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The Effect of Non-Farm Employment on Multidimensional Poverty in Rural Ethiopia

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MULUGETA ABENEH

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Examiner	*Signature*

DECLARATION

I, the undersigned, declare that the thesis comprises my own work. In compliance with internationally accepted practices, I have duly acknowledged and referenced all materials used in this work. I understand that non-adherence to the principles of academic honesty and integrity, misrepresentation/fabrication of any idea/data/fact/source will constitute sufficient ground for disciplinary action by the University and can also evoke penal action from the sources which have not been properly cited or acknowledged.

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Mulugeta Abeneh

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MulugetaAbeneh

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Acronym

CSA Central Statistics Agency

ESS Ethiopia Socio Economic Survey

FGT Foster Greer Thorbecke

HICES Household Income Consumption Expenditure Survey

MDIG Millennium Development Goal

MPI Multidimensional Poverty

OPHI Oxford Poverty & Human Development Initiative

RNFE Rural Non-Farm Employment

UNDP United Nation Development Program

WBG World Bank Group

Abstract

The major objective of this study is to analyze the effect of non-farm employment on multidimensional poverty in rural Ethiopia using balanced panel data from ESS2013/14 and 2015/16. The study employed Alkire and Foster poverty model and probit regression model. Ten indicators of multidimensional poverty are categorized in three dimensions of multidimensional poverty. Results reveal that the incidence of multidimensional poverty among the rural households of Ethiopia isreducing from 94.9percent in 2013/14 to 92.5% in 2015/16,and average deprivations of indicators and the adjusted multidimensional poverty reduced from 50.2% and 49.5%in 2013/14 to 49.7% and 47.4% in 2015/16 respectively. From the three dimensions, standard of livingwas the highest contributor to the multidimensional poverty index of rural Ethiopia with share of 43.8 percent followed by health dimension at 34.2 percent. On the other hand,thepercentage of rural households thatengaged innon-farm employment increase from 28.9% in 2013/14 to 31.3% in 2015/16. The result of the probit regression shows that non-farm employment has asignificant effect on multidimensional poverty status.Non-farm employment activities reduce the likelihood of the rural household being multidimensionally poor on average by 0.032.It is recommended that the government should implement policies that promote non-farm employment, and increase credit access for rural households.

Key words: Non-farm employment, Multidimensional poverty, Probit model, Rural Ethiopia

CHAPTER 1: INTRODUCTION

1.1.Background of the Study

People struggle with poverty around the world. Half of the world's 736 million extremely poor people lived in just 5 countries in India, Nigeria, Democratic Republic of Congo, Ethiopia, and Bangladesh. 1.5 billion People are multi-dimensionally poor in 91 developing countries, and, in total, 2.2 billion people are estimated to live in multidimensional poverty or near-poverty. World Bank (2019) shows that 85% of the world's poor live in South Asia and Sub-Saharan Africa.According to the Human Development Report (2019), 1.2 billion people have an income of $1.25 or less a day and 2.7 billion live on less than $2.50 a day, in 104 developing countries. Poverty in Sub-Sahara Africa has been a predominant challenge.A lot of countries in Sub-Saharan Africa have been addressing the basic capabilities or the extreme deprivations. Even though the basic level has raised in the developing world, but the gap between very low human development and very high human development countries is very significant.

Poor people in rural areas tend to have deprivations in both education and access to water, sanitation, electricity and housing. Sub-Saharan Africa has the most overlapping multidimensional deprivations with more than half the populations of Burundi, Somalia and South Sudan experiencing severe multidimensional poverty, with 50% or more of overlapping deprivations(UN, 2019).

According to the recent household consumption expenditure survey report, between 2010/11 and 2015/16 about 5.3 million people are lifted out of poverty in Ethiopia. Poverty gap and poverty severity indices have respectively declined from 10.1 percent and 3.9 percent in 2000 to 3.7 percent and 1.4 percent in 2016 respectively. Nonetheless, poverty is still a challenge in Ethiopia as over 22 million people are living below the national poverty line. Poverty is predominantly rural phenomenon in Ethiopia. While urban headcount poverty declined from 36.9 percent in 2000 to 14.8 percent in 2016, rural poverty only declined from 45.4 percent to 25.6 percent in the same period(UNDP, 2018).

According to Goshu (2015), 35% and 25% of Ethiopians were multidimensionally-poor in 2004 and 2009 respectively. Child mortality contributed more for the decrease in the breadth

of poverty. Moreover, the decrease in asset deprivation contributed the largest for the decrease in MPI across the two periods. The use of country-specific indicators such as land holding and crop stored for agrarian economy are more likely to identify poor people than indicators used in internationally comparable MPI estimation. By comparison, Uganda, Kenya and Rwanda and Ethiopia have MPIs of 0.367, 0.229, 0.426 and 0.489 respectively.

This suggests that the poor in Ethiopia suffer from a larger number of depravations compared to others in Eastern Africa Countries. It may also suggest that social services that improve living standards are more available to the poor in other countries of Eastern Africa compared to Ethiopia.A recent report revealed that investments in improving nutrition and access to safe water have helped to reduce Ethiopia's MPI (Alkire et al, 2010). On the other hand, UNDP (2019) finds that MPI value of Ethiopia in 2016 was 0.489, of which 19.7% was contributed by thehealthdimension, 29.4%byeducation and 50.8% bystandard of living.

Therefore different poverty coping mechanisim should bee used. Engaging in non-farm employment is one way to escape from rural poverty. Rural non-farm employment(RNFE) activities include value chain activities, such as agro processing, transport, distribution, marketing, and retail, as well as tourism, manufacturing, construction and mining, plus self-employment activities (handicrafts, bakeries, mechanics, kiosks, and so on).

According to Reardo (2016), in developing countries households are motivated to undertake RNF activity by either "pull" or "push" factors. When opting to undertake RNF activities, farm households may be motivated by: "pull" factors, such as better returns in the non-farm sector relative to the farm sector; and "push" factors, which include an inadequate farm output, resulting either from temporary events (e.g. a drought) or longer term problems (e.g. land constraints); incomplete crop insurance and consumption credit markets (to use as ex post measures for harvest shortfalls); the risks of farming, which induce households to manage income and consumption uncertainties by diversifying and undertaking activities with returns that have a low or negative correlation with those of farming; an absence or failure of farm input markets or input credit markets, compelling households to pay for farm inputs with their own cash resources.

World Bank(2017) finds that rural nonfarm activities, accounting for35 percent to 50 percent of rural income in developing countries, and an important part of rural poor households' complex income strategies. For the landless and the very poor, who are often employed as farm laborers, sustainable income gains at the household level are generally associated with additional wages earned from rural nonfarm employment opportunities. However, households that rely solely on farm labor tend to be among the poorest. In rural areas, agricultural workers are more than four times more likely to be poor compared with people employed in other sectors.

Yacob(2017) finds that participation in non-farm work significantly increases the future expected food consumption, thereby alleviating the vulnerability of households to food poverty. Healso confirms that current food poverty and future food poverty, i.e., vulnerability to food poverty, are not independent from each other. Nonfarm work plays a crucial role in providing the means to overcome the risk of food poverty in these resource poor households. On the other hand, Adem (2018) finds that in Ethiopia, 83% of small-holder farmers participated in farming activities and from those farmers only27% were engaged in non-farm economic enterprises; and non-farm employment provides additional income that enables farmers to spend more on their basic needs include food, education, cloth and health care services.

According to Alaina(2018), without non-farm employment, rural poverty would be much higher and deeper, and that income inequality would be higher as well. Berhane(2015) finds thatnon-farm income has a positive impact on rural household's welfare in Ethiopia. Non-farm employment provides additional income that enables farmers to spend more on their basic needs include: food, education, closing and health care (Ana Damena, 2017). And it leads to a possibility that knowledge sharing with in a household is a cause of educational selectivity of non-farm family labor supply (Yang, 1997). It is the most important income source of middle income farms; it lifts poor households out of poverty and is found to be an important catalyst that helps smooth income inequality in rural regions, and then RNFE is a potential pathway out of poverty for their rural poor (Haggblade, 2010, Iqbal, 2018, and Escobar, 2002).

Therefore, livelihood diversifications on NFE are one way of coping mechanism from poverty. And the purpose of this paper was to show the effects of non-farm employment on multidimensional poverty in rural Ethiopia.

1.2. Statement of the problem

Even though poverty reduced by about 93% from 2000 to 2016, still it is challenged in Ethiopia as over 22 million people are living below the national poverty line. The 2015/16 HICE survey shows that the poverty head count index, which measures the proportion of population below the poverty line in Ethiopia, is estimated to be 23.5% in 2015/16, with marked differences between urban (14.8%) and rural (25.6%) of the country. The poverty gap index that measures the average poverty gap in the population as a proportion of the poverty line is also estimated to be 6.7%. By this measure of poverty depth the rural poverty gap (7.4%) is also a little more than twice the urban poverty gap (3.6%). Moreover, the national poverty severity index is found to be 2.8 % with rural poverty severity index (3.1%) being considerably higher than that of urban areas (1.4%).Also multidimensional poverty is high in Ethiopia. Over 86% of Ethiopian households are multi-dimensionally poor (UNDP, 2018).

Therefore this needs a query for means to escape from poverty. Engagement on rural non-farm activity could reduce poverty in rural Ethiopia. According to Wan et al.(2016), RNFE could help rural households to reduce poverty. Rural non-farm economic activities are getting wide spread recognition in most of the developing countries due to increasing inability of farm sector to provide employment and reasonable livelihood to rural households (Parveen, 2018).Non-farm income contributes to higher food production and farm income by easing capital constraints, thus improving household welfare in multiple ways (Qaim, 2010). So, greater non-farm income helps to improving food consumption patterns and dietary diversity (Mishra, 2017). Non-farm employment can open an opportunity to provide for enhanced child's long-term nutritional status. Women's time in non-farm employment, although affecting house sanitation/hygiene (Mwadime, 1996).

Similarly non-farm employment largely exhibit a favourable effect on income distribution and poverty redction; needs to address underlying factors that condition risk bearing ability of households; have temporal and consumption smoothing benefits, and can contribute a certain percentage to help poor households to escape from extern poverty in rural Ethiopia (Bezabihet.al.,2010;Woinishet,2010;Zerihun,2016;Berhane,2015;Kassieet.al.,2017;Mekore,2018 & Kowalski,2016).

Previous Studies regarding he effect of RNFE on poverty focused on the unidimensional approach. For example, Alain et al. (2005) show that non-farm employment has a positive spillover effect on household farm production in China. Steven (2011) suggests that RNFE has a potential pathway out of poverty for rural poor households. Mollerset.al. (2011) find the positive effects of non-farm employment on rural livelihood by using FGT poverty measures in Croatia. Muhamedetal. (2018) find that non-farm income supports poverty reduction in Pakistan. Even though there are different studies that show the effects of non-farm employment on the reduction of poverty in money measures, there is no studies conducted that show the effects of non-farm employment on multidimensional poverty in rural Ethiopia. Monetary and multidimensional poverty are distinct constructs that are linked, but cannot serve as a proxy for one another. The monetary poor or non-poor households are not always multidimensional poor or non-poor, or who are poor according to monetary poverty measures are not always multidimensionally poor, and there is no clear-cut link between aggregate income and multidimensional poverty (Alkire et.al, 2015; Nicolai,2016; K. Roelen,2017).

Even if almost all the above studies show that non-farm employments have negative effect on the monetary measure of poverty, it does not mean that non-farm employments also affect multidimensional poverty negatively. So the current study was tried to fill the gap by examining the effects of non-farm employments on multidimensionalpoverty in rural Ethiopia.

Therefore,this study analyzed the effect of non-farm employment on multidimensional poverty by using 2013/14 and 2015/16 Ethiopian socio-economic survey data. And it answerd the following research questions:What is the multidimensional poverty statuses of rural households of Ethiopia? What is the stutas of non-farm employment in rural

households of Ethiopia?What is the effects of non-farm employment on multidimensional poverty in rural Ethiopia?

1.3. Objectives of the Studies

The aim of this paper was to analyze the effect of non-farm employment on multidimensional poverty in rural Ethiopia. Specifically, it aims:

i. To measure multidimensional poverty status in rural Ethiopia
ii. To examain the statuses of non-farm employment in rural Ethiopia.
iii. To analyze the effects of non-farm employment on multidimensional poverty status of rural households of Ethiopia.

