebe (2002) cited in Esubalew, (2006); Sisay, (2009), Alemayehu G. et al., (2005), Kebede, (2019) and Tamirat Sivakumar (2020). The study found out that an increase in the level of education of the household head results in the percentage of poor people significantly declines.

Improve in the educational level of the head of the Household reduces the probability of a household being poor Akerele et al., (2012); Mok et al., (2007); Biyena & Beyene, (2019)

Similarly, among the essential variables to explain chronic poverty incidence is the level of education of the household head Alemayehu et al., (2005); Mok et al., (2007); Shete (2010); Specifically, their studies have been observed that ahead of households whose highest educational attainment was at the primary school, the secondary, tertiary were more likely to non-poor than those with no schooling.

Family size, Age of the HH head, and Poverty

As the HH age goes up, Poverty expected to worsen, and further Dependent HH members are expected to be more vulnerable to Poverty and the probability of being poor than have fewer family sizes, lower HH head age, and low dependent family members in the HH (Akerele et al., 2012), (Biyena & Beyene, 2019), (Geda et al., 2001).

Household Income, Credit Access, and Poverty

The probability of falling into poverty reduces with an increase in income and access to the Household's credit (Biyena & Beyene, 2019).

Household head gender and Poverty: Male-headed households will get less likely to be poorer (Geda et al., 2001).

2.6 Conceptual Framework of Poverty

The concept of poverty is deep and complex, and it is not simple to understand it easily due to its multidimensional nature. Many scholars and subject matter specialists try to put an indispensable effort to find its exact and universally agreed-to concept and definition. It is also interpreted in different ways by different experts. In economics, social, political, institutional, environmental, and cultural contexts. Because of its variation in other subject matter specialists, disciplines, and interpretations, various approaches have been employed to understand the concept of poverty. The concepts of poverty from sociological approaches are the structural inequities and inherent disadvantages among peoples and groups. They are based on observations that even when resources are flowing into sectors dominated by the poor, they may not take full advantage because of social structural difficulties (Kanbur, 2002), cited in (Zinabu et al., 2019).

Also, another scholar Ashley (2019), defines poverty in sociological perspectives; Poverty is a social condition characterized by the lack of resources necessary for basic survival or essential to meet a certain minimum level of living standards than expected. Such as lack of access to food, clothing, and shelter. People in poverty typically experience persistent hunger or starvation, inadequate education, and health care and are usually alienated from mainstream society.

An individual or society was being in poverty when the minimum level of economic well-being standard was not attained (Sen, 1983).

Overall, poverty illustrates in various deprivations, including lack of income and productive resources fall into malnutrition, ill health, hunger, increased morbidity and mortality, inadequate housing, limited access to education and other basic services, homelessness, unsafe environments, and social discrimination and exclusion (UN, 2009). Therefore, poverty is multidimensional, and there is no common idea about it among different subject matter specialists and scholars. Consequently, a severe and continuous task should be undertaken after now.

2.7 Conceptual Framework

After careful study of the literature review, the following conceptual framework was formulated to illustrate the effect of telecommunications services on urban household poverty in Debre Birhan city.

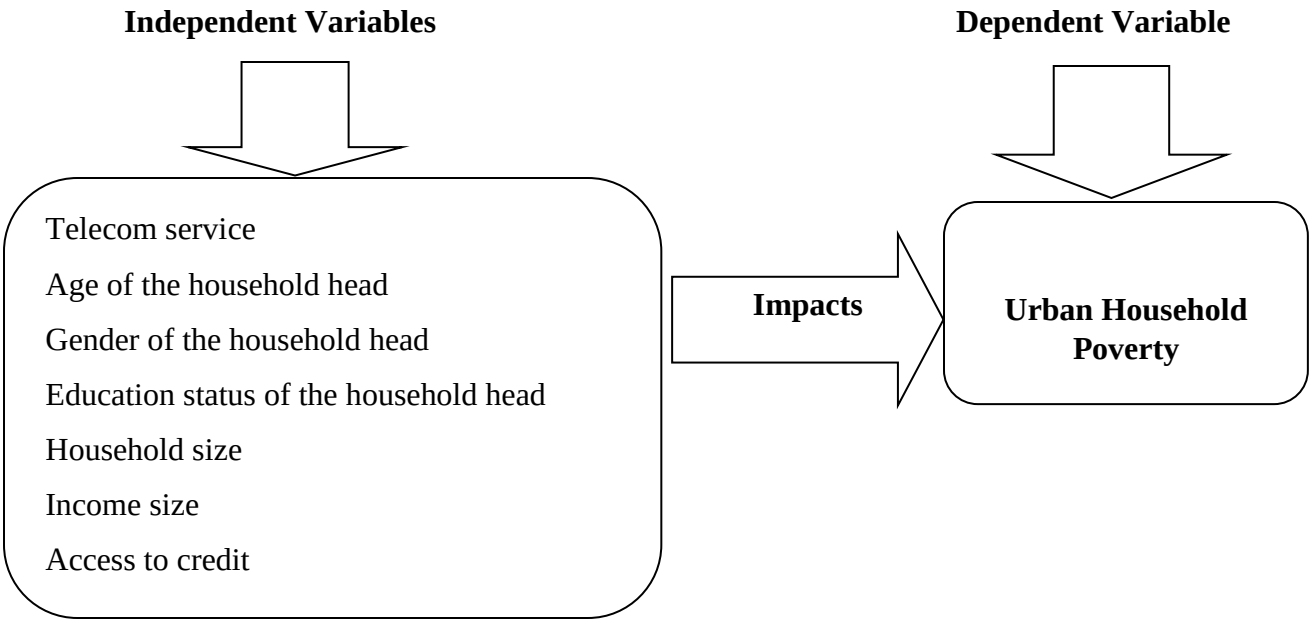


Figure 2.2: Conceptual framework

Source: Combine by the researcher

CHAPTER THREE

3 RESEARCH METHODOLOGY

3.1 Research Design

The method of research for this study was both descriptive and explanatory method. The researcher chose this design because the descriptive approach was used to describe the numerical data obtained from respondents through a questionnaire. On the other hand, the illustrative method was used to observe the relationship between dependent and independent variables. Moreover, to address the stated objectives, the researcher used primary data sources for data interpretation and analysis, used a logistic regression model to analyze the responsible factors of urban poverty, and used MPI to determine the status and extent of urban poverty in Debre Birhan city.

And also, the researcher used the Yamane (1967) formula to determine the representative sample size in the study area. In addition to this, a multi-collinearity test was being employed to ensure the validity and reliability of the research by using the variance inflation factor test, and the researcher used Multidimensional Poverty Index (MPI) approach to measure poverty in this study. And also, this approach is better than income and consumption in developing countries like Ethiopia due to lack of enough information about respondent's income and consumption, unlike developed countries because most of them work in the informal sector, and due to lack of daily expense recording, makes challenging to acquire HHs consumption properly.

3.2 Description of the Study Area

North Shoa zone is one of ten zones in Amhara National Regional State, having 22 Woreda and five urban administrators with a land cover of 17,697.64Sq Km. The Zone exist at an altitudinal range from 1500 to 4000 m.a.s.l, having Dega (35%), Wayne Dega (30.65%), Kolla (33.7%) and Werch (0.6%) eco-climatic zone. The climatic condition of the study area based on eco-climatic classification termed as Wayne Dega. The climate of the area is the same as most of the Ethiopian Northern Highlands (ITAB-Consultancy, 2008). The average annual max and min temperature of the area range between 15^{0} to 22^{0} c. Night frost frequently occurs from October to January. The rainfall pattern in this region has two distinct peaks during the year. Short rain

occurs from February to May and long rain from June to September. The average annual rainfall is 1150 mm, 70% falling in long rain periods (Gryssels and Anderson, 1983). According to Ethiopian Central Statistics Agency CSA (2014), the total population number is 120,399 with an annual growth rate of 2.5 percent, and out of this, 65,957 (53.19 percent) were female. The rest, 54,442 (46.8 percent), were male.

3.3 Data Type and Sources

To assess and analyze the research objectives for this study, we used both primary and secondary data.

3.3.1 Primary Data

Primary data was collected from urban households of the study area through the questionnaire.

3.3.2 Secondary Data

Secondary data for the study was collected from various source documents (reports and profiles of the woreda) on the topic matter from various offices such as the woreda administrative office. It also reviews the library by assessing previous studies, documents, books, journals, etc. And from government offices reports additionally as from the net, especially from the websites of various institutions. In this regard, the research mainly uses various data sources associated with urban households and poverty.

3.4 Method of Data Collection

We used a structured questionnaire to collect data from households.

We translated the data collection questionnaire from English to Amharic and back to English by experienced bilingual translators to ensure its validity.

3.5 Sampling Technique

The location of the selected kebeles was kebele 01, 03, 05, and 07. Where Kebele 07 is located at the periphery of the city. The households were determined by using a systematic sampling method from each kebeles based on sampling frames from the city statistics office of the

woredas municipality administration. The researcher chose this sampling method because this sampling method provides equal opportunity to be selected for all households without affecting previously chosen households. Each 3rd house number of the Household in each Kebele has been chosen randomly and sampled the 3rd households and proceed by adding the interval (k=41). As shown in Table 3.3 below, the numbers of households selected from each sample kebeles are determined using proportional to size sampling method to the respective total household size in each kebele.

By applying proportional to size sampling technique,

Let be: N1= the total number of household size in surveyed kebeles; 8266

n= the required sample size in each kebeles

K= the number of households in each surveyed kebeles

N= the total sample size; 199

Then, $n = \frac{K*N}{N1}$

3.6 Methods of Data Analysis

The study used both descriptive and econometric approaches to data analysis. The logit model deploys to estimate the probability of a household being poor by using Telecommunications services. The dependent variable is dichotomous: 0 when a household is above the poverty line and 1 when below.

