Addis Ababa University
School of Graduate Studies

Urban Poverty and its dynamics in Ethiopia: evidence from panel household survey

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DECLARATION

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This thesis has been submitted for examination with my approval as a M.Sc. thesis supervisor.

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Abstract

Although there are some empirical researches undertaken on poverty in Ethiopia, there is a need for new researches that make use of recent data set and improved methods. Moreover, little research is done on the variables that affect the dynamics of poverty to understand what determines households to fall into and move out of poverty. Using Ethiopian Socioeconomic Survey (ESS) wave 2 (2013/14) and wave 3 (2015/16) data, this research identified the correlates of poverty, and the factors that determine the movement of households into and out of poverty. To this end, Kripfganz and Schwarz's sequential (two-stage) regression is used as a primary tool of analysis. The findings from this sequential regression are then compared with two other alternative methods of estimation: Logit Random Effect regression and Logit Fixed Effect regression. The research found that dependency ratio, age of household head and the square of age of head of household are strongly associated with poverty of households. Moreover, it was found that households with illiterate heads have a higher probability of falling into poverty, as compared to the base group of households headed by one with adult and informal education. A multinomial logistic regression undertaken to capture the probability of moving into and out of chronic poverty showed that ownership of nonagricultural business has the tendency to decrease the (relative) probability of a household being chronically poor, rather than move out of poverty. The research finally recommended that the government need to design polices and incentive packages for head of household to get into literacy programs. Family planning scheme should also augment the poverty reduction programs as it reduces the dependency rate. It is also recommended that the government needs to design appropriate entrepreneurial-oriented economic policies and incentive packages that support households to start up businesses.

Key words- Urban. Urban poverty. Poverty. Poverty dynamics. ESS.

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Acronyms

AgSS- Agricultural Sample Survey

CSA- Central Statistical Authority

DHS- Demographic and Health Survey

EAs- Enumeration Areas

ERHS -Ethiopian Rural Household Surveys

EUHS- Ethiopian Urban Household Survey

ESS- Ethiopian Socio-economic Survey

FGT-Foster-Greer-Thorbecke

HICE -Household Income Consumption Expenditure

LSMS- Living Standards Measurement Study

MDG- Millennium Development Goals

MOFED-Ministry of Finance and Economic Development

PPP- Purchasing Power Parity

RRR- Relative Risk Ratio

SDG- Sustainable Development Goals

SRS -Simple Random Sampling

UNDP- United Nations Development Program

WMS-Welfare Monitoring System

Chapter 1- Introduction

1. 1- Background of the study

It is evident that poverty in Africa is still pervasive, despite the decreasing trend in the last few decades. But there are differences of opinion regarding how fast poverty is declining .For example, researches using national accounts (Pinkovskiy and Sala-i-Martin (2014), Sala-i-Martin and Pinkovskiy(2010) ; and also researches using DHS data like Young (2012) both argue that poverty in Africa has fallen much faster than what the researches using survey estimates found (For eg Chen and Ravallion (2010)) .

Despite the conflicting findings regarding the speed and the current level of poverty, there seems to be a growing consensus in the literature that poverty is falling in Africa (Mckay, 2013; World bank, 2015).

Despite the modest achievement of African countries, poverty reduction is still the focus and the top agenda of most of the policies of African countries. It is also one of the key goals of international institutions, like UN which includes the 'no poverty' component of Sustainable Development Goals (SDGs), and the Millennium Development Goals (MDGs) before SDGs

As it may be expected, the prevalence of poverty has also spawned several research outputs on poverty in developing countries. The researches on poverty has been facilitated by the availability of household data , the periodic report of poverty head count and Demographic and Health Survey (DHS) data and other data sources.

As new data for recent years becomes available, new empirical researches that are based on the new data need to be carried out. Besides, the transformation of the economic structure of developing countries is resulting in significant change in the poverty status of households. Therefore, there is a need to make continuous research that captures the new reality as new events and transformations unfold. Moreover, there is a debate on what data source to use- the household survey or the national accounts for poverty research in Africa, with some preferring the one to the other. Besides, what measure of poverty to use (income, consumption, or asset-based or non-monetary measures) is also a matter of contention.

Therefore, research on poverty in Africa is far from consensus, and is filled with controversies. In Ethiopian context, although there are some empirical researches undertaken, there is a need for new researches that make use of recent data set like that of Ethiopian Socio-economic Survey (ESS), a joint undertaking of Central Statistical Authority (CSA) and World Bank. Moreover, little research is done on the variables that affect the dynamics of poverty so as to understand what determines households to fall into and move out of poverty

This research aimed at contributing to the empirical literature on poverty and poverty dynamics in Sub-Saharan Africa, by taking Ethiopia as a focus country, and using new empirical estimation methods and relatively more recent data sources.

1. 2- Problem statement

1.2.1 - The research problem

Ethiopia has shown remarkable progress in reducing poverty in the last two decades. In 2000, Ethiopia had one of the highest poverty rates in the world, with 56% of the population living below US$1.25 Purchasing Power Parity (PPP) a day and 44% of its population below the national poverty line. In 2011, less than 30% of the population lived below the national poverty line and 31% lived on less than US$1.25 PPP a day. (World Bank, 2015). Recent estimates by National Planning Commission (2017) indicate that as of 2015/16, poverty rate has even further declined to 23.5%.

Despite the modest improvement in reducing poverty, poverty is still pervasive in Ethiopia since the proportion of population below poverty line (23.5%) is not a negligible proportion, a little below one fourth of the population. This necessitates a policy intervention targeted at eradicating poverty in the country. But policy intervention is effective if the policies use evidence-based researches as an input. Moreover, policies aimed at reducing poverty need to use the knowledge of the variables that affect changes at individual and household level (Jollife et al, 2016). Such evidence based and hence well-targeted policies will facilitate the country's effort to meet the SDG goal of "no poverty"/"end poverty in all forms and dimensions by 2030" (UNDP, 2018)

This research contributes to the empirical literature that is based on recently available data source, the Ethiopian Socio-economic Survey (hereafter called ESS) that was prepared jointly by Central Statistical Authority (hereafter called CSA) and the World Bank. Most previous researches on poverty in Ethiopian context used the Ethiopian Rural/Urban Household Survey, a relatively older data set than the ESS data. Some of these researches, among others, include Dercon , Hoddinott and Woldehanna (2011); Alemu et al (2011); Bigston and Shimelis (2008); Dercon(2006), Kedir and Mckay (2005); Bigston, Kebede, Shimelis and Tadesse (2003)). Ethiopian Rural/Urban Household Survey covers the years from 1989 to 2009, where there were eight rounds, the first in 1989, and the last being in 2009. Since the survey only ended in 2009, almost a decade ago, it has little policy relevance for the current poverty status of the country. This implies the need for new researches, like this paper, that make use of recent data such the ESS data which covers years from 2011/12 to 2015/16.

Urban poverty, the focus of this research, in Ethiopian context has been previously dealt with by some researches using the data from Ethiopian Rural Household Survey (Kedir and Mckay, 2005; Disney and Kedir, 2003; Kedir, 1999 ;Dercon and Tadesse, 1999). Urban poverty has also been compared with rural poverty in some researches using the data from Ethiopian Rural Household Survey (Bigston et al, 2003; Tadesse and Dercon, 1997.)

However, to the researcher's knowledge, there is no significant research that focuses on poverty in urban area of Ethiopia using the recently available ESS data. This lack of recent literature on urban poverty using ESS household data can be perhaps due to the fact that it is only quite recently, in its second wave (2013/14) and third wave (2015/16) that the ESS survey covered urban areas , not in its first wave (2011/12)

Moreover, with increasing urbanization in the country and increasing migration from rural to the urban areas, it is high time that researches focus on urban poverty, identify its unique character and dynamics. Although urban poverty rate showed a declining trend, the proportion of the poor who lived in urban areas has increased from 11% in 2000 to 14% in 2011 (World Bank, 2015). This suggests the need to tackle urban poverty before it becomes worse, and a source of political and economic instability.

Besides, there is only very limited research on the dynamics of poverty in Ethiopian context to understand what determines households to fall into and move out of poverty. Although Kafle et al (2016) has made attempts to analyze the proportion of the households that moved into and out of poverty, no attempt was made to identify the variables that significantly affect the transition. Bigston and Shimelis (2008) focus on poverty transition and persistence but based on data of almost two decades ago (1994–2004).