1.4.Significance of the study

The results provide insights for the quest poverty status of the households in Ethiopia. The study will also serve further studies in this area and provide with a better insight and tool for donors and fiscal policy makers through giving idea, figure and data in their aspiration effort towards achieving sustainable growth and development. In addition, this study will fill the existing knowledge gap by including the effects of non-farm employment on multidimensional poverty in Ethiopia.

1.5. Limitation of the study

Because of limited information in the first wave we use only the two wave panel data.

1.6. Organization of the study

2. The rest of the paper is organized as follows: The next chapter, Chapter, 2 discusses the literature review. Chapter 3 discusses Methodology of the study, data type, data analysis, model specification and diagnostic test. Chapter 4 presents result and desiccation and. Chapter 5 contain concludes, recommendation, a methodological annex outlines and discusses the data sources

CHAPTER 2: LITERATURE REVIEW

2.1.1. Definition and Concepts of Rural Non-Farm Employment

For this paper, the terms non-farm, and non- agricultural activities are the same and defined as non-farm. The rural non-farm economy (RNFE) defined as comprising all those activities associated with waged work or self-employment in income generating activities (including income in-kind) that are not agricultural but which generate income (including remittances etc.) in rural areas. Thus, all secondary (including manufacturing, processing, construction) and tertiary (including transport, trade, finance, rent, services) sectors are non-farm (Development, Non-Farm Income in Rural Areas, 2002).

Although agriculture has traditionally accounted for a large share of rural household income over 80 percent of all rural households farm to some extent empirical evidence points toward the existence of a large and growing RNFE. Rural nonfarm activities, accounting for35 percent to 50 percent of rural income in developing countries, are an important part of rural poor households' complex income strategies. For the landless and the very poor, who are often employed as farm laborers, sustainable income gains at the household level are generally associated with additional wages earned from rural nonfarm employment opportunities. However, households that rely solely on farm labor tend to be among the poorest. In rural areas, agricultural workers are more than four times more likely to be poor compared with people employed in other sectors (Worldbank, 2017).

2.1.2. Definition and Measurement of Poverty

Poverty is defined as a failure to reach some absolute level of capability (Sen A. , 1983). The definition of poverty adopted over time has reflected a shift in thinking from a focus on monetary aspects to wider issues such as political participation and social exclusion. Poverty has historical definition, contemporary economists' definitions and contemporary institutions' definitions. From the historic definition of poverty, Adam Smith defined poverty as "the inability to purchase necessities required by nature and customs" (Sanchez, 2014).

According to United Nations (1998), poverty is a denial of choices and opportunities, a violation of human dignity. It means lack of basic capacity to participate effectively in society; not having enough to feed and clothe a family, not having a school or clinic to go to; not having the land on which to grow one's food or a job to earn one's living, not having

access to credit. It means insecurity, powerlessness and exclusion of individuals, households and communities. It means susceptibility to violence, and it often implies living on marginal or fragile environments, without access to clean water or sanitation. The recent literature defined poverty as multidimensional concept that seeks to measure levels of deprivation encountered by a person, household or community (Institiut, 2016).

There are two approaches to measuring poverty which are the monetary approach and the non-monetary approach. The monetary approach includes income and expenditure wills the non- monetary approach include the direct measure and the subjective measure. And poverty is can be unidimensional or multidimensional. The unidimensional poverty measure emphasizes on the poverty line and number of poor's. It uses headcount ratio, poverty gap and squared poverty gap to measure the extent of poverty. While the multidimensional poverty measures emphasize on the non-monetary poverty such as poverty on education, health and standard of living.

2.1.2.1. Unidimensional Measures of Poverty

According to Sen (1976), in the measurement of poverty two distinct problems must be faced, viz., (i) identifying the poor among the total population, and (ii) constructing an index of poverty using the available information on the poor. The most common procedure for handling the second problems seems to be simply to count the number of the poor and check the percentage of the total population belonging to this category. This ratio, which we shall call the head-count ratio H, is obviously a very crude index. An unchanged if number of people below the "poverty line" may go with a sharp rise in the extent of the short-fall of income from the poverty line. The measure is also completely insensitive to the distribution of income among the poor. A pure transfer of income from the poorest poor to those who are better off will either keep H unchanged, or make it go down surely a perverse response.

According to (Foster, 2010) the unidimensional poverty measures described in the following way

$$p_\alpha = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{Z - Y_i}{Z}\right)^\alpha$$

Where Z is the poverty line, Y_i is the i^{th} lowest income (or other standard of living indicator) N is the total population, q is the number of persons who are poor, and $\alpha \geq 0$ is a "poverty aversion" parameter. We recognized at the time that the class has certain advantages. The head count index (P_0) measures the proportion of the population that is poor. But it does not indicate how poor the poor are; the poverty gap index (P_1) 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, and the squared poverty gap ("poverty severity") index (P_2) averages the squares of the poverty gaps relative to the poverty line.

2.1.2.2. Multidimensional Measures of Poverty

Income or consumption expenditure is traditionally uni-dimensional measure of poverty. In the uni-dimensional analysis, a basket of goods and services considered the minimum requirement to live a non-impoverished life is valued at the current prices. People who do not have an income sufficient to cover that basket are deemed poor. Uni-dimensional poverty certainly provides very useful information. Yet poor people themselves define their poverty much more broadly to include lack of education, health, housing, empowerment, employment, personal security and more. So multi-dimensional measure of poverty is uniquely able to capture the multiple aspects that contribute to poverty (Santos, 2011)

According to UNDP (2019), the multidimensional poverty index (MPI) identifies multiple deprivations at the household and individual level in the tree dimension of poverty. These dimensions include: health, education and standard of living. The three dimension of multidimensional poverty have equal weight. The MPI have ten indicators which have the same weight in the same dimension. Education dimension have two indicators: those are school attendance and years of schooling. Health dimension have two indicators those are nutrition and child mortality. And standards of living have sex indicators: these are cooking fuel, toilet (sanitation), floor, drinking water, electric and asset.

The MPI reflects both the incidence of multidimensional deprivation (a headcount of those in multidimensional poverty) and its intensity (the average deprivation score experienced by poor people). It can be used to create a comprehensive picture of people living in poverty,

and permits comparisons both across countries, regions and the world and within countries by ethnic group, urban or rural location, as well as other key household and community characteristics. The MPI offers a valuable complement to income-based poverty measures (Xiaolin Wang, Hexia, Sabina Alkire, 2016).

The MPI has the mathematical structure of one member of a family of multidimensional poverty measures proposed by Alkire and Foster (2007, 2009). This member of that family is called M0 or Adjusted Headcount Ratio. M0 is the appropriate measure to be used whenever one or more of the dimensions to be considered are of ordinal nature, meaning that their values have no cardinal meaning.M0 measures poverty in d dimensions across a population of n individuals.

M_0 Measure poverty in D dimensions across a population of individuals. Let $y = \lfloor yij \rfloor$ denote NxD matrix of achievements for i person across j dimension. The typical achievement $[yi\text{j} \geq \text{o}]$ represents individual i achievement in dimension j. Each row vector $y_i = (y_{i1}, y_{i2}, y_{i3\ldots\ldots y_{iD}})$ gives individual i's achievements in the different dimensions, whereas each column vector.

$y_j = (y_{1j}, y_{2j}, y_{3j,\ldots\ldots y_{Nj}})$, Gives the distribution of achievements in dimension j across individuals. M_0Allow weighting each dimension differently. In fact, this is the procedure followed by the MPI, which has 'nested weights'. The element $W_j$represents the weight that is applied to dimension j. Note that$\sum_{j=1}^{D} w_j = D$, that is the dimensional weights sum to the total number of dimensions. In the case of the MPI, D =10 (Sabina Alkire and Maria Emma Santos, 2010/11).

2.1.3. Theories of Poverty

Deferent theory argues differently on the cause of poverty and anti-poverty strategy. These theories include: individual deficiencies, cultural belief systems that support, sub-cultures in poverty, political-economic distortion, geographical disparities and cumulative and circumstantial origins (Bradshaw).

Poverty caused by individual deficiencies theory of poverty is the large and multifaceted sets of explanations that focus on the individuals are responsible for their poverty situation.

Typically, politically conservative theoreticians blame individuals in poverty for creating their own poverty problem, and argue that with harder work and better choices the poor could have avoided their poverty problem. And it ascribes poverty to lack genetic qualities such as intelligence are not reversed easily. Cultural belief systems that support, sub-cultures in poverty theory is argued that poverty is created by the transmission over generations of a set of beliefs, values, and skills that socially generated but individually held. The poverty caused by economic, political, and social distortions or discrimination theory is known as a progressive social theory, which argue that in this tradition look not to the individual as a source of poverty, but to the economic, political, and social system which causes people to have limited opportunities and resources with which to achieve income and well-being. The theories of poverty caused by geographical disparities suggest that people, institutions, and cultures in certain areas lack the objective resources needed to generate well-being and income, and that they lack the power to claim redistribution. And the last poverty theory which is poverty caused by cumulative and cyclical interdependencies argued that an individual who lack resources to participate in the economy, which makes economic survival is harder for the community (Bradshaw).

The classical traditional view that individuals are responsible for their own intention, choosing in effect to become poor (e.g. by forming lone-parent families),and deficiencies may continue over time, owing for example to lack of appropriate role models, and that state aid should be limited to changing individual capabilities and attitudes(i.e. the laissez-faire tradition). But, the neoclassical theories are more wide ranging and recognize for poverty beyond individuals control. These include lack of social as well as private assets; market failures that exclude the poor from credit markets and cause certain adverse choices to be rational; barriers to education; immigrant status; poor health and advanced age; and barriers to employment for lone-parent families (E. Philip Davis and Miguel Sanchez-Martinez, 2015).

On the other hand Keynesian/Neoliberal adopts a money-centered, individual stance towards poverty. They argue the important functions of the government allows for a greater focus on public Goods And Inequality.

2.2. Link between Rural Non-Farm Employment and Poverty

Rural non-farm employment affect rural livelihood positively in three ways. It is the most important income source of middle income farms; it lifts poor households out of poverty and is found to be an important catalyst that helps smooth income inequality in rural regions, and the RNFE is a potential pathway out of poverty for their rural poor (Haggblade, 2010; Buchenriede,(2011; Iqbal, 2018, and Escobar, 2002). The other argues that without non-farm employment, rural poverty would be much higher and deeper, and that income inequality would be higher as well. Participation in non-farm activities has a positive spillover effect on household farm production (Janvry, 2005).

Non-farm employment provides additional income that enables farmers to spend more on their basic needs include: food, education, closing and health care (Ana Damena, 2017). And it leads to a possibility that knowledge sharing with in a household is a cause of educational selectivity of off-farm family labor supply, (Yang, 1997).

The Non-farm employment activities exert positive effects on household food consumption and nutrition (Seng, 2015). The prevalence of child stunting, underweight, and wasting is lower in households with non-farm income than in households without. Non-farm income contributes to higher food production and farm income by easing capital constraints, thus improving household welfare in multiple ways (Qaim, 2010). So, greater non-farm income helps to improving food consumption patterns and dietary diversity (Mishra, 2017). Non-farm employment can open an opportunity to provide for enhanced child's long-term nutritional status on nutrient intake and through purchased goods that improve housing quality. Women's time in non-farm employment, although affecting house sanitation/hygiene, does not have to compromise the nutritional status of children (Mwadime, 1996).

Non-farm employment affects the livelihood of the rural household positively, and it is an important catalyst that helps smooth income inequality in rural regions. RNFI affects the health of the household through food consumption and nutrition. If the household participate in non-farm employment the prevalence of child stunting, underweight, and wasting is lower. So, greater non-farm employment helps to improving food consumption patterns and dietary diversity, and it can open an opportunity to provide for enhanced child's long-term nutritional

status. Similarly Samuel and et.al (2018) emphasizes that households that participate in non-farm economic activity earns higher income and expend more on health care.

On the other hand, non- farm employment affect multidimensional poverty by affecting expenditure on education and standard of living. RNFE affect the standard of living through the total income and purchased goods hat improve housing quality. Women's time in non-farm employment, although affecting house sanitation/hygiene, does not have to compromise the nutritional status of children (Mwadime, 1996).

