Multidimensional Poverty and Inequality in Urban Ethiopia[1,*]

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Abstract

Poverty reduction and ensuring fair distribution of resources have been among the core agenda of the Ethiopian government for decades. This study estimates the extents of urban monetary and multidimensional poverty and inequality at national and regional levels. The multidimensional poverty and inequality indices estimated constitute indicators grouped under four dimensions– education, health, living standards and monetary poverty. Associations to the micro-, community- and macro-level factors are made using simple simulations and econometric models. Data primarily come from ESS 2015/16. Results reveal large prevalence of food and nonfood poverty coupled with nonmonetary deprivations in housing and cooking fuels. Monetary poverty rates of incidence, gap and severity in 2015/16 are found to be higher than the official figures. Multidimensional poverty in urban Ethiopia is one of the highest, with more than half of it coming from monetary poverty followed by deprivations in living standards, health and education. Despite smaller values of multidimensional inequality index and inequality among the multidimensionally poor, disparities among regions exist. Deprivations, poverty and inequality seem to fall with urbanization and national rates are generally found to mask disparities among population groups. Besides demographic and geographic factors, receiving remittance, access to credit, availability of microfinance institutions and primary schools at community-level, and food price shocks are among the factors that are associated with various indicators of household welfare. Policy options include provision of basic public services, promoting access to microcredit, installment of fair distribution/redistribution systems and use of multidimensional approach to welfare measurement by the government.

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1.   Introduction

Urbanization in poor countries has been viewed by some development theorists as an integral part of economic growth, poverty reduction and distributional change (Ravallion, Chen and Sangraula, 2007; Todaro and Smith, 2012). However, these claims are not well supported by empirical evidence so far. Fast urbanization in developing countries over the past few decades has led to more people worldwide living in urban than in rural areas since 2007. In 2020, over 56 percent of the world's population lived in cities/towns which is projected to reach over 68 percent by 2050 (UN, 2018). Countries in sub-Saharan Africa (SSA) register the highest recent urban growth rates averaging over 4.2 percent per annum in the last four decades (1980-2020). Over the same period, Ethiopia's urban population grew by over 4.7 percent per annum, making 21.7 percent of the total population to live in urban areas in 2020. This is projected to almost double to 39.1 percent (or 74.5 million people) in 2050 (UN, 2018).

Against expectation, the urbanization of SSA has rather been correlated with poverty and inequality. For example, the urban share of the money poor in the region grew from 24.3 to 30.2 percent during 1993-2002 when the urban population share rose from 29.8 to 35.2 percent (Ravallion, Chen and Sangraula, 2007). Showcasing inequality, growth in most cities and towns of SSA has also been associated with slum growth as evident from the change in their slum[3] household population between 1990 and 2014 by over 115 percent to reach about 201 million (UN-HABITAT, 2016). Besides the natural population growth, rural-urban migration is to blame for unregulated urban growth. Capacities of urban areas are pushed away from their limits of providing employment, housing, basic services (water, health, education, electricity), etc. These mean that urban dwellers may be deprived in multiple welfare indicators so that poverty and inequality analyses need to pursue a multidimensional approach. A very recent estimate using surveys done in 40 SSA countries over 2010–2018 shows that over 29 percent of urban residents live in acute multidimensional poverty, representing about 86 million of 326.5 million of the 2017 urban population in those countries (UNDP and OPHI, 2019). The same report shows for Ethiopia that 37 percent (or about 6 million of 16 million) of urban dwellers are poor multidimensionally.

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[3] A slum household is defined as that lacking one or more of the following conditions: access to improved water, access to improved sanitation, sufficient living area, durability of housing, secure tenure (UN-HABITAT, 2016).

Income or expenditure has traditionally been used as a standard indicator of welfare, aggregated as indices such as FGT (Foster, Greer and Thorbecke, 1984) for poverty and Gini coefficient for inequality. A feature of this unidimensional approach is that it depends on market prices to compute the monetary values of goods consumed. However, the fact that markets are imperfect in many developing countries and that consumption includes public goods whose market prices are inexistent has put the approach under strong criticism, calling for a systematic inclusion of nonmonetary dimensions (Tsui, 2002). The multidimensionality of welfare is recognized by the SSF report (Stiglitz, Sen and Fitoussi, 2009), the 'Atkinson' report commissioned by the World Bank (World Bank, 2017), and very importantly by UN's Human Development Report through publication of multidimensional poverty and inequality indices (UNDP, 2010, 2015, 2019) and its Sustainable Development Goals (SDGs). A multidimensional approach is based on a shortfall from a threshold on indicators of someone's wellbeing (Bourguignon and Chakravarty, 2003) and summaries can be computed as a multidimensional poverty index (MPI) (Alkire and Foster, 2009, 2011) and inequality index (Seth and Alkire, 2014).

Poverty reduction and fair distribution of resources have been among the core agenda of the Ethiopian government for decades. These are at least reflected in its policy and strategy documents including Sustainable Development and Poverty Reduction Program (SDPRP) (MoFED, 2002), Plan for Accelerated and Sustained Development to End Poverty (PASDEP) (MoFED, 2006), and Growth and Transformation Plan (GTP) I and II (MoFED, 2010; NPC, 2016). These and related efforts have helped declines in the proportion of people living in poverty in the last couple of decades. For example, over the 20-year period spanning 1995/96–2015/16, poverty headcount rate fell from 45.5 to 23.5 percent (NPC, 2017, Table 10). In urban areas, the reduction was slightly higher, from 33.2 to 14.8 percent. Other unidimensional poverty measures (poverty gap and severity indices) also dropped during the same period.

However, the absolute number of people living in poverty declined only slightly (from 25.6 to 21.4 million) over the reference period (1995/96–2015/16) (NPC, 2017, Figure 4). When nonmonetary dimensions are considered, the poverty situation in the country is even far higher as the percentage of the population in multidimensional poverty using 2016 survey data was 83.5 percent (or 85.5 million people) (UNDP, 2019). Over half of the overall multidimensional

poverty is contributed by deprivations in living standards. Moreover, among all the countries considered for the global multidimensional poverty index (MPI), Ethiopia has the biggest difference between incidences of multidimensional poverty (83.5 percent) and monetary poverty (27.3 percent) based on the poverty line of $1.90 per person a day (UNDP and OPHI, 2019). Hence, poverty still is a concern in Ethiopia and a lot of work awaits ahead to achieve the Sustainable Development Goal (SDG) of ending poverty in all its forms by 2030.