This research therefore included poverty dynamics (of households falling into and out of poverty) and its determinants, unlike most previous researches which focused on static poverty at a given point in time or considered dynamics insufficiently or used older dataset.

Therefore, this research attempted to fill this knowledge gap on urban poverty and urban poverty dynamics using relatively recent data: second wave (2013/14), and third wave (2015/16) ESS data and using appropriate estimation techniques.

1.2.2 -The Research questions

The research addressed the following research questions:

- What are the factors that are highly associated with (consumption-based) urban poverty of households in Ethiopia, and the direction of the effect of the variables
- What is the characteristics of poverty dynamics in urban Ethiopia-indicated in terms of the relative proportion of households moving out of poverty, and falling back into poverty between the two waves under consideration
- What are the factors that are highly associated with the likelihood that a household will move out of poverty, fall back into poverty, stayed poor in both periods, be never poor between the two waves under consideration

1.3. Data source and methodology

The panel data source used in this research is Ethiopia Socioeconomic Survey (ESS) data, a joint project between Central Statistical Authority and World Bank's Living Standards Measurement Study (LSMS). Only data from wave 2 (2013/14) and wave 3 (2015/6) are used in this research since urban areas, the focus of this research, were not covered in the first wave (2011/12).

In the ESS survey, a total of 1,486 urban households were interviewed in wave 2. During wave 3, 1255 households were re-interviewed yielding a response rate of 85 percent (a panel attrition rate of 15 percent). This research therefore used 1277 urban households, 1255 of which have data for both wave 2 and wave 3, and 22 households have data only for either wave 2 or 3. The data is therefore strongly balanced.

To identify the correlates of poverty, Kripfganz and Schwarz's sequential (two-stage) regression is used as a primary tool of analysis. Sequential (two-stage) regression is considered as an improvement on both traditional fixed effect and random effect regression since fixed effect models wipe out all time-invariant characteristics and a pure random effects model imposes exogeneity assumptions (Kripfganz and Schwarz, 2015; Wooldridge, 2010). The findings from this sequential regression are then compared with two other alternative ways of estimation: Logit random effect regression and Logit Fixed effect regression.

To understand the variables which are responsible for a household to move out of or into poverty and hence understand the dynamics of poverty, a Multinomial logistic regression model is also used.

More detailed explanation of the data source and method is presented in chapter 3

1.4 Significance of the study

Given the fact that almost one in four of the Ethiopian population live below poverty line, the need for a research on poverty hardly needs explanation. This research will provide evidence based input for policy makers so as to make an informed policy choice regarding how to tackle poverty. It will also be an input for future researchers who are interested to further explore the topic.

1.5 Scope of the study

The study focused only on urban poverty. So given different contexts of rural and urban poor, it can only be generalized to Ethiopian poor with some caution. Moreover, the latest data available is for 2015/16, which is 2-3 years away from the date that this research is conducted. But it is believed that the data will somehow approximate the current poverty status of the country.

Chapter 2. Literature Review

2.1. Theoretical Review

2.1.1 The concept of poverty

There are different ways of defining poverty, which can be categorized into historic definitions and contemporary economists' definition, as summarized in Davis and Sanchez Martinez (2014)

2.1.1.1 Historic definitions of poverty

Adam Smith, who is largely considered as the father of modern economics defined poverty as "the inability to purchase necessities required by nature or custom" (Smith, 1776). In this definition, the social/psychological status aspect of poverty (custom) receives implicitly the same weight as the material, purely economic condition (nature).

Karl Marx was focused more on the relative dimension of the notion of poverty: "Our needs and enjoyments spring from society; we measure them, therefore by society and not by the objects of their satisfaction. Because they are of a social nature, they are of a relative nature" (Wood, 1988)

Joseph Rowntree in the early 20th century distinguished between *primary* and *secondary* poverty. He understood primary poverty as "earnings insufficient to obtain the minimum necessaries for the maintenance of merely physical efficiency" (Rowntree 1901, quoted in Townsend, 1979). In his view, the concept of *secondary* poverty was based on the more subjective judgment of whether the people he interviewed were "in obvious need and squalor", despite lying above the poverty line he delineated (Laderchi et al., 2003). Rowntree also suggested that the definition of poverty is explicitly dependent on the socio-economic environment at the time. That is, it had a strong relative as well as absolute component (Davis and Sanchez-Martinez, 2014)

2.1.1.2 Contemporary definitions of poverty

Amarya Sen is one of the modern economists who have contributed to the debate on the concept of poverty. Sen interpreted poverty as the lack of enough elements in the “set” of material goods and services that are ultimately “mapped” (i.e. transformed) into the realization of capabilities . Poverty is then understood as insufficient entitlements defined as a broad package of rights including health, education and freedom, which are “indicators of freedom to live a valued life” and realise human potential (Sen, 1999). Criticisms of Sen's capability theory include it being regarded as excessively individualistic, his omission of an explicit determination of which capabilities are important and which are not (Davis and Sanchez-Martinez , 2014)

Peter Townsend defines poverty as "the lack of the resources necessary to permit participation in the activities, customs and diets commonly approved by society" (Townsend, 1979)

According to the World Bank (2000), “poverty is pronounced deprivation in wellbeing”. So World Bank’s approach therefore includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity. Poverty is also considered to encompass low levels of health and education, poor access to clean water and sanitation, inadequate physical security, lack of (political) voice, and insufficient capacity and opportunity to better one’s life. Such definition emphasizes the multi-dimensional character of poverty.

2.1.2 Approaches to poverty

There are three approaches to poverty that are often referred in most conceptualization of poverty. The three approaches have different implication for not only how poverty is defined but also for how poverty should be measured.

The first approach to poverty emphasizes command over commodities, and the poor are those who do not have enough income or consumption to put them above some adequate minimum threshold. Poverty is then measured by comparing individuals' income or consumption with some defined threshold below which they are considered to be poor. This view sees poverty largely in monetary terms. This is the most conventional view and is the starting point for most analyses of poverty. (Haughton and Khandker, 2009)

A second approach to poverty is to ask whether people are able to obtain a specific type of consumption good: Do they have enough food? Or shelter? Or health care? Or education? In this view the analyst goes beyond the more traditional monetary measures of poverty: Nutritional poverty might be measured by examining whether children are stunted or wasted; and educational poverty might be measured by asking whether people are literate or how much formal schooling they have received.(ibid)

The third approach to poverty focuses on the capability of the individual to function in society. Poor people often lack key capabilities; they may have inadequate income or education, or be in poor health, or feel powerless, or lack political freedoms. This approach is well-articulated by Amartya Sen (1987), who argues that well-being comes from a capability to function in society. Thus, poverty arises when people lack key capabilities, and so has inadequate income or education, or poor health, or insecurity, or low self-confidence, or a sense of powerlessness, or the absence of rights such as freedom of speech. Viewed in this way, poverty is a multidimensional phenomenon and less amenable to simple solutions. For instance, while higher average incomes will certainly help reduce poverty, these may need to be accompanied by measures to empower the poor, or insure them against risks, or to address specific weaknesses such as inadequate availability of schools or a corrupt health service

2.1.3. Measuring poverty

The first common way to measure poverty is based on **income**. Income is defined in principle as the sum of consumption and change in net worth. This is generally used as a measure of welfare in developed countries, but it tends to be seriously understated in less-developed countries. *(* Haughton and Khandker, 2009)

Another way of measuring poverty is based on **consumption**. Consumption is less understated and comes closer to measuring permanent income. However, it requires one to value durable goods (by assessing the implicit rental cost) and housing (by estimating what it would have cost to rent). While consumption per capita is the most commonly used measure of welfare, some analysts use consumption per adult equivalent, in order to capture differences in need by age, and economies of scale in consumption

Other popular measures of welfare include calorie consumption per person per day, food consumption as a proportion of total expenditure, and nutritional status as measured by stunting or wasting.

However, there is no ideal measure of well-being, and analysts need to be aware of the strengths and limitations of any measure they use *(* Haughton and Khandker, 2009)

Poverty lines

The Cost-Of-Basic Needs (CBN) approach is the common way of determining poverty line , while the Food Energy Intake (FEI) method has been suggested as an alternative when the data available are more limited (World Bank poverty manual, 2016)

i. The Cost-of-Basic-Needs method

This approach requires information on the prices of the goods that the poor consume. The most satisfactory approach to building up a poverty line, while trying to ensure that the line covers basic needs, proceeds as follows:

• Stipulate a consumption bundle that is deemed to be adequate, with both food and non-food components; and

• Estimate the cost of the bundle for each subgroup (urban/rural, each region, etc.).

ii. **Food Energy Intake method**

When price data are not available, a number of researchers have used an alternative method to construct the poverty line – the *food energy intake method*. The goal here is to find the level of consumption expenditure (or income) that allows the household to obtain enough food to meet its energy requirements. The consumption will include non-food as well as food items; even underfed households typically consume some clothing and shelter, which means that at the margin these “basic needs” must be as valuable as additional food.

