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An Investigation on the Components of the Living Standards: Evidence from Ethiopia

Araştırma Makalesi /Research Article

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ABSTRACT: *Adaption of the 2030 Agenda for Sustainable Development in 2015 by United Nations member states is an urgent call for action to improve human lives while protecting environment. As any other developed and developing members, Ethiopia is also expected to response the call for action. Ethiopia is a country with high dependency on rain-fed agriculture, severe drought as a result of climate change and wrong human action, widespread poverty, and high dependency on humanitarian aid which requires a careful investigation to deal with its problematic situations. This paper offers a household level investigation on the components of living standards or welfare in Ethiopia, utilising COVID-19 High Frequency Phone Survey of Households 2020. Findings suggest that living area, ownership of dwelling, Access to water and electricity, having a rental income, and the number of household members significantly associated with the level of consumption, that are expected to provide guidance for policy makers.*

Keywords: *Ethiopia, Living Standards, Consumption, Household Level Data*

JEL Codes: *I31, I32, D10*

Yaşam Standartlarının Bileşenleri Üzerine Bir Inceleme: Etiyopya'dan Bulgular

ÖZ: *2015'te Birleşmiş Milletler üye devletleri tarafından 2030 Sürdürülebilir Kalkınma Gündemi'nin uyarlanması, çevreyi korurken insan yaşamını iyileştirmek için acil bir eylem çağrısıdır. Diğer gelişmiş ve gelişmekte olan üyeler gibi Etiyopya'nın da eylem çağrısına yanıt vermesi beklenmektedir. Etiyopya, yağmurla beslenen tarıma bağımlılığın yüksek olduğu, iklim değişikliği ve yanlış insan eyleminin bir sonucu olarak şiddetli kuraklığın olduğu, yaygın yoksulluğun ve insani yardıma yüksek bağımlılığın olduğu ve sorunlu durumlarıyla başa çıkmak için dikkatli bir araştırma gerektiren bir ülkedir. Bu çalışma, COVID-19 Yüksek Frekanslı Hane Halkı Telefon Anketi 2020'den yararlanarak Etiyopya'daki yaşam standartları veya refah bileşenleri hakkında hanehalkı düzeyinde bir araştırma sunmaktadır. Bulgular, yaşam alanı, mesken sahipliği, su ve elektriğe erişim , kira geliri olması ve hanehalkı üyesi sayısının tüketim düzeyi ile önemli ölçüde ilişkili olduğunu göstermektedir. Çalışmanın bulgularının politika yapıcılar için yol gösterici olması beklenmektedir.*

Anahtar Kelimeler: *Etiyopya, Yaşam Standartları, Tüketim, Hane Düzeyi Verileri*

JEL Kodları: *I31, I32, D10*

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1. Introduction

Adaption of the 2030 Agenda for Sustainable Development in 2015 by United Nations (UN) member states is an urgent call for action to improve human lives while protecting environment that covers 17 goals (UN, 2023a). Although this is an urgent action plan, progress does not seem sufficient in many countries. Sustainable Development Goals Report in 2023 by UN DESA highlights this slow progress to achieve the goals. Particularly, COVID-19 has worsen conditions for vulnerable groups from several aspects like economic, health, and social impacts. Insufficient investment in agriculture, insufficient protection of forests and wildlife, economic shocks, extreme poverty etc. may affect individuals permanently as mentioned in the report. In the progress report of UN General Assembly Economic and Social Council, it is seen that commitments are far behind the reality, that is to say, "*..preliminary assessment of the roughly 140 targets with data show only about 12% are on track; close to half, though showing progress, are moderately or severely off track and some 30% have either seen no movement or regressed below the 2015 baseline….Under current trends, 575 million people will still be living in extreme poverty in 2030 - and only about one third of countries will meet the target to halve national poverty levels. Shockingly, the world is back at hunger levels not seen since 2005 – and food prices remain higher in more countries than in the period from 2015-2019. The way things are going, it will take 286 years to close gender gaps in legal protection and remove discriminatory laws. And in the area of education, the impacts of years of underinvestment and learning losses are such that by 2030, some 84 million children will be out of school and 300 million children or young people who attend school will leave unable to read and write...*" (UN, 2023b:2). Therefore, each country should be examined in terms of their strengths and weaknesses, and they should act responsibly considering this bad picture of the world.