Moreover, inequality in resource distribution has been rising in Ethiopia over the past decades. Official figures show that the Gini coefficient using unidimensional (expenditure) approach increased from 0.29 to 0.33 in the country and from 0.34 to 0.38 in urban areas between 1995/96 and 2015/16 (NPC, 2017). Though this indicator of monetary inequality among people in Ethiopia is still lower compared to that in other countries in East Africa (World Bank, 2020), the fact that it is getting higher over time is worrisome. Rising inequality not only constrains the country's efforts to meet SDG 10 of reducing inequality by 2030 and to maintain economic and social stability, but also severely undermines the poverty reduction role of economic growth. Therefore, reduction of poverty and inequality should continue as among the primary tasks of the Ethiopian government. This requires, among other things, timely assessments using state-of-the-art methods which this study takes on.

Recent empirical studies estimate poverty at national level in Ethiopia. These include MoFED (2012), NPC (2017), Sender (2019), Shimeles (2019), Woldehanna & Araya (2019), and World Bank (2010, 2016, 2020). The studies apply unidimensional indicators (income or expenditure levels) to determine welfare status. However, as noted earlier, welfare is multidimensional that income or expenditure is deficient in defining one's experience of poverty. Nonmonetary indicators capturing lack of capabilities need to be considered, including lack of education, health, housing, clean water, sanitation, electricity supply, empowerment, employment, personal security, information, etc. The multidimensional approach to poverty is well suited to analyze this. Yet, only few empirical evidences are available in Ethiopia at national level applying such a technique (World Bank, 2015; Bersisa and Heshmati, 2016, 2021; Seff and Jolliffe, 2016; Tigre, 2018; Goshu, 2019; Belete, 2021). For urban Ethiopia, no recent systematic evidence investigating poverty in this framework is available to our best knowledge.

With regards to inequality, previous studies in Ethiopia at national level (Geda, Shimeles and Weeks, 2009; Woldehanna and Araya, 2019) and subnational level (Nebebe and Rao, 2016; Teka, Woldu and Fre, 2019) primarily use unidimensional (expenditure-based) Gini coefficients. Despite the multidimensionality of inequality in resource distribution (UNDP, 2015), official inequality estimates are also unidimensional (MoFED, 2012; NPC, 2017). Some analyze inequality using a dashboard of monetary and nonmonetary outcomes (Kedir, 2015; Argaw, 2017). Only a couple of studies attempt to assess multidimensional inequality at national level (Goshu, 2019; Tigre, 2020). In fact, UNDP has recently started reporting multidimensional inequality indices alongside its MPI for over 100 countries including Ethiopia (UNDP, 2019; UNDP and OPHI, 2019). Apart from providing index estimates, these reports lack detailed contextual investigations and disaggregations by population groups and indicators.

This study seeks to assess multidimensional poverty and inequality thereby filling the existing evidence gaps and directing policy interventions in Ethiopia. Specifically, it seeks to answer: (i) What are the extents of monetary and multidimensional poverty and inequality at national, regional levels and other population group levels? and (ii) How are micro-, community- and macro-level correlate with multidimensional urban poverty and inequality? For answering these, the study employs available advanced methods in unidimensional and multidimensional welfare analysis. The estimated indices contain 12 indicators under four dimensions–education, health, living standards and monetary poverty. A mix of individual- and household-level characteristics are captured. Indicators in education and health dimensions contain capabilities of individuals which are then aggregated to the household. Indicators and their deprivation cut-offs are related to the wider literature, SDGs, the global MPI, national goals, and are also customized to the Ethiopian urban context. Unidimensional indices of poverty and inequality as well as their multidimensional extensions (Alkire-Foster index for poverty and Seth-Alkire index for inequality) are analyzed. Decompositions of results by selected population groups and dimensions/indicators and links to the macroeconomy and urbanization are also made. Simple simulations and econometric models are run to have an idea of the micro- and community-level factors that are associated with household welfare. The study primarily uses Ethiopia's LSMS-ISA dataset (ESS 2015/16) in addition to data and information collected from CSA, NPC, NBE, and other sources.

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The remainder of the paper is organized as follows. The next section presents the research methods including the data. After results are presented and discussed in section three, the last section provides conclusions and policy implications.

2.   Research Methods and the Dataset

2.1   The Dataset: Ethiopia Socioeconomic Survey

The study primarily uses the urban sub-sample of the 2015/16 wave of Ethiopia Socioeconomic Survey (ESS). Collected jointly by the World Bank and the Central Statistical Agency (CSA) as part of the Living Standard Measurement Study-Integrated Surveys of Agriculture (LSMS-ISA) project, ESS was initiated in 2011/12 in rural and small towns. Its 2013/14 and 2015/16 waves included samples from medium and large towns. ESS uses a stratified, two-stage design where regions of Ethiopia serve as the strata (CSA and World Bank, 2017). While the first stage involves selection of primary sampling units or enumeration areas (EAs), the second stage entails the selection of households using simple random sampling. In 2015/16, a total of 4,954 households were interviewed which host over 23,393 individuals. A third of them were sampled from urban areas (small, medium and large towns[4]) which this study focuses. Data cleaning produces a usable urban sample of 1,625 households (411 or 25% from small towns and 1,214 or 75% from medium and large towns) (Table A1 in the Appendix). As expected, the majority were drawn from the largest regions of Oromia (21%) and Amhara (18%). About 15% were also sampled from the city of Addis Ababa. As a multi-topic survey, ESS contains individual-, household- and community-level data. Individual data on demographics, education, health, expenditures, and time use are also collected while household data include expenditure, assets, shocks, non-farm enterprises, credit and farm production. Community-level data on various social services as well as on prices from local markets are available. Data for the dimensions of multidimensional poverty and inequality analysis are extracted from the various modules of ESS.