2.3.Empirical Literature Review

There are extensive studies on the effects of non-farm employment on unidimensional poverty. These literatures focused on the unidimensional measures of poverty even though; they were use different models by different researchers in different countries. But, their findings were almost similar. This shows that non-farm employments have a positive effect on the reduction of poverty. Some of them are the following:

According to Alkire and Santos (2010), a study on 5.6 billion people of 104 countries of the world showed that in 2010 about 1.7 billion (30.4%) people of the world was multi dimensionally poor which was higher than the 1.3 billion poor studied using US $1.25 poverty line of the World Bank. Of the world total MPI poor, 51% live in South Asia and 28% in Sub-Saharan Africa though the proportions of multidimensional acute poor were 65% in Sub-Sahara and 53% in South Asia and 15% of the multidimensional poor lived in East Asia and the Pacific. The poorest country from the Sub-Saharan Africa is Niger, had 93% MPI poor people and people on average deprived 69% of the weighted indicators (Alkire&Santos, 2010). A country may be highly deprived in one dimension and less in others. In Pakistan 51 % were MPI poor.

According to Global MPI (2019), at present, estimates for a total of 39 Sub-Saharan Africa countries, and 866 million people, which are 96% of the population of Sub-Saharan Africa. Of these, a total of 521 million are MPI poor – over half a billion people. On average, 60% of people in Sub-Saharan Africa are MPI poor, as compared to 46% by the $1.90/day poverty (402 million). This makes Sub-Saharan Africa the region covered by the Global MPI with the highest percentage of MPI poor, though not the greatest number of MPI poor people (that

would be South Asia). 36% of all poor people in the 103 countries and 5.4 billion people covered live in Sub-Saharan Africa.

Alain et al.(2005), on the title of the role of non-farm incomes in reducing rural poverty and inequality in China by using standard selection model show that non-farm employment has appositive spillover effect on household farm production. Steven (2011) sees in depth the role of RNFE, and suggests that it has a potential pathway out of poverty for the rural poor households. Also Mollers et al. (2011) find the positive effects of non-farm employment on rural livelihood by using FGT poverty measures i.e. the head count index, poverty gap index and poverty severity index(square poverty gap index) in Croatia, and Muhamedetal.(2018) by using the same model find that non-farm income supports poverty reduction in Pakistan.

Similarly, Katsushi et al. (2012), by using treatment effect model argue that unskilled or manual non-farm employment significantly reduces poverty and vulnerability in Vietnam and India. Also Sagarika (2018), by using three stages feasible generalized least squares argue that most types of rural non-farm employment have significant poverty-reducing effect.

On the other, hand Kimity (2015), by using an endogenous switching model find that non-farm employment exerts positive effects on household food consumption and nutrition.

In Ethiopia non-farm employment also have appositive effect on the reduction of poverty. Some findings show that Also Damena (2017), by using probit and Heckman selection model conclude that non-farm employment improve farmers spending on basic needs i.e. food, education, closing and health care.

Similarly, Zerihun (2016), by using a four-wave panel data from the Ethiopian rural household survey over the period 1994-2009, and fixed, random, and probit models find that non-farm income has a positive impact on rural households' welfare with an inequality reducing effect in rural Ethiopia. Afer (2015), in rural Tigray: Ethiopia evidence from rural households of Gulomekeda Wereda by using the logistic regression model show that access to non- farm income have strong negative association with the households poverty status.

Even though there are different studies that show the effects of non-farm employment on the reduction of poverty in money measures, there is no studies conducted that show the effects

of non-farm employment or non-farm income on multidimensional poverty except the studies conducted by: Damilola et al. (2019) on the title Effect of off-farm income on multi-dimensional poverty among rural farm households in Nigeria by using the probit model, and concluding that among the off-farm income components, the non-farm wage income and non-farm self-employment income have negative association with multi-dimensional poverty.

But,KeetieRoelen (2017) by using an innovative mixed-methods approach find that monetary and multidimensional poverty are distinct constructs that are linked, but cannot serve as a proxy for one another and also Sabina Alkire et.al (2015) the monetary poor or non-poor are not always multidimensionally poor or non-poor People, and who are poor according to monetary poverty measures are not always multi-dimensionally poor. Nicolai (2016) by using Alkire-Foster method concludes that there is no clear-cut link between aggregate income and multidimensional poverty.

Therefore, non-farm employments have negative effect on the reduction of monetary measure of poverty does mean that non-farm employments also affect multidimensional poverty negatively. So, the current study is tried to examine the effects of non-farm employments on multidimensional poverty in rural Ethiopia.

Table 1 summary of previous studies on the effect of non-farm employment on poverty

Author	Title	Methodology	Finding
1. Sabina Alkire et.al(2015)	Static and Dynamic Disparities between Monetary and Multidimensional Poverty Measurement: Evidence from Vietnam	Alkire-Foster method	➢ the monetary poor (or non-poor) are not always multidimensionally poor (or non-poor) ➢ People who are poor according to monetary poverty measures are not always multidimensionally poor, a new study published in the OPHI working paper series has found.
KeetieRoelen, 2017	Monetary and Multidimensional Child Poverty: A Contradiction in Terms?	an innovative mixed-methods approach	monetary and multidimensional poverty are distinct constructs that are linked, but cannot serve as a proxy for one another
Nicolai Suppa* April 2016	Comparing Monetary and Multidimensional Poverty in Germany	Alkire-Foster method	there is no clear-cut link between aggregate income and multidimensional poverty.
1. Judith Möllers and Gertrud Buchenrieder	Effects of Rural Non-farm Employment on Household Welfare	FGT	➢ Rural non-farm employment affect rural livelihood positively.

	(2011)	and Income Distribution of Small Farms in Croatia		
2.	Steven Haggblade(2010)	The Rural Non-farm Economy: Prospects for Growth and Poverty Reduction		They see the RNFE as a potential pathway out of poverty for their rural poor.
3.	Muhammad Amjed Iqbal1, Azhar Abbas, Raza Ullah1, Umar Ijaz Ahmed, Ali Sher and Shoaib Akhtar(2018)	Effect of Non-Farm Income on Poverty and Income Inequality: Farm Households Evidence from Punjab Province Pakistan	Foster, Greer and Thorbecke (FGT) poverty index and Gini coefficient	Non-farm income supports towards poverty reduction of households in the study area.
4.	Sagarika Dey(2018)	The Role of Employment Diversification in Reducing Vulnerability to Poverty among Marginal and Small-holder Agricultural Households in India	three-stage feasible generalized least squares (FGLS) and	While most types of rural non-farm employment have significant poverty-reducing effects.
5.	Alain de Janvry,	The Role of Non-Farm	standard selection model	Without non-farm employment, rural poverty

	Elisabeth Sadoulet, and NongZhu(2018)	Incomes in Reducing Rural Poverty and Inequality in China		would be much higher and deeper, and that income inequality would be higher as well. Participation in non-farm activities has a positive spillover effect on household farm production.
6.	Dennis Tao Yang(1997)	Education and Off-Farm Work	OLS estimation technic	The possibility that knowledge sharing with in a household is a cause of educational selectivity of off-farm family labor supply.
7.	Ana Damena, DemmelashHabte(2017)	Effect of Non-farm Income on Rural Household Livelihood: A Case Study of Moyale District Oromia Regional State, Ethiopia	Probit and Heckman selection model (two stage) are used respectively	Nonfarm employment provides additional income that enables farmers to spend more on their basic needs include: food, education, closing and health care.
8.	KimtySeng(2015)	The Effects of nonfarm activities on farm households' food consumption in rural Cambodia	An endogenous switching model	Non-farm activities exerts positive effects on household food consumption
9.	Ifeoluwa Damilola Adeoye, WayoSeini, Daniel Sarpong and Ditchfield (2019)	Effect of off-farm income on multi-dimensional poverty among	The probit regression model is	The non-farm wage income and non-farm self-employment income have negative association with multi-dimensional poverty.

	rural farm households in Nigeria		
10. Babatunde R. O. and MatinQaim(2010)	Impact of off-farm income on food security and nutrition in Nigeria	Structural model	The prevalence of child stunting, underweight, and wasting is lower in households with off-farm income than in households without. Off-farm income contributes to higher food production and farm income by easing capital constraints, thus improving household welfare in multiple ways.
11. Sumit Mishra, AndaleeRahman(2017)	Does non-farm income affect food security? Evidence from India	Instrumental variable approach(IV)	Greater non-farm income helps in improving food consumption patterns and dietary diversity.
12. Robert K. N. Mwadime(1996)	Non-farm employment in rural Kenya: micro-mechanisms influencing food and nutrition of farming households	MANOVA	Non-farm employment can open an opportunity to provide for enhanced child's long-term nutritional status through the effect of total income on nutrient intake and through purchased goods that improve housing quality. Women's time in non-farm employment, although affecting house sanitation/hygiene, does not have to compromise the nutritional status of children.
13. Katsushi, Raghav	Does non-farm sector	Treatment-effects model.	Unskilled or manual non-farm employment

Gaiha, Ganesh Thapa(2012)	employment reduce rural poverty and vulnerability? Evidence from Vietnam and India		significantly reduces poverty and vulnerability
14. Samuel Ampaw, Edward NketiahAmponsah and Nkechi Srodah (2018)	Nonfarm enterprise participation and healthcare expenditure among farm households in rural Ghana	Endogenous switching regression and propensity score matching techniques	Households that participate in nonfarm enterprises earn higher incomes and expend more on healthcare.
15. M. J. Hossain andA. K. M. Abdullah AlAmin(2018)	Non-farm Income and Consumption Expenditures in Rural Bangladesh: Empirical Evidence from Multilevel Regression Modelling	two-stage stratified sampling A multilevel mixed-effects linear regression model is used	Non-farm income has a significant positive effect on household's consumption expenditures and non-farm income recipient households spend about 29% more than their counterparts.

CHAPTER 3: METHODOLOGY OF THE STUDY

3.1. Data type and sources

The data source for this study is secondary data obtained from CSA-World Bank-Ethiopian rural Socioeconomic Survey (ERSS-2013/14 and 2015/16).The Ethiopia Rural Socioeconomic Survey (ERSS) is being implemented by the Central Statistical Agency (CSA) and the World Bank Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA). This is nationally representative of small, and medium and large towns in the country. The data was intended to meet Ethiopian data demands and gaps targeting high quality and public accessibility while being aligned with the national strategy for developing statistics.

ESS data is a panel data which began as ERSS (Ethiopia Rural Socioeconomic Survey) in 2011/12. ESS1 will refer to the first wave of the ESS carried out in 2011/122; ESS2 will refer to the second wave of the ESS carried out in 2013/14 and ESS3 will refer to the third wave of the ESS carried out in 2015/2016. ESS1, ESS2, and ESS3 together create a panel data set of households from rural and small town areas (i.e. the same households that were interviewed in ESS1 were tracked and re-interviewed in ESS2 and ESS3)..

Accordingly, the number of enumeration areas (EAs) covered by the survey increased from 333 (or 3,776 households) to 433 (or 5,262 households). ESS2 and ESS3 together represent a panel of households and individuals for rural and all urban areas. ESS2 and ESS3 covered all regional states including the capital, Addis Ababa. The majority of the sample comprises rural areas as it was carried over from ESS1.The ESS2 and ESS3 were implemented in 433 enumeration areas (EAs) out of which, 290 were rural, 43 were small town EAs from ESS1, and 100 were EAs from major urban areas.

The survey consists of three questionnaires, household questionnaire, agriculture questionnaire, and community questionnaire. From these questionnaire the household questionnaire, provides information on basic demographics; education; health (including anthropometric measurement for children); labor and time use; saving; food and non-food expenditure; household nonfarm income-generating activities; food security and shocks; safety nets; housing conditions; assets; credit; and other sources of household income.

Hence the research focused on the effect of non-farm employment on multidimensional poverty in rural Ethiopia, the rural data from the household questionnaire were used.

3.2.Methods of Analysis

Both descriptive and econometrics analysis methods were used. For the descriptive analysis Alkire and Foster Method was used to examine multidimensional poverty status in rural Ethiopia. While for econometrics analysis the probit regression was used to identify the effect of non-farm employment on multidimensional poverty status of households in rural Ethiopia. Since multidimensional poverty status is a binary outcome variable, which have the value of one if the household is multidimensional poor and zero when the household is not multidimensional poor the binary outcome model must be used. For this outcome variable Logit or Probit Model is required. Logit and probit models are appropriate when attempting to model a dichotomous dependent variable, e.g. yes/no, agree/disagree, like/dislike, etc. In a probit model, the value of Xβ is taken to be the z-value of a normal distribution. So based the normality distribution of probit model we have used the probit regression model to see the effects of non-farm employment on multidimensional poverty in rural Ethiopia.