In the process of achieving sustainable development goals, most developing countries have considerable challenges. Sub Saharan Africa, in this respect, draws a particular attention as the region experience a variety of issues around access the food (Van Ittersum et al., 2016), national legitimacy (Jackson, 1992), water scarcity (Freitas, 2015), fatal diseases like HIV (Haeuser et al., 2022), growing income inequality (Sulemana et al., 2019), and many others. Identifying those problems and determining contributors of it are critical to progress in a sustainable way. Therefore, every efforts made to understand what each country needs, where the problem is, how to tackle with matter.

Ethiopia which is the case country of this paper is one developing sub Saharan African country. As any other developed and developing members, Ethiopia is also expected to response the call for action. Those 17 goals to achieve economic growth, combating issues on education, job opportunities, health, and social protection in an environmentally friendly way are as follows (UN Ethiopia, 2023):

No poverty; Zero hunger; Good health and well-being; Quality education; Gender equality; Clean water and sanitation; Affordable and clean energy; Decent work and economic growth; Industry, innovation and infrastructure; Reduced inequalities; Sustainable cities and communities; Responsible consumption and production; Climate action; Life below water; Life on land; Peace, justice and strong institutions; Partnerships for the goals. However, Ethiopia seems to be far behind these goals from several aspects. Even though there are efforts in the field, sub Saharan Africa might still be thought as understudied. The current paper, to that end, aims to fill this gap studying the case of Ethiopia using a nationally representative data of COVID-19 High Frequency Phone Survey of Households. Findings of this paper is expected to be useful in combating poverty and improving welfare of individuals in the region.

The rest of the paper is organised as follows: Section 2 reviews the literature in the field that focuses particularly on living standards, development goals, and Ethiopia. Section 3 discusses materials and methods to be used in the empirical investigation. Section 4 provides empirical findings from the probit analysis. Finally, Section 5 gives conclusion and policy implications based on the findings.

2. Literature Review

When considering sustainable development goals of the UN, there are variety of researches looking particularly into associations with the environmental or climate conditions in the developing countries. Access to energy is one challenge for billions of individuals, while it is also an important contributor to climate change (Kaygusuz, 2012). As well explained by Kaygusuz (2012), this directly influence individual wellbeing since relying on biomass instead of electricity causes thousands of premature deaths due to air pollution. Similarly, migration of numerous people to urban areas from rural areas accompanies insufficient infrastructures and services (Rodić and Wilson, 2017). Dumped uncollected waste in watercourses or vacant land or burned in the open air near the residences causes health risks to the residents, children in particular (Rodić and Wilson, 2017). Besides, these movements also give rise to water scarcity problem in urban areas (Vairavamoorthy et al., 2008) that influences individual wellbeing considerably. Since the role of health conditions increases across the world, healthy environment is considered as a human right in the Council of Europe (Keles, 2012).

Along with healthy environment, access to enough nutrition is fundamental to sustain the development. However, this is still a great concern for many countries, particularly in sub-Saharan Africa. Petrou and Kupek (2010) investigate the living standards of about three thousand children in Ethiopia, Peru, India and Vietnam using data from Young Lives project of childhood poverty. To measure the living standards, the study facilitates principal component analysis in which several variables used such as the number of people per room, access to electricity, source of water, owned devises like radio, fridge, TV, etc. to generate a wealth index that

is scaled from zero to ten. Findings of the maximum likelihood probit estimation show negative and statistically significant association between alternative measures of the living standards and childhood undernutrition in those developing countries. It is suggested that adverse effects of poverty on undernutrition accumulate during the early years of childhood.

Even though nutrition is thought to be the key necessity for individual wellbeing, it is not that simple to enable a decent life for human being. There are discussions in the literature about what each member of a society should have to live a decent life. Rao and Min (2018) address the issue as a matter of justice and a basis for resource allocation. Following the discussion about a basic minimum along with Amartya Sen's objection on converting sources into functioning, they propose specific components to satisfy basic physical and social wellbeing of individuals, which are nutrition, shelter, living conditions, clothing, health care, air quality, education, information and communication, mobility, and freedom to gather/dissent. However, those components are still not seen to be sufficient to ensure wellbeing and to overcome relative poverty considering significant disparities in society. Nowadays, social protection is also accepted within the elements of basic needs and capabilities which is in rise in developing countries (Barrientos and Hulme, 2009). Barrientos and Hulme (2009) describe this as a quiet revolution that could serve improving the welfare of poor and strengthening solidarity and security, although it does not widely overarching in several developing countries.