Although ESS is the principal data source, the study also used supplementary data and information from other sources. For example, data on

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[4] CSA's definition of town size is used: Small town: less than 10,000 population; medium town: 10,000–100,000 & big town/city: more than 100,000 (CSA and World Bank, 2017). However, the ESS dataset used here does not discriminate between medium and large towns; we only have two groups: small town, and medium/large town.

urbanization are collected from CSA; information on microfinance come from the National Bank of Ethiopia; and government expenditure and related official statistics are obtained from the Ministry of Planning and Development.

2.1.   Data Analysis Methods

The study follows procedures of the AF framework (Alkire & Foster, 2009, 2011) to identify households as multidimensionally poor. These tools provide raw (unweighted) deprivation headcount ratios for each indicator which are equivalent to the headcount ratio of the FGT family of indices. We then compute AF multidimensional poverty indices and undertake subgroup decomposition. Multidimensional poverty and inequality among the multidimensionally poor are also computed based on Seth & Alkire (2014). For the multidimensional analyses, the procedures also provide weighted deprivation count, censored multidimensional poverty headcount ratio, average intensity of deprivations, adjusted multidimensional poverty index and multidimensional inequality index. Regressions are lastly used to identify the correlates of multidimensional poverty and inequality in urban Ethiopia.

2.1.1.   *Dimensions and indicators*

We use 12 indicators categorized in four dimensions that represent the welfare of the household. Some of the indicators capture access to and utilization of basic infrastructural services such as education, health, water, sanitation, electricity, housing. Others measure food and nonfood poverty as well as access to information. The fact that children's deprivations are considered through nutrition and education also helps capture the future welfare of the society. The dimensions, indicators and their deprivation cut-offs are chosen based on the literature, SDGs and global MPI. Yet, attempts are made to customize them to the Ethiopian urban context.

Table 1 provides the selected dimensions, indicators, weights, and deprivation thresholds for constructing multidimensional poverty and inequality indices.

The tool developed by Alkire & Foster (2009, 2011), implemented by (UNDP, 2010) since 2010 and Alkire & Santos (2014) for a host of countries and referred by many as the global MPI, is a widely accepted framework for multidimensional poverty analysis. The global MPI primarily uses Demographic

and Health Surveys (DHSs) for its data needs but advises contextualizing choices of dimensions and indicators according to needs. Hence, this paper first opts for using LSMS rather than DHS dataset since the former contains income and expenditure data which DHSs lack. Second, given that housing is one challenge in many urban settings, we consider the number of people living per room above a certain limit (overcrowding) as one deprivation which is not available in the global MPI. Third, our indices contain a monetary poverty dimension. Yet, we keep eight indicators of the global MPI with little adjustment of moving drinking water and sanitation deprivations to the health dimension.

Table 1: Dimensions, indicators, weights and deprivation cut-offs for multidimensional welfare

Dimension (weight)	Indicator (weight)	Deprivation cut-off	Indicator in Global MPI?
Education (1/4)	Formal education (1/8)	Any household member has no formal education (SDG4.6).	Yes
	Child enrolment (1/8)	School-age child not currently attending school (SDG4.1).	Yes
Health (1/4)	Child nutrition (1/12)	Child (6-83 months-old) is stunted (height-for-age z-score<-2) (SDG2.2; WHO).	Yes
	Safe water (1/12)	Unsafe source of drinking water (SDG6.1; WHO).	Yes
	Sanitation (1/12)	Unimproved toilet facility (SDG6.2).	Yes
Living standards (1/4)	Electricity (1/20)	No access to electricity (SDG7.1).	Yes
	Cooking fuel (1/20)	No improved cooking fuels (SDG7.1).	Yes
	Overcrowding (1/20)	Over 3 people live per room (SDG11.1; UN-Habitat).	New
	Floor (1/20)	Floor is natural, non-permanent material (SDG11.1).	Yes
	Information (1/20)	No TV/ radio/mobile phone/ fixed phone.	New
Monetary poverty (1/4)	Food poverty (1/8)	Adult per-capita food expenditure is below the national food poverty line (SDG1.2; NPC).	New
	Nonfood poverty (1/8)	Adult per-capita nonfood expenditure is below the national nonfood poverty line (SDG1.2; NPC).	New

Note: WHO=World Health Organization. NPC=National Planning Commission. TV=Television. SDG=Sustainable Development Goal. SDG1.2: Reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions. SDG2.2: End all forms of malnutrition. SDG4.1: Ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes. SDG4.6: Ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy. SDG6.1: Achieve universal and equitable access to safe and affordable drinking water for all. SDG6.2: Achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations. SDG7.1: Ensure universal access to affordable, reliable and modern energy services. SDG11.1: Ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums. In 2015/16, official annual adult equivalent food, nonfood and overall poverty lines were birr 3772, 3412 and 7184 respectively (NPC, 2017).

Education is an important indicator of present and future capability. Two indicators–years of schooling and compulsory child enrolment–form the education dimension. Whether any household member has no formal education captures deprivation in years of schooling while deprivation in child enrolment is measured by presence of any school-age child not in school. Indicator of school enrolment for children of compulsory school-age, which is 7 to 17 years in Ethiopia, is widely used in the literature (Alkire and Santos, 2014; Seff and Jolliffe, 2016) and goes in line with national standards and SDG targets. The health dimension is represented by three indicators capturing lacks in human capital functioning and other health issues. The first is child nutrition measured in terms of stunting. Following Seff & Jolliffe (2016) and WHO (2006), we use two more indicators which are traditionally included in the standards of living dimension (access to safe drinking water[5] and sanitation) to strengthen the health dimension. Education and health dimensions represent the extent of access to and utilization of basic infrastructural services and contain a certain element of intrahousehold inequality.