Poverty Indexes

The following indexes are often used to measure the extent of aggregate poverty:

i. The *headcount index* (P0) measures the proportion of the population that is poor. It is popular because it is easy to understand and measure. But it does not indicate how poor the poor are. When the headcount (H) is taken as a fraction of the total population N, the headcount index is defined as H/N.

ii. The *poverty gap index* (P1) measures the extent to which individuals fall below the poverty line (the poverty gaps) as a proportion of the poverty line. The sum of these poverty gaps gives the minimum cost of eliminating poverty, if transfers were perfectly targeted. The measure does not reflect changes in inequality among the poor.

Total poverty gap (TPG) of the poor is defined as :

$$\mathrm{TPG}=\sum_{i=1}^{H}(Y_p - Y_i)$$

Where Y_p is the poverty line income and Y_i is the individual’s income

iii. *The squared poverty gap index* (also known as the *poverty severity index*, P2) averages the squares of the poverty gaps relative to the poverty line. It is one of the Foster-Greer-

Thorbecke (FGT) class of poverty measures that allow one to vary the amount of weight that one puts on the income (or expenditure) level of the poorest members in society. The FGT poverty measures are additively decomposable. It is also possible to separate changes in the FGT measures into a component resulting from rising average incomes, and a component resulting from changes in the distribution of income.

iv. The *Sen-Shorrocks-Thon index* combines measures of the proportion of poor people, the depth of their poverty, and the distribution of welfare among the poor. This measure allows one to decompose poverty into three components and to ask: Are there more poor? Are the poor poorer? Is there higher inequality among the poor?

2.2 Review of empirical literature

The researches on poverty in Ethiopia seem to be dominated by those researches that used household data. These researches that use household data can further be classified into three categories based on the type of data source they used, as presented below.

2.2.1 Data source and method used by previous empirical researches

The first category of researches is based on the Ethiopian Rural Household Surveys (ERHS)/Ethiopian Urban Household Survey (EUHS). These set of researches are based on household data undertaken by the department of economics of Addis Ababa University, in collaboration with other institutes like the Centre for the Study of African Economies (University of Oxford), the International Food Policy Research Institute, Department of Economics (Goteborg University), Michigan State University. This data cover the years from 1989 to 2009, where there were eight rounds, the first in 1989, and the last being 2009 (see Dercon and Hoddinott , 2004 for more details on these surveys). To mention some researches that used this data: Dercon , Hoddinott and Woldehanna (2011), Alemu et al (2011), Bigston and Shimelis (2008), Dercon (2006), Kedir and Mckay (2005), Bigston, Kebede, Shimelis and Tadesse (2003).These researches identified the determinants of poverty using regression, analyzed the dynamics /transition of poverty from one round of the survey to the other. Moreover, Dercon ,Hoddinott and Woldehanna (2012) analyze the initial characteristics with which chronic poverty is associated . Kedir (1999), and Kedir and Mckay (2005) used Multinomial Logit, similar to the one used in this paper, to identify the variables that significantly affect the dynamics of poverty and the likelihood of falling into different transient and chronic poverty groups of households.

The second category of researches is based on new household data source generated by Central Statistical Authority and World Bank Living Standards Measurement Study (LSMS**).** These data sources, called Ethiopian Socio-economic survey (hereafter called ESS), constitute of three waves and cover the years 2011 to 2016. The first wave was undertaken in 2011/12, the second wave in 2013/14, and the third wave was on 2015/16. The researches that made use of this data are so far very few and even these researches used only wave 1 and wave 2 data, not wave 3. The researcher is not aware of any research that used wave 3. These include: Kafle, McGee, Ambel and Seff (2016), who used wave 1 and 2 of ESS data; Seff and Jollife (2016), Bersisa (2016), among others. (See Jollife et al, 2016 for a summary of the recent researches on poverty that used ESS dataset, published in the special issue of Ethiopian Journal of Economics). However, these recent researches that used ESS data have not made the attempt to use regression and analyze the determinants of poverty with the exception of Bersisa (2016) who used random effect logit model to identify the determinants of household energy poverty. Although Kafle et al (2016) has made attempts to analyze the proportion of the households that moved into and out of poverty, no attempt was made to identify the variables that significantly affect the transition.

The third category of researches use Household Income Consumption Expenditure (HICE) surveys (which focuses on the income dimension of poverty) and Welfare Monitoring Survey (that captures the non-income aspects of poverty such as health, education, and access to services), both generated by Central Statistical Authority (hereafter called CSA) . This data source has provided poverty profile since 1996, the year of the establishment of Welfare Monitoring System (WMS) .Demissie and Kasie (2017) and the analytical report of CSA (2012) , and MOFED (2012) are some of the researches in this category that used HICE data.

2.2.2 Key findings of previous empirical researches

The key findings of some of the previous researches are summarized as follows:

- Regarding **determinants of poverty**, Dercon , Hoddinott and Woldehanna (2011), using a 15-year longitudinal data set from Ethiopia, found that chronic poverty is associated with initial characteristics which include lack of physical assets, education, and ‘remoteness’ in terms of distance to towns or poor roads. Another research by Kedir and Mckay (2005) focuses on characteristics of chronic poverty and conclude that chronically poor households are characterized by high household dependency rates, low levels of education, lack of asset ownership, and insecure, low return or no employment. Moreover, Bigston, Kebede, Shimelis and Tadesse (2003), on the other hand, show that land ownership, education, type of crops planted, occupations in urban areas, dependency ratios, and location are important determinants of poverty

- On **poverty dynamics**, Bigston and Shimelis (2008) focus on poverty transition and persistence during the years 1994–2004. They conclude that it is hard to exit poverty once a household falls into poverty, while it is easier to maintain a non-poverty status once a household has escaped poverty. They also found that the difficulty of exiting from poverty increases with the time spent in that state.

- **More recent researches** include Kafle, McGee, Ambel and Seff (2016) who, using panel data from wave 1 and wave 2 of ESS data, found that consumption-based poverty increased slightly overtime in rural and small town areas but a large proportion of the population saw improvement in food consumption, consuming more nutritious foods and fewer staples. Using the same dataset as that of Kafle et al , Seff and Jollife (2016) also used wave 1 and 2 of ESS data to compare multidimensional poverty with consumption based poverty. They conclude that both measures of poverty (multidimensional poverty and consumption based poverty) are different and that changes in consumption are largely independent of changes in multidimensional wellbeing

Chapter 3- Data source and methodology

3.1-Data source

The panel data source used in this research is Ethiopia Socioeconomic Survey ESS data, wave 2 (2013/14) and wave 3 (2015/6). These data can be accessed online from World bank database (http://microdata.worldbank.org/)

Only Wave 2 and wave 3 are used in this research since urban areas were not covered in the first wave (2011/12). It used 1255 urban households that were surveyed in both ESS wave 2 and wave 3. A total of 1,486 households were interviewed in wave 2. During wave 3, 1255 households were re-interviewed yielding a response rate of 85 percent (a panel attrition rate of 15 percent)

A panel data source has been preferred in this research since panel data, as compared to cross-sectional data, is often considered to be much more informative about levels, profiles and dynamics of poverty than cross sectional data (Jollife et al, 2016; Kafle et al, 2016).

A household level data has been used in this research since several researchers have argued that household survey is the preferred data source to use for poverty analysis, an approach also commonly followed by World Bank (Chen and Ravallion, 2010; Chen and Ravallion, 2004; Ravallion , 2000; Deaton, 2005) . But household survey data is not without critics since some researchers prefer national accounts (Pinkovskiy and Sala-i-Martin , 2014; Sala-i-Martin and Pinkovskiy, 2010; Pinkovskiy and Sala-i-Martin, 2009; Bhala, 2003; Karshenas , 2003). Still others use Demographic Health Survey (DHS) data (eg Young, 2012; Young, 2009).