To predict the value of a response variable y using the values of several explanatory variables for a multiple regression can be expressed as:

$Y_i = \beta_0+\beta_1X_1+\ldots+\beta_kX_k + e_i$ …… (1)

The regression process finds the co-efficient, which minimizes the squared differences between the observed and expected y (the residuals) values. As the logistic regression outcome is binary, y needs to be transformed so that the regression process can be used. The logit transformation gives the following:

$$\text{Ln } (p/1\text{-}p) = \beta_0+\beta_1X_1+\ldots+\beta_kX_k + e_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where p is the probability of an event occurring

If possibilities of the occurrence of interest happening for individuals are needed, the logistic regression equation can be written as:

$$P = \frac{\text{Exp } (\beta 0+ \beta 1X1+\cdots+ \beta 7X7)}{1+\exp(\beta 0+ \beta 1X1+\cdots+\beta 7X7)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

Therefore, the logistic regression is given as:

$$\text{Log } (y_i) = \beta 0 + \beta 1X1 + \cdots + \beta 7X7 + e_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Where,

Yi= is the odds ratio, a dummy for poverty status. Odds express the likelihood of an event occurring relative to the probability of an event not happening.

B_0 = the intercept to be regressed

The statistical significance of individual regression coefficients (βs) has tested using the chi-square statistic, and all be significant predictors if P<0.7.

3.6.1 MPI: Dimensions, Indicators, Deprivation Cut-offs, and Weights

Three key dimensions: health, education, and standard of living, comprising ten indicators. People who experience deprivation in at least one-third of these weighted indicators fall into the category of multidimensionality poor (UNDP, 2020).

The health dimension takes morbidity as an indicator, replacing the global indicator of nutrition. This is required to replace the nutrition indicator due to the lack of available data in Ethiopia. The morbidity indicator and its cutoff have alternatively been used in Ethiopia (Brück & Kebede, 2013). Though the cause and severity of illness have not been identified, 'However, we believe that including morbidity indicators together with child mortality gives a balanced assessment of health in the Household. The inclusion of morbidity has justified by Sen (1996), who argues that in developing economies, where extreme Poverty prevails, one could concentrate on the centrally

important functions and basic capabilities that measure Poverty, one of which is the capability of a household to escape avoidable morbidity' (IBID).

All other indicators are based on the global MPI indicators and cutoff.

Table 3.1: MPI dimensions, indicators, deprivation cut-offs, and weights

Dimensions of Poverty	***Indicator***	***Deprived if living in the Household where…***	***Weight***
Health	*Child mortality*	*Any child under the age of 18 years has died in the five years preceding the survey.*	*1/6*
	Morbidity	*Any adult HH member has experienced illness in the previous four weeks before the survey*	*1/6*
Education	*Years of schooling*	*No household member aged 'six years + school entrance age' or older has completed six years of schooling.*	*1/6*
	School attendance	*Any school-aged child is not attending school up to the age at which he/she would complete class 8.*	*1/6*
Standard of living	*Cooking Fuel*	*The household cooks with dung, wood, charcoal, or coal.*	*1/18*
	Sanitation	*The Household's sanitation facility is not improved (according to SDG guidelines), or it is improved but shared with other households.*	*1/18*
	Drinking-Water	*The Household does not have access to improved drinking water (according to SDG guidelines), or safe drinking water is at least a 30-minute walk from home, round trip.*	*1/18*
	Electricity	*The Household has no electricity.*	*1/18*
	Housing	*At least one of the three housing materials for the walls, roof, and floor is inadequate: the roof is of natural materials, and/or the floor and/or walls are of natural or rudimentary materials.*	*1/18*
	Assets	*The Household does not own more than one of these assets: telephone, computer, radio, TV, bicycle, animal cart, motorbike, or refrigerator, and does not own a car or truck.*	*1/18*

Source: (UNDP, 2020).

The official starting age of primary school in Ethiopia is at the age of 7 (Ethiopia - Primary School Starting Age (Years) - 1970-2020 Data, n.d.) (Abebe, 1999) (Statistics & 2013, 2015).

A household is identified as poor in the MPI if the household deprivation score is equal or higher to 1/3 (33percent). In other words, a household's deprivation must be no less than a third of the (weighted) considered indicators to be considered MPI poor (Alkire et al., 2015). The AF methodology also suggests the appropriate poverty cut-off be the range of 1/3 to 1/5 of the available indicators.

A household is considered in 'Severe Poverty' if the HH is deprived in 50 percent or more. They are identified as 'Vulnerable to poverty' if the Household is deprived in 20-33percent of the weighting indicators (OPHI, 2017). In this study, the MPI was measure corresponding to the (Alkire and Santos, 2011) family of multidimensional poverty measures, later called the AF methodology. The AF method is explained as follows: AF methodology satisfies several essential properties of multi-dimensional poverty measures such as Poverty and dimensional focus, symmetry, normalization, decomposability, weak monotonicity for $\alpha > 0$, weak rearrangement, replication invariance, and scale invariance (Alkire and Foster, 2009).

3.7 Determination of Sample Size

The research was covered four kebeles in Debre Birhan city out of nine kebeles, and a total of 201 respondents were surveyed.

Table 3.2: Total Population in Debre Birhan city (2020/21)

Keble's	Sex		Total number of Population
	Male	Female	
Kebele 01	5,196	6,364	11,560
Kebele 02	6,863	8,976	15,839
Kebele 03	5,486	6,298	11,784
Kebele 04	7,955	8,392	16,346
Kebele 05	4,716	5,920	10,636
Kebele 06	6,698	8,229	14,927
Kebele 07	3,318	4,037	7,355
Kebele 08	6,524	8,813	15,338
Kebele 09	7,685	8,928	16,614
Total HH	**54,442**	**65,957**	**120,399**

Source: Debre Birhan Municipality (Apr 2021)

Dagne (2017), in his study, using the CSA (2013) population estimation as a base and the rate of population growth by Amhara Region Urban Planning Institute (RUPI) as 6% per annum, estimates the city population in different years. In line with this, the city's total population has projected to be (118,540) in 2020, which is nearly the same as the current data obtained from the Municipality.

The information collected from the municipality reveals that the average household size has to be 5. Taking this reference: the total Households in the city per each surveyed Kebele has figured as follow:

Table 3.3: Total Household Distribution among Sampled Kebele's

Kebele	Kebele01	Kebele 03	Kebele 05	Kebele 07	Total Household
Household size	2,312	2,356	2,127	1,471	**8,299**

Source: Own computation

Scott et al. (2018), in their study area in Debre Birhan, considering the housing status, electricity, sanitation, road access, the average income, street light, investment area, and other economic profiles, grouped those nine Kebele's to four. We have also selected one kebele per group.

The sample size was determined by using the minimum sampling size formula as derived by Yamane (1967), a simplified formula to calculate sample sizes as shown below

A 93 percent confidence level and P = 0.7 are assumed.

$n = \frac{N}{1 + N\,(e)2}$ Where n = is Household sample size

N = total household population size, and

e = is the level of precision with the given level of confidence 93percent

$$n = \frac{8266}{1 + 8266\,(0.07)2}$$

n= 199

- *The formula for Determining Selection Interval for Systematic Sample is derived as follow:*

$$k = \frac{Population\ size}{Sample\ size}$$

$k = \frac{8266}{199} = 41$

Table 3.4: The household size of the survey kebeles

Surveyed kebeles	Total households	Sample households
Kebele 01	2312	56
Kebele 03	2356	57
Kebele 05	2127	51
Kebele 07	1471	35
Total	8266	199

3.8 Variables Definitions

Dependent Variable	Descriptions/Definitions
Urban Household Poverty	It is defined as poor quality in education, housing, income, health care, clothing, calorie intake, entertainment, political representation.
Explanatory Variables	
Telecommunications	Networking Service Providers across the internet and PSTN, Wireless carriers, and cable operators
Gender of Household Head	The range of characteristics on differentiating between male and female based on the context of the features include biological sex, sex-based social structure, or gender identity
Household head age	It is a period of human life measured by years from birth, usually marked by a particular stage or degree of mental or physical development involving legal responsibility and capacity.
Household size	It is defined as the number of persons in a private household
Income of the household	An individual or business receives money in exchange for providing labor, producing a good or service, or investing capital, or individuals most often earn income through wages or salary.
Household Head Age Status	It is defined as a household that can read and writes only, accomplish primary school, secondary school, and colleges and universities.
Credit	The ability to obtain goods or services from legal institutions before payment, based on the trust that payment will be made in the future.

3.9 Evaluation of Econometric Model, the Logistic Regression Model

3.9.1 Overall Model Evaluation

a) Likelihood Ratio test

In this comprehensive model evaluation test, we can see how dependent and independent variables firmly have a relationship, according to Park (2013), which compares the likelihood of the data with a complete model without the model-independent variables. In this regard, if the p-value for the overall model fit statistic is more significant than 0.05, we can conclude that at least one of the explanatory variables impacts the dependent variable.

This goodness of fit test is used to determine the significant difference between the observed value of a given event from the expected value.

b) Specification Test (link test)

The link test measures the variables in the model are correctly measured, no unnecessary variables are included, and important variables are excluded in the model. It is a specification test after logit. If the _hat (the linear predicted values) is significant and _hatsq (linear predicted values squared) is insignificant, the model is well specified.