The five indicators in the living standards dimension are similar for all members and capture the household public goods component of welfare. They primarily measure deprivations in other basic services including housing, electricity, cooking fuel and information. Housing is one of the major problems in urban Ethiopia where we capture it here as whether over three people live per room (Santos and Villatoro, 2018). Quality of the floor is another housing indicator. The choice of informational assets over all other assets is also motivated by the literature and applied on Ethiopian data (Plavgo *et al.*, 2013). Deprivation cut-offs of the indicators are chiefly taken from SDG targets and national ones.

As can be seen from Table 1, monetary poverty is incorporated as a fourth dimension. The monetary dimension may be considered as capturing both present and future capabilities. It is composed of two indicators: food poverty and nonfood poverty. In this paper, consumption aggregates into food and nonfood expenditure as done by the World Bank's LSMS team are used and compared with the country's official absolute poverty lines (NPC, 2017). Regional price differences are assumed away. One challenge of including a monetary indicator in a multidimensional index is its possible correlation with nonmonetary

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[5] This is captured by improved water sources defined as consisting of water piped into a dwelling, water piped into a yard or plot, a public tap or standpipe, a tube-well or borehole, a protected dug well, a protected spring, bottled water, or rainwater (WHO, 2006).

indicators which may ultimately affect weights given to them. However, using similar dataset used here, Seff & Jolliffe (2016) find that monetary and multidimensional poverty are not correlated. There is growing research favoring the inclusion of a monetary dimension in multidimensional welfare measurement (Sen, 1999; Atkinson, 2003; Stiglitz, Sen and Fitoussi, 2009). For example, Sen notes that "the role of income and wealth has to be integrated into a broader and fuller picture of success and deprivation" (Sen, 1999, p.20). Recent works have also estimated multidimensional poverty indices with monetary poverty (Bersisa and Heshmati, 2016, 2021; Rippin, 2016; Burchi, Rippin and Montenegro, 2018; Santos and Villatoro, 2018; World Bank, 2018; Goshu, 2019; Belete, 2021). For instance, Bersisa & Heshmati (2016, 2021) and Goshu (2019) in their multidimensional poverty index for Ethiopia include a monetary dimension with an indicator taking 1 if the household's adult per-capita expenditure is below the national poverty line. World Bank's first multidimensional poverty indices for various countries also incorporate a monetary indicator that the household consumes below the international US$1.90 per day per person line (World Bank, 2018).

2.1.2. *Identifying the poor and aggregating multidimensional poverty and inequality*

We follow the AF framework (Alkire & Foster, 2009, 2011) to identify households as multidimensionally poor. The single indicator raw deprivation rates or headcount ratios (h_j) for each indicator j are computed as:

$$h_j = \frac{1}{N} \sum_{i=1}^{N} I_{(0,1)}\left(y_{ji} \leq z_j\right)$$

where $I_{(0,1)}\left(y_{ji} \leq z_j\right)$ is an indicator function taking 1 if the expression in parenthesis is satisfied and 0 otherwise; y_{ji} is attainment by household i in indicator j; z_j is the cut-off in indicator j, also called indicator-specific poverty line; and N is the number of households. Note also that raw deprivations provide the proportion of households who are deprived in a specific indicator, regardless of whether they are deemed multidimensionally poor, i.e. they are not censored by the multidimensional deprivation status (Apablaza and Yalonetzky, 2012). These are equivalent to the poverty headcount ratio (P_0) in the FGT indices

(Foster, Greer and Thorbecke, 1984). The traditional FGT indices are used to estimate monetary poverty headcount (P_0), gap (P_1) and severity (P_2) rates.

The sum of weighted deprivations (C_i) for each household i, also called deprivation score, is

$$C_i = \sum_{j=1}^{D} w_j I_{(0,1)}\left(y_{ji} \leq z_j\right)$$

where w_j is the weight given to indicator j; and D is the total number of indicators. Censoring at the cut-off and averaging helps get the aggregate multidimensional poverty headcount ratio (H) as

$$H = \frac{1}{N} \sum_{i=1}^{N} I_{(0,1)}(C_i \geq k)$$

where k is the multidimensional poverty cut-off. Optionally, once the poor are identified, this can be expressed as $H = \frac{q}{N}$ where q is the number of the multidimensionally poor. Following Alkire and Santos (2014) and (UNDP, 2019), a household is then identified as multidimensionally poor if it is deprived in at least a third of the weighted deprivations, i.e. $h_i = I_{(0,1)}(C_i \geq k)$ where $k = 0.33$. We also consider other thresholds to see the sensitivity of multiple deprivations to the choice of these cut-offs[6].

The average intensity of multidimensional deprivations (A) or average percentage of weighted deprivations (as a proportion of the maximum number of possible deprivations) suffered by the multidimensionally poor households is given by

$$A = \frac{1}{N*D*h_j} \sum_{i=1}^{N} I_{(0,1)}(C_i \geq k) * C_i.$$

The adjusted multidimensional poverty index (M) is then simply given by the product

$$M = H * A.$$

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[6] UNDP (2019) considers people in the range 0.20–0.33 as vulnerable to multidimensional poverty while those with a deprivation score of 0.50 or higher are in severe multidimensional poverty.

For decomposing multidimensional poverty into dimensions/indicators and population subgroups, we proceed as follows. The percentage contribution (Q_j) of indicator j to the adjusted multidimensional poverty M is:

$$Q_j = \frac{1}{N * D * M} \sum_{i=1}^{N} I_{(0,1)}\left(y_{ji} \leq z_j\right) * I_{(0,1)}(C_i \geq k)$$

where the terms on the right-hand side are as defined previously. Such a decomposition provides information that can be useful for revealing the country's deprivation structure and can be helpful to policy (UNDP, 2019). If we have S number of population subgroups, the percentage contribution of each subgroup s (e.g. urban region) to the adjusted multidimensional poverty index M is extracted from the identity:

$$\frac{m_1(\frac{N_1}{N})}{M} + \frac{m_2(\frac{N_2}{N})}{M} + \cdots + \frac{m_s(\frac{N_S}{N})}{M} = 1$$

where m_s is the value of M in subgroup $s = 1, 2, \ldots, S$ and N_s is the number of households in each subgroup. Each element at the left-hand side of the equation is, therefore, the contribution of a specific subgroup.