The case country that this paper investigate is Ethiopia. This country is highly dependent on agriculture that generates 32.8% of the country's GDP, produces 90% of exports, and employment for 72.7% of the total population (Assaye et al., 2022). Even though the process of development is extremely complex and difficult to attribute to a single element of it, one might still say that development of this country is mostly about agricultural development. Agricultural Development Led Industrialisation is Ethiopia's governmental development strategy to actualise goals of economic growth through agriculture sector (Mogues, 2011). Integrated Soil Fertility Management as one system technology is promoted by governments to improve household welfare. Hörner and Wollni (2021) investigate the effect of this agriculture technology on the household level welfare in Ethiopia. Empirical investigation was based on 2,059 households that cultivated in 2017 across three regions of highlands. Adoption of this particular technology was found to be positively associated with welfare outcomes of households in wet regions (i.e., Amhara and Oromia), while no impact was found in drier region (i.e., Tigray). This finding implies that regional differences should be considered to improve well-being of individuals in these regions. In Tigray region where mostly smallholder farmers were located, Gebrehiwot (2015) examines if agricultural extension system has any impact on the welfare via a survey of 730 households. Accordingly, findings suggest that Integrated

Household Extension Program contribute the welfare of rural households in this region.

Climate change creates a big burden for poor and agriculture-based economies like Ethiopia (Eshete et al., 2020). Using 2005/2006 Ethiopian social accounting matrix and macro level data, Eshete et al. (2020) investigate whether CO_2 emission affects productivity on agriculture and welfare of households in Ethiopia where carbon emissions were aimed to lower by 2025 as a result of climate-resilient green economy strategy. Findings of projections show that the effect of CO_2 emission on the welfare of household is negative, which means emission-induced reduction in the agricultural production worsen the welfare of households. Additionally, the loss of welfare is more evident for poor rural households with more agriculture dependency and limited income diversification. Agricultural policies seem to influence welfare of Ethiopian households considerably. In this manner, Shikur (2020) questions if price support policy which was applied in developed countries historically can increase productivity and thereby social welfare in a developing country, Ethiopia. Study draws important implications that are irrigation policies and adoption of precision agriculture increase household income and consumption; decrease the cost of production; and jointly increase productivity that would help eliminating poverty.

Moreover, water resources of the country is quite limited and access to water is a big challenge for poor agro pastoral households which have less labour for water collection and fewer assets for storage and transport (Tucker et al., 2014). Besides, as part of country's Sustainable Development and Poverty Reduction Program in 2002, reducing poverty was aimed by government which was reflected in rapid growth numbers between 2004-2008, although country also observed the highest rates of inflation in the history (Alem and Söderbom, 2012).

Related to this, despite all the policies and interventions, poverty and hunger are still important concerns in the country. Targets by 2030 indicate that poverty across the population to be reduced at least by half (Ethiopia, 2023). Therefore, every effort should be made to understand the dynamics of the welfare of Ethiopians, then efficient policy intervention should take place. This study, in this respect, is expected to provide considerable insights to understand which factors influence household welfare. Composition and levels of food consumption are important determinants of nutritional well-being that translates into productivity, health, and income (Berhane et al., 2011). Taking this fact into account, this study uses 10 rounds of COVID-19 High Frequency Phone Survey of Households in which consumption quintile (i.e., low and high) is chosen as a measure of living standards or welfare as dependent variable of the empirical investigation. A variety of independent variables are included in the probit model to explain the dependent variable. Studying with a household level and rounds of data consecrate this research.

3. Materials and Methods

COVID-19 High Frequency Phone Survey of Households 2020 was utilised in this paper to investigate living standards in the case of Ethiopia (Central Statistics Agency of Ethiopia, 2020). This data set which is provided by Central Statistics Agency of Ethiopia and the World Bank is publicly accessible for free through a registration process. The scope of harmonised data set includes both household and individual level data for variety of topics. For the purpose of this study, household level data is preferred.