3.10 Description of the Dependent and Independent Variables

Table 3.5: Description of the Dependent and independent variables

Variables		Types	Variable description
Dependent Variable			
Poverty status		Dummy	1= if the Household is poor 0= if the Household is not poor
Explanatory variables			
1	Age of household head	Continuous	Age of household head
2	Gender of household head	Dummy	0=Female, 1=Male
3	Family size	Continuous	Family size in the adult equivalent
4	Educational level	Continuous	The academic level of household head
5	Access to internet and phone	Dummy	Yes=1 no=0
6	Household income /PCI/	Continuous	Household income size
7	Credit Access	Dummy	Yes=1 No=0

3.10.1 Definition of Variables

The Outcome Variables

Poverty (Dependent variable): A non-poor household is, therefore, that Household with MPI is less than 0.333, and the Household is poor if MPI is equaled or greater than 0.333.

The Independent Variables

Access to the Internet and Mobile phones is expected to reduce the probability of the Household being poor (Balwant, 2016), (Shih, 2011). In addition, mobile phones and internet services enhance social capital in urban slums, expand a competitive business, and lowering the cost of financial services (Rangaswamy & Nair, 2010). It also reduces the transaction and transportation cost, the flow of information can ease doing business, and individuals stay connected during an emergency to increase the sense of wellbeing (Adera et al., 2014).

Age of the household head: The age of the household head is an important demographic factor that potentially affects productivity, income, and thus consumption. The household age increases the Household's poverty status due to reduced productivity, large family size, and income level (Datt & Jolliffe, 2005).

Gender of the household head: In societies where tradition plays a dominant role in allocating various tasks, gender also has implications for generating income and education. Custom and practice also exert differential power relations between men and women, which further suppress asset ownership by women. In Kenya Geda et al. (2005), Female-headed households were more likely to be poor than male-headed households. In other findings, households headed by females reduce the probability of being poor Xhafaj & Nurja, (2014), inverse finding. In Nigeria, Male-headed households were more likely to be poor than female-headed households (Oginni et al., 2013).

The education level of the household head: It expected that household heads with more education were gain better income and be more efficient than those with less educated. The education status of household heads increases thereby educational expenditures also increase the positive relationship between education of household head and whole family's education expenditures and academic level of the Household positively related to the poverty status of the

households Kabubuo (2002); Geda et al., (2005); Mok et al., (2007); Akerele (2011); Fru Awah Wanka, (2014) and Edoumiekumo et al., (2013).

Household size: The impact of household size on poverty status was mixing as shown in previous literature. Here, it's hypothesized that household size affects the variable quantity in, either way, counting on the demographic composition of the Household. For example, it'll positively affect a bigger household size composed of working labor (hence less dependency ratio) and negatively impact if it implies a better dependency ratio. At the same time, household size is also expected to own an opposite impact on the Household's vulnerability compared to its effect on poverty.

Household income: Family income represents the amount of income the family earns either daily or monthly. It is the amount of income (in Birr) generate from work and any activities. Therefore, it was being expected that the availability of family income is positively related to welfare.

Access to credit: Access to micro-credit might help households make up assets because it smoothed income and consumption, enhances the purchases of inputs and productive assets, and protects against risks.

CHAPTER FOUR

4 RESULTS AND DISCUSSION

4.1 Characteristics of the Study Participants

The survey data indicate that 90.55 percent of the respondents are male-headed, and 9.45 percent are female-headed. The cross-tabulation result suggests that 39.56 percent of male-headed households are poor, and 15.77 percent of female-headed households were poor. Thus, the chi-square result indicated no linear relationship between the gender of household head and urban household poverty status in the study area.

Table 4.1: Households sample distribution by gender

poverty status	**gender**			
	female	male	Total	Chi-Square($x^{2)}$
non poor	16	110	126	Pearson chi2(1) = 4.1561
poor	3	72	75	Pr = 0.041
Total	19	182	201	

Source: Own computation based on survey data, 2021

The mean household head age of respondents is 45.01 years, and the mean age of poor respondents is 42.77 years, and the mean age of non-poor respondents 46.35 years.

Table 4.2: Households sample distribution by age

Group Statistics					
	Poverty Status	N	Mean	Std. Deviation	t-value
HH Head Age	Non poor	126	46.35	9.85	t = 2.5893
	Poor	75	42.77	8.77	Pr(T>t)= 0.0052***

Source: Own computation based on survey data, 2021

*** indicate 1% confidence level of significance

As referred in the below table, the chi-square result indicated that there is a linear relationship between household head education level and urban household poverty status in the study area, and the decision was to reject the null hypothesis.

Table 4.3: Education and Poverty Status

Group Statistics					
	Poverty Status	N	Mean	Std. Deviation	t-value
Household head education level	Non poor	126	6.48	3.19	t = 3.2252 Pr(T>t)= 0.0007***
	Poor	75	5.1	2.41	

Source: Own computation based on survey data, 2021

*** indicate 1% confidence level of significance

Table 4.4: Sample households distribution by family size

Group Statistics					
	Poverty Status	N	Mean	Std. Deviation	t- value
Family Size	Non poor	126	5.10	1.37	t = -7.5588 Pr(T>t)= 0.0000***
	Poor	75	6.31	1.37	

Source: Own computation based on survey data, 2021

*** indicate 1% confidence level of significance

The mean family size of the respondents was calculated to be 5.7 family members. The distribution result indicated that the mean family size of poor respondents was calculated to be 6.6 family members. The mean family size of non-poor respondents was estimated to be 5.1 family members. This implies that the average number of families in the study area was above the national five members in households. Thus, the t value result indicated a linear relationship between family size and urban household poverty status in the study area, and the decision rejected the null hypothesis.

Table 4.5: Sample households distribution by family size

poverty status	credit			Chi-square (χ^2)
	yes	no	Total	Pearson chi2(1) = 4.621 Pr = 0.032**
non poor	113	13	126	
poor	59	16	75	
Total	172	29	201	

** implies significance at 5% level

Source: Own computation based on survey data, 2021

Based on the descriptive observation majority, 85.6 percent, have had access to credit for a different reason; the rest, 14.4 percent of households, have no access or no need to take a loan. Therefore, the chi-square result indicated a linear relationship between credit accessed and urban household poverty status in the study area, and the decision was to reject the alternative hypothesis.

Table 4.6: Households Income and Poverty

Group Statistics					
	Poverty Status	N	Mean	Std. Deviation	t- value
Income size	Non poor	126	6987.56	5205.35	t=7.97
	Poor	75	2802.69	2229.69	pr(T>t) =0.000***

Source: Own computation based on survey data, 2021

*** indicate 1% confidence level of significance

Their income size can reveal one characteristic of the sample households. The respondents' average annual per capita income size was Birr 5,426.04, and the average annual per capita income size of the poor households was Birr 2,802.69. The average yearly per capita income size of the non-poor households was Birr 6,987.56. The t value result indicated that the per capita income size significantly influenced the household poverty status in the study area, and the decision was to reject the null hypothesis.

4.2 Telecommunications Services and Poverty

Access to infrastructure is fundamental for poverty reduction then; the researcher tries to examine the availability of internet and phone in the study area. One hundred percent of respondents had phone accessed, and 65.17 percent of respondents had internet access.

Table 4.7: Household poverty and Access to Telecommunications Service

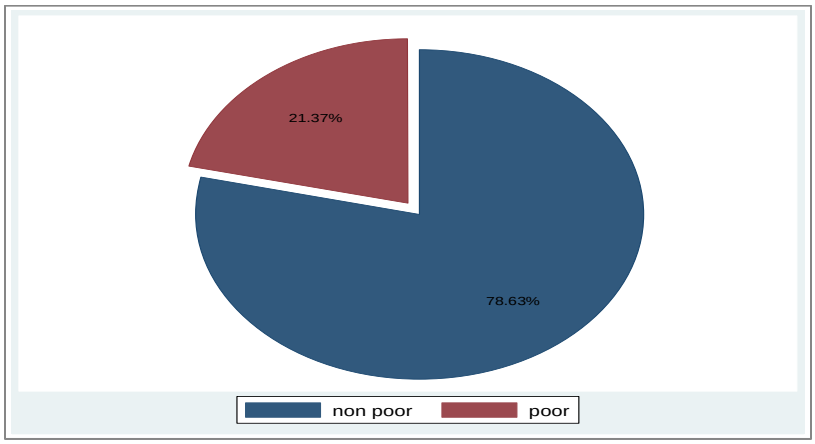
Poverty Status * Internet & Mobile access Cross tabulation					Chi-square (χ^2)
		Internet access			
		No	Yes	Total	
Poverty Status	Non poor	23	103	126	Pearson chi2(1) = 40.8576 Pr=0.0000***
	Poor	47	28	75	
Total		70	131	201	

*** indicate 1% confidence level of significance

Source: Own computation based on survey data, 2021.

The above tabulation result indicates that 21.37 percent of telecom service (both internet and mobile) users are poor, and 78.63 percent of telecom service users in the study area were non-poor. Furthermore, the chi-square result indicated a linear relationship between having a phone and internet and the household poverty status in the study area. Therefore, the decision was to reject the null hypothesis.