As noted by Sen (1976), a measure of poverty needs to satisfy three important aspects– incidence, intensity and inequality. The AF counting approach to poverty based on ordinal indicators lacks the inequality aspect (Seth and Alkire, 2014; Rippin, 2016; Burchi, Rippin and Montenegro, 2018). A poverty measure that is insensitive to inequality does not provide incentives to the policymaker to prioritize the conditions of the poorest. In other words, we need a measure of inequality in order to understand whether a poverty alleviation policy has been equitable across the poor. Although multidimensional poverty index can still be decomposable, it is inconclusive regarding the disparity across socio-demographic subgroups.

This study employs the measure suggested by Seth & Alkire (2014) which Abeje *et al*. (2019) also applied to Ethiopian data. The traditional Gini coefficient (G) is also used to measure inequality in monetary terms (consumption expenditure). The multidimensional inequality index (I_h) among the multidimensionally poor suggested by Seth & Alkire (2014) is

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$$I_h = \frac{4}{q} \sum_{i=1}^{q} [C_i - A]^2$$

where q is the number of multidimensionally poor households; C_i is the weighted deprivation score of households i; and A is the intensity of multidimensional poverty, as defined earlier. It can also be computed for the whole household population by using the overall average deprivation score and leaving the denominator q so that we denote the index by I.

Weighting of dimensions and indicators is important in multidimensional welfare analysis. We opt to provide equal weights to all dimensions, and each indicator in a dimension is similarly equally weighted. This is the tradition in most of the literature. However, depending on the availability of further information and assumptions made, one may also assign subjective weights (Decancq, Fleurbaey and Maniquet, 2019) or statistically-computed weights (Bersisa and Heshmati, 2016; Tigre, 2018). Besides basing our choices of dimensions and indicators on the literature and attempting to customize them to the Ethiopian urban context, we undertake a statistical procedure to test if the indicators and their weights are relevant following Goshu (2019). We estimate linear pairwise and nonlinear tetrachoric correlations between the chosen indicators and the computed multidimensional poverty and inequality measures whose results are summarized in Table A3, all the correlations with the weighted deprivation score and multidimensional poverty as well as with the multidimensional inequality (except one indicator) are highly significant confirming that our chosen indicators along with their weights are appropriate to analyze multidimensional poverty and inequality in urban Ethiopia.

2.1.3. *Identifying correlates of multidimensional poverty and inequality*

To gain an understanding of the significant correlates of single deprivations, monetary poverty, and multidimensional poverty and inequality, econometric models are estimated. Such analyses supplement non-parametric descriptive analyses on the links between multidimensional urban poverty and inequality and various micro-, community- and macro-level factors. They also help identify constraints, opportunities and policy implications for reducing poverty and inequality in urban Ethiopia. However, these estimations do not aim to find the determinants of multidimensional poverty and inequality.

The general model takes the form $Y_i = X\beta + \varepsilon_i$ where Y_i measures the status of household i in monetary poverty, multidimensional poverty or multidimensional inequality; vector X represents the potential correlates with their parameters β; and ε_i is the error term. Since multidimensional inequality is difficult to measure at the household level, we proxy it by a squared variation of the household deprivation score from the average deprivation score. For those related to monetary and multidimensional poverty, a binary logit is estimated while for multidimensional inequality, a simple ordinary least squares model is estimated.

3.   Results

3.1   Characteristics of urban households

Table 2 provides the characteristics of households for the full urban sample and by town size. 41% are headed by females which is slightly higher in medium and large towns (43%). Head's average age is 42 years and 37% of them are younger than 35 years with those in medium and large towns significantly younger. Average household size is 3.9 persons. Over the year preceding the survey, 15% of the households took credit of at least birr 500. More than a third of them have at least one migrating member over the past two years for various reasons which reaches almost half in small towns. In a tenth of the households there exists some form of child labor and this is over thrice more prevalent in small towns (20%) than in medium/large towns (6%). While illiteracy is significantly higher in small towns (42%) compared to that in medium/large towns (23%), completing a certain level of education is not.

Overall, food and nonfood monthly expenditures are significantly higher among households living in medium/large towns than in small towns. About 1 in 10 urban households receive international remittances. Price and non-price shocks are also rampant in urban Ethiopia. For example, about 30% faced food price rises during the previous year with no significant disparities by town size. Health, primary school, and microfinance branches are reported to be available at community (enumeration area) levels in over two-thirds of the households where small towns are better than medium or large towns.

Table 2. Demographic and socioeconomic characteristics of urban households by town size

Variable	All urban Ethiopia		Small town	Medium/large	Test for difference
	Mean	SD	Mean	Mean	p-value
Household head is female	0.41	0.492	0.39	0.43	0.123
Household head's age	42.25	14.941	44.29	43.45	0.049**
Household head is young (<35y)	0.37	0.482	0.27	0.35	0.003***
Household size	3.88	2.127	4.35	3.84	0.000***
Household head is married	0.59	0.492	0.65	0.56	0.003***
Household head is Christian	0.82	0.387	0.73	0.82	0.002***
Household head is Muslim	0.18	0.384	0.26	0.18	0.002***
Household has migrant members	0.38	0.485	0.48	0.32	0.000***
Household head is working	0.58	0.493	0.57	0.57	0.926
Any child is working	0.10	0.297	0.20	0.06	0.000***
Share of females in working age (15-60y)	0.56	0.302	0.55	0.56	0.420
Head's education: illiterate	0.26	0.438	0.41	0.23	0.000***
Head's education: elementary	0.29	0.453	0.29	0.32	0.282
Head's education: high school	0.22	0.416	0.11	0.22	0.000***
Head's education: above high school	0.23	0.422	0.18	0.23	0.044**
Monthly expenditure (adult equivalent)	885.44	675.314	697.74	1027.43	0.001***
Monthly food expenditure (ad. eq.)	577.71	513.900	480.03	668.75	0.027**
Monthly nonfood expenditure (ad. eq.)	261.49	263.327	201.05	302.11	0.001***
Household owns the dwelling	0.48	0.500	0.66	0.42	0.000***
Taken credit of at least birr 500 in a year	0.15	0.353	0.14	0.15	0.550
Received international remittances	0.09	0.281	0.06	0.10	0.003***
Shock faced: food price rise	0.29	0.455	0.27	0.32	0.033**
Shock: non-price	0.11	0.309	0.11	0.10	0.443
Community has health clinic	0.76	0.428	0.85	0.74	0.000***
Community has public primary school	0.76	0.425	0.80	0.76	0.095*
Community has microfinance institution	0.69	0.464	0.74	0.68	0.028**

Notes: SD=Standard deviation. *, ** & *** show an estimate in small towns is statistically different from that in medium/large towns at 10%, 5% & 1% level, respectively. For categorical variables, proportion chi-square test is used. All observations are weighted to make estimates representative.
Source: Based on data from ESS 2015/16.