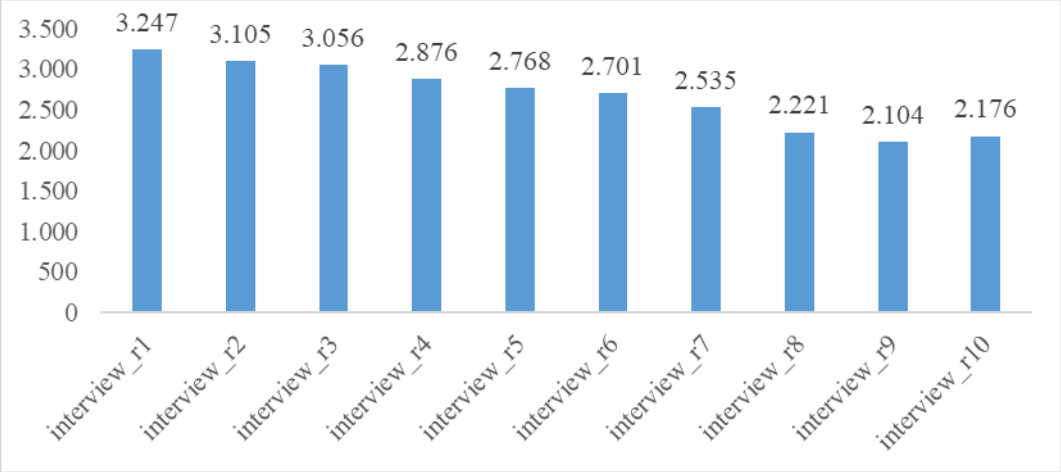
This sample is a subsample from harmonisation of Ethiopia Socioeconomic Survey and Ethiopia COVID-19 High Frequency Phone Survey of Households data. These surveys are nationally and regionally representative and based on random sampling method. This data set was produced by Living Standards Measurement Study team of the World Bank and the variables of it come from Ethiopia Socioeconomic Survey (ESS 2018-2019) and Ethiopia COVID-19 High Frequency Phone Survey of Households (2020) where the sample of households was drawn from those interviewed in ESS 2018-2019. A modular approach that allows for dropping/adding modules in different waves of the survey was used through Computer Assisted Telephone Interviewing. Participants from rural and urban areas were asked to provide phone numbers of their own or a reference number to be interviewed in the following stage. During the data collection, households were called every 3-4 weeks[2]. Household data consist of 6,770 cases for 11 rounds of the survey starting from 2018-09-01 to 2021-02-23. However, variables in the survey were given in the wide format (e.g. the number of female in Round 1, and the number of female in Round 2, etc. were given separately). To be able to use them in a more efficient way, those variables were reshaped in a long format that results larger number of observations. Each variable in each round does not have the same number of observations due to modular approach of the survey which results the number of cases to differ based on the variable selection in the analysis as seen in the final specification of the model in which the number of children in household and the number of working age adult in household were included. Still, author tried to select those variables observed for as many individuals as possible. Those number of households that were interviewed across survey rounds are given in Figure 1 below. While some of the households were interviewed only a few rounds, some completed all interviews in 10 rounds and some did none of them.

Consumption quintile might be used as a proxy to measure household welfare or living standards. While the poorest households (i.e. the lowest consumption) are grouped in the first quintile, those households with the largest consumption are grouped in the fifth quintile. Survey participants of COVID-19 High Frequency

[2] For more information on the data set, please visit https://microdata.worldbank.org/index.php/catalog/4072

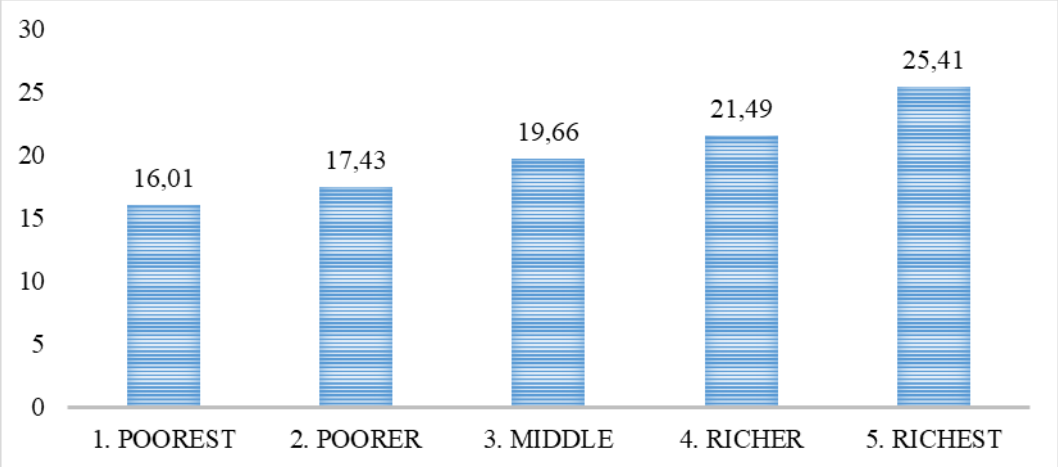
Phone Survey were asked to evaluate their consumption quintile. Corresponding answers are "1. Poorest", "2. Poorer", "3.Middle", "4.Richer", and "5. Richest". Distribution of the share of given answers are shown in Figure 2. According to the table, it is seen that the highest share of answer is seen in Category 5 (i.e. the richest). The richer and middle are followed it. 16 % per cent of respondents replied they are in the poorest quintile of consumption, while 17.43 per cent marked the poorer category. This survey question constitutes the dependent variable of the empirical analysis in this study. However, to have relatively more observations in given categories and to make the presentation of findings easier, this dependent variable was dichotomised and recoded as "0" if an individual replied being in middle or lower categories, and "1" if an individual replied being in the richer or richest categories.