Figure 4.1: the telecom service and sampled household poverty status



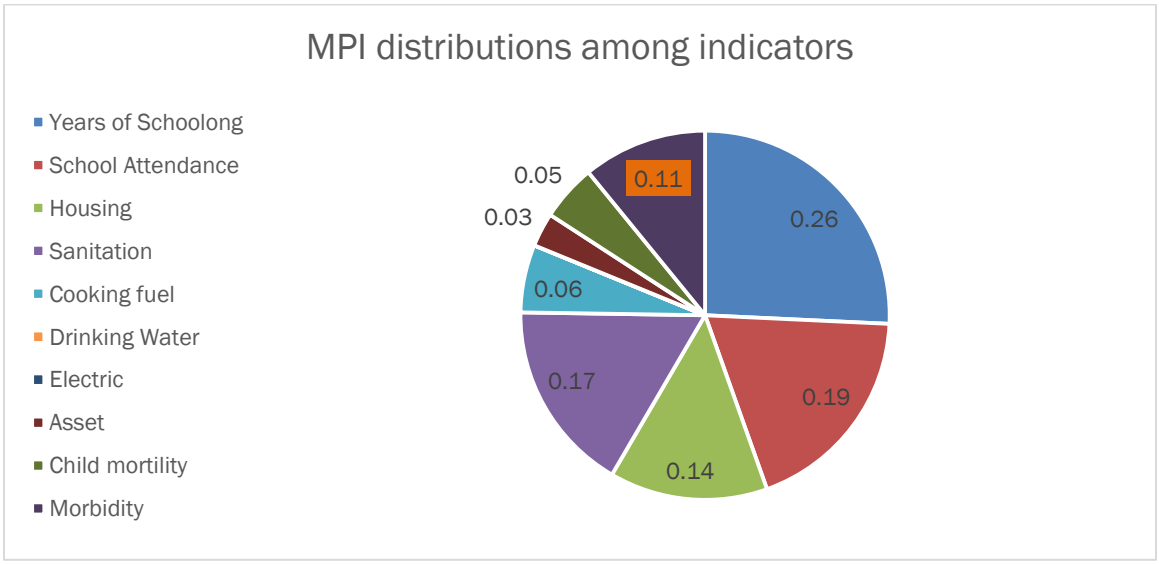
Source: Own computation based on survey data, 2021

4.3 Multidimensional Poverty Index

Among MPI indicators, years of schooling accounts for 26percent, which is the highest, followed by school attendance and sanitation, 19percent & 17percent respectively. Considering the installation, not the service availability rate, the contributions of MPI of drinking water and electricity go to zero.

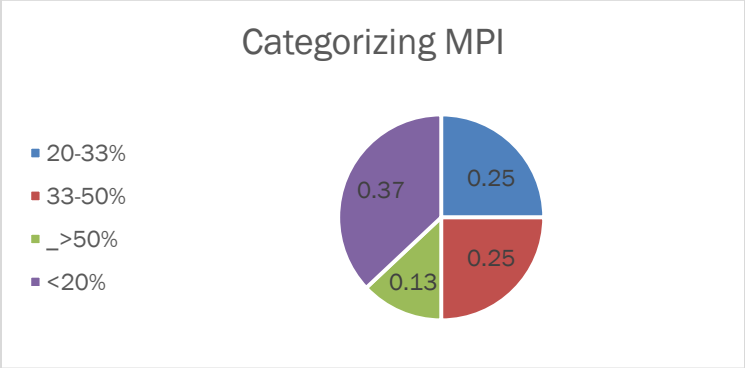
Among the three MPI dimensions, education is the highest (45.1percent), followed by standard of living and health has 39.2 percent & 15.7percent, respectively.

Figure 4.2: The Contributions of Each indicator to the MPI



Based on the survey data, 62.7percent (126households) not poor and 37.3percent (75HH) poor. 13percent of the HH live in Severe Poverty, and as per the weighting indicators, 25percent of the households have identified as Vulnerable to poverty.

Figure 4.3: Categorizing Intensity of Deprivation



4.4 A Binary Logistic Regression Analysis

To conduct logistic regression, Stata, version 14, was used.

Variance inflation factor VIF (variance-inflating factor) is used to check multi-collinearity problem based on the test for each variable should be less than ten, and the mean VIF should be less than 5 (Gujarati, page 366). So that the below table result shows there is no multi-collinearity problem.

Table 4.8: Multicollinearity test

	VIF	1/VIF
lnincome	1.43	0.698
lnedu	1.34	0.748
Lanfam_size	1.28	0.779
Lnage	1.27	0.784
Gender	1.23	0.812
Credit	1.10	0.908
Internet access	1.09	0.920
Mean VIF	1.25	

4.4.1 Likelihood Ratio Test

In the likelihood test, if p-values > 0.05, then the overall goodness of fit of the model is observed.

Table 4.9: Logistic model for poverty, goodness-of-fit test

```
Likelihood-ratio test                                 LR chi2(1)  =      0.16
(Assumption: m2 nested in m1)                         Prob > chi2 =    0.6903
```

The test does not reject the null hypothesis of the overall model as a fitted model.

4.4.2 Specification Test (Link Test) Specification

The link test measures the variables in the model are correctly measured, used to detect a specification error, no unnecessary variables are included, and important variables are excluded in the model. It is a specification test after logit. Since the _hat (the linear predicted values) is significant and _hatsq (linear predicted values squared) is insignificant, the model is well specified. The result shows the model is correctly specified.

Table 4.10: Likelihood ratio test, Test of goodness of fit

poverty	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
_hat	1.022	0.166	6.150	0.000	0.696	1.347
_hatsq	0.028	0.055	0.500	0.615	-0.080	0.135
_cons	-0.064	0.281	-0.230	0.820	-0.615	0.487

4.5 Interpretation of the Model

Table 4.11: Logistic Regression Output

poverty	*Coef.*	*St.Err.*	*Z*	*p-value*	*[95% Conf*	*Interval]*	*Sig*
lnedu	*-1.325*	*0.587*	*-2.26*	*0.024*	*-2.475*	*-0.175*	**
lnfam_size	*16.368*	*2.768*	*5.91*	*0.000*	*10.943*	*21.793*	***
lnage	*-6.377*	*2.669*	*-2.39*	*0.017*	*-11.608*	*-1.147*	**
internetaccess	*-2.766*	*0.607*	*-4.56*	*0.000*	*-3.955*	*-1.577*	***
gender	*-0.361*	*1.026*	*-0.35*	*0.725*	*-2.372*	*1.651*	
credit	*-2.266*	*0.636*	*-3.56*	*0.000*	*-3.512*	*-1.020*	***
lnincome	*-3.207*	*0.815*	*-3.94*	*0.000*	*-4.805*	*-1.610*	***
Constant	*17.698*	*5.245*	*3.37*	*0.001*	*7.408*	*27.987*	**

*** Significant at 1% (*** p<0.01) **Significant at 5% (** p<0.05), * Significant at 10%(* p<0.1, *)

Source: Model output

Table 4.12: Marginal Effect Output

	dy/dx	*Std.Err.*	*z*	*P>z*	*[95%Conf*	*Interval]*
lnedu	*-0.123*	*0.046*	*-2.650*	*0.008*	*-0.213*	*-0.032*
lnfam_size	*1.514*	*0.207*	*7.330*	*0.000*	*1.109*	*1.919*
lnage	*-0.590*	*0.233*	*-2.530*	*0.011*	*-1.047*	*-0.133*
internetaccess	*-0.256*	*0.035*	*-7.230*	*0.000*	*-0.325*	*-0.186*
gender	*-0.033*	*0.095*	*-0.350*	*0.727*	*-0.220*	*0.154*
credit	*-0.210*	*0.053*	*3.960*	*0.000*	*-0.313*	*-0.106*
lnincome	*-0.297*	*0.069*	*-4.270*	*0.000*	*-0.433*	*-0.161*

The variable internet and mobile access are significant at the 1 percent significance level (p-value .000*). Internet and mobile access of the household have negatively related to being multidimensional poor. Telecom services expand information flow, reduces transaction costs, and make markets efficiently operate. Households with access to the internet and mobile phones decrease the likelihood of being MPI poor by 25.6percent.

The findings of negative relationships of telecom access and being poor, Consistent with the recent telecom literature. Telecom access increases productivity and GDP Tankari, (2018) (pierskalla & Hollenbache, 2013). Galperin (2017), internet technology increases a firm's productivity and individuals; markets are well-coordinated, strengthens social and human capital, internet technology also allows the sharing of information among individuals and firms to contribute to the movement towards a competitive market. Alleman et al. (2009), Telecommunications offers more significant growth and profit potential by lowering the transaction cost. Rohman (2013) states that access to a mobile phone has a higher likelihood of earning a household income than those of the unconnected ones.

At the 1percent level of significance with a p-value of 0.000, The variable household size is significant. Household size significantly and positively affects the incidence of MPI poor in the study area, keeping all other covariates constant. Households with larger family sizes increase the likelihood of being MPI poor by 151.4percent. The inverse relationship shows a common finding in the empirical literature Geda et al., (2005); Datt and Jolliffe (2005); Gounder, (2013); Sekhampu, (2013); John C. Anyanwu (2014) they found that per capita income decreased with an increase of household size.

The variable household head age is significant at the 5 percent level of significance (p-value 0.017). Therefore, the age of the household head has negatively related to poverty status. That implies that the probability of being poor decreases when household age increases, keeping all other covariates constant. This finding was different from other scholars; as the household age increases, the household's poverty status increases due to reduced productivity, large family size, and minimize income level (Datt and Jolliffe, 2005).

The variable household income and education are significant at 1 percent and 5 percent significance levels, respectively. Thus, the household income size and education level significantly and negatively affect the household's poverty level, keeping all other covariates constant. This implies that when household income and education levels increase, the probability of being poor decreases, keeping all other covariates stable.

The variable credit access is significant at the 1 percent level of significance (p-value .000). Thus, HHs credit access has been negatively related to poverty status. This implies that when households have access to credit, the probability of being poor was reduced, keeping all other covariates constant. This finding shows a similar result in the empirical literature (Biyena & Beyene, 2019).

CHAPTER FIVE

5 CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This thesis evaluates the effect of telecommunications services on urban household poverty reduction in Ethiopia in Debre Birhan. This paper tried to measure the poverty of families in the multidimensional poverty measure through close and open-ended questionnaires.