The dataset used in this research, the Ethiopia Socioeconomic Survey (ESS), is jointly collected by Central Statistical Authority and World Bank Living Standards Measurement Study (LSMS).

ESS began as Ethiopia Rural Socioeconomic Survey (ERSS) in 2011/12. The first wave of data collection in 2011/12 included only rural and small town areas. The survey name dropped the word "Rural" in the second wave of data collection when the sample was expanded to include all urban areas. (CSA and World Bank, 2017)

The sample for the ERSS (Wave 1) comprises 4,000 households in rural and small towns across Ethiopia. The sample for ESS (Wave 2) was expanded to include 1,500 urban households, for a total sample of 5,500 households. The sample used for ESS wave 3 was 3772 (rural households), and 1672 (urban). ESS wave 3 further stratified cities into medium-sized (towns with a population between 10,000 and 100,000) and big-sized towns (greater than 100,000).

The ESS sample is a two-stage probability sample. The first stage of sampling entailed selecting enumeration areas (ie. the primary sampling units) using simple random sampling (SRS) from the sample of the Annual Agricultural Sample Survey (AgSS) enumeration areas (EAs). The AgSS EAs were selected based on probability proportional to size of population (PPS). The second stage of sampling was the selection of households to be interviewed in each EA.

As with the rural sample, the urban sample was selected following a multi-stage, clustered design. In the second stage of selection, 15 households were selected (SRS) in the mid- and large-size town EAs. Due to non-response and fieldwork issues, the final number of households interviewed was slightly less than the 1,500 urban households as planned in the design. A total of 1,486 households were interviewed with a response rate of 99 percent. During wave 3, 1255 households were re-interviewed yielding a response rate of 85 percent. Attrition in urban areas is 15% due to consent refusal and inability to trace the whereabouts of sample households. (CSA and World Bank, 2017)

3.2. Description of Variables

Table 1- Description of Variables

<table>
<tr><th colspan="2">Variable label</th><th>Variable description</th></tr>
<tr><td colspan="2">poor</td><td>Dummy for poverty status of households ; Poor=1</td></tr>
<tr><td colspan="2">hhsize</td><td>Household size</td></tr>
<tr><td colspan="2">depratio</td><td>Dependency Ratio; the ratio of the number of dependent household members (ages 0 to 14 and above 65) to those typically in the labor force (the productive members , ages 15 to 64)</td></tr>
<tr><td colspan="2">female</td><td>Dummy for gender of household head; Female=1</td></tr>
<tr><td colspan="2">agehhead</td><td>Age of Household head</td></tr>
<tr><td colspan="2">Agehhead2</td><td>Age of household head squared</td></tr>
<tr><td rowspan="4">Education dummies; base category Adult and informal education</td><td>illiterate</td><td>Dummy for education level of head of household; Illiterate=1</td></tr>
<tr><td>primaryschool</td><td>Primary school=1</td></tr>
<tr><td>highschool</td><td>High school=1</td></tr>
<tr><td>certificateandabove</td><td>Certificate and above =1</td></tr>
</table>

Dummies for Occupation of head ; base category- social services	agriculture	Agriculture=1
	trading	trading=1
	Publicadmin	public administration=1
nonagribus		Household owned non-agricultural business=1
assist		Household received assistance of any kind =1

3.3 The econometric models

The research used panel data models and such models allow economists to estimate more complicated and realistic models (Verbeek, 2008), control for the effects of missing or unobserved variables (Wooldridge, 2010; Hsiao, 2017), and allows to uncover dynamic relationships (Hsiao , 2007)

The four econometric models used in this research, which are described below in detail, are the following: Sequential regression, Logit random effect regression, ,Logit Fixed effect regression and Multinomial logistic regression. The first three models are used to identify the determinants of poverty of urban households while the last one (Multinomial logistic regression) is intended to capture the dynamics of poverty of households.

i. Sequential regression

To identify the correlates of poverty, Kripfganz and Schwarz's sequential (two-stage) regression has been used in this research as a primary tool of analysis.

The sequential (two-stage) regression is basically an improvement on traditional fixed effect and random effect regression. A pure random effects model requires that exogeneity assumptions be met, which may be hard to justify (Kripfganz and Schwarz, 2015). Besides, a fixed effect models wipe out all time-invariant characteristics. But a researcher may be interested in the effect of the time-invariant variables, like the case in this research. So there is a need to use a model that captures the effect of this time invariant variables. Methods devised to that effect include Kripfganz and Schwarz's sequential (two-stage) regression (the one used in this model), correlated random-effects model (Mundlak, 1978; Chamberlain, 1982) and "hybrid" models (Allison, 2009).

A sequential (two-stage) regression has been preferred in this research because of the fact that it provides robustness to misspecification that result due to exogeneity assumption. Moreover, it provides the coefficient of time-invariant regressors .

Sequential regression involves two stages. In the first stage, only the coefficients of time-varying regressors are estimated. In a second stage, the coefficients of time-invariant regressors are recovered. Moreover, this new *xtseqreg* Stata command implements corrected standard errors at the second stage that account for the first-stage estimation error.

The latent variable for each household i at time t is given by:

$$\boldsymbol{y_{it}}^{*} = \boldsymbol{X_{it}\beta} + \boldsymbol{f_i'}\boldsymbol{\gamma} + \boldsymbol{e_{it}}, \qquad (1)$$

where $\boldsymbol{e_{it}} = \alpha_i + u_{it}$

$\boldsymbol{X}_{it}$ is a vector of time-varying variables. In the model used in this research, all regressors except gender, occupation and school level dummies are time variant and are included in $\boldsymbol{X}_{it}$.

$\boldsymbol{f_i'}$ is a vector of observed time-invariant variables; This include all gender, occupation and school level dummies (illiterate, primary school, high school, certificate and above; and agriculture, trading activities and public administration)

$\boldsymbol{\alpha_i}$ is an unobserved household specific effect of the i-th household and

$\boldsymbol{\beta}$ is vector of coefficients to be estimated

u_{it} is idiosyncratic error

ii. Logit random effect regression

This is another alternative estimation method used in this paper. The advantage of the unobserved effect logit model over the probit model in that it is possible to obtain a consistent estimator of β without any assumptions about how the unobserved effect α_i is related to X_i. (Wooldridge, 2010)

$$\mathbf{P}(\boldsymbol{y_{it}} = \mathbf{1}|\boldsymbol{X_{it}}, \boldsymbol{\alpha_i}) = \boldsymbol{\Lambda}(\boldsymbol{X_{it}\beta} + \boldsymbol{\alpha_i}), \qquad t=1,\ldots\ldots, T \qquad (2)$$

Where $\Lambda(.)$ is a logistic function

$\boldsymbol{X}_{it}$ is a vector of time-varying variables.

α_i is an unobserved household specific effect of the i-th household

It is assumed here in Logit random effect regression that

i) y_{i1}.........., y_{it} are independent conditional on X_{it}, α_i

ii) $\alpha_i | X_{it} \sim$ Normal $(0, \sigma_\alpha^2)$

iii. Logit Fixed effect regression model

Logit Fixed effect regression is yet another alternative estimation method used in this paper. It is similar to the logit random effect above in equation (2) except that a fixed effects logit analysis treats the α_i as a parameter to be estimated along with $\boldsymbol{\beta}$. The advantage of this method is that there is no need to make assumptions about the distribution of $\alpha_i | X_{it}$. That is, the unobserved effect is allowed to be correlated with the regressors. However, time-invariant variables are not included in X_{it}, and that this estimation method drops these time-invariant variables

iv. Multinomial logistic regression model

To better understand the underlying causes that lead people to move out of or into poverty and hence understand the dynamics of poverty, a Multinomial logistic regression is also used. The multinomial logit estimates the coefficient of the explanatory variables for all nominal outcomes, except the reference category. Multinomial logit has been used in research in Ethiopian poverty by Kedir and Mckay (2005), although it used a relatively older data (from 1994 to 1997).

The dependent variable is divided into four categories, adopting the categories recently used by Kafle et al (2016): those Households that moved out of poverty ("forward movers"), and those that fall into poverty ("backward movers"), those that were poor in both periods ("chronically poor"), those who have not been poor ("never poor") between the time period under consideration (Between 2013 and 2015)

The latent variable for each household belonging to category j is

$$\boldsymbol{y_{ij}}^{*} = \boldsymbol{\alpha_{ij}} + \boldsymbol{X_i}\boldsymbol{\beta_j} + \boldsymbol{\varepsilon_{ij}}, \tag{3}$$

Where $\boldsymbol{X_i}$a vector of household level explanatory variables, and $\boldsymbol{\beta_j}$is the coefficient vector, which must be estimated.α_{ij} is a random variable. The error term,$\boldsymbol{\varepsilon_{ij}}$,, is assumed to be independent and identically distributed across all outcomes j.