Figure 1: The number of households interviewed in each round



Source: Own illustration.

Figure 2: Distribution of answers across categories (percentage)



Source: Own illustration.

Keeping in mind that living standards contain a wide range of elements that vary across individuals and development level of countries, this paper focus only a limited number of these potential elements due to data availability constraint. This study exploits the above mentioned data set as much as possible, in which each potential element of living standards in Ethiopia was involved here. Therefore, the current study aims to answer the following question:

- What is the relationship between area where a household live/ home ownership/ access to basic needs/ income sources/ land ownership/ household members and welfare of household?

Based on those question/objective, following hypothesis is formulated:

H1: There are significant differences between living in a rural area and living in an urban area/ homeowners and non-homeowners/ accessing to basic needs and not accessing to basic needs/ income sources/ landowners and non-landowners/ number of children in household/ the number of working age adult in household in welfare of household.

Validity of the hypothesis above is tested using nine independent variables in total in the analysis. Even though the dependent variable is likely to be influenced by several indicators, data constraint detain this research in this respect. In regard to those independent variables, it should be said that they are not always used directly as in survey. For example, survey contains the number of males and females separately in some particular age groups such as age 0 to 14, 15 to 64, 65 and above. To have total number of children, females and males aged 0 to 14 were summed up. Also, to have total number of working age adult, females and males aged 15 to 64 were summed up.

Even though this survey has relatively narrower range of indicators, still there are some questions that can be used to have an idea on the welfare of households. For this purpose, this investigation includes household indicators such as whether they own dwelling, they access to clean water, they connect to electricity, they have rental income, they receive remittances, they own land, and they live in urban or rural area. Additionally, the number of children in the household as dependant family members, and the number of working age population in the household as potential income earners are included.

Living in a rural or urban region might matter in terms of welfare of households as work and live conditions differ as highlighted by Epstein et al. (2003). Not only the area where households live, but also their access to certain services affects living standards of them. Therefore, inclusion of access to improved water, connection to electricity, ownership of land and dwelling is expected to have significant affect to explain welfare of households. Income is probably to most direct way to measure households' welfare. Hence, income sources of rent and remittances were also involved in the specification.

Descriptive statistics of the variables used in the empirical analysis are given in Table 1 below. Of the total survey participants, 54 per cent lives in urban areas, 64 per cent owns their dwelling, and 34 per cent own land. 14 per cent of them can access to improved water sources, and 68 per cent can connect to electricity. Regarding to the income sources, almost 7 per cent have a rental income, and 17 per cent receives remittances.

Table 1: Description and descriptive statistics of variables

Variable	Description		Frequency	Percentage
1. Consumption Quintile	0. Poor, 1. Rich	0	39,545	53.10
		1	34,925	46.90
2. Rural/Urban	0. Rural, 1. Urban	0	34,265	46.01
		1	40,205	53.99
3. Ownership of dwelling	0. No, 1. Yes	0	26,345	35.38
		1	48,125	64.62
4. Access to improved water source	0. No, 1. Yes	0	63,580	85.38
		1	10,890	14.62
5. Connection to electricity	0. No, 1. Yes	0	23,474	31.52
		1	50,996	68.48
6. Rental income	0. No, 1. Yes	0	69,311	93.07
		1	5,159	6.93
7. Received remittance	0. No, 1. Yes	0	61,754	82.92
		1	12,716	17.08
8. Ownership of land	0. No, 1. Yes	0	45,760	61.45
		1	28,710	38.55

		Obs.	Mean	SD	Min	Max
9. Number of children in household	Continuous variable	33528	1.60	1.59	0	14
10. Number of working age adult in household	Continuous variable	33528	2.60	1.33	0	14

Source: Own illustration.