Primary data was collected from urban households of the study area through the questionnaire and secondary data for the study mainly uses various data sources associated with urban households and poverty. A total sample of 202 households using a systematic sampling technique were selected. Binary logistic regression deployed for the data analysis.

Telecom service is an integral part of development; the study results indicate that telecom service access made a poverty status difference. The services expand information flow, reduce transaction costs, and make markets efficiently operate.

Households with access to the internet and mobile phones decrease the likelihood of being MPI poor by 25.6percent. Access to telecom infrastructure is fundamental for poverty reduction by empowering households by easing price information access, increasing productivity, education and health service improvement. Then, the researcher tries to examine the availability of the internet and phone in the study area.

One hundred percent of respondents had phone accessed, and 65.17 percent of respondents were internet accessed. The cross-tabulation result indicates that 21.4 percent of internet & mobile telecom service users are poor, and 78.6 percent of telecom service users in the study area were non-poor.

The paper concludes that the joint access of the internet and phone has significantly and negatively affected the incidence of being MPI poor in the study area, keeping all other covariates constant. In addition, the age level of the household head has negatively related to poverty status. The paper also concludes that household size has positively associated with being poor. The household income size significantly and negatively affects the household's poverty

level, keeping all other covariates constant. This implies that the probability of being MPI poor decreases when household income increases, keeping all other covariates constant.

5.2. Recommendation

There is a need to strengthen telecom services to improve household's wellbeing.

Based on the empirical findings, the researcher was drawn the following policy implications for using telecom services to minimize the poverty status of urban households.

Federal and state governments and the service provider company (Ethio telecom) should focus on telecom provisioning service varieties, quality of service, and promoting universal access and support the technology with artificial intelligence and machine learning to enhance efficiency in communication. Moreover, preserving the nation's security made the telecom policies transparent and stable to attract potential investors in the sector. Therefore, any intervention in providing more telecom services like the internet and access to cell phones and improving the service quality will induce households to engage in activities that will enhance household wellbeing.

To reduce poverty and improve national competitiveness, the government should address problems on education that have the highest share to the MPI poor.

The results and analyses above suggest that policy interventions are necessary to reduce poverty in Debre Birhan city, North Shoa zone, and in Ethiopia in general.

A further empirical investigation on the economic contributions of telecom service in different age groups of the household members, its contribution to employment, small and medium scale enterprises, and necessary to be addressed.

REFERENCES

Abbi M. (2005). Understanding Urban Chronic Poverty: Crossing the Qualitative and Quantitative Divide, International Institute for Environment and Development. CPRC Working Paper 53.

Abebe H. Gabriel. (2002). The PRSP Process in Ethiopia, Second Meeting of the African Learning Group on the Poverty Reduction Strategy Papers, ECA, Brussels, Belgium

Abebe, T. (1999). Ethiopia education. In Geography (Vol. 3, Issue 1, pp. 1–29).

Adam, L. (2010). Ethiopia ICT Sector Performance Review 2009 / 2010: Towards Evidence-based ICT Policy and Regulation. 2(9), 1–42.

Adera, E. O., Waema, T. M., May, J., Mascarenhas, O., & Diga, K. (2014). Prelims – ICT Pathways to Poverty Reduction. In ICT Pathways to Poverty Reduction. https://doi.org/10.3362/9781780448152.000

Akerele, D. and Adewuyi, A.S. (2011). Analysis and Profiles and Socioeconomic Determinants of Welfare among Urban Households of Ekiti State, Nigeria, Current Research Journal of Social Sciences, 3(1), 1-7.

Akerele, D., Momoh, S., Adewuyi, S. A., Phillip, B. B., & Ashaolu, O. F. (2012). Socioeconomic determinants of poverty among urban households in South-West Nigeria. International Journal of Social Economics, 39(3), 168–181. https://doi.org/10.1108/03068291211199341

Alemayehu G. (2014). Growth, Poverty and Inequality in Ethiopia, 2000-2013: A Macroeconomic Appraisal, Unpublished, Department of Economics, Addis Ababa University.

Alkire, S., & Foster, J. (2011). Counting and multidimensional poverty measurement. In Journal of Public Economics (Vol. 95, Issues 7–8). https://doi.org/10.1016/j.jpubeco.2010.11.006

Alkire, S., & Santos, M. E. (2012). Acute Multidimensional Poverty: A New Index for Developing Countries. In SSRN Electronic Journal. https://doi.org/10.2139/ssrn.1815243

Alkire, S., Conconi, A., Housseini, B., Seth, S., & June, A. V. (2014). Africa' s New Stories On Multidimensional Poverty. June.

Alkire, S., Foster, J., Seth, S., Santos, M., Roche, J., & Ballon, P. (2015). Multidimensional Poverty Measurement and Analysis: Chapter 10 – Some Regression Models for Af Measures.

Alleman, J., Liebenau, J., & Rappoport, P. (2009). The New Economics of ICT : The Regulatory Implications of Post-neoclassical Economics for the ICT Sector. New Economics and Information & Communications Technology, June 2014, 14.

Araya M. (2010). Poverty and Income Inequality in Urban Areas: Socio Economic Analysis of Households in WukroWereda: Un-published Master's thesis, Department of Development Studies, Addis Ababa University.

Ashenafi, K. (2012). Assessing Progress in Ethiopia towards Eradication of Extreme Poverty and Hunger as Part of Goal One of the Millennium Development Goals Addis Ababa University Collage of Business and Economics Department of Public Administration and Development Managemen.

Asilhan. K and Heman. S, 2006, Gender, Time Use, and Poverty in Sub-Saharan Africa, Washington DC.

Asitik, J. . (2016). Entrepreneurship : A means to poverty reduction in rural northern Ghana ? by Akanganngang Joseph Asitik. Phd Thesis, 1–379.

Askale T. W. .(2011). Poverty Alleviation and Community Participation Towards Development in Bahir-Dar Amhara Regional State, Ethiopia. Submitted in partial fulfillment of the requirements for the degree of Master in Development Studies at Nelson Mandel. Nelson Mandela Metropolitan University.

Asmamaw Enquobahrie. (2004). Understanding Poverty: The Ethiopian Context, (A Paper Presented at The Gambia AAPAM Roundtable Conference), Ababa –Ethiopia

Asongu, S. A., Le Roux, S., & Biekpe, N. (2018). Enhancing ICT for environmental sustainability in sub-Saharan Africa. Technological Forecasting and Social Change, 127(April), 209–216. https://doi.org/10.1016/j.techfore.2017.09.022

Ayalneh G (2005). Determinants of poverty in rural Ethiopia, Alemaya University, No. 2: 101-120.

Ayana Z. (2017). The Role of Pro-Poor Public Expenditure on Poverty Reduction in Ethiopia [Addis Ababa University]. In Addis Ababa University. http://213.55.95.56/handle/123456789/2638.

Balwant, S. M. (2016). Impact of Mobile Phone on Livelihood of Rural People. Journal of Rural Development, 35(3), 483–505.

Baron, D. (2010). The Impact of Telecommunications Services on Doing Business in Ethiopia, (December). Retrieved from http://addischamber.com/AACCSA/userfiles/2011-09-29_PSDBooks/TelecomReportPrintV2_107PagesINDD.pdf

Bayes, Abdul; von Braun, Joachim; Akhter, R. (1999). www.econstor.eu.

Bellù, L. G., & Liberati, P. (2005). Impacts of Policies on Poverty. Absolute Poverty Lines. EASYPol.

Berhanu, G. K. (2020). Measuring rural poverty among rural households in Gedeo Zone, SNNP Region, Ethiopia. Journal of Development and Agricultural Economics, 12(1), 9–16. https://doi.org/10.5897/jdae2019.1134

Biyena, D. C., & Beyene, E. A. (2019). Urban Poverty and its Determinants in Debre Markos City: A Household Level Analysis. Economy, 6(2), 65–75. https://doi.org/10.20448/journal.502.2019.62.65.75

Brief Historical Review of Telecom Sector in Ethiopia. History - ethiotelecom .(n.d.). https://www.ethiotelecom.et/history/.

Brück, T., & Kebede, S. W. (2013). Dynamics and Drivers of Consumption and Multidimensional Poverty: Evidence from Rural Ethiopia. In SSRN Electronic Journal (Issue 7364). https://doi.org/10.2139/ssrn.2248670

Central Statistical Authority (2010). Statistical Report on the Urban Employment Unemployment Survey, Addis Ababa.

Cheng, Y. (2017). Future development. Conveyor Belt Furnace Thermal Processing. https://doi.org/10.1007/978-3-319-69730-7_21

Crossman, Ashley. (2021). Understanding Poverty and Its Various Types. Retrieved from https://www.thoughtco.com/poverty-3026458

Dagne, A. U. (2017). Utility Service Provision from Planning Perspective (The case of Debre Birhan Town, ANRS, Ethiopia. 8(8), 1979–2053.

Datt, G., & Jolliffe, D. (2005). Poverty in Egypt: Modeling and policy simulations. Economic Development and Cultural Change, 53(2), 327–346. https://doi.org/10.1086/425224

De Silva, H., & Zainudeen, A. (2007). Poverty Reduction through Telecom Access at the 'Bottom of the Pyramid. The Journal of Developing Areas, 47(1), 63. http://www.kiwanja.net/database/document/document_asia_BOP.pdf%0Ahttp://www.ifpri.org/pubs/jhu/icttelecom.asp

DESA, U. (2009). Rethinking poverty: Report on the world social situation 2010. New York: United Nations Department of Economic and Social Affairs. Accessed February 1, 2015.

Devas.N, 2004, Urban Poverty and Governance in the Era of Globalization, Decentralization and Democratization, London

Duclos. J, 2002, Vulnerability and Poverty Measurement Issues for Public Policy, World Bank, Washington DC.