The probability of falling in each category can be written as

$$\mathrm{P}\left(y_{i=}o_j \middle| \alpha_{i\,,}\boldsymbol{\beta}, \boldsymbol{X}_i\right) = \mathrm{P}(\max y_{ik}^{*} = y_{ij}^{*} / \alpha_{i\,,}\boldsymbol{\beta}, \boldsymbol{X}_i) \tag{4}$$

Where j=1, 2,3,4 ; J=1 for "chronically poor" ; j=2 for "forward movers"; j=3 "backward movers"; for j=4 for "never poor";

J=2="forward movers" is used as the base (reference) category.

Chapter 4- Results and Analysis

4.1. Setting the background: Poverty status in Ethiopia

In this section, status of poverty, in the decades following the new millennium, is described to set the background for the urban poverty analysis in subsequent sections. World Bank estimates and MOFED/National Planning commission poverty estimates are presented below.

The results below in Table 2 show the percentage of poor in the population in Ethiopia, those living below US $1.25 poverty line

Table 2- World Bank estimates Poverty rate for years 2000-2011 ;

Source World Bank Poverty Assessment- Ethiopia (2011)

Year	**Percentage of Poor**
2000	56%
2011	31%

According to World Bank estimate given above in Table 2, poverty has fallen by 25 percentage points using US $1.25 poverty line. The last World Bank estimate available is on 2011, and hence may not capture the current reality, as compared to MOFED estimate in Table 3 which has more recent estimates of 2015/16.

As shown in Table 3 and figure 1, MOFED/National Planning Commission estimate shows that poverty head count has decreased by a significant amount (20.7 percentage points, or by 46.8%) in the sixteen year interval (from 1999/2000 to 2015/16). It is not only the poverty head count that declined. As Table 3 shows, the poverty depth (captured by P_1) and the poverty severity (captured by P_2) has also declined. These indices hence clearly indicate that there is a significant poverty reduction in the last nearly two decades, and this implies that the Ethiopian government's alleged pro-poor policy is on the right track toward poverty reduction. However, still, the last poverty estimate, which is 23.5% in 2015/16, indicates that a significant proportion of the population is still living in poverty. Little below one fourth, one in four people, of the population is still poor as of 2015/16, which is and ought to be a concern to policy makers.

Table 3 -Poverty rate for the years 1999-2016;

Source- Interim report of MOFED (2012), National Planning Commission (2017)

Year	Poverty head count index (P_0)	Poverty gap index (P_1)	Poverty severity index (P_2)
1999/2000	44.2%	11.9	4.5
2004/05	38.7%	8.3	2.7
2010/11	29.6%	7.8	3.1
2015/16	23.5%	6.7	2.8

Hence, it can be concluded that estimates by both World Bank and MOFED both show that the percentage of poor has decreased by significant amount in the decades following the new millennium.

Since the segment of the poor people that this paper focuses is on urban poor, it is vital to see the level of poverty disaggregated by rural and urban areas. According to the information presented in Table 4, urban poverty head count has declined from the year 2004 to 2011, and again declined from 25.7% in 2010/11 to 14. 8% in 2015/16.Rural poverty rate has also declined from 39.3% in 2004/5 to 25.6 % in 2015/16. It can also be seen that rural poverty rate is higher than urban poverty rate in all the three periods. This implies that rural poverty is more pervasive than urban poverty.

Moreover, the rate of poverty reduction is slower for rural poverty than urban poverty since in the decade under consideration (2004-2015), urban poverty has fallen by 57.8%, while rural poverty has only fallen by 22.6% from the year 2004/5 to 2015/16.

Table 4. Urban and rural poverty;

Source MOFED (2012); National Planning commission (2017)

Area	**2004/5**	**2010/11**	**2015/16**
Urban	35.1%	25.7%	14.8%
Rural	39.3%	30.4%	25.6%

4.2. Descriptive statistics

4.2.1. Poverty status of sampled households

To determine the poverty line, we use a similar approach to the one recently used by Kafle et al (2016) where the recent poverty estimate is used to determine the poverty line, and then the consumption data in different waves in inflated or deflated. Accordingly, 2010 poverty estimate is used to determine the cut off line for whether a given household is poor or not. Therefore, the bottom 25.7 percent (or those below 74.3 percentile) of the household for wave 1 (2013/14) are considered poor, and the annual consumption level below which households are considered poor is fixed at Birr 4453 per adult equivalent.

To make the poverty line comparable across both waves, we compute the wave 3 (2015/16) income levels by deflating them by a factor of 1.19. To arrive at the factor of 1.19, we used the average CPI (calculated as an average CSA's reported CPI for different months) for both waves, 2013/14 and 2015/16. Therefore, the poverty line for the second wave is Birr 5300 per adult equivalent.

Accordingly, Table 5 shows the poverty status for each wave of ESS household survey, further classified into whether a household is headed by male or female

Table 5.Poverty rate by gender of the head of household;

Source- *Researcher's computation based on ESS data*

	Wave 2		**Wave 3**	
	No of poor households	**Perc**	No of poor households	**Perc**
Male-Headed	218	57.9	114	54.3
Female Headed	158	42.1	96	45.7
Total	376	100	210	100

From table 5 above, it can be seen that out of the households categorized as poor, the proportion of male-headed households is greater in number than that of female in both waves. Hence, male-households dominate the poor segment of the population. Moreover, it can be inferred that while the proportion of the poor male-headed households have shown a decline of 3.6 percentage points (from 57.9% to 54.3 %) from wave two to wave 3, the proportion of the female-headed households have shown an increase of 3.6 percentage points. Therefore, it can be concluded that female-headed households show an increasing trend in poverty over time.

It can also be inferred that both the proportion, in absolute number and in percentage, of poor households (whether headed by male or female) has decreased from wave 2 to wave 3. This reduction in poverty between the two waves is not surprising given that the country's GDP has grown in the interval between the two waves.

4.2.2 Descriptive statistics of explanatory variables

Table 6. Overall, between and within mean and standard deviation of variables

Variable		Mean	Std. Dev.	Min	Max	Observations
poor	**overall**	0.2154	0.4112	0	1	N = 2376
	between		0.3354	0	1	n = 1277
	within		0.2436	-0.28451	0.715488	T-bar = 1.86061
hhsize	**overall**	3.8696	2.2655	1	14	N = 2363
	between		2.1584	1	14	n = 1277
	within		0.7372	-0.63034	8.369657	T-bar = 1.85043
depratio	**overall**	0.5407	0.6882	0	5	N = 2047
	between		0.6279	0	5	n = 1268
	within		0.2715	-1.70924	2.790762	T-bar = 1.61435
female	**overall**	0.4219	0.4939	0	1	N = 2377
	between		0.4699	0	1	n = 1277
	within		0.1562	-0.07804	0.921961	T-bar = 1.86139
agehhead	**overall**	41.0572	15.5291	3	99	N = 2376
	between		15.1126	16	98	n = 1277
	within		4.0740	10.55724	71.55724	T-bar = 1.86061
illiterate	**overall**	0.6508	0.4768	0	1	N = 2377
	between		0.4091	0	1	n = 1277
	within		0.0578	0.15082	1.15082	T-bar = 1.86139
Primaryschool	**overall**	0.1001	0.3002	0	1	N = 2377
	between		0.2525	0	1	n = 1277
	within		0.0734	-0.39987	0.600126	T-bar = 1.86139
highschool	**overall**	0.0917	0.2887	0	1	N = 2376
	between		0.2521	0	1	n = 1277
	within		0.00	-0.40825	0.591751	T-bar = 1.86061
Certificate and above	**overall**	0.0323	0.1770	0	1	N = 2377
	between		0.1590	0	1	n = 1277
	within		0.09	-0.46761	0.532394	T-bar = 1.86139
nonagribus	**overall**	0.1665	0.3726	0	1	N = 2377
	between		0.3193	0	1	n = 1277
	within		0.1924	-0.3334	0.666597	T-bar = 1.86139
Assist	**overall**	0.0197	0.1392	0	1	N = 2377
	between		0.1047	0	1	n = 1277
	within		0.0940	-0.48023	0.519773	T-bar = 1.86139

The results shown in Table 6 decompose the independent variable x_{it} into a between and within. Such an approach makes it possible to see the variation across households and the variation in the same household over time (Stata reference manual, 2013). It shows the mean, within and between variations of explanatory variables

What follows is a descriptive statistics of each explanatory variable one by one.

i. Gender of household head

In the ESS data that this research is based on, the percentage of male and female headed urban households is as depicted in Table 7 below

Table 7 Gender of household head; Source-*Researcher's computation from ESS data*

Gender of household head	**No**	**Percentage**
Male	722	57.53
Female	533	42.47
Total	1255	100

As shown in Table 7 above, the number of male-headed households included in the ESS survey is greater than female headed households. More than half (57.53%) of those surveyed are male-headed households.

ii. Household size

As shown in Table 6, the between variation for household size (2.16) is higher than within variation (0.73). That is, the variation across households in terms household size is higher than the variation of a household across time (between the two waves). In other words, if one draws a household at random from the data, the difference in household size is much higher than the difference for the same household in the two waves. This result is not surprising given that the time span between the two waves is only two years and one doesn't expect too much change in two years and hence the low within variation. The household size ranges from minimum of 1 to 14.