This investigation models conditional probability of Ch =1 which is a successful outcome. Ch stands for consumption of a given household, whether it is poor or rich. Successful outcome, in this respect, refers to being rich (or being in a higher consumption quintile). The probability of this outcome s explained by the following equation:

$$P\,[Ch = 1|X1h, \dots, XKh; \beta 0, \dots, \beta K] = \phi(\beta 0 + \sum k = 1K\beta kXkh) \quad (1)$$

where Ch is the binary dependent variable, Φ is cumulative distribution function the standard normal distribution which states the probability of a success of outcome variable, that is represented by Ch =1, is a function of the linear combination of the regressors. Each specification of the model includes round variable to cover round-specific changes. The higher values of βX mean higher likelihood of the event to happen. With regards to the interpretation of the coefficient, a one-unit change in Xkh leads to a βk change in the z-score of C. However, this is not straightforward as linear models. Therefore, marginal effects are often used to interpret such models with binary or ordered dependent variable. Marginal effects are based on prediction of estimated model to interpret coefficients in a scale that makes sense. Regarding to weighting strategy in the analysis, cross section household weight that is provided in the survey is used.

Table 2: Pairwise correlations

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	1.00									
2	0.27*	1.00								
	(0.00)									
3	-0.06*	-0.48*	1.00							
	(0.00)	(0.00)								
4	0.04*	0.08*	-0.06*	1.00						
	(0.00)	(0.00)	(0.00)							
5	0.23*	0.50*	-0.33*	0.09*	1.00					
	(0.00)	(0.00)	(0.00)	(0.00)						
6	0.08*	0.08*	0.11*	0.01	0.07*	1.00				
	(0.00)	(0.00)	(0.00)	(0.15)	(0.00)					
7	-0.00	0.12*	-0.10*	0.07*	0.03*	0.01	1.00			
	(0.78)	(0.00)	(0.00)	(0.00)	(0.00)	(0.16)				
8	-0.24*	-0.85*	0.49*	-0.08*	-0.42*	-0.05*	-0.13*	1.00		
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
9	0.08*	-0.28*	0.27*	-0.02	-0.21*	-0.04	-0.10*	0.24*	1.00	
	(0.00)	(0.00)	(0.00)	(0.25)	(0.00)	(0.03)	(0.00)	(0.00)		
10	0.19*	-0.12*	0.24*	-0.03	-0.10*	0.08*	-0.09*	0.08*	0.13*	1.00
	(0.00)	(0.00)	(0.00)	(0.16)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	

Note: numbers used instead of variable names to save space. Those numbers refer to the same variable as in Table 1. * p<0.1

It is worth noting that a causal relationship occurs if exogeneity assumption holds. This means that independent and dependent variables are correlated but the causal link is not bilateral. More clearly, independent variable affects the dependent variable but dependent variable does not affects the independent variable. If dependent variable affects the independent variable, that means exogeneity assumption fails, causality problem may arise and it results biased estimates. In the case our investigation, it might be thought that ownership of dwelling

increases wealth (i.e., high consumption quintile), or only wealthy households who are presented in a high consumption quintile can afford owning of dwelling. To see if there is a high correlation between these variables, pairwise correlations among the variables used in the analysis were checked. Results of it is presented in Table 2.

It is seen that the correlation does not seem too high. Nevertheless, it would be a more robust way to find an instrument and apply an instrumental variable technique to make sure the findings of this investigation are not suffering from such bias. However, the difficulty of finding a good instrument refrain this study doing so.

4. Empirical Results

Probit model is preferred to examine the determinants of food insecurity. Four specification of the model is used to see how inclusion of particular independent variables influences the findings of this study. To process the data, STATA software was used.

Findings of four specifications are presented in Table 3. The first specification includes independent variables of living in rural or urban area, owning of dwelling, access to water, and connection to electricity. The first column that is called raw presents the coefficients of probit model, while the second column presents marginal effects of each variable. As seen in the first specification, all of the variables that are living in urban, ownership of dwelling, access to improved water source, and connection to electricity are found to be statistically significant indicators at 1 per cent significance level. More precisely, living in an urban area rather than a rural area decreases the probability of being in a rich quintile (i.e. higher welfare) by 25.7 percentage points. However, ownership of dwelling, access to water source, and connection to electricity also increases this probability by 11.2, 2.2, and 15.9 percentage points, respectively.