3.1   Unidimensional Deprivations, Poverty and Inequality

Measuring welfare using only monetary indicators gives FGT poverty incidence of 38%, intensity or gap at 13% and severity of 6% (Table 3). Corresponding official figures during the same year (2015/16) in urban Ethiopia are much lower at 15%, 4% and 1.4% (NPC, 2017)[7]. Although the incidence of monetary poverty does not significantly vary with head's sex, poverty gap and severity are higher among female-headed households. Households in small towns are worse off in all measures of monetary poverty. Unlike previous findings (NPC, 2017; Goshu, 2019), our estimates also show that urban monetary poverty measures are lower than national averages in Addis Ababa and regions with higher rate of urbanization such as Tigray. On the other hand, urban monetary poverty in the regions of Amhara and SNNP stay above the national averages. Monetary inequality measure (Gini coefficient) based on consumption expenditure in urban Ethiopia is estimated as 0.37 which contrasts with the official figure of 0.38 for the same year. Differences exist when disaggregated by town size and regions where the metropolitan Addis Ababa has the lowest Gini at 0.31 while urban areas of SNNP region are the most unequal at Gini of 0.46.

Table 3: Monetary poverty and inequality indices in urban Ethiopia: 2015/16

	Poverty headcount (P_0)	*Poverty gap (P_1)*	*Poverty severity (P_2)*	*Gini Coefficient (G)*
All urban Ethiopia	0.38	0.13	0.06	0.37
Head's sex				
Male	0.37	0.12**	0.05**	0.37
Female	0.41	0.15	0.07	0.37
City/town size				
Medium/large	0.33***	0.10***	0.04***	0.35
Small town	0.55	0.22	0.12	0.37
Urban region				
Addis Ababa	0.26	0.07	0.03	0.31
Amhara	0.50	0.17	0.08	0.35
Oromia	0.37	0.13	0.07	0.34
SNNP	0.39	0.14	0.07	0.46
Tigray	0.32	0.09	0.03	0.36
Other regions	0.37	0.15	0.08	0.34

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[7] However, this should be taken carefully; ESS's food expenditure data are on selected items which may overestimate food and overall poverty rates.

Notes: *, ** & *** show an estimate of a group (e.g., male) is statistically different from that of the other group just below it (e.g., female) at 10%, 5% & 1% level, respectively.[1] In 2015/16, official annual adult equivalent poverty line was birr 7,184 (NPC, 2017). All observations are weighted to make estimates representative. SNNP=Southern Nations, Nationalities and Peoples. "Other regions" represents the regions of Afar, Benishangul-Gumuz, Gambella, Harari and Somali, and Dire Dawa city administration. ESS data are not separately representative in these regions.
Source: Based on data from ESS 2015/16.

Nonmonetary deprivation rates for the whole sample and for selected socioeconomic groups are presented in Table 4. Monetary food and nonfood poverty indicators are also reported. In general, there is considerable deprivation in indicators of living standards besides high prevalence of food and nonfood poverty. There also exist certain disparities in deprivations when disaggregated by head's sex and town size. Deprivations in education in urban Ethiopia are the lowest of all the deprivations measured. 6% of households have any member not receiving formal education with similar proportion reporting to host a school-age child not in school during the time of the survey. In a tenth of the households, their lives at least one under-seven child whose height-for-age is below WHO's standards (stunted). This child nutrition deprivation is substantially higher in male-headed households (13%) than in female-headed ones (5%). Drinking water is still not safe for 7% of the urban households in the sample and female-headed households are slightly worse off (9%). Sanitation constitutes the largest deprivation within the health dimension where 27% lack improved sanitation facilities, reaching as high as 39% among households in small towns.

Table 4: Unidimensional deprivations in monetary and nonmonetary welfare indicators in urban Ethiopia by head's sex and location: 2015/16

| Dimension	Indicator	All sample: urban Ethiopia	Head's sex		Town size	
			Male	*Female*	*Medium/ large town*	*Small town*
Education	Formal education	0.06	0.04**	0.07	0.05	0.08
		(0.008)	*(0.010)*	*(0.012)*	*(0.008)*	*(0.020)*
	Child enrolment	0.06	0.05	0.06	0.06	0.06
		(0.006)	*(0.009)*	*(0.010)*	*(0.007)*	*(0.011)*
Health	Child nutrition	0.10	0.13***	0.05	0.09	0.12
		(0.012)	*(0.016)*	*(0.010)*	*(0.013)*	*(0.026)*
	Safe water	0.07	0.06*	0.09	0.08	0.06
		(0.016)	*(0.012)*	*(0.025)*	*(0.019)*	*(0.022)*
	Sanitation	0.27	0.26	0.29	0.23***	0.39
		(0.027)	*(0.029)*	*(0.034)*	*(0.030)*	*(0.053)*
Living standards	Electricity	0.10	0.07	0.15	0.09	0.14
		(0.032)	*(0.020)*	*(0.056)*	*(0.041)*	*(0.039)*
	Cooking fuel	0.80	0.80	0.80	0.75***	0.95
		(0.030)	*(0.033)*	*(0.034)*	*(0.039)*	*(0.019)*
	Overcrowding	0.13	0.15*	0.10	0.12	0.16
		(0.013)	*(0.018)*	*(0.017)*	*(0.015)*	*(0.031)*
	Floor	0.53	0.50	0.56	0.47***	0.73
		(0.036)	*(0.037)*	*(0.044)*	*(0.046)*	*(0.041)*
	Information	0.09	0.05***	0.15	0.07***	0.18
		(0.016)	*(0.012)*	*(0.026)*	*(0.020)*	*(0.027)*
Monetary poverty	Food poverty	0.29	0.27*	0.32	0.25***	0.42
		(0.023)	*(0.026)*	*(0.027)*	*(0.025)*	*(0.047)*
	Nonfood poverty	0.68	0.69	0.68	0.64***	0.81
		(0.023)	*(0.028)*	*(0.028)*	*(0.027)*	*(0.033)*