Edoumiekumo, S. Karimo, T. and Tombofa, S. (2013). Determinants of Households poverty and Vulnerability in Bayelsa State of Nigeria, International Journal of Humanities and Social Science Invention, 2 (12), pp. 14 – 23.

Esubalew A, (2006). Determinants of Urban Poverty in Debre Markos Town: a household level analysis.Un-published Master's thesis, Department of Regional and Local DevelopmentStudies, Addis Ababa University.

Ethio telecom 2013 EFY (2020/21) First Half Business Performance Summary Report. (2020). https://www.ethiotelecom.et/ethio-telecom-2013-efy-2020-21-first-half-business-performance-summary-report/.

Ethiopia - Primary School Starting Age (years) - 1970-2020 Data. (n.d.).

Ethiopian Economic Association (EEA). (1999). Annual Report on the Ethiopian Economy, Addis Ababa, Ethiopia

Evgjenixhafaj and Ines nurja.(2014). Determination of the key factors that influence poverty through econometric models European scientific journal vol.10, no.24

Fru Awah Wanka (2014). The impact of educational attainment on household poverty in South Africa: a case study of Limpopo province, MA Thesis, Department of Economics, Western Cape University.

Galperin, H., & Fernanda Viecens, M. (2017). Connected for Development? Theory and evidence about the impact of Internet technologies on poverty alleviation. Development Policy Review, 35(3), 315–336. https://doi.org/10.1111/dpr.12210

Galperin, H., & Viecens, M. F. (2014). Connected for Development? Theory and Evidence About the Impact of Internet Technologies on Poverty Alleviation. SSRN Electronic Journal, 1–35. https://doi.org/10.2139/ssrn.2397394

Gebrekidan, D. K. (2019). Rural Household Multidimensional Poverty and Vulnerability in Degu'a Tembien District, South Eastern Zone of Tigray, Ethiopia. Aau.

Geda, A., De Jong, N., Mwabu, G., & Kimenyi, M. S. (2001). Determinants of Poverty in Kenya: a Household Level Analysis. ORPAS - Institute of Social Studies, August, 1–25.

Geda, A., Jong, N. de, Kimenyi, M. S. and Mwabu, G. (2005). Determinants of Poverty in Kenya: A Household Level Analysis. Working Paper No. 2005-44, Department of Economics, Working Paper Series, University of Connecticut.

Getinet Haile, 2003, The Incidence of Youth Unemployment in Urban Ethiopia. Paper Presented at the 2nd International EAF Conference, Organized by the Centre for African Development Policy Research (Western Michigan University) and the Institute of Development Research (Addis Ababa University).

Global Trends and Policies. (2006). World Bank Document. Information and Communications for Development.

Gounder, N. (2013). Correlates of poverty in Fiji: An analysis of individual, household and community factors related to poverty. International Journal of Social Economics, 40(10), pp. 923–938.

Gujarati N.D. (2004). Basic Econometrics, Fourth Edition, New Delhi: The McGraw−Hill Companies.

Habtamu (2016). Urban Economic Growth and Poverty Reduction in Ethiopia: the Case of Addis Ababa,Un-published Master's thesis, Department of Development Economics St Mary's University.

John C. Anyanwu (2014). Marital Status, Household Size and Poverty in Nigeria: Evidence from the 2009/2010 Survey Data African Development Review, Vol. 26, No. 1, 2014, 118–137.

Kaba, S. D. (2009). School of Graduate Studies Institute of Regional and Local Development Studies. Urban Poverty and and the Survival Strategies of the Poor in Asella Town, Oromiya National Regional State, Ethiopia.

Kabubo-Mariara, J. (2002). Labour Force Participation in Kenya, African Journal of Economic Policy, 9(2).

Kala Seetharam Sridhar. (2015). Is Urban Poverty More Challenging than Rural Poverty? A Review. Environment and Urbanization Asia 6(2) 95–108. DOI: 10.1177/0975425315589159

Kebede (2019). Determinants of Urban Poverty and Coping Strategies of Household to Urban Life in Town of Ethiopia, Wollega University, Journal.

Kedir, A. M., & McKay, A. (2005). Chronic poverty in urban Ethiopia: Panel data evidence. International Planning Studies, 10(1), 49–67. https://doi.org/10.1080/13563470500159246.

Kefela Ghirmai T. (2011). The impact of mobile phone and economic growth in developing countries. (2011). African Journal of Business Management, 5(2), 269–275. https://doi.org/10.5897/AJBM09.367.

Kristofer H. Baldwin T. Martin H. (2019). Future Development. Poverty in Africa is now falling—but not fast enough (brookings.edu). 0).

Lipton, M. and Ravallion, M. (1995). "Poverty and policy".In Handbook of Development Economics: Vol III, Berhman" and T.N. Smivasan, Elsevier Science.

Lister, R. (2004). Poverty. Polity Press, London.

Mebrahtu, A. (2010). College of Business and Economics Department of Management Poverty and Income Inequality in Urban Areas: (Socio-Economic Analysis of Households in Wukro Wereda) a Thesis Submited To the Department of Management in Partial Fulfilment of the Requiremnts for.

Mekonnen, T. (2002). Determinants and dynamics of urban poverty in Ethiopia: a comparison of poverty in Rural and Urban Ethiopia. Ethiopian Journal of Economics, 8, 61-81.

Melese T. Solomon K. & Amsalu B. (2017). Determinants of Urban Poverty: The Case of Nekemte Town, Eastern Wollega Zone of Oromia Regional State, Wollega University, Department of Economics,Vol.32, 2017.

MoFED,(2012). Ethiopia`s Progress Towards Eradicating Poverty: An Interim Report on Poverty Analysis Study (2010/11), May, Addis Ababa.

MOFED. (2004). Ethiopia: Sustainable Development and Poverty Reduction Program, Addis Ababa, Ethiopia

Moges, A. G. (2013). The Challenges and Policies of Poverty Reduction in Ethiopia. Ethiopian E-Journal for Research an Innovation Foresight, 5(1), 25. https://journals.bdu.edu.et/index.php/eejrif4/article/viewFile/284/374

Mohammed B. (2017). Measurement and Determinants of Urban Poverty in Case of Southern Nations, Nationalities, and Peoples' Region (SNNPR), Ethiopia, Volume 7, Issue 3.

Mok, T. Y., Gan, C., & Sanyal, A. (2007). The determinants of urban household poverty in Malaysia. MODSIM07 - Land, Water and Environmental Management: Integrated Systems for Sustainability, Proceedings, April, 1124–1130. https://doi.org/10.3844/jssp.2007.190.196

Mok. T, (2009), Poverty Lines, Household Economies of Scale and Urban Poverty in Malaysia, A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Economics, Lincoln University

Mora-Rivera, J., & García-Mora, F. (2021). Internet access and poverty reduction: Evidence from rural and urban Mexico. Telecommunications Policy, 45(2), 102076. https://doi.org/10.1016/j.telpol.2020.102076

Mpogole, H., Usanga, H., & Tedre, M. (2008). Mobile Phones and Poverty Alleviation: A Survey Study in Rural Tanzania. Proceesings of M4D, Sweden, 2005, 62–72.

Mulat Demeke, Fantu Guta, Tadele Ferede, 2003, Growth, Employment, Poverty and Policies in Ethiopia: An Empirical Investigation International Labour Office, Geneva

Njoh, A. J. (2018). The relationship between modern Information and Communications Technologies (ICTs) and development in Africa. Utilities Policy, 50(April), 83–90. https://doi.org/10.1016/j.jup.2017.10.005

Obijiofor, L. (2009). Mapping theoretical and practical issues in the relationship between ICTs and Africa's socioeconomic development. Telematics and Informatics, 26(1), 32–43. https://doi.org/10.1016/j.tele.2007.12.002

Oginni, A., Ahonsi, B., & Ukwuije, F. (2013). Are female-headed households typically poorer than male-headed households in Nigeria? Journal of Socio-Economics, 45(August), 132–137. https://doi.org/10.1016/j.socec.2013.04.010

OPHI. (2017). Oxford Poverty and Human Development Initiative. Ethiopia Country Briefing, Multidimensional Poverty Index Data Bank. June, 1–10. www.ophi.org.uk/multidimensional-poverty-index/mpi-country-briefings/.%0Ahttp://www.ophi.org.uk/wp-content/uploads/ophi-wp-591.pdf

Organisation for Economic Co-operation and Development. (2001). The DAC guidelines. Poverty reduction. International Development, 129 p. https://doi.org/10.1787/9789264194779-en

Oshota, S. O. (2019). Technology Access, Inclusive Growth and Poverty Reduction in Nigeria: Evidence from Error Correction Modeling Approach. Zagreb International Review of Economics and Business, 22(2), 1–21. https://doi.org/10.2478/zireb-2019-0017

Park, H. A. (2013). An introduction to logistic regression: From basic concepts to interpretation with particular attention to nursing domain. Journal of Korean Academy of Nursing, 43(2), 154–164. https://doi.org/10.4040/jkan.2013.43.2.154.

Profile – Ethiotelecom. (n.d.). About Ethio telecom. https://www.ethiotelecom.et/profile/.

Rangaswamy, N., & Nair, S. (2010). in a Mumbai Slum Community. Communication, 6(3), 51–65. http://itidjournal.org/itid/article/viewPDFInterstitial/563/249

Rashid, A. T., & Elder, L. (2009). Mobile Phones and Development : Electronic Journal of Information Systems in Developing Countries, 36(2), 1–16.

Richter, R. (2005). The New Institutional Economics: Its Start, its Meaning, its Prospects. European Business Organization Law Review, 6(2), 161–200. https://doi.org/10.1017/S1566752905001618

Rohman, I. K. (2013). Do Productive Uses of ICT Connect to Income Benefits : A Case Study on Teleuse @ BOP4 Survey in Indonesia dengan pendapatan : studi kasus survey teleuse @ bop4 di indonesia.