Moreover, the average household size is 3.86. Male-headed and female headed households have different average household size as shown in Table 8. Male-headed households tend to have higher household size than female headed ones. This will have an implication on the probability of falling into poverty since household size is associated with poverty. The following table, table 8, illustrates the household size by the gender of the household head.

Table 8.Household size by gender of household head;

Source-*Researcher's computation from ESS data*

Gender of household head	**Average Household size**
Male	4.65
Female	4.00

iii. Dependency ratio

Dependency ratio is calculated as ratio of those typically not in the labor force (the dependent part, ages 0 to 14 and 65 or more) and those typically in the labor force (the productive part, ages 15 to 64). The average dependency ratio is 0.54. Similar to household size, the variation across households in terms dependency ratio is higher than the variation of the same household's dependency ratio across time. The dependency ratio ranges from 0 to 5.

As table 9 shows, male-headed and female headed households have almost the same average dependency ratio, with male-headed households having slightly higher dependency ratio.

Table 9. Average Dependency ratio by gender of household head;

Source-*Researcher's computation from ESS data*

Gender of household head	**Average Dependency ratio**
Male headed	0.57
Female headed	0.54

iv. Age of head of households

The average age of head of households is around 41 years. There is significant overall variation in age (overall standard deviation of 15.53 and coefficient of variation of 0.37) and across households (between standard deviation of 15.11 and coefficient of variation of 0.36). So one can say that the data set contains households which vary significantly in age

v. Occupation type

It is revealed graphically in figure 2 that in the panel data used, the majority of households are engaged in agriculture (53.78%). Those engaged in trading activities are also sizable portion (6.14%), while those whose households are engaged in public administration are the least of all. A social services occupation category includes those occupations which considered separately are very low (below 1%) and it includes Education, Health, and other related services. Social services occupation is the second largest occupation category, and is used as base category later in regression in section 4.3.

vi. School level

It can also be inferred from Table 6 that the within variation for dummies related with the school level of households is either zero or close to zero. This shows that this variable can be considered time-invariant between the two waves in consideration.

Moreover, from the graph figure 3, it can be inferred that the majority of the heads of households considered in this research are illiterate (63. 43%), followed by those with primary school and high school.

Other education levels, each taken alone with low proportion of less than 1%, are collected in one category: ‘Adult and informal education’. ‘Adult and informal education’ category includes basic education, adult education, and informal education and others. Adult and informal education constitute the second largest category, and this group is used later as a base category in the regression in section 4.3

4.3 Regression results for correlates of poverty

To identify the correlates of poverty sequential (two-stage) regression has been carried out. The results of the two-stages (sequential regression) are presented in Table 10. These results are then compared with alternative methods of estimation used-Logit random effect regression and Logit Fixed effect regression, both presented in Table 11

4.3.1 Results of sequential regression

In the first stage of the sequential regression in Table 10, the statistically significant variables are dependency ratio (significant at 1%), age of household head (significant at 1%),illiterate dummy (significant at 5%), and square of the age of household (significant at 1%).

Dependency ratio is positively related with the probability of a household being poor, as the positive coefficient of dependency in Table 10. That is, the higher the dependency ratio, the higher the probability that the household will be poor, other things held constant.

The age of household head is negatively related to the probability of household being poor. That is, the older the head of households is , the lower probability of being poor. But the positive coefficient on the agehhead2 **(age of head squared**) implies that the chance of poverty decreases for a given household as the age of the head increases , but poverty increases , beyond some age, for older household heads.

Regarding the **education dummies**, it has been earlier shown in description of variables (Table 1) that four categories of education levels are used, using adult and informal education as a base category. These four categories are illiterate, Primary School, High school, Certificate and above. Out of all the categories, only illiterate dummy is found statistically significant. The positive coefficient on illiterate dummy implies that households headed by illiterate are more likely to be poor, as compared to those that have adult and informal education (the base category). Other education categories , that is whether a household head has attained primary school, high school or above, has no impact on the incidence of poverty. Household size was not found significant either.

The second stage of the sequential regression, displayed in Table 10, shows that **dummies related with occupation of household** are significant factors. As it was shown in the description of variables, three categories of occupation dummies are used: Agriculture, Public Administration, and Trading activities, leaving one category (social services) to avoid dummy variable trap. Social services occupation is used as base category.

Hence, we can infer that households engaged in agriculture as occupation, as compared with those engaged in social services (the base group), have a higher probability of being poor. This has an important implication that engaging in agriculture in urban areas results in lower chance of escaping poverty. This finding coupled with the fact that the majority of the households under consideration are engaged in agriculture implies the need for attention on households engaged in agriculture. Households engaged in trading activities are less likely to be poor as compared with those engaged in social services (the base group). Besides, households hired in public administration work are also less likely to be poor as compared with those engaged in social services.

Although not statistically significant, engaging in non-agricultural business is associated with lower probability of being poor, while receiving any kind of assistance from any party is associated with higher probability of poverty but still not statistically significant. It is puzzling why those households who receive assistance (a finding consistently found in other methods too) are more likely to be poor than those who don’t. It could be due to the dependency syndrome that assistance creates, as it may discourage individuals to look for jobs, and once the assistance ceases to be given, the individuals may fall back into poverty.

Table 10. Results of sequential regression (Method I)

First stage regression results(syntax-Xtseqreg, first)	
Household size	.002 (.005)
Dependency Ratio	.045*** (.014)
Gender dummy (Female=1)	.003 (.0195)
Age of household head	-.010*** (.003)
Illiterate dummy	.071** (.0298)
Primary school dummy	-.0432 (.0396)
High school dummy	-.0178 (.041)
Certificate and above dummy	-.016 (.057)
Age of household head squared	.0001*** (.00003)
Second stage regression results	
Agriculture occupation	.018*** (.003)
Trading occupation (dummy)	-.012* (.005)
Public administration occupation (dummy)	-.034*** (.009)
Owned non-agricultural business (dummy)	-.006 (.003)
Received assistance (dummy)	.007 (.009)

Notes. Standard errors are reported in parenthesis
*, **, *** indicates significance at the 10%, 5%, and 1% significance level, respectively

4.3.2. Comparison of findings in different estimation methods

The findings from the sequential regression reported earlier are now compared with two other alternative ways of estimation: Logit random effect regression and Logit Fixed effect regression. This was found important to check the consistency of the finding if alternative methods are used. Accordingly, the following analysis compares the findings of the three methods.

- **Dependency ratio of a household**

  Dependency ratio of a household is found statistically significant in all the three methods. Dependency ratio is found in all the three methods to be positively significantly associated with the probability of being poor. The higher the dependency rate, the higher the probability of a household being poor. As dependency rate increases by one unit, the probability of a household being poor increases by around 0.26 (as the marginal effect reported in Table 11 shows).

- **Age of household head and the square of age of head of household**

  The age and the square of age of household are both statistically significant in all the three methods. Besides, the variable age squared is statistically significant and indicates that the relationship between the probability of being poor and age is not linear. The negative coefficient for age and the positive one for age squared indicate a monotonic decreasing function of probability of a household being poor by age until a turning point is reached, after which point the function starts to increase. That is, age has a negative effect on probability of being poor on an early age, but it has the effect of increasing the probability of falling into poverty as head of household gets older.