Notes: *, ** & *** show an estimate of a group (e.g., male) is statistically different from that of the other group just on the right (e.g., female) at 10%, 5% & 1% level, respectively. [1]In 2015/16, official annual adult equivalent food, nonfood and overall poverty lines were birr 3772, 3412 and 7184 respectively (NPC, 2017). Standard errors in parentheses. All observations are weighted to make estimates representative.
Source: Based on data from ESS 2015/16.

Deprivations in indicators of living standards are amongst the highest in urban Ethiopia. For example, 1 in 10 households has no electricity while an overwhelming 80% (95% in small towns) use unimproved cooking fuels. Partly proxying the housing problem, 13% of households have at least three of their members living in a single room. Over half of the houses have their floor made from natural, non-permanent material. This deprivation reaches about three quarters in small towns and is yet a major concern in medium and large towns (47%). About 1 in 10 households (as high as 1 in 5 in small towns) is disconnected from current information due to lack of information-providing assets. People in female-headed households are also highly deprived in information (15%). Food poverty is also high in urban Ethiopia where about 29% could not meet the national poverty line of birr 3772 per year per adult equivalent. Female-headed households (32%) and those living in small towns (42%) are the most affected in food poverty; and yet a quarter living in medium and large towns are food-poor. During the same period (2015/16), the official food poverty headcount rate in urban Ethiopia was reported as 15% while 28% in 2010/11 and 35% in 2004/05 (NPC, 2017). Nonfood poverty at 68% is over twice higher than food poverty which significantly varies by town size.

Figure 1: Deprivations in monetary and nonmonetary indicators in urban Ethiopia by region (%)
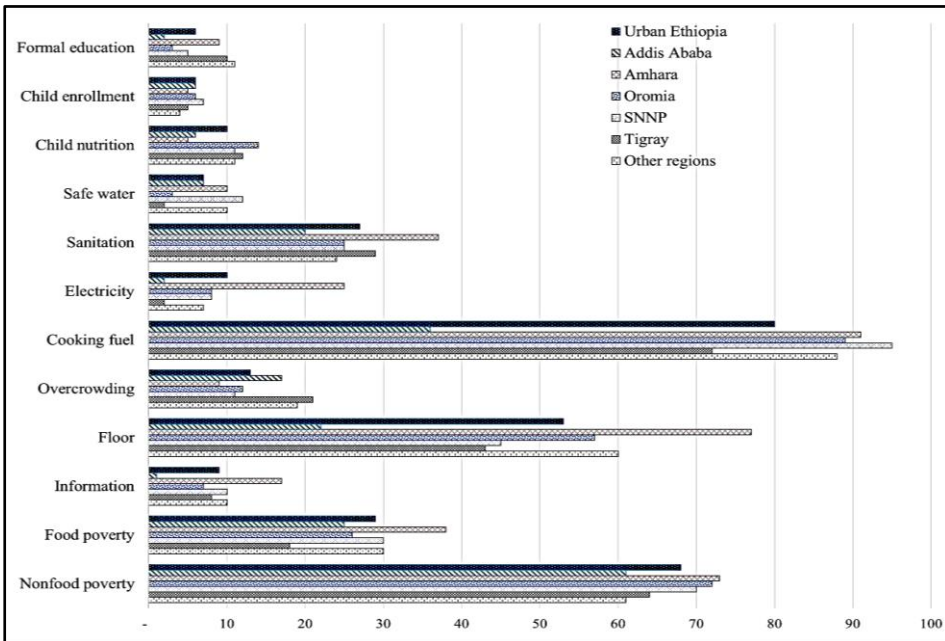
Notes: All observations are weighted to make estimates representative. SNNP=Southern Nations, Nationalities and Peoples. "Other regions" represents the regions of Afar, Benishangul-Gumuz, Gambella, Harari and Somali, and Dire Dawa city administration. ESS data are not separately representative in these regions.
Source: Based on data from ESS 2015/16.

Evidence on regional disparity in deprivations is depicted in Figure 1. Substantial variations exist in deprivations in almost all indicators across regions in urban Ethiopia. Compared with the national urban average (6%), deprivation in formal education is higher in Tigray (10%), Amhara (9%) and other less populated regions (11%) while Addis Ababa (2%) and Oromia (3%) are better performers. Deprivation in child enrolment is almost equally distributed in all regions. Nutrition deprivation measuring if any under-seven child is stunted in the household is the highest in Oromia followed by Tigray, SNNP and other regions. Concerning access to safe drinking water, SNNP (12%), Amhara (10%) and other regions (10%) have deprivations above the national average of 7%. Lack of sanitation is among the deprivations having big regional differences with Amhara region (37%) followed by Tigray (29%) performing poorly compared with Addis Ababa (20%).

Amhara region is also an outlier in terms lack of access to electricity with a quarter of urban households deprived while the national average is 10% and that in Addis Ababa is 2%. Use of unhealthy cooking fuels is the most widespread across all regions in urban Ethiopia. This deprivation ranges from 95% in SNNP region to 36% in Addis Ababa. Housing deprivation in terms of overcrowding (if more than 3 people live per room) also exhibits regional disparities ranging from 21% in Tigray to 9% in Amhara regions. However, housing quality is questionable where 77% of households in Amhara region live in houses whose floor are built with only natural and non-permanent materials. Oromia and other regions also have floor deprivations higher than the national average. Housing floor deprivation is expectedly the lowest in Addis Ababa (22%) compared with other urban areas in the country though still higher for a metropolitan city. This adds to the result that the City has one of the highest overcrowdings (17%). Information deprivation is the lowest in Addis Ababa and is the highest in urban areas of Amhara region. With regards to food poverty, except the outliers Amhara region (38%) and Tigray (18%), the headcount figures remain between 25% and 30%. Apart from worrisome higher incidences throughout, no substantial differences are noticed among regions on nonfood poverty.