Satterthwaite, D. (2004). The under-estimation of urban poverty in low- and middle-income nations. Environment and Urbanization, December, 1–75.

Scott, P., Henry, L., Tech, T., Annis, J., Butterworth, J., Hollander, D., Jordan, E., & Perez, E. (2018). Sustainable WASH Systems Learning Partnership SANITATION IN SMALL TOWNS-DEBRE BIRHAN, ETHIOPIA: BASELINE ASSESSMENT REPORT (Issue November). www.globalwaters.org/SWS,

Sekhampu, T. S. (2013). Determinants of Poverty in South African Township Journal of Social Sciences, 34(2), 145-153.

Sen A. K. (1983). Poor, relatively speaking. Oxford economic papers, 35(2), 153-169

Sen A. K. (1999), Development as Freedom, Oxford: Oxford University Press.

Shih, A. (2011). The Contribution of Mobile Telecommunication Technology to Sustainable Development in Selected Countries in Africa by. Cornell University.

Sife, A. S., Kiondo, E., & Lyimo-Macha, J. G. (2010). Contribution of Mobile Phones to Rural Livelihoods and Poverty Reduction in Morogoro Region, Tanzania. The Electronic Journal of Information Systems in Developing Countries, 42(1), 1–15. https://doi.org/10.1002/j.1681-4835.2010.tb00299.x

Singh, N. (2008). Transaction costs, information technology and development. Indian Growth and Development Review, 1(2), 212–236. https://doi.org/10.1108/17538250810903792

Sisay D. (2009). Urban Poverty and the Survival Strategies of The Poor in Assela Town: Un-published Master's thesis, Department of Regional and Local Development Studies, Addis Ababa University.

Sisay, B. (2018). Poverty , Vulnerability and Resilience in Rural Ethiopia : Addis Ababa University School of Graduate Studies (Issue June). Addis Ababa University.

Souter, D., Scott, N., Garforth, C., & Jain, R. (2005). Economic Impact of Telecommunications on Rural Livelihoods and Poverty Reduction: A study of rural communities in India, Mozambique and Tanzania. In Framework (Issue October). http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:The+Economic+Impact+of+Telecommunications+on+Rural+Livelihoods+and+Poverty+Reduction+:+a+study+of+rural+communities+in+India,+Mozambique+and+Tanzania#4

Sridhar, K. S. (2007). The paper investigates the relationship between telecommunications infrastructure and the economic growth of the nation. 7.

Statistics, U. I. for, & 2013, 22 August. (2015). Ethiopia Age distribution and school attendance of girls aged 9-13 years UNESCO Institute for Statistics 22 August 2013 (Issue August 2013). http://weekly.cnbnews.com/news/article.html?no=124000

Streeten, P., Burki, S. J., Ul-Haq, M., Hicks, N., & Stewart, F. (1981). First things first; meeting basic human needs in the developing countries.

Tamirat T. & S.Sivakumar (2020). Determinates of Urban Poverty at Household Level: The Case of Wolaitta Soddo Town, SNNPRS, Ethiopia, Hawassa University, Vol.60, 2020.

Tankari, M. R. (2018). Mobile phone and households' poverty: Evidence from Niger. Journal of Economic Development, 43(2), 67–84. https://doi.org/10.35866/caujed.2018.43.2.004

Telecommunications History in Ethiopia _ Ethiopian Communications Authority, (n.d.). Telecommunications History in Ethiopia | Ethiopian Communications Authority (eca.et).

Tesfaye A. (2006). The Analysis of Urban Poverty in Ethiopia, University of Sydney, Australia.

Tirkaso, W. T. (2011). Information Communication Technologies and Poverty Reduction in Rural Ethiopia Challenges and Prospects Information Communication Technologies and Poverty Reduction in Rural Ethiopia Challenges and Prospects Household Level Analysis Thesis No xx.

Todaro. M. and Smith. S, 2003, Economic Development, eighth edition, Pearson Education Limited UK.

UNDP. (2020). The 2020 Global Multidimensional Poverty Index (MPI) | Human Development Reports. In Human Development Report. http://hdr.undp.org/en/2020-MPI%0Ahttp://hdr.undp.org/en/2018-MPI%0Ahttp://hdr.undp.org/en/2020-MPI

United Nations. (2013). An Action Agenda for Sustainable Development. In Sustainable Development Solutions Network. (Issue June).

United Nations. (2015). Multidimensional Poverty. Development Issues No. 3. 3, 1–2. www.un.org/en/development/desa/policy/wess/.

Waverman, L., Meschi, M., & Fuss, M. (2005). The Impact of Telecoms on Economic Growth in Developing Countries. Africa the Impact of Mobile Phones, 2(1980), 1–23. https://www.businessgrowthinitiative.org/KeyPracticeAreas/Documents/Forms/DispForm.aspx?ID=148.

World Bank (2020). Ethiopia Poverty Assessment: Harnessing Continued Growth for Accelerated Poverty Reduction. Washington DC.

World Bank, 2007, Ethiopia Accelerating Equitable Growth, Country Memorandum: Poverty Reduction and Economic Management Unite Africa Region, Washington DC.

Yamane, Taro. 1967. Statistics, An Introductory Analysis, 2nd Ed., New York: Harper and Row

Zinabu A. Ahimed U. & Tilahun K. (2019). Review on the Current Status of Poverty and Its Determinants in Ethiopia Vol.50, 2019.

APPENDIX

Specification Test (link test)

Iteration 0: log likelihood = -123.18893

Iteration 1: log likelihood = -55.263962

Iteration 2: log likelihood = -54.710073

Iteration 3: log likelihood = -54.692161

Iteration 4: log likelihood = -54.692125

Iteration 5: log likelihood = -54.692125

Logistic regression *Number of obs = 185*

LR chi2(2) = 136.99

Prob > chi2 = 0.0000

Log likelihood = -54.692125 *Pseudo R2 = 0.5560*

poverty	*Coef.*	*Std.Err.*	*z*	*P>z*	*[95%Conf.*	*Interval]*
_hat	*1.022*	*0.166*	*6.150*	*0.000*	*0.696*	*1.347*
_hatsq	*0.028*	*0.055*	*0.500*	*0.615*	*-0.080*	*0.135*
_cons	*-0.064*	*0.281*	*-0.230*	*0.820*	*-0.615*	*0.487*

Test of goodness of fit

Likelihood ratio test

```
. lrtest m1 m2

Likelihood-ratio test                                 LR chi2(1)  =      0.16
(Assumption: m2 nested in m1)                         Prob > chi2 =    0.6903
```

The test does not reject the null hypothesis of the overall model as a fitted model.

Multi-collinearity test

	VIF	*1/VIF*
lnincome	*1.43*	*0.698*
lnedu	*1.34*	*0.748*
Lanfam_size	*1.28*	*0.779*
Lnage	*1.27*	*0.784*
Gender	*1.23*	*0.812*
Credit	*1.10*	*0.908*
Internet access	*1.09*	*0.920*
Mean VIF	***1.25***	

Logit estimation result (robust estimation)

Logistic regression *Number of Observation* = *185*

Wald chi2(7) = *52.97*

Prob > chi = *0.000*

Log pseudo likelihood = *-54.815* *pseudo* R^2 = *0.555*

poverty	*Coef.*	*St.Err.*	*Z*	*p-value*	*[95% Conf*	*Interval]*	*Sig*
lnedu	*-1.325*	*0.587*	*-2.26*	*0.024*	*-2.475*	*-0.175*	**
lnfam_size	*16.368*	*2.768*	*5.91*	*0.000*	*10.943*	*21.793*	***
lnage	*-6.377*	*2.669*	*-2.39*	*0.017*	*-11.608*	*-1.147*	**
internetaccess	*-2.766*	*0.607*	*-4.56*	*0.000*	*-3.955*	*-1.577*	***
gender	*-0.361*	*1.026*	*-0.35*	*0.725*	*-2.372*	*1.651*	
credit	*-2.266*	*0.636*	*-3.56*	*0.000*	*-3.512*	*-1.020*	***
lnincome	*-3.207*	*0.815*	*-3.94*	*0.000*	*-4.805*	*-1.610*	***
Constant	*17.698*	*5.245*	*3.37*	*0.001*	*7.408*	*27.987*	**

**** Significant at 1% (*** p<0.01) **Significant at 5% (** p<0.05), * Significant at 10%(* p<0.1, *)*

Marginal Effect Output

Average marginal effects *Number of obs = 185*

Model VCE : Robust

Expression : Pr(poverty), predict()

dy/dx w.r.t. : lnedu lnfam_size lnage internetaccess gender credit lnincome

Delta-method

	dy/dx	*Std.Err.*	*z*	*P>z*	*[95%Conf.*	*Interval]*
lnedu	*-0.123*	*0.046*	*-2.650*	*0.008*	*-0.213*	*-0.032*
lnfam_size	*1.514*	*0.207*	*7.330*	*0.000*	*1.109*	*1.919*
lnage	*-0.590*	*0.233*	*-2.530*	*0.011*	*-1.047*	*-0.133*
internetaccess	*-0.256*	*0.035*	*-7.230*	*0.000*	*-0.325*	*-0.186*
gender	*-0.033*	*0.095*	*-0.350*	*0.727*	*-0.220*	*0.154*
credit	*-0.210*	*0.053*	*3.960*	*0.000*	*-0.313*	*-0.106*
lnincome	*-0.297*	*0.069*	*-4.270*	*0.000*	*-0.433*	*-0.161*

My name is Addisu Mandefro and I came from Addis Ababa University Business and Economics Postgraduate Education Program.