- **Education level of household head**

As it has been shown in description of variables, four categories of education levels are used, using adult and informal education as a base category. These four categories are illiterate, Primary School, High school, Certificate and above

It has been indicated earlier (in section 4.3.1) that in the sequential regression, dummies related with education of household head, except whether the household is illiterate or not, are not significant factors. The same conclusion is reached from Logit random effect regression (Table 11) that whether a household is headed by an illiterate or not is a significant variable, not his/her school level. The result that school level of household beyond basic literacy level is not a significant factor runs counter to the accepted notion that more education helps in reducing the chance of household being poor.

In both sequential regression and Logit random effect regression, an illiterate household has a higher probability of being poor, as compared to literate households. Households headed by illiterate person have 44.7 percentage points higher chance of being poor (marginal effect is 0.447) as compared to those households with adult and informal education, as shown in Logit random effect regression (Table 11). This implies that illiterate households are more likely to be poor than those with adult and informal education, the comparison group.

Logit fixed effect regression, drops all time invariant variables: gender and dummies related with school (illiterate, primary school, high school, certificate and above), and dummies for occupation of household head (agriculture, trading activities and public administration).

- **Occupation of household head**

As shown in the description of variables earlier, three categories of occupation dummies are used: Agriculture, Public Administration, and Trading activities, leaving one category (social services) to avoid dummy variable trap. Social services occupation is used as base category.

The results of Logit random effect regression indicates that dummy variables related with occupation of head are not significant at the common significance levels (1,5 and 10%). But as it has been shown earlier, in section 4.3.1, the sequential regression revealed that dummies related with occupation of household are significant factors. So here there is a difference in finding in both methods, and since sequential regression is the primary tool of analysis used, the implications derived from it are used as a conclusion. In the sequential regression, it was found that households engaged in agriculture as occupation, as compared with those engaged in social services (the base group), have a higher probability of being poor. Households engaged in trading activities are less likely to be poor as compared with those engaged in social services (the base group).

Moreover, households hired in public administration work are also less likely to be poor as compared with those engaged in social services.

- **Household size**

Household size is found to be not statistically significant in all methods. Although it was not found statistically significant, one more member of a household increases the probability of a household being poor by around 2 percentage points (marginal effect is 0.0192 as Table 11 shows)

- **Gender of head of household**

While gender of household head was not statistically significant methods, the relationship is consistently positive in both the sequential regression and Random Effect Logit regression. Fixed Effect Logit dropped gender of household, as it is time invariant.

In both Random Effect Logit regression and sequential regression, Female headed household are found to have a higher probability of falling into poverty. Female headed households are more likely to be poor, as compared to male headed households, by about 5.9 percentage points (marginal effect is 0.0589).

- **Ownership of non-agriculture business**

Whether a household owns non-agricultural business was not found to be significant factor in all the three methods. This implies that whether a household owns a business or not has no impact on the chance of escaping poverty.

- **Assistance to households**

Logit random effect regression indicated that households who receive any kind of assistance whether from government or any other source are found to be more likely to be poor than those that don't by about 20 percentage about points (marginal effect of 0.195) . This may be due to the sense of dependency created due to assistance. The same result is also found in sequential regression.

Table 11.Results of Sequential regression, Logit random effect regression and Logit Fixed effect

	Method I. Sequential regression	Method II. Logit random effect regression		Method III. Logit Fixed effect regression	
Variable	Coef.	Coef	Marginal Eff	Coef	Marginal Effect
Household size	002 (.005)	0.019 (0.040)	0.0192	0.0179 (0.039)	.0179
Dependency Ratio	.045*** (.014)	0.263** (0.108)	0.2635	0.2626* (0.107)	.2626
Gender dummy (Female=1)	.003 (.0195)	0.059 (0.174)	0.0589		
Age of Household head	-.010*** (.003)	-0.069*** (0.026)	-0.0689	-0.073** (0.025)	-.0737
Age of household head squared	.0001*** (.00003	0.0007*** (0.001)	0.0007	0.0008*** (0.000)	.0008
Illiterate dummy	.071** (.0298)	0.447* (0.235)	0.4473		
Primary School dummy	-.0432 (.0396)	-0.273 (0.328)	-0.2731		
High School dummy	-.0178 (.041)	-0.184 (0.340)	-0.1842		
Certificate and above dummy	-.016 (.057)	-0.041 (0.487)	0.2710		
Agriculture occupation dummy	.018*** (.003)	0.271 (0.181)	-0.3191		
Trading occupation dummy	-.012* (.005)	-0.319 (0.323)	-0.7940		
Public administration occupation dummy	-.034*** (.009)	-0.794 (0.667)	-0.2500		
Owned non-agricultural business=1	-.006 (.003)	-0.250 (0.204)	0.1949		
Received assistance =1	.007 (.009)	0.195 (0.481)	0 .1949		

Notes. 1.Standard errors are reported in parenthesis
2.*, **, *** indicates significance at the 10%, 5%, and 1% significance level, respectively
3. Marginal effect is dy/dx with respect to the variable of interest
4. .Dependent variable is poor= the probability of a household being poor

To conclude this section, similar findings are found in all the three methods, except regarding whether dummies related with occupation are significant where the sequential regression shows that dummies related with occupation of household are significant factors, while these variables were not found significant in Logit random effect regression. Accordingly, in all the three methods, dependency ratio, age of household head and the square of age of head of household are found to be associated with poverty of households, while the rest of the variables (household size, the gender of head of household, ownership of non-agriculture business and assistance to households) are not found statistically significant. In the sequential regression, however, unlike Logit random effect regression, dummies related with occupation of household are significant factors. It was found that households engaged in agriculture as occupation, as compared with those engaged in social services (the base group) have a higher probability of being poor. Households engaged in trading activities are less likely to be poor as compared with those engaged in social services (the base group). Households hired in public administration work are also less likely to be poor as compared with those engaged in social services

4.4. Capturing the poverty dynamics

4.4.1 Transition matrix of poverty

Before presenting the determinants of shifting from and into poverty, a look at transition dynamics reveals important facts about the proportion of people moving into and out of poverty.

Table 12 reveals that out of all household who were poor in wave 2 (2013/14), the majority (66.67%) escaped poverty, but still a significant portion, one third (33.33%) remained trapped in poverty

Of all households who were not poor in wave 2 (2013/14), the majority (89.53%) remained in non-poor status but about one tenth (10.47%) fell into poverty

So it can be concluded that there is a significant shift of household into and out of poverty, and that once a household is out of poverty, there is a significance chance that it may slip back to poverty.

Moreover, although there is a persistence of non-poverty status, as the majority (89.53%) remained in the non-poverty status in both waves, there is a significant shift from poor status to non-poor status (66.7%) of those who were poor in wave 2 escaped poverty in wave 3), an encouraging sign of progress towards poverty reduction.

But there is a persistence of poverty, as one third (33.3%) of the households remained trapped in the poverty in that they were poor in both waves.

Table 12.Transition matrix showing getting out of /falling into poverty;

Source – *Researcher's computation from ESS data*

To wave 3

From wave 2

Poor=1	**0**	**1**	**Total**
0	**89.53 %**	**10.47 %**	100%
1	**66.67 %**	**33.33 %**	100%
	83.35%	16.65%	100

Another approach of understanding the poverty dynamics is by classifying the households depending on whether they moved out of or into poverty, or remained the same. Accordingly, four poverty categories are identified: Never poor, Backward movers (moved from non-poor status to poor status), forward movers (moved from poor status to not poor), and Chronically poor (stayed poor in both waves. The terminology of these categories are adopted from the recent research by Kafle et al (2016). These categories are also used later in multinomial logistic regression

As figure 4 indicates, the majority group is 'never poor' category, followed by forward movers. Backward movers and the chronically poor, both of which need serious attention for the purposes of policy intervention, constitute relatively lower proportion but together constitute sizable portion (16.66%). Chronically poor constitute still significant proportion, implying poverty persistence of households.

Backwards movers, which are another group that need serious attention for policy intervention, are still not a small proportion (7.64%).

4.4.2 Multinomial logistic regression-the determinants of the dynamics of poverty

Finding out which variables are responsible for a household to move out of or into poverty is very crucial so as to understand the dynamics of poverty, and select the policy intervention that effectively targets to help households escape poverty, or prevent them from sliding back to poverty.