3.2.1.Methods of Measuring Poverty Status

Poverty measurement can be broken down conceptually into two distinct steps: the first step is the identification step defines the cutoffs for distinguishing the poor from the non-poor, and the second step the aggregation step brings together the data on the poor into an overall indicator of poverty. Choosing an approach by which to identify the poor is more complex when poverty measures draw on multiple variables. There are three main methods of identification. These are a dual-cutoff, union, and intersection (Alkire, 2016).

The union approach regards someone who is deprived in a single dimension identified multi-dimensionally poor. It is commonly used, but as the number of dimensions increases it may be overly inclusive and may lead to exaggerated estimates of poverty. It is commonly used, but as the number of dimensions increases it may be overly inclusive and may lead to exaggerated estimates of poverty. Intersection method requires that someone be deprived in all dimensions in order to be identified as multidimensionally poor. Often considered too restrictive, this method generally produces untenably low estimates of poverty (Alkire, 2016).

A dual cut-off approach was applied using two types of cut-offs in identifying the poor (Alkire and Foster, 2014). The first step involves identifying those who are deprived in each dimension using certain thresholds or poverty line, $z > 0$ in each dimension j. This threshold can also be referred to as the deprivation threshold or cut-off, below which a household is considered to be deprived. The second cut-off point or poverty threshold, k, describes the minimum weighted

deprivation count across dimensions. This poverty threshold reveals the minimum number of the household's deprivations in a given number of dimensions. The deprivation of each household is weighted across the different indicators. A household is regarded as being multi-dimensionally poor when the number of deprivations $c_i \geq k$, otherwise that household is multi-dimensionally non-poor. A household having a weighted deprivation score below this threshold is considered multi-dimensionally non-poor. The Global MPI has three dimensions and 10 indicators. Each dimension is equally weighted, each indicator within a dimension is also equally weighted, and these weights. A person is identified as multidimensionality poor (or 'MPI poor') if they are deprived in at least one third of the weighted indicators shown above; in other words, the cutoff for poverty (k) is 33.33%.

The proportion of the population that is multidimensionality poor is the incidence of poverty, or headcount ratio (H). The average proportion of indicators in which poor people are deprived is described as the intensity of their poverty (A). The MPI is calculated by multiplying the incidence of poverty by the average intensity of poverty across the poor (MPI = H x A); as a result, it reflects both the share of people in poverty and the degree to which they are deprived (Santos, 2011).

Hence the dual-cutoff identification is better than the other two identification methods; so the research were applied this method.

3.2.2. Dimensions, indicators, deprivation cut-off and weight of MPI

Three dimensions and ten indicators of multidimensional poverty are used.We assign equal weights to each of the three dimension (education, health and living standards) which sums up to 1, implying one-third (0.33) for each and also equal weighting across indicators in a dimension. This is in fact the tradition in the majority of the literature (Alkire S., 2014; UNDP, 2019, & Damilola, 2019). However subjuctiv weight could be giveen, we could not find the required information to apply such weights. The dimension, weight, indicators and the deprivation cutoff descused in tabel 2 bellow.

Table 2 the Dimension, Indicators and Weight of MP

Dimension	Indicator	Household deprivation cut-off	Weight
Education(1/3)	Years of schooling	No one has completed five years of education in the household; the household is deprived by years of schooling.	16.7%
	Child school attendance	At least one school-age child 7-15 years old in the household is not currently attending in school the house hold is deprived.	16.7%
Health(1/3)	Nutrition	At least one member of the household's body mass index is less than 18.5 and greater than 25 the household is deprived by nutrition.	16.7%
	Mortality	One or more of children of age under 5 have died in the last 5 years in the household the household is deprived.	16.7%
Standard of living(1/3)	Electricity	If the household have not used electricity light the household is deprived by electricity.	5.6%
	Water	If the household's safe drinking water source are not piped water, protected	5.6%

		water source, using rainwater, or clean water source is more than 30 minutes walk from home(roundtrip)the householdis deprived by clean drinking water.	
	Sanitation	If the household lack of adequate sanitation or their toilet is shared, the household is deprived by sanitation.	5.6%
	Floor	If the household's house has dirt, sand or dung floor, the household is deprived.	5.6%
	Cooking fuel	If the household use 'dirty' cooking fuel(dung, firewood or charcoal), the household is deprived by cooking fuel.	5.6%
	Asset	The household does not own more than one of: radio, bed/table, kerosene lamp, kitchen utensils, jewelry, or ox cart/bicycle, or do not own all farm tools (hoe, plough, sickle or shovel/spade). refrigerator, telephone or television, the household	5.6%

Source: Alkire& Santos (2011)

Poverty Identification and Aggregation

$$C_i = W_1 I_1 + W_2 I_2 + W_3 i_3 \ldots\ldots + W_d I_d \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where $I_i = 1$, if the household is deprived in indicator i and $I_i = 0$ otherwise, and W_i is the weight attached to indicator $i$with $\sum_{i=1}^{d} W_i = 1$

$$H = \frac{q}{N} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$$A = \frac{\sum_{i=1}^{N} C_i(k)}{q} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$MPI = H * A \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

3. Where q is the number of people who are multi-dimensional poor, N is the entire population, $C_i(k)$ is the censored deprivation scores of household i.

3.3. The Probit Regression Model

Multi dimensional poverty status is dummy variable, that the household is multidimensional poor if the weighted deprivation is greater than 0.33, while non poor if the weighted deprivation of the household is less than 0.33. So, the probit model was used to estimate the effect of non-farm employment, on multi-dimensional poverty. Under situations of binary dependent variables, the probit regression models will be used. However, the choice of probit regression model in this study stems from the distribution of the error term which lies on the assumption of a standard normal distribution and its ability to report the predicted probabilities, which is of interest in this study.

The probit model is expressed as:

$$P\left(Y = {}^{1}/_{X}\right) = \Phi(X\beta + \varepsilon) \quad (5)$$

Where Y = multidimensional poverty status, and X is factors that affect multidimensional poverty.

Johannes and et.al.(2017) shows that the maximum likelihood estimator for the regression coefficients, β, in a panel binary response model with fixed effects can be severely biased if N is large and T is small, a consequence of the incidental parameters problem. Since N is only two year and T is very large random effect is used for this estimation.

Table 3 Variables selection and measurements

Definition of the independent variable	Description and measurement	Prior sign
Multi-dimensional Poverty Status(Hi)	Dummy, 1 if the household is multi-dimensionally poor, or the sum of weighted deprivation of the household is greater than 0.33, and non- poor if the sum of the weighted deprivation of the household is less than 0.33.	Dependent Variable
Sex of head	Female-head = 1; male = 0	+/-
Age of head	Numbers of years	+/-
No_ of Adult workers	Numbers of active person between 14 and 64 years	-
Accesses to credit	Dummy(yes =1;otherwise = 0)	-
Dependency ratio	The ratio of dependent household to adult	+

	workers$\left(\frac{<14 \text{ □□□□□ □□□+ } >64 \text{ □□□□□ □□□}}{14-64 \text{ □□□□□ □□□}}\right)$	
Region	Dummy(Amhara=1; otherwise = 0)	+/-
	Tigre =1, otherwise = 0	+/-
	Oromo =1, otherwise =0	+/-
	SNNP =1, otherwise =0	+/-
Employment type	Dummy, 1 if the household engaged on non-farm ; otherwise =0	+/-
Education level of household head	Years of schooling of household head	-
Religion	Orthodox = 1,other wise = 0	+/-
	Muslim = 1, otherwise = 0	+/-
Marital status	Married = 1, otherwise=0	+/-
Shock		
Drought	1,if the household faced drought problem	+
Flood	1, if the household faced Flood problem	+
Heavy Rains	1, if the household faced heavy rains preventing work	+
Shock_crop_damaged	1, if the household faced other Crop Damage	+
Shock_ Livestock	1, if the household faced Great Loss/Death of Livestock	+
		+
Distance from nearest market (d_market)	Distance in kilometers	+
Distance from nearest woreda Town(d_town)	Distance in kilometers	+
Distance from nearest Bank(d_CBE)	Distance in kilometers	+
Distance from nearest hospital(d_hospital)	Distance in kilometers	+

3.4. Diagnostic Tests

This study conducted diagnostic test before running the model. As we can see from appendix no one variable is correlated more than 0.8, therefore no correlation problem in this model. On the other hand there is no one variable that the VIF greater than 10 and the mean VIF also 1.931.Because of probit model is standard normal distributed, variance is constant. So there is no heteroscedasticity problem. As we can see in the appendix by using Skewness and kurtosis the

error term is normally distributed. The model specification test also conducted by using link test, as we can see the result in the appendix 1, the model was specified correctly.

Due to lack of information on variables like license for non-farm employment, non-farm employment correlated with the error term, and non-farm employment were endogenous. Because Government of Ethiopia (GoE) has implemented a series of reform measures towards a market oriented economy, including deregulation of domestic prices; license for non-farm employment required. License is also important to protection and privacy. To solve this endogeneity problem labor hours used for non-farm employment are used as an instrument. The numbers of hours used for non-farm employment affects multidimensional poverty only through non-farm employment. We can see in appendix 2 the step how to test endogeneity and IV regress.

CHAPTER 4: RESULT AND DISCUSSION

This Chapter contains both the descriptive and inferential statistics analysis. In the descriptive Chapter, the incidence and intensity of multidimensional poverty and the relationship of non-farm employment with overall multidimensional poverty and its indicators in rural Ethiopia are described. cross tabulation of multidimensionally poor rural household and quintile of aggregate consumption as weill as decompositions of multidimensional poverty index of rural Ethiopia by sub-group were discrived. Weill in the econometrics Chapter the effects of non-farm employment was analyzed.

4.1.1. Descriptive Statistics

Table 4 presents the descriptive statistics of selected variables at rural household level. 23.6% and 23.2% of the rural household head were female in 2013/14 and in 2015/16 respectively. This implies that female headed reduce by 0.4% from 2013/14 to 2015/16.On average the rural household size are approximately 5 members per household in both years. The average age of the rural household head were approximately 46 and48 years old in 2013/14 and 2015/16 respectively. On average 76.6% and 76.7% of the head were married in 2013/14 and in 2015/16 respectively, and the numbers of dependent person per household were approximately 2 in both years. Non-farm employments increase overtime from 28.9% in 2013/14 to 31.3% in 2015/16.

From the access to basic services the average distance from the nearest asphalt road was reduced from 39.194 km in 2013/14 to 34.905km in 2013/14. This implies that the linkages between rural areas with the urban areas were improved. On the other hand the average distance from the nearest Woreda Town was reduced from 22.653km in 2013/14 to 14.133km 2015/16. This indicates numbers of Woreda increase in 2015/16 relative to 2013/14. Similarly the average distance from the nearest CBE reduced from 24.052 km in 2013/14 to22.069 km in 2015/16. The average distance from the nearest primary school is reduces from 0.957 km in2013/4 to 0.799km in 2015/16. This reduction is the results of millennium development goals. Those rural households get market access after moving on avarege14.597km in2013/14, but its distance reduced to 14.133km in 2015/16. This indicates that the accesses of market and market chine increase for rural households in 2015/16 relative to 2013/14.

Table 4 summery of Descriptive Statistics

	Year 2013/14 N=2821		Year 2015/16 N=2821	
Variable	Mean	Std.Dev.	Mean	Std.Dev.
Non-farm employment	.289	.453	.313	.464
Age of household head	46.009	15.043	48.139	15.166
Head-married	.766	.423	.767	.423
Orthodox	.436	.496	.435	.496
Muslim	.329	.47	.329	.47
Head-female	.236	.425	.232	.422
Numbers of adult worker	2.301	1.046	2.392	1.097
Dependency ratio	1.145	.97	1.098	.948
Education levels of head	2.7	8.624	2.616	6.973
shock drought	.104	.305	.327	.469
shock flood	.022	.148	.011	.106
shock landslide	.003	.053	.005	.07
shock heavy rain	.015	.123	.028	.166
shock other cop damage	.044	.206	.086	.281
shock livestock death	.039	.194	.083	.276
credit access	.046	.209	.278	.448
Distance from nearest asphalt road	39.194	47.907	34.905	44.539
Distance from nearest woreda Town	22.653	25.143	21.991	20.453
Distance from nearest market	14.597	11.781	14.133	15.052
Distance from nearest primary school	.957	5.494	.799	3.582
Distance from nearest hospital	18.14	23.32	13.671	14.473
Distance from nearest CBE	24.052	22.977	22.069	21.713
Distance from nearest MFI	20.491	20.385	21.227	20.873
Household size	5.007	2.305	5.093	2.326

Source: Own computation from 2013/14 and 2015/16 ESS data

4.2. **Percentage of Individuals Indicator** Values are below the Threshold.