I have gathered information to research the impact of telecommunications services on family poverty. Your participation in the study is entirely dependent on your own will and consent. You can either participate in the study from the beginning or not. If you disagree, your right to terminate is fully reserved. You do not have to return the information you do not understand.

ID numbers related to house numbers or street block addresses are only used for data collection during data collection. Only limited members of the data collection team will use it during data collection, and I promise to keep it confidential. The request only takes an average of 25 minutes.

Finally, thank you so much for listening

I'm willing_____ I'm not willing_____

Signature_____ Date (D/M/Y):----------

If you want to contact the researcher:

Name: Addisu Mandefro

Phone: 09-11-51-96-74

Email: newnile0@gmail.com

Households Information

In this questionnaire, the name household refers to those currently living in the household -but not passing visitors.

House No/Road Block name_____ **Kebele**: _____

Survey Date (Date/Month/Year): _____ /_____/_____

Household Contact No _____

Signature of Respondent (If literate)**:**_____

1. Marital Status of the HH head:

   Single (never married) ☐ Married ☐ Separated (Divorced, Widow) ☐

2. Family occupation (You can tick one or more):

Employed: Government/non-governmental ☐ Self-employed: ☐

Unemployed ☐ Pensioner ☐

Other, specify _____

3. What is your monthly approximate average household income?

   Specify here_____

4. What is your monthly approximate average expense?

   Specify here_____

5. Do you/your HH have to get access to credit from the recognized governmental/none governmental financial institutions? Yes ☐ No ☐

   If the answer for 5 is yes, go to the next question 6, skip to 7 otherwise

6. Could you please estimate your total HH asset (In Birr): _____

Households Telecom Service Usage: - Mobile & Internet

7. Do you/your household members are using mobile service?

   Yes ☐ No ☐

   If the answer for 7 is yes, go to the next question 8,9 & 10, skip to 11 otherwise

8. How many of those HH members have & use mobile phones? (number)

   The number of mobile phone users in HH: ☐

9. In a typical month, about how much money on average, in ET Birr, does your household spend on your mobile or cell phone service (excluding spending on the internet) ☐

10. In a typical month, do you use your mobile or cell phone most often for (You can choose more than one option?)

Much more often for work ☐ somewhat more often for work ☐

About an equal amount for work and personal reasons ☐

Somewhat more often for a personal reason ☐ much more often for personal reasons ☐

11. Do you/your household members use internet service?

    Yes ☐ No ☐

    If the answer for 11 is yes, go to the next 12, 13, 14 & 15, skip to 16 otherwise

12. How many of the HH members use internet service? (number)

    The number of the internet service user in HH: ☐

13. What type of internet access do you have at home?

    - Broadband (WIFI) ☐
    - Only have access to the internet on my cell phone ☐

14. In a typical month, about how much money on average, in ET Birr, does your household spend on your internet service? ☐

15. Do you use the internet most often (You can select more than one option)?

Much more often for work ☐ somewhat more often for work ☐

About an equal amount for work and personal reasons ☐

Somewhat more often for a personal reason much more often for personal reasons

16. Could you indicate: How important Ethio telecom services are for you in general?
(Read item and then tick appropriate box)

(0)Not applicable (1)No influence (2)Small influence (3)Medium influence (4)Large influence

Benefit Type	**Influence**				
	0	1	2	3	4
Better market prices					
Better access to education					
Increased sales					
Increased support from family					
Ability to check on the availability of products before travel					
Less time needed to make business arrangements e.g. delivery of produce					
Help quickly in cases of emergencies					
Information about new products and their use and application					
Better access to family health information					

An Input to Multidimensional Poverty Index Determination

General HH List and Information: Start with HH Head (if there are more than 5 HH members, use an additional questionnaire, starting with member 6)					
	Member 01	Member 02	Member 03	Member 04	Member 05
Name					
Age	Yr: _____ Mth: _____	Yr: _____ Mth: _____	Yr: _____ Mth: _____	Yr: _____ Mth:_____	Yr: _____ Mth: _____
Gender	M: ☐ F: ☐	M: ☐ F: ☐	M: ☐ F: ☐	M: ☐ F: ☐	M: ☐ F: ☐
MPI indicator					
Interviewer Checkpoint: Following question on Years of education is for members 7 years or older. Record 00 if years of education are less than 1 year. For those who are younger than 7, code N/A.					
1.Years ofSchooling	What is the highest **grade** completed:____	What is the highest **grade** completed: _____	What is the highest **grade** completed:____	What is the highest **grade** completed: _____	Whatis the highest **grade** completed : _____
Interviewer Checkpoint: Following question on school attendance is for members 7-15 years of age. For those outside of the age range, code N/A					
2. School attendance	Does he/she attend school at any time during the age (7-15) school year? Yes: ☐ No: ☐ Don't know: N/A:	Does he/she attend school at any time during the age (7-15) school year? Yes: ☐ No: ☐ Don't know: ☐ N/A: ☐	Does he/she attend school at any time during the age (7-15) school year? Yes: ☐ No: ☐ Don't know: ☐ N/A: ☐	Does he/she attend school at any time during the age (7-15) school year? Yes: ☐ No: ☐ Don't know: ☐ N/A: ☐	Does he/she attend school at any time during the age (7-15) school year? Yes: ☐ No: ☐ Don't know: ☐ N/A: ☐

3. **House Flooring**	Interviewer Observe: Main material for the dwelling Floor **Natural floor** Earth/sand: ☐ Dung: ☐ **Rudimentary floor** Wood planks: ☐ Palm/bamboo: ☐ **Finished floor** Parquet or polished wood: ☐ Vinyl or asphalt strips: ☐ **Vinyl or asphalt strips** Ceramic tiles: ☐ Cement: ☐ Carpet: ☐ Other (specify):_____

3.1. House Walls	Interviewer Observe: Main material for the dwelling Wall **Natural walls** No walls: ☐ Cane/palm/trunks: ☐ Dirt: ☐ **Rudimentary walls** Bamboo with mud: ☐ Stone with mud: ☐ Uncovered adobe: ☐ Plywood: ☐ Cardboard: ☐ Reused wood: ☐ **Finished walls** Cement: ☐ Stone with lime/cement: ☐ Bricks: ☐ Cement blocks: ☐ Covered adobe: ☐ Wood planks/shingles: ☐ Other (specify)_____ _____
3.2. House Roofing	**Interviewer Observe: Main material for the dwelling Roof** **Natural roofing** No roof: ☐ Thatch/palm/leaf: ☐ Sod: ☐ **Rudimentary roofing** Rustic mat: ☐ Palm/bamboo: ☐ Wood planks: ☐ Cardboard: ☐ **Finished roofing** Metal: ☐ Wood: ☐ Calamine/cement fiber: ☐ Ceramic tiles: ☐ Cement: ☐ Roofing shingles: ☐ Other (specify)_____ _____
4. Sanitation	What kind of toilet facility do members of your household usually use? Flush / pour flush: ☐ Flush to the piped sewer system: ☐ Flush to septic tank: ☐ Flush to pit (latrine): ☐ **where** Pit Latrine: ☐ Ventilated Improved Pit latrine: ☐ Pit latrine with slab: ☐ Pit latrine without slab / open pit: ☐ Composting toilet: ☐ Bucket: ☐ Hanging toilet/hanging latrine: ☐ No facilities or bush or field: ☐ Other (specify) _____
4.1.Sanitation: Sharing Facility	Do you share this toilet facility with other households? Yes: ☐ No: ☐
5. Cooking Fuel	**What type of fuel does your household mainly use for cooking?** Electricity: ☐ Natural gas: ☐ Biogas: ☐ Charcoal: ☐ Wood: ☐ Straw/shrubs/grass: ☐ Animal dung: ☐ No Food Cooked in Household: ☐ Other (specify)_____
6.**Drinking-Water**	**What is the main source of drinking water for the household members?** **Piped water** Piped into dwelling: ☐ Piped into yard or plot: ☐ Public tap/standpipe: ☐ **Dug well** Protected well: ☐ Unprotected well: ☐ Surface water (river, stream, dam, lake, pond, canal, irrigation channel): ☐ Bottled Water: ☐ Other (specify)_____
6.1.**Non-Drinking-Water**	**What is the main source of drinking water for the household members?** **Piped water** Piped into dwelling: ☐ Piped into yard or plot: ☐ Public tap/standpipe: ☐

	Dug well Protected well: ☐ Unprotected well: ☐ Surface water (river, stream, lake, pond, canal, irrigation channel): ☐ Bottled Water: ☐ Other (specify)_____
6.2. Water: Distance to Water Source	How long does it take to get to the water source, get water and come back? Minutes _____

7. Electricity	Does your household have?:	
	Electricity	Yes ..... ☐ No ..... ☐
8. Asset	Does your household have?:	
	Radio	Yes ..... ☐ No ..... ☐
	Refrigerator	Yes ..... ☐ No ..... ☐
	Television	Yes ..... ☐ No ..... ☐
	Non-mobile Telephone	Yes ..... ☐ No ..... ☐
	Mobile Telephone	Yes ..... ☐ No ..... ☐
	Bicycle	Yes ..... ☐ No ..... ☐
	Motorbike/ Scooter	Yes ..... ☐ No ..... ☐
	Car	Yes ..... ☐ No ..... ☐
	Truck	Yes ..... ☐ No ..... ☐
9. Child mortality	Does any child of the HH member, under the age of 18 years has died? Yes: ☐ When: DD/MM/YY: _____ No: ☐	
10.Morbidity	Does any adult HH member has experienced illness but doesn't visit a clinic/hospital/health center/any other modern medical treatment (in the previous four weeks before the survey) Yes: ☐ No: ☐	