The next specification includes two income resources such as whether households have rental income and remittances. Inclusion of these two indicators does not have a significant effect on the previously significant indicators, and variables themselves are found to be statistically significant as well. It might be surprising to see having remittances to decrease household welfare. This finding is actually in line with Rivera-Batiz (1982). Rivera-Batiz (1982) argued that labour force declines through emigration that makes production possibilities curve of the country to shrink in the migrant-sending country. This eventually increases the price of non-traded goods (under certain assumptions that is widely discussed ibid) that would result a reduction of welfare of non-migrants. While having a rental income increases the welfare, remittances decreases it though its effect is smaller. The third specification has land ownership as another welfare indicator that is found negative and significant. The final specification has the size of dependant family members (i.e. children) and working age adults as well. These

two indicators are found positive and statistically significant at 1 per cent significance level, which implies that having more children and more working age adult increases the probability of being in a rich category though the effect of working age adults is larger in magnitude.

Table 3: Empirical findings

	1		2		3		4	
Variables	Raw	Marg.	Raw	Marg.	Raw	Marg.	Raw	Marg.
Rural/Urban								
Urban	-0.67*	-0.25*	-0.66*	-0.25*	-0.53*	-0.20*	-0.79*	-0.28*
	(0.01)	(0.00)	(0.01)	(0.00)	(0.02)	(0.00)	(0.03)	(0.01)
Ownership of dwelling								
Yes	0.31*	0.11*	0.28*	0.10*	0.29*	0.10*	0.13*	0.04*
	(0.01)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)
Access to improved water source								
Yes	0.06*	0.02*	0.06*	0.02*	0.06*	0.02*	0.12*	0.04*
	(0.01)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.02)	(0.00)
Connection to electricity								
Yes	0.42*	0.15*	0.41*	0.15*	0.41*	0.15*	0.42*	0.15*
	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)	(0.02)	(0.00)
Rental income								
Yes			0.26*	0.09*	0.26*	0.09*	0.39*	0.13*
			(0.02)	(0.00)	(0.02)	(0.00)	(0.02)	(0.09)
Received remittance								
Yes			-0.10*	-0.03*	-0.11*	-0.04*	-0.01	-0.00
			(0.01)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)
Ownership of land								
Yes					-0.16*	-0.06*	0.05	0.01
					(0.02)	(0.00)	(0.03)	(0.01)
Number of children in household							0.13*	0.04*
							(0.00)	(0.00)
Number of working age adult in household							0.21*	0.07*
							(0.00)	(0.00)
Constant	-0.28*		-0.25*		-0.26*		-0.91*	
	(0.02)		(0.02)		(0.02)		(0.03)	
Observations	74,470	74,470	74,470	74,470	74,470	74,470	33,528	33,528
Pseudo-R2	0.074		0.076		0.077		0.116	

Note: Each specification covers a round-indicating variable that help to absorb round-specific changes. Robust standard errors in parentheses. * p<0.01

Table 4: Empirical findings, comparison of Round 0 and Round 10

		Round 0		Round 10	
Variables		**Raw**	**Marg.**	**Raw**	**Marg.**
Rural/Urban					
	Urban	-0.662***	-0.235***	-0.914***	-0.324***
		(0.068)	(0.024)	(0.089)	(0.029)
Ownership of dwelling					
	Yes	0.059	0.020	0.148***	0.051***
		(0.042)	(0.014)	(0.045)	(0.015)
Access to improved water source					
	Yes	0.099**	0.034**	0.135***	0.047***
		(0.046)	(0.016)	(0.049)	(0.017)
Connection to electricity					
	Yes	0.449***	0.156***	0.414***	0.148***
		(0.041)	(0.014)	(0.059)	(0.021)
Rental income					
	Yes	0.347***	0.118***	0.377***	0.127***
		(0.069)	(0.023)	(0.070)	(0.022)
Received remittance					
	Yes	0.011	0.004	-0.032	-0.011
		(0.044)	(0.015)	(0.049)	(0.017)
Ownership of land					
	Yes	-0.060	-0.021	0.189**	0.064**
		(0.067)	(0.023)	(0.091)	(0.030)
Number of children in household		0.124***	0.042***	0.134***	0.047***
		(0.010)	(0.003)	(0.013)	(0.004)
Number of working age adult in household		0.252***	0.086***	0.213***	0.074***
		(0.014)	(0.004)	(0.015)	(0.005)
Constant		-0.959***		-0.833***	
		(0.058)		(0.078)	
Observations		6,770	6,770	5,230	5,230
Pseudo-R2		0.136		0.105	

Robust standard errors in parentheses. * p<0.01, ** p<0.05

This finding is expectable considering the fact that adults are likely to work to increase household welfare. Children, in this respect, might also work for this purpose. In less developed countries, education is not that widespread as

developed countries. Therefore, children are likely to contribute household's welfare, even though their monetary contribution is likely to be less than adults. However, this should be treated with caution considering a potential issue of causality (i.e., if the higher consumption quintile, or a higher welfare, is related to more children in the household). It might be useful to check whether the findings differ between pre-Covid and Covid periods. To check if this is the case, another two specifications were added and they are presented in Table 4.