Table 5 shows the deprivation of each indicator in multidimensional poverty. The Multidimensional Poverty Index (MPI) is published by the UNDP's Human Development Report Office and tracks deprivation across three dimensions and 10 indicators: health (child mortality, nutrition), education (years of schooling, enrollment), and living standards (water, sanitation, electricity, cooking fuel, floor, assets).

It first identifies which of these 10 deprivations each household experiences, and then identifies households as poor if they suffer deprivations across one -third or more of the weighted indicators.

Based on the Alkire Foster methodology, the MPI is created by multiplying together two numbers: the percentage of the population who are poor; and the average percentage of the weighted indicators that poor people experience (intensity). Including intensity provides an incentive to reach the poorest of the poor. The MPI reflects those in acute poverty; alternative cutoffs are used to report those who are vulnerable and those in severe poverty.

99.746% of the rural households of Ethiopia are deprived by nutrition 2013/14 and it reduced to 99.687%. It is followed by cooking fuel deprivation which cover the 99.866% of the household in 2013/14 and reduced to 98.114% in 2015/16. This implies that almost all of the rural households of Ethiopia using firewood, dung, charcoal, and crop residuals. 97.235 % and 96.065% of the households are deprived by floor in 2013/14 survey years and 2015/16 survey years respectively. Similarly 83.5165 % and 69.692% of the rural households are deprived by of the rural households are deprived by electric city. This reduction is due to the adoption of solar light.

Table 5 Percentage of Individuals Indicator Values below the Threshold.

Indicators	2013/14	2015/16
Floor deprivation	97.235%	96.065%
Cooking deprivation	99.866%	98.114%
Toilet deprivation	44.594%	38.958%
Electric deprivation	83.516%	69.692%
Water deprivation	57.32%	53.633%
Asset deprivation	23.928%	20.206%
Years of schooling deprivation	52.570%	49.167%
School attendance deprivation	13.577%	12.230%
Nutritional deprivation	99.746%	99.687%
Child mortality	2.026%	6.026%

Source: Own computation from 2013/14 and 2015/16 ESS data

4.3. The Multidimensional Poverty Index

Table 6 shows that the incidence, intensity and adjusted MPI in the two wave years. The censored head count ratio in rural Ethiopia is reduced from 94.9% in 2013/14to 92.5% in 2015/16. Similarly that poor household's average deprivations of indicators and the adjusted MPI reduced from 50.2% and 49.5% in 2013/14to 49.7% and 47.4% in 2015/16 respectively. For the overall censored head count ratio of the panel year 2013/14contributes 50.9% to the indices and year 2015/16 contributes 49.1%. On average 93.5% of the rural household's were multidimensionally poor in the panel year, the adjusted multidimensional poverty index of the rural Ethiopia is .484 for the panel year.

Table 6 the Multidimensional Poverty Index

Poverty status	2013/14	2015/16	Total
H	0.949	0.925	0.935
MO	0.495	0.474	0.484
A	0.503	0.497	1.000

Source: 2013/14 and 2015/16 ESS data of Ethiop

4.3.1. Decomposition of Multidimensional Poverty Index by Dimension

Looking at the censored headcount ratios in table 7 the deprivations of all the three dimensions were reduced from 2013/14 to 2015/16. Standard of living, education and health were 44.7%, 22.5 and 35.8% in 2013/14 respectively, but reduced to 42.8%, 21.5 and 32.6 in 2015/16 respectively. Standard of living is the highest component of MPI, it cover 43.8% of the total which is followed by health dimension that share 34.2% of the aggregate multidimensional poverty index. The remaining 22% of the aggregate multidimensional poverty is the share of education dimension. The least share of education dimension is because of the second goals of millennium development. According to the MDG (2014) report, the net enrolment rate in primary education is 93 percent in 2014, and net enrolment in primary education grew by about 18 per cent per annum. Also the forecast show that it will reach 100 per cent in 2015.

Similarly the share of the health dimension is less than share of standard of living dimension. MDG (2014) report shows that health service coverage significantly improved and primary health service coverage reached 93.4 per cent of the population in 2012/13 and 94.0 percent in2013/14.One of the reasons behind the observed success in reducing child mortality has been the expansion of the coverage of health service. From this we can understand that the reduction of

child mortality leads to the MPI share of health dimension is less than standard of living dimension.

Table 7 Decomposition of Multidimensional Poverty by Dimension

Dimension	2013/14	2015/16	Total
Standard of living	0.447	0.428	0.438
Education	0.225	0.215	0.220
Health	0.358	0.326	0.342
Total	1.000	1.000	1.000

Source: 2013/14 and 2015/16 ESS data of Ethiop

4.3.2. Decompositions of Multidimensional Poverty by Indicators

Table 8 show that the decompositions of multidimensional poverty by indicators. More than half of the multidimensional poverty indicators deprivations shares to MPI were reduced in 2015/16 relative to in 2013/14. From these indicators toilet, electric, water, asset, years of schooling and school attendance are reduced in 2015/16 compared to their deprivation in 2013/14. This reduction due increase in access to clean water and improved sanitation, numbers of health posts, The primary net attendance rate for 7-14 year old children, numbers of health center, immunization coverage, access to solar light, modern contraceptive use, and decrease in infant mortality, and under-five mortality. These changes are the result of millennium development goals which lead to decline the deprivations of multidimensional poverty indicators.

Table 8 Decomposition of Multidimensional Poverty Index by Indicators

Indicators	2013/14 survey year	2015/16 survey year
Floor deprivation	0.108	0.106
Cooking deprivation	0.110	0.107
Toilet deprivation	0.050	0.046
Electric deprivation	0.094	0.082
Water deprivation	0.65	0.063
Asset deprivation	0.027	0.024
Years of schooling deprivation	0.178	0.0174
School attendance deprivation	0.046	0.043

Nutritional deprivation	0.37	0.328
Child mortality	0.007	0.021

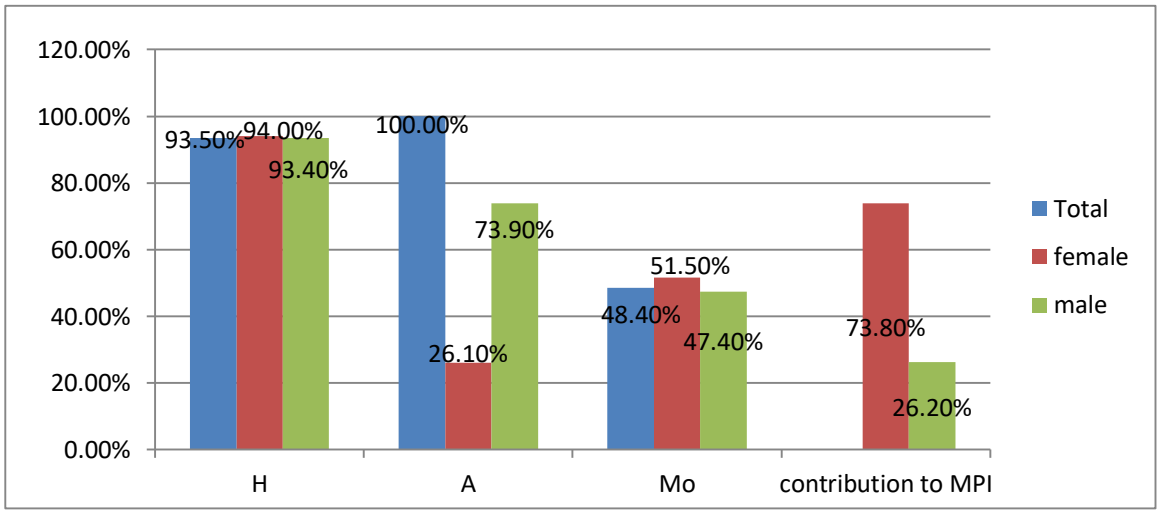
Source: 2013/14 and 2015/16 ESS data of Ethiop

4.3.3. Decomposition of MPI by: Sex of the Household Head (2013/14-2015/16)

Figure 1 shows that decomposition of MPI by sex of the household head. From the female head almost all (94%) are multi-dimensionally poor. Similarly from the male headed of the household 93.4% are multi-dimensionally poor. On the other hand male headed are deprived by 73.9% of the indicators, while female headed are deprived by only 26.1% of the indicators. The male headed of rural household contributed 26.2% for censored headcount ratio of rural Ethiopia, but female headed contributed the largest share (73.8%) of the censored head count ratio of the rural Ethiopia. This result is in line with the finding of Diran et al. (2010) that was sex of the household heads was positively related to the likelihood of poverty. This implies that female-headed

Figure 1 Decomposition of MPI by: household head sex(2013/14-2015/16)

households are likely to be poorer than male-headed households. This could be attributed to the low income generating potentials of women. Gender is an integral and inseparable part of rural livelihoods. Men and women have different assets, access to resources, and opportunities. Women's may have lower education due to discriminatory access as children, and their access to productive resources as well as decision making tend to occur through the mediation of men. Women typically face a narrower range of labor markets than men and lower wage rates.



Source: Own computation from 2013/14 and 2015/6 ESS data of Ethiopia

Note: H= censored head count ratio, Mo = adjusted multidimensional poverty rate and A=intensity

4.3.4. Decomposition MPI by: Marital status

Table 9 shows that 94.2% of non-married rural household heads of Ethiopia are multi-dimensionally poor. Also 93.3% of married head are multi-dimensionally poor. The average deprivation of indicators for married heads are greater than that of non-married headed. On average non married headed rural households are deprived by only 25.4% of the indicators, but married headed of the rural households are deprived on average by 74.6% of the indicators. So married headed of the rural household contribute the largest to MPI in rural Ethiopia with the share of 74.4%. On the other hand non-married headed of rural Ethiopia contribute only 25.6% for the MPI of rural Ethiopia. Similarly the share of married headed rural household is greater than that of non-married headed for the adjusted MPI of rural Ethiopia.

Table 9 decomposition of MPI by: marital status of household head

	Head not married	Head married	Total
H	0.942	0.933	0.935
Mo	0.522	0.472	0.484
A	0.254	0.746	1.000

Source ESS 2013/14 and ESS 2015/6 data

Table 10 Show that the contribution of each indicator for both married headed or not married headed share of adjusted MPI in rural Ethiopia. Nutritional deprivation contributes the largest share for both married headed and non married head share of adjusted MPI in rural Ethiopia.

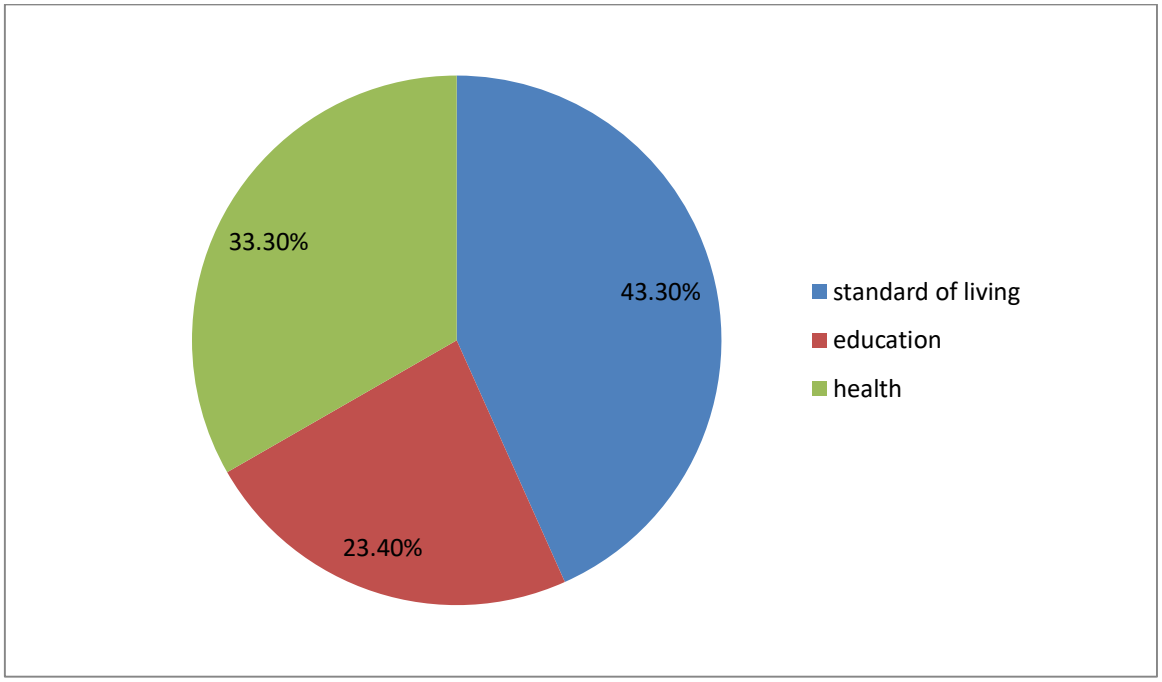
Table 10 the contributions of each indicator to marital status of headed share of adjusted MPI (2013/14-2015/16)

	Head not married	Head married	Total
Floor	0.100	0.108	0.106
Cooking	0.100	0.110	0.107
Toilet	0.055	0.046	0.048
Electric	0.083	0.089	0.088
Water	0.059	0.065	0.064
Asset	0.036	0.021	0.025
Years of schooling	0.196	0.168	0.176
School attendance	0.037	0.047	0.044
Nutrition	0.300	0.329	0.321
Child mortality	0.033	0.016	0.021
Total	1.00	1.000	1.000

Sources: 2013/14 and 2015/6 ESS data of Ethiopia

Figure 2 shows that the contribution of each dimension to adjusted MPI share of married headed. Dimension 1(standard of living dimension) contributed 44% for married headed adjusted MPI, and 43.3% for non-married headed adjusted MPI of rural household. Similarly dimension 3 contributes 33.3% for married headed and 34.5% for non-married headed adjusted MPI of rural households of Ethiopia respectively. On the other hand the contribution of dimension 2 (education dimension) is less than that of health and standard of living dimension.