In Tables 13.1 and 13.2, a Multinomial Logistic regression results are shown, with forward movers as base category, for three categories: Never poor, Backward movers (moved from non-poor status to poor status), and Chronically poor (stayed poor in both waves)

i) Chronic poor category

As shown in Table 13.1, the variables which were found significant for the relative odds of a household staying chronic poor, rather than be forward movers (move out of poverty) are **dependency ratio** (positive effect , significant at 5% significance level), **age of household head** (positive effect , significant at 10% significance level), **owning non agribusiness** (negative effect, significant at 10% significance level) .

The coefficients in Table 13.1 show **the relative log odds** of a category as compared to base category. Hence, a one unit increase in the dependency ratio is associated with a 0.29 increase in the relative log odds of being chronic poor versus forward movers. Besides, one year increase in the age of the household head is associated with a 0.06 increase in the relative log odds of being chronic poor versus forward movers. Moreover, those that own some kind of non agricultural business show 0.51 decreases in the relative log odds of being chronic poor versus forward movers (move of poverty). Other variables are not statistically significant in either of the conventional significance levels

As revealed in Table 13.2, **in terms of relative probability**, a one unit increase in dependency ratio increases the relative probability of being chronic poor rather than being forward movers by 35% (Relative Risk Ratio, RRR, of 1.35). The relative probability of being chronic poor rather than being forward movers is 6 percent higher for one year older households (RRR of 1.065).Those that own non-agricultural business have 32% (RRR of 0.68) lower relative probability of being chronic poor , as compared to forward movers.

Therefore, dependency ratio has the tendency to increase the (relative) probability of a household being chronically poor (rather than moving out of poverty), while owning nonagricultural business decreases it. Older households have a higher probability of being trapped in poverty (chronically poor), rather than be forward movers.

ii. Backward movers

The only variable which was found significant for the relative odds of a household staying backward movers, rather than be forward movers (move out of poverty) is whether as household own non-agricultural business (negative effect at 5% significance level)

Those that own non-agricultural business have 46% (RRR of 0.54) lower relative probability of being backward movers, as shown in table 13.2. Here also, owning non agricultural business decreases the chance of being backward movers, that is slipping back to poverty, as compared to forward movers.

iii) Never poor category

The variables which was found significant for never poor category are dependency ratio (negative effect, at 10% significance level) whether a household owns non-agricultural business (positive effect at 1% significance level) and age of household head (positive effect at 1% significance level)

A one unit increase in dependency ratio decreases the probability of being never poor by 17% (RRR of 0.83). Those that own non-agricultural business have 68.9% (RRR of 1.689) higher relative probability of being never poor in both waves, as compared to forward movers. One year older household heads have 9 percent higher relative probability of being never poor (RRR of 1.099) , rather than be forward movers.

Table 13.1 Multinomial Logistic regression results- relative odds

	Chronically poor	**Backward movers**	**Never poor**	**forward movers**
Household size	0.037 (-0.051)	0.002 (-0.055)	0.0062 (-0.035)	**base/reference category**
Dependency Ratio	0.299** (-0.123)	-0.077 (-0.152)	-0.187* (-0.097)	
Gender dummy (Female=1)	0.181 (-0.227)	0.022 (-0.235)	-0.003 (-0.148)	
Age of household head	0.063* (-0.034)	0.041 (-0.035)	0.095*** (-0.022)	
Illiterate dummy	0.15 (-0.324)	-0.32 (-0.314)	-0.264 (-0.212)	
Primary school dummy	-1.02 (-0.623)	0.165 (-0.437)	0.396 (-0.301)	
High School dummy	-0.307 (-0.487)	-0.631 (-0.487)	-0.119 (-0.293)	
Certificate and above dummy	-0.331 (-0.679)	-0.31 (-0.673)	-0.153 (-0.409)	
Agriculture dummy (occupation dummy)	-0.352 (-0.237)	-0.003 (-0.256)	-0.198 (-0.16)	
Trading (occupation dummy)	-0.076 (0.479	0.55 (-0.441)	0.455 (-0.308)	
Public administration(occupation dummy)	0.251 (-0.786)	-14.733 (-1173.995)	0.179 (-0.524)	
Owned non-agricultural business (dummy)	-0.516* (-0.27)	-0.548 (0.282)*	1.524* (-0.195)	
Received assistance (dummy)	0.26 (-0.528)	-15.507 (-1161.373)	-0.495 (-0.409)	
Age of household head squared	-0.0006 (-0.0003)	-0.0004 -0.0003	-0.001 -0.0002	

Notes .Standard errors are reported in parenthesis

*, **, *** indicates significance at the 10%, 5%, and 1% significance level, respectively

'Forward movers' category is used as base/reference category

Table 13.2 Multinomial Logistic regression results -Relative probability (Relative risk ratio, RRR)

	Chronically poor	**Backward movers**	**Never poor**	**forward movers**
Household size	1.038 (0 .052)	1.002 (0.056)	1.006 (0.036)	**base/reference category**
Dependency Ratio	1.350 (0.166)	0.925 (0.141)	0.829 (0.080)	
Gender dummy (Female=1)	1.199 (0.273)	1.023 (0.241)	0.997 (0.148)	
Age of household head	1.065 (0.037)	0.718 (0.037	1.100 (0.025)	
Illiterate dummy	1.162 (0.377)	0.726 (0.228)	0.768 (0.163)	
Primary school dummy	0.360 (0.224)	1.180 (0.516)	1.487 (0.448)	
High School dummy	0.735 (0.358)	0.532 (0.259)	0.887 (0.261)	
Certificate and above dummy	0.718 (0.488)	0.733 (0.494)	0.858 (0.351)	
Agriculture dummy (occupation dummy)	0.703 (0.167)	0.997 (0.256)	0.820 (0.131)	
Trading (occupation dummy)	0.926 (0.444)	1.734 (0.766)	1.577 (0.486)	
Public administration (occupation dummy)	1.286 (1.011)	0.000 (0.000)	1.196 (0.628)	
Owned non-agricultural business (dummy)	0.676 (0.453)	0.731 (0.489)	1.689 (0.330)	
Received assistance (dummy)	1.297 (0.685)	0.000 (0.000)	0.609 (0.250)	
Age of household head squared	0.999 (0.000)	1.000 (0.000)	0.999 (0.00	

*Standard errors are reported in parenthesis

Chapter 5. Conclusion and Policy Implication

The regression result show that dependency ratio, age of household head and the square of age of head of household, and whether a household is illiterate or not are found statistically significant factors affecting the likelihood that a household is poor. This finding was consistently found both in the sequential (two-step) regression and alternative methods of estimation (random effect logit and fixed effect logit). So there was a consistency of the major findings in all the three estimation methods with regards to which factors are significant.

Accordingly, dependency ratio is found in all the three methods to be positively significantly related with the probability of being poor. That is, the higher the dependency ratio, the higher the probability that a household is poor. Moreover, the multinomial regression results also show that dependency ratio has the tendency to increase the (relative) probability of a household being chronically poor, as compared to those move out of poverty. Since dependency ratio is the ratio of the number of dependent household members (ages 0 to 14 and above 65) to those typically in the labor force (the productive members, ages 15 to 64), one way to decrease dependency ratio is to use family planning so that the number of dependents in a household decreases. Some kind of support to the elderly (65 years and above) like elderly care homes established by government or other actors can also ease the burden of the household, reducing dependency ratio and hence the poverty of the given household.

Whether a household is headed by an illiterate or not is a significant variable affecting poverty, not his/her school level. An illiterate household has a higher probability of being poor, as compared to those households with adult and informal education. Households headed by illiterate person have 44.7 percentage points higher chance of being poor than the comparison group, households with adult and informal education. Therefore, government need to design polices and incentive for head of household to get into adult and literacy programs. Literacy campaigns targeted at the head of households will make the poor households able to be involved in the economic system, ensuring inclusive growth, rather than being trapped in a vicious cycle of poverty.

A multinomial logistic regression undertaken to capture the probability of moving into and out of chronic poverty showed that ownership of nonagricultural business has the tendency to decrease the (relative) probability of a household being chronically poor (as compared to being forward movers). Therefore, owning non-agricultural business has a significant positive impact to make households move out of poverty, and avoid slipping back to poverty. So the government needs to design appropriate entrepreneurial-oriented economic policies and incentive packages that support households to start up businesses. By creating favorable environment for households to start up business, and by supporting, financially or technically, those that already own business will help mitigate poverty, and prevent households from falling back to the vicious cycle of poverty.

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