The first specification covers the analysis for Round 0 when the data collection started on 2018-09-01 and ended on 2019-08-31 (i.e. pre-Covid), while the second specification covers the analysis for Round 10 when the data collection started on 2021-02-01 and ended on 2021-02-23 (i.e. during Covid). Both of the specifications has all of the independent variables used in Specification 4. It is seen that the coefficient of urban is larger in magnitude for Round 10, while both are negative and significant. Ownership of dwelling and ownership of land are found to be positive and significant in Round 10 though they are not statistically significant in Round 0. Although the effects of the rest of the independent variables are similar, the magnitudes of them vary slightly.

Findings of this further analysis indicate some important impacts due to the pandemic. First, living in an urban area rather than a rural area decreases the probability of being in a rich quintile more than the pre-Covid period. Secondly, while owning the dwelling and land were not significant indicators of household welfare, they become significant contributors in the Covid period. Additionally, the importance of the access to water sources and having a rental income increased in this period. Notwithstanding, the welfare contribution of the number of working age adults in the household decreased, although it is still positive. The labour market during the pandemic has been volatile and considerable job losses have been observed. Relatedly, it is likely to have adults who lost their jobs, which translates into lower contribution to the household welfare. Considering restrictions during the pandemic, it is well expected to have access to water is a great advantage for households. Related to potential income loses of households as a result of economic impacts of Covid-19, owning the dwelling and land, and having a rental income are expected to ease household's situation.

5. Concluding Remarks

Sustainable development goals clearly states that all countries must act together to improve human lives without any harm on the environment in a fast pace. Ethiopia is one of those countries, however, concerns over extreme poverty that is about struggling to meet basic needs remain significant. According to UN Ethiopia Annual Results Report 2020/2022 Ethiopia was ranked 175 out of 191 countries in Human Development Index, and the number of people who are in need of humanitarian assistance increased from 8.4 million in 2020 to 29 million in 2022. Very high dependency onto rain-fed agriculture and deteriorated

environmental conditions through human action and climate change have worsen conditions in this country.

Even though living standards imply a complex structure, Ethiopia is a developing country where even basic needs have not been met commonly in society. Also, there is a considerable data availability concern for researches. Taking these facts into account, this study simply considers household consumption as a measure of living standard due to data constraint. Probit model suggests that living in an urban area rather than a rural area decreases the probability of being in the rich quintile, however, ownership of dwelling, access to water source, and connection to electricity also increases this probability. Besides, having a rental income increases the welfare, while remittances decrease it. Finally, having more children and more working age adult increases the probability of being rich category though the effect of working age adults is larger in magnitude.

The further analysis distinguish pre-Covid period and Covid period to see if there are any differences before and after. Results of this particular analysis show that the importance of some elements used in this investigation became more important during the pandemic. It is likely to think in a way that, limited resources to fight with the virus, job loses, breakdown in the demand and supply chain etc. seem to influence living conditions of Ethiopian households. Access to basic needs like water and alternative income resources like rental income were seen being more important during the pandemic.

Findings of this study might be used by policy makers to improve living standards of Ethiopians. Considering agriculture as a key element of the Ethiopian economy, using improved technology that would provide a higher crop productivity via decreased use of water, pesticides, fertilizer, etc. is likely to lower risks over those households who make a living from agricultural activities. Moreover, a widespread coverage of insurance would also serve to lower that risk. Also, improved water access should be assured to all households by local authorities for health and safety. Last but not the least, job creation in formal sector that would cover considerable numbers of working age Ethiopians seem to be very important to increase welfare in the society.

It is worth mentioning a few limitations of the current study. First, consumption quintile was considered as a measure of living standards or welfare of Ethiopian in this study. However, welfare of a household is likely to involve several factors to take into account together. Hence, this measure may not be a sufficient indicator, although it provides considerable insight in this developing country with a high level of extreme poverty. Nevertheless, this study is expected to contribute to limited literature of the welfare of sub-Saharan African countries. Secondly, the right hand side variables might be diversified to get more information on the determinants of consumption. Nevertheless, data availability pose a challenge to have that diversity. This is likely to be made in the existence

of a data set with more variables in the future surveys, although time period might be limited in such a case.

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