Figure 2contribution of each dimension to married headed share of adjusted MPI (2013/14-2015/16)



Source: 2013/14 and 2015/16 ESS data

4.3.5. Decomposition of MPI by Region

Table 11 shows that from the nine regions in Ethiopia, Tigray, Amhara, Oromya and SNNPR regions comprises more than 90% of the total population (CSA, 2010). Hence, things happening in these regions will affect the overall poverty of the country.Even though multidimensional poverty in all regions was declined from 2013/14 survey year to 2015/16 survey year, it was different from region to region. The censored head count ratio for Tigray, Amhara, Oromia and SNNP were 94.3%, 96.4%, 96.25 and 94.4% in 2013/14 survey year, and it reduced to 90.9%, 95.3%, 94.5% and 92% in 2015/16 survey year respectively. Similarly the adjusted multidimensional poverty index for Tigray, Amhara, Oromia and SNNP were 0.491, 0.515, 0.483 and 0.482 in 2013/14 survey year and 0.455, 0.50, 0.466 and 0.45 in 2015/16 survey year respectively. The adjusted multidimensional poverty index for rural households of Amhara region were higher than that of Tigray, Oromia and SNNP in both survey years. 96.4% of the rural households of rural Amhara were multidimensionally poor in 2013/14 survey year, and 95.3% of them were multidimensional poor in 2015/16 survey years. This indicates that the head counts of multidimensional poverty reduced by only 1.1%. But, for Tigray and Oromia regions the head count ratio reduced by 3.4% and 1.75% respectively. This implies that there was systematic biased toward the region.

Table 11 Decomposition of Multidimensional Poverty Index by Region

Multi dimensional poverty status	survey year 2013/14				survey year 2015/16			
	Tigray	Amhara	Oromia	SNNP	Tigray	Amhara	Oromia	SNNP
Hi	94.3%	96.4%	96.2%	94.4%	90.9%	95.3%	94.5%	92%
MO	0.491	0.515	0.483	0.482	0.455	0.50	0.466	0.45

Source: 2013/14 and 2015/16 ESS data

4.4. The Relationship between Multidimensional Poverty and Consumption Quintiles (2013/14-2015/16)

Table 12 shows that the cross tabulation of multi-dimensionally poor rural households and aggregate consumption quintiles of rural households of Ethiopia. From this table $\square_1$ is the poorest quintile and $\square_5$ is the richest quintile. KeetieRoelen (2017) by using an innovative mixed-methods approach find that monetary and multidimensional poverty are distinct constructs that are linked, but cannot serve as a proxy for one another, and also Sabina Alkire et.al (2015) the monetary poor or non-poor are not always multidimensionally poor or non-poor People, and who are poor according to monetary poverty measures are not always multidimensionally poor.

Similarly table 12 shows that all multidimensional poor rural households are not also unidimensionally poor. 17.63% of the rural households are multi-dimensionally poor, but not unidimensionally poor. On the other hand 0.47% the rural household are unidimensionally poor, but not multi-dimensionally poor. Moreover 23.50% of the rural households are both multi-dimensionally and uni-dimensionally poor. From this we can generalize that unidimensionally poverty is good opportunity to the rural household become multi-dimensionally poor.

Table 12 the relationship between multidimensional poverty and consumption quintiles

Multidimensional poverty status	**5 quintiles non-monetary aggregate consumption**					
	Q1	Q2	Q3	Q4	Q5	Total
Non-poor	0.47	0.72	0.90	1.28	3.04	6.40
Poor	23.50	18.76	19.00	14.70	17.63	93.60
Total	23.97	19.48	19.89	18.91	17.75	100.00

Source: 2013/14 and 15/16 ESS data of Ethiopia

4.4.1. Non-Farm Employment and Multidimensional Poverty

Table 13 show that contributions of non-farm employment for each dimension deprivation. The deprivations of all dimensions were less in 2013/14relative to 2015/16 survey year. Households that are not engaged in non-farm employment are more deprived by each dimension than the household that are engaged in non-farm employment for both survey years. Households that are not engaged in non-farm employment on average deprived about 45.4% in standard of living, 22.1% in education and 32.4% in health dimension in 2013/14. But, the deprivation of standard of living and education reduced to 43.8%, 22.00% respectively for the households that are not engaged in non-farm employment in 2015/16. The rural households that are not engaged in non-farm employment are more deprived than that engaged in non-farm employment in both survey years. Deprivations of standard of living for the household that engaged in non-farm employment reduced from 43.6% in 2013/14 to 42.1% in 2015/16. Similarly deprivations of education reduced from 23.00% in 2013/14 to 21.6% in 2015/16. This implies that engaging in non-farm employment is one mechanism to escape form multidimensional poverty.

Table 13the Contribution of Non-farm Employment to the Deprivation of each Dimension (2013/14-2015/16).

Dimensions of Multidimensional poverty	Non-farm employment status 2013/14 survey year		Non-farm employment status 2015/16 survey year	
	Not engaged in non-farm employment	Engaged in non-farm employment	Not engaged in non-farm employment	Engaged in non-farm employment
Standard of living	45.4%	43.6%	43.8%	42.1%
Education	22.1%	23.0%	22.6%	21.6%
Health	32.4%	33.4%	35.8%	34.5%
Total	100%	100%	100%	100%

Source: 2013/14and 2015/16 ESS data of Ethiopia

Table 14 shows that the cross tabulation of multidimensional poor household and non-farm employment. On the table more of the household who is not engaged in non-farm employment are

multidimensionally poor in both survey years. multidimensionally poverty is less in 2015/16 relative to in 2013/14 for both households that are engaged in non-farm employment or not. 67.81% and 64.69% of the samples that are not engaged in non-farm employment are multidimensionally poor in 2013/14 and 2015/16 respectively. But, only 26.80% and 25.9% of the rural household that engaged in non-farm employments are multidimensionally poor in 2013/14 and 2015/16 survey year respectively. This shows that reduction of multidimensional poverty due to increasing non-farm employment participation.

Table 14 the Relationship between Non- Farm Employment and Rural Household Multidimensional Poverty

Multidimensional poverty status	Non-farm employment status 2013/14 survey year		Non-farm employment status 2015/16 survey year	
	Not engaged in non-farm employment	Engaged in non-farm employment	Not engaged in non-farm employment	Engaged in non-farm employment
Non-poor	3.3%	2.09%	4.01%	3.4%
Poor	67.81%	26.80%	64.69%	27.9%
Total	71.11%	28.89%	68.70%	31.3%

Source: 2013/14 and 2015/16 ESS data of Ethiopia

4.5. The Probit Regression Result

Table 15 shows the marginal effect of probit regression performed to estimate the effects of non-farm employment on multidimensional poverty. The study has investigated the effects of non-farm employment on multidimensional poverty. Probit regression was run on a balanced panel data of 5642, Ethiopian Socioeconomic Survey (ESS 2013/14 & ESS 2015/16).

Table 15 the marginal effects after probit regression

variable	dy/dx	Std.Err.
Non-farm employment	-0.031***	0.009
age_head	0.005***	0.001
Head-married	0.004	0.013
Orthodox	-0.010	0.012
Muslim	-0.012	0.014
Head-female	-0.016	0.014
Numbers of adult workers	-0.019**	0.008
Dependency ratio	0.013*	0.007
Educ-head	-0.005***	0.001
shock drought	0.023*	0.013
shock_flood	0.011	0.021
shock_landslide	-0.054	0.048
shock_heavyrain	0.052***	0.017
shock_othercrop damaged	0.002	0.013
shock_livestockdeath	0.025**	0.012
shock_natural	-0.014	0.013
Credit access	-0.018**	0.008
Distance from nearest asphalt road	0.000	0.000
Distance from nearest woreda town	0.0004**	0.000
Distance from nearest market	0.00005	0.000
Distance from nearest primary school	0.000	0.000
Distance from nearest hosp hospital	-0.000	0.000
Distance from nearest CBE	0.000	0.000
Distance from nearest MFI	-0.000	0.000
Household size	0.003	0.004
Amahara	0.042***	0.016
Tigray	0.010	0.021
Oromia	0.047***	0.014
SNNP4	0.017	0.017

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Note that: CBE is Commercial Bank of Ethiopia, and MFI isMicro Finance

Non-farm employment

Holding all other factors constant the regression result shows that engaging in non-farm employment reduces the likelihood rural households of Ethiopia being multi-dimensionally poor on average marginally by 0.032 at 1%level of significant. This implies that engaging in non-farm employment improve farmers spending on basic needs i.e. food, education, closing, health care and improve asset accumulation. Which, confirming the hypothesis that engaging in non-farm employment has a negative effect on multidimensional poverty. The result is in line with Damilola et al. (2019) who conclude the non-farm wage income and non-farm self-employment has negative association with multidimensional poverty. Similarly the result support the findings of different literature that conclude engaging in non –farm employment reduce the unidimensional level, depth and severity of poverty, and it is an effective way to out of poverty for rural households in developing countries (Alain et .al 2005, Hadijah; 2011, Steven; 2011, Katsushi et al; 2012, Trung; 2014, Muhamed et.al; 2018, Sagarika; 2018&Shakila; 2019).

Access to credit

Similarly, the marginal effects of access to credit were significant at 5% level of significant and negatively affected the likelihood of rural households of Ethiopia being multi-dimensionally poor. Holding all other factors constant if the household get credit, the likelihood of rural households of Ethiopia being multi-dimensionally poor was on average marginally reduced by0.018.The result is in line with Damilola.et.al(2019) concluded that having access to formal credit by rural farm households reduces the likelihood to be multi-dimensionally poor, by revealing the role of credit in promoting rural livelihoods and poverty alleviation in Nigeria, and Bruk & Kebed (2013) finding households with access to loans and membership in an informal saving association are less likely to be consumption and multidimensional poor in rural Ethiopia. This implies that the access to credit reduce capital constraints, and increase expenditures on basic needs like food, close, health care, education and construction of housing.

Shock

As hypothesized shock has positive effect on being multi-dimensionally poor, the probit regression result shows that holding all other factors constant heavy rain increases the likelihood of multi-dimensionally poor on average marginally by0.052 at 1%level of significant, which agrees the finding of Kebed(2013) that show occurrence of many shocks simultaneously affects deprivations in morbidity, access to safe drinking water, and housing quality significantly. This implies that simultaneous shocks affect the structural character of welfare. On the other hand livestock death also increases the likelihood of being multidimensional poor by 0.025 at 10% level of significant. Since, it reduces the wealth of the rural household. The other shock that significantly affect the likelihood of multi-dimensionally poor was drought. Which, different from the finding of Bruk&Kebed (2013) that conclued drought has an insignificant effect on multidimensionl poverty. But for this study the occerance of drought had apositive effect to the likelihood of multidimensionally poor and it increase the likelihood by 2.3%,but only at marginally significant level.

Education level of household

Education levels of the household head also affect the likelihood of rural household being multi-dimensionally poor negatively. If the education level of the household increase, the likelihood of being multi-dimensionally poor reduced by 1% at 5% level of significant. Which, confirming hypothesis that years of education of the household head reduce multidimensional poverty, and agree with the finding of Joshuaet.al (2017) that concluded more years of education reduce poverty in the rural Nigeria by 12.9%.

Dependency ratio

Dependency ratio also significantly increases the likelihood of being multidimensionally poor, and the result in line with WorldBank (2020)concluded that dependency ratio strongly correlated with poverty, and dependency ratio positively affects the likelihood of the household being unidimensionally poor (Daniel, 2018; Diran et al.; 2010). The regression result shows that if dependant persone on adult worker increase by one persone, the liklhood of the household being multidimensionally poor increase by .0013 at 1%blevel of segnificant.

Numbers of Adult worker

On the other hand the number of adult workers is significant at 5% level of significant, with an expected negative sign. The marginal effect indicates that having one more adult worker in a household reduces the likelihood of being multi-dimensionally poor by about 0.019. This implies that adults are expected to engage their labor in productive activities, thereby earning some income to meet the felt needs of household members. The result confirming with Damilola (2019) concluding that number of adult working reduce the likelihood of being multidimensionally poor in Nigeria.

Distance from the nearest Woreda Town

Distance from the nearest town also the other significant variable that affects the likelihood of rural households being multi-dimensionally poor. If the distance from the town increases by one kilometer the likelihood of being multi-dimensionally poor increase by 0.0.004 at 1%persent level of significant. This implies that if the household live away from the nearest Woreda Town, access to clean drinking water, electric city, hospital and other basic access are limited.

Region Dummy

The likelihood of be being multi-dimensionally poor is greater for the household that live in Amhara and Oromia region than the household live in other region. The likelihood of multi-dimensionally poor for the household that live in Amhara region is greater by 4.5% than the household live in other region at 5% level of significant.Similarly the likelihood of multi-dimensionally poor for the household live in Oromia region is greater by 5.1% than the household live in other region at 1% level of significant.

CHAPTER 5: CONCLUSION AND RECOMMENDATION

5.1. Conclusion

Multidimensional poverty was reduced from 94.9% in 2013/14 survey year to 92.5% in 2015/16 survey year it is still a challenging phenomenon for the rural households of Ethiopia. Since engaging in non-farm employment one way of escape multidimensional poverty, participations of rural households of Ethiopia in non-farm employment increase from 28.9% in 2013/14 survey year to 31.3% in 2015/16 survey year.

The deprivations of all the three dimensions are less in 2013/14 relative to in 2015/16. Standard of living, education and health were 44.7%, 22.5 and 35.8% in 2013/14 respectively, but reduced to 42.8%, 21.5 and 32.6% in 2015/16 survey respectively, also the censored head count ratio in rural Ethiopia is reduced from 94.9% in 2013/14 to 92.5% in 2015/16. On the other hand that poor household's average deprivations of indicators and the adjusted MPI reduced from 50.2% and 49.5% in 2013/14 to 49.7% and 47.4% in 2015/16 respectively.

The probit regression result shows that non-farm employment, access to credit, numbers of adult workers and education level of the household head have significantly negative effect to the likelihood of being multidimensionally poor. While distance from the nearest woreda town, heavy rain, livestock death and dependency ratio have a significant positive effect on the likelihood of being multidimensionally poor.

Engaging in non-farm employment reduce the likelihood of rural households of Ethiopia being multidimensionally poor on average marginally by 0.032 at 1% level of significant. Also access to credit is statistically significant, and the access to credit reduces the likelihood of the rural households of Ethiopia being multidimensionally poor on average marginally by 0.018.Heavy rain is the other significant variable that increases the likelihood of being multidimensionally poor on average marginally by 0.052 at 1% level of significant. On the other hand livestock death also increases the likelihood being multidimensional poor on average marginally by 0.025 at 10% level of significant.

5.2. Policy Implication

Since multidimensional poverty is challenging for rural households of Ethiopia, policy makers need to give attention for poverty coping programs and strategies. Also the government should implement policies that promote non-farm employment, such as small business and self-employment, as well as the creation and support of businesses that absorb the extra labor from the

farm. Non- farm employment can smooth consumption and increase expenditures on education, health care and asset accumulation.

Governmental creditor organization should increase access to credit, since credit reduced the financial constraints and increase expenditures on basic needs like food, close, health care, education and construction of housing. We recommend that the government need to implement different projects to link the woreda Town with the rural area of Ethiopia, and link rural area with woreda Town through physical infrastructures such as increasing access to electric city, clean drinking water, access to health center.

Since standard of living contributes the highest shares of multidimensional poverty in both survey years, the government needs to design practical and effective policies for raising living standards by formulating a comprehensive social development strategy that covers the immediate needs, as well as the medium and long-term needs. This responsibility does not rest on the Ministry of Social Affairs alone, or with any specific group of ministries. It is rather a collective responsibility of all parties involved in the development process, with a special role for the government, including the entities concerned with the formulation of overall economic and social policies. In light of such a strategy, it is possible to identify the specific responsibilities to be entrusted to the various ministries, and the complementarities of their work, as well as the responsibilities that are the domain of the private and civil sectors

Bibliography

Afer, N. (2015). Determinants of Poverty in Rural Tigray:Ethiopia Evidence from Rural Households of Gulomekeda Wereda. *Journal of Poverty, Investment and Development , 10*.

Alain, Elisabeth. (2018). The Role of Non-Farm Incomes in Reducing Rural Poverty and Inequality in China. (p. 1001). Berkeley: unpublished working paper.

Alkire. (2016, March). Measuring Multidimensional Poverty: Dashboards, Union Identification, and the Multidimensional Poverty Index (MPI). *OPHI research in progress series 46a* .

Ana Damena, D. H. (2017). Effect of Non-farm Income on Rural Household Livelihood: A Case Study of Moyale District Oromia Regional State, Ethiopia. *American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS)* .

Arellano M. and Bond S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies , 58*, 277-97.

Berhane, Z. (2015). Non-farm diversification and its impacts on income inequality and poverty: evidence from rural Ethiopia. *Ethiopian Jornal of Development Research , 37* (2).

Bezabihandet.al. (2010). Participation in Off-Farm Employment, Risk Preferences, and Weather Variability:in the case of Ethiopia., (pp. 19-23). Cape Town, South Africa.

Bradshaw, T. K. Theories of Poverty and Anti-Poverty Programs in Community Development. *Community Development , 38* (1), 7-25.

Breitung J. and Pesaran M. H. (2005). *Unit Roots and Cointegration in Panel. CWPE 0535.Brooks, C.(2008). Introductory Econometrics for Finance.* (Second ed.). New York: Cambridge University.

Buchenrieder, J. M. (2011). Effects of Rural Non-farm Employment. *Quarterly Journal of International Agriculture* (3), 217-235.

Buchenrieder, J. M. (2011). Effects of Rural Non-farm Employment on Household Welfare and Income Distribution of Small Farms in Croatia. *Quarterly Journal of International Agriculture , 50* (3), 217-235.

Damilola. (2019). Effect of off-farm income on multi-dimensional poverty among rural farm households in Nigeria. *Internasional Journal of Social economics , 46* (9), 1081-1091.

Daniel. (2018). *Urban Poverty and its dynamics in Ethiopia:evidence from panel household survey.* Addis Ababa, Ethiopia: Unpublished paper.

Development, D. f. (2002). Non-Farm Income in Rural Areas. *Policy planing and implementation* .

Diran. (2010). Poverty and rural livelihood diversification among farming households in Sout West Nigeria. *Journal of food Agricultur and environment , 8*.

E. Philip Davis and Miguel Sanchez-Martinez. (2015). *an over view of the main economic theories relating to the cause and responses to poverty in the UK.* UK: Joseph Rowntree Fundation.

Escobar, J. A. (2002). Rural diversity, agricultural innovation policies and poverty reduction. *Agricultural Research & Extension Network* (122).

Foster. (2010, may 28). The Foster–Greer–Thorbecke (FGT) poverty measures: 25 years later. 491-524.

Gatenio, S. (2017). Benefits of Multidimensional Measures of Child WellBeing in China. *International Journal of Environmental Research and Public Health , 14* (11).

Goshu, A. (2015). *Multidimensional Poverty: Theory and Empirics.* University of Brescia: Unpublished Work.

Hadijah, S. (2012). Does Non-Farm Income Improve The Poverty and Income Inequality Among Agricultural Household In Rural Kedah? *Procedia Economics and Finance , 1*, 269-275.

Haggblade, S. (2010). The Rural Non-farm Economy: Prospects for Growth and Poverty Reduction. *world development , 30* (10), 1429-1441.

Institiut, D. (2016). *Definitions and measures of poverty.*

Janvry, Elisabeth Sadoulet, and Nong Zhu. (2005). The Role of Non-Farm Incomes in Reducing Rural Poverty and Inequality in China. *CUDARE Working Papers* , 1001.

Johannes. (2017). *Estimating Fixed Effects: Perfect Prediction and Bias in Binary Response Panel Models with an Application to the Hospital Readmissions Reduction Program*. Retrieved from https://dx.doi.org/10.2139/ssrn.3074193 or https://dx.doi.org/10.2139/ssrn.3074193.

Joshua. (2017). An analysis of multidimensional poverty and its determinant in rural Nigeria. *Journal of Development and Agricultural Economics , 19*, 303-311.

Kassieet.al. (2017). Determinant factors of livelihood diversification:evidences from Ethiopia. *Cognet Social scince , 3*.

Kebed, B. (2013). Dynamics and Drivers of consumption and multidimensional poverty in rural Ethiopia. *ECONSTOR* (7364).

Kowalski, J. (2016). Nonfarm Enterprises in Rural Ethiopia: Improving Livelihoods by Generating Income and Smoothing Consumption? *Ethiopian Journal of Economics Vol , XXV* (2).

Kuns, R. (Vienna, 2011). *Summary based on Chapter 12 of Baltagi:Panel Unit Root Tests.* Vienna.

M. Amjed Iqbal, A. A. (2018). Effect of Non-Farm Income on Poverty and Income Inequality: Farm Households Evidence from Punjab Province Pakistan. *Sarhad Journal of Agriculture , 34* (2), 233-239.

Mahembe, E. (2018). THE DYNAMICS OFEXTREME POVERTY IN DEVELOPING COUNTRIES. *28* (2).

Mekore, G. (2018). Determinants and its extent of rural poverty in Ethiopia: Evidence from Doyogena District, Southern part of Ethiopia. *Journal of Economics and International Finance , 10* (3), 22-29.

Mishra, A. R. (2017, September 7). Does non-farm income affect food security? Evidence from India.

Mohammed Adem, E. T. (2018). Income diversification and food security situation in Ethiopia: A review study. *Cogent Food & Agriculture , 4* (1), 1513354.

Mwadime, R. K. (1996). Non-farm employment in rural Kenya: micro-mechanisms influencing food and nutrition of farming households.

Naude, N. S. (2014). Non-Farm Enterprise Performance and Spatial Autocorrelation in Rural Africa: Evidence from Ethiopia and Nigeria. *Food policy , 67*, 175-191.

Parveen, S. (2018). The Rural Non-Farm Economy and Poverty Alleviation in Tehsil Sillanwali, District Sargodha. *European Online Journal of Natural and Social Sciences , 7* (3).

Pedroni P. (2000). Fully-Modified OLS for Heterogeneous Cointegration Panel. in Nonstationary Panels, Panel Cointegration and Dynamic Panels,. *working paper Advances in Economics , 15*, 93-130.

Pedroni P. (1999). Panel Cointegration: Asymptotic and finite samples properties of pooled time series Tests with an application to the PPP hypothesis. *Econ. Theory , 20*, 597-625.

Pedroni, P. (1999). Panel Cointegration: Asymptotic and finite samples properties of pooled time series Tests with an application to the PPP hypothesis. *Econ. Theory , 20*, 597-625.

Qaim, 1. B. (2010). Impact of off-farm income on food security and nutrition in Nigeria. *35* (4), 303-311.

Reardo, T. (2016). Rural non-farm income in developing countries.

Sabina Alkire and Maria Emma Santos. (2010/11). Acute Multidimensional Poverty: A New Index for developing countries. *World Development , 59*, 251-274.

Sabina Alkire, Adriana Conconi, Gisela Robles, José M. (2014). The Global Multidimensional Poverty Index (MPI): 5-year methodological note. *OPHI* .

Sanchez, E. P. (2014, August 20). A review of the economic theories of poverty.

Santos, S. A. (2011). Training Material for producing National Human. *Oxford Poverty & Human Development Initiative.*

Sen. (1976). Poverty: An Ordinal Approach to Measurement. *44* (2), 219-231.

Sen, A. (1983). Poor, Relatively Speaking. *35* (2), 153-169.

Seng, 1. K. (2015). The Effects of nonfarm activities on farm households' food consumption in rural Cambodia. *Development Studies Research , 2* (1), 77-89.

Shakila. (2019). Impact of income diversification on rural livelihood in some selected areas of Bangladesh. In *Journal of Bangladesh Agricultural University* (Vol. 17, pp. 73-79).

Trung. (2014). Non-Farm Activity, Household Expenditure, and Poverty Reduction in Rural Vietnam: 2002–2008.

WD. (2013). Disability and Poverty in Developing Countries: A Multidimensional Study. *41*, 1-18.

Woinishet. (2010). Participation into off-farm activities in rural Ethiopia: who earns more? .

Worldbank. (2017). *Growing the Rural Nonfarm Economy.* Washington. DC.

WorldBank. (2020). *Harnessing Continued Growth for Accelerated Poverty Reduction.* Washington DC.

Xiaolin Wang, Hexia, Sabina Alkire. (2016). On the Relationship between Income Poverty and Multidimensional Poverty in China. *Oxford Poverty & Human Development Initiative* (101).

Yacob. (2017). Implications of Non-Farm Work to Vulnerability to FoodPoverty-Recent Evidence From Northern Ghana. *World Development , 91*, 113-124.

Yang, D. T. (1997). Education and Off-Farm Work. *The University of Chicago Press journal , 45* (3), 613-632.

Zerihun. (2016). Non-farm Diversification and its Impacts on Income Inequality and Poverty: Evidence from Rural Ethiopia. *Ethiopian Journal of Development Research , 37* (2).

Appendix1:-*Model specification test*

Link test was used to test whether the model is correctly specified or no. since _hatsq is insignificant we are fell to reject that the null hypothesis, the model is correctly specified.

Probit regression Number of obs = 5,642

LR chi2(2) = 109.90

Prob > chi2 = 0.0000

Log likelihood = -1286.678 Pseudo R2 = 0.0410

Hi	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
_hat	1.051403	.7413446	1.42	0.156	-.4016062	2.504411
_hatsq	-.0168565	.2407486	-0.07	0.944	-.4887151	.4550022
_cons	-.0379792	.5637049	-0.07	0.946	-1.142821	1.066862

Appendix 2:- Endogeneity test and IV regression

Endogenous

First: Regress endogenous variable non-farm employment on IV variable (labor hours used for non-farm employment) and all exogenous variables.

non_farmemp	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
age_head	-0.025	0.005	-4.60	0.000	-0.036	-0.014	***
head_married	-0.423	0.228	-1.85	0.064	-0.869	0.024	*
Orthodox	0.616	0.242	2.54	0.011	0.142	1.090	**
Muslim	0.135	0.258	0.52	0.602	-0.371	0.640	
head_female	-0.129	0.234	-0.55	0.582	-0.587	0.330	
n_adult	0.070	0.123	0.57	0.570	-0.171	0.310	
o.n_adult	0.000	.	.	.	.	.	

Depratio	-0.057	0.136	-0.42	0.675	-0.324	0.210	
educ_head	0.003	0.007	0.49	0.624	-0.010	0.017	
shock_drought	-0.186	0.262	-0.71	0.477	-0.700	0.327	
shock_flood	0.247	0.443	0.56	0.577	-0.621	1.115	
shock_landslide	0.090	0.942	0.10	0.924	-1.757	1.936	
shock_heavyrain	1.407	0.437	3.22	0.001	0.550	2.263	***
shock_othercropdam~e	0.038	0.241	0.16	0.876	-0.434	0.509	
shock_livestockdeath	0.196	0.241	0.81	0.415	-0.276	0.669	
shock_natural	-0.225	0.279	-0.81	0.419	-0.771	0.321	
credit_access	0.563	0.135	4.18	0.000	0.299	0.827	***
d_asphalt	0.000	0.001	-0.21	0.833	-0.003	0.002	
d_town	-0.001	0.004	-0.29	0.768	-0.008	0.006	
d_market	0.002	0.006	0.28	0.778	-0.009	0.012	
d_prschool	-0.005	0.011	-0.43	0.666	-0.027	0.017	
d_hospital	0.001	0.003	0.31	0.754	-0.006	0.008	
d_CBE	-0.006	0.003	-1.79	0.074	-0.012	0.001	*
d_MFI	-0.008	0.003	-2.28	0.023	-0.015	-0.001	**
hh_size	0.149	0.069	2.16	0.031	0.014	0.284	**
Amahara	-1.862	0.304	-6.12	0.000	-2.457	-1.266	***
Tigray	-2.087	0.369	-5.65	0.000	-2.811	-1.363	***
Oromia	-1.563	0.288	-5.42	0.000	-2.128	-0.998	***
SNNP	-0.929	0.311	-2.98	0.003	-1.539	-0.319	***
Hoursfnonfarm_p	0.035	0.005	7.20	0.000	0.025	0.044	***
Constant	-1.139	0.505	-2.25	0.024	-2.129	-0.149	**
Constant	3.092	0.080	.b	.b	2.935	3.249	

Mean dependent var	0.301	SD dependent var	0.459
Number of obs	5642.000	Chi-square	185.672
Prob > chi2	0.000	Akaike crit. (AIC)	4804.165

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

Then predict v1hat

Second: estimate the original dependent variable Hi on all exogenous variable and v1hat. Since v1 hat is significant at 1%level of significant non-farm employment is endogenous. So, instrumental variable was used to solve the endogeneity problem.

Random-effects probit regression

Hi	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
non_farmemp	-0.438	0.131	-3.35	0.001	-0.694	-0.182	***
age_head	0.010	0.006	1.86	0.063	-0.001	0.021	*
head_married	-0.239	0.208	-1.15	0.252	-0.647	0.170	
orthodox	0.048	0.206	0.23	0.817	-0.356	0.451	
muslim	-0.153	0.208	-0.74	0.461	-0.561	0.254	
head_female	-0.245	0.202	-1.21	0.226	-0.641	0.151	
n_adult	-0.190	0.111	-1.71	0.088	-0.408	0.028	*
o.n_adult	0.000	.	.	.	.	.	
depratio	0.334	0.147	2.28	0.023	0.046	0.621	**
educ_head	-0.044	0.005	-8.63	0.000	-0.054	-0.034	***
shock_drought	0.362	0.297	1.22	0.223	-0.220	0.944	
shock_flood	0.251	0.494	0.51	0.611	-0.718	1.221	
shock_landslide	-0.607	0.847	-0.72	0.473	-2.266	1.053	
shock_heavyrain	2.012	0.665	3.02	0.002	0.708	3.315	***
shock_othercro	0.081	0.273	0.30	0.768	-0.454	0.616	

pdam~e							
shock_livestockdeath	0.676	0.301	2.25	0.025	0.086	1.266	**
shock_natural	-0.335	0.321	-1.04	0.297	-0.964	0.294	
credit_access	-0.068	0.143	-0.48	0.633	-0.349	0.212	
d_asphalt	0.001	0.001	0.54	0.588	-0.002	0.003	
d_town	0.008	0.004	2.01	0.044	0.000	0.015	**
d_market	0.000	0.005	0.08	0.937	-0.009	0.010	
d_prschool	0.017	0.021	0.80	0.422	-0.024	0.058	
d_hospital	-0.002	0.003	-0.50	0.617	-0.008	0.005	
d_CBE	0.001	0.003	0.21	0.833	-0.006	0.007	
d_MFI	-0.002	0.004	-0.70	0.482	-0.009	0.004	
hh_size	0.045	0.064	0.71	0.479	-0.080	0.171	
Amahara	-0.030	0.283	-0.11	0.915	-0.585	0.525	
Tigray	-0.748	0.316	-2.37	0.018	-1.367	-0.129	**
Oromia	0.096	0.262	0.37	0.713	-0.417	0.610	
SNNP	-0.182	0.230	-0.79	0.428	-0.634	0.269	
v1hat	-0.355	0.082	-4.31	0.000	-0.516	-0.193	***
Constant	2.010	0.418	4.81	0.000	1.190	2.829	***
Constant	0.954	0.186	.b	.b	0.590	1.319	

Mean dependent var	0.936	SD dependent var	0.245
Number of obs	5642.000	Chi-square	145.809
Prob > chi2	0.000	Akaike crit. (AIC)	2154.997

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

Appendix 3:-Mulicollinearity test

The variance inflation factor shows that the VIF of all variable is less than 10, so there is no multicollinearity problem.

Variance inflation factor

	VIF	1/VIF
shock natural	6.673	.15
shock drought	4.681	.214
SNNP	2.661	.376
Orthodox	2.647	.378
Muslim	2.595	.385
head married	2.402	.416
Amahara	2.391	.418
Tigray	2.217	.451
head female	2.169	.461
Oromia	1.885	.531
d CBE	1.663	.601
d town	1.617	.619
shock	1.508	.663
othercropdam~e		
d MFI	1.476	.678
shock	1.458	.686
livestockdeath		
hh size	1.371	.73
d hospital	1.345	.744
d market	1.315	.76
shock heavyrain	1.312	.762
d asphalt	1.208	.828
shock flood	1.205	.83
age head	1.117	.895
credit access	1.052	.951
non farmemp	1.047	.955
educ head	1.045	.957
d preschool	1.04	.962
shock landslide	1.034	.967
Mean VIF	1.931	.

Normality test result

As the joint result shows p>0.05 so the residual is normally distributed.

Skewness/Kurtosis tests for Normality

------ joint ------

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj_chi2(2)	Prob>chi2
resid	5,642	0.764	0.784	0.170	0.921

Marginal effects after xtivreg

y = Linear prediction (predict) = .9360156

variable	dy/dx	Std.Err.	z	P>z	95%	C.I.	X
non_fa~p*	-0.032	0.008	-4.030	0.000	-0.047	-0.016	0.301
age_head	0.001	0.000	2.500	0.012	0.000	0.001	47.074
head_m~d*	0.002	0.012	0.160	0.875	-0.022	0.025	0.767
orthodox*	-0.010	0.012	-0.820	0.410	-0.033	0.013	0.436
muslim*	-0.009	0.013	-0.700	0.486	-0.033	0.016	0.329
head_f~e*	-0.001	0.012	-0.070	0.940	-0.024	0.023	0.234
educ_h~d	-0.005	0.000	-12.400	0.000	-0.006	-0.004	2.658
shock_~t*	0.024	0.015	1.630	0.103	-0.005	0.053	0.215
shock_~d*	0.013	0.024	0.540	0.592	-0.035	0.061	0.017
shock~de*	-0.052	0.046	-1.120	0.261	-0.141	0.038	0.004
shock_~n*	0.054	0.022	2.440	0.015	0.011	0.098	0.022
shock~ge*	0.000	0.014	0.000	0.997	-0.028	0.028	0.065
shock_~h*	0.025	0.014	1.780	0.075	-0.003	0.053	0.061
shock~al*	-0.014	0.016	-0.910	0.361	-0.046	0.017	0.301
credit~s*	-0.018	0.008	-2.380	0.017	-0.033	-0.003	0.162
d_asph~t	0.000	0.000	0.540	0.592	-0.000	0.000	37.050

d_town	0.000	0.000	2.030	0.042	0.000	0.001	22.322
d_market	0.000	0.000	0.110	0.911	-0.001	0.001	14.365
d_prsc~l	0.000	0.001	0.650	0.517	-0.001	0.002	0.878
d_hosp~l	-0.000	0.000	-0.790	0.431	-0.000	0.000	15.906
d_CBE	0.000	0.000	0.790	0.428	-0.000	0.000	23.061
d_MFI	-0.000	0.000	-0.140	0.888	-0.000	0.000	20.859
hh_size	0.002	0.002	1.000	0.318	-0.002	0.005	5.050
Amahara*	0.045	0.014	3.210	0.001	0.017	0.072	0.225
Tigray*	0.012	0.018	0.690	0.492	-0.022	0.046	0.112
Oromia*	0.051	0.013	3.830	0.000	0.025	0.077	0.188
SNNP*	0.022	0.014	1.550	0.120	-0.006	0.049	0.258

(*) dy/dx is for discrete change of dummy variable from 0 to 1