Before analyzing the overall picture of poverty and inequality in a multidimensional context, it is worthwhile to see the deprivation score that is the weighted sum of deprivations in all indicators. This is depicted as a density curve in Figure A1 in the Appendix, disaggregated by town size and region. There exist large disparities in overall household deprivation across towns and regions. Notably, small towns and Amhara region have the highest accumulation of multidimensional deprivation in urban Ethiopia since their distribution curves remain atop of other comparison groups. In contrast, medium and large towns, and hence Addis Ababa, have the lowest cumulative deprivations.

3.2   Multidimensional Poverty and Inequality

Multidimensional poverty and inequality measures in urban Ethiopia are summarized in Table 5. There exists high incidence of multidimensional poverty (H) where 30% of the households lives below the multidimensional poverty line with high intensity (A) reaching 45% of the deprivations in weighted indicators. These make the adjusted multidimensional poverty index (M) 0.13. These compare with the estimates by UNDP & OPHI (2019) using DHS 2016 data for incidence, intensity and adjusted MPI in urban Ethiopia as 37%, 44% and 0.16 respectively although they do not include a monetary poverty dimension.

With regards to multidimensional inequality, the overall index in urban Ethiopia is estimated as 0.10 while the inequality among the multidimensionally poor is 0.048. An almost similar index for inequality among the multidimensionally poor for Ethiopia reported at the Human Development Report using DHS 2016 data is 0.024 (UNDP, 2019) whereas Seth & Alkire (2014) estimate a higher value of 0.129 for 2011, hinting that inequality among the poor rose between 2011 and 2016. In contrast, using a different approach and estimating for urban and rural areas, Goshu (2019) finds that multidimensional inequality increases with urbanization.

The issue of how multidimensional poverty and inequality vary with the choice of the multidimensional poverty cut-off is worth discussing. We estimate these measures at various cut-offs and summarize results in

Table A2 of the Appendix. At the worst extreme, i.e. if multidimensional poverty line is being deprived in at least 5% of the weighted indicators (*k=0.05*), we find 95% of households would be multidimensionally poor with an average intensity of 28% thereby making adjusted MPI of 0.26. Inequality among the multidimensionally poor stands at 0.094. At the other extreme cut-off of 0.80 or more, only 0.1% are multidimensionally poor with average intensity of 85% but

almost none is in MPI. Inequality among the multidimensionally poor is 0.001 implying almost all at the highest deprivation cut-off are equally poor. UNDP (2019) defines that when the weighted deprivation score falls in the range 0.20–0.33 a household is vulnerable to multidimensional poverty; while at 0.50 or higher, severe multidimensional poverty sets in. Accordingly, another 30% of households is at risk of sliding into multidimensional poverty in urban Ethiopia while 7% lives in severe multidimensional poverty.

3.3   Decomposition of Multidimensional Poverty and Inequality

3.3.1   *Decomposition by gender and location*

Female-headed families are worse off in terms multidimensional welfare. Multidimensional poverty is significantly higher in households headed by females (0.15) compared to those headed by males (0.12) (Table 5). The difference comes from both incidence and intensity of poverty. Multidimensional inequality and the inequality among the multidimensionally poor are also substantially higher among female-headed households relative to the national urban average and male-headed households.

Table 5: Multidimensional poverty and inequality indices in urban Ethiopia: 2015/16

	Multi-dimensional poverty headcount	Average intensity of deprivations (A)	Adjusted multi-dimensional poverty index (M)	Multi-dimensional inequality (I)	Inequality among the multi-dimensionally poor
Urban Ethiopia	0.30	0.45	0.13	0.10	0.048
Head's sex					
Male	0.29*	0.44*	0.12*	0.09**	0.039**
Female	0.33	0.47	0.15	0.12	0.057
City/town size					
Medium/large	0.25***	0.45	0.11***	0.10	0.045
Small town	0.49	0.46	0.22	0.10	0.051
Urban region					
Addis Ababa	0.14	0.41	0.05	0.07	0.024
Amhara	0.43	0.46	0.20	0.11	0.045
Oromia	0.32	0.44	0.14	0.10	0.043
SNNP	0.31	0.46	0.14	0.11	0.057
Tigray	0.24	0.43	0.10	0.08	0.021
Other regions	0.30	0.46	0.14	0.12	0.086

Notes: k=0.33 is used as multidimensional poverty cut-off. *, ** & *** show an estimate of a group (e.g., male) is statistically different from that of the other group just below it (e.g., female) at 10%, 5% & 1% level, respectively. All observations are weighted to make estimates representative. Standard errors are not reported for brevity; they can be available upon request. SNNP=Southern Nations, Nationalities and Peoples. "Other regions" represents the regions of Afar, Benishangul-Gumuz, Gambella, Harari and Somali, and Dire Dawa city administration. ESS data are not separately representative in these regions. Source: Based on data from ESS 2015/16.

Regarding the distribution across regions, considerable disparities are observed particularly on the proportion of people living in multidimensional poverty. Like in the case of single and weighted deprivations, households in urban Amhara region at incidence, intensity and adjusted MPI of 43%, 46% and 0.20, respectively, are the most multidimensionally poor while those in Addis Ababa city are the least poor at 14%, 41% and 0.05. Urban areas in Oromia and SNNP regions are also other hotspots of multidimensional poverty. There is some regional variation in multidimensional inequality. A notable finding is that the most urbanized Tigray region and Addis Ababa city have the lowest overall multidimensional inequality and that among the multidimensionally poor.

Figure 2: Contributions of population groups to multidimensional poverty in urban Ethiopia: 2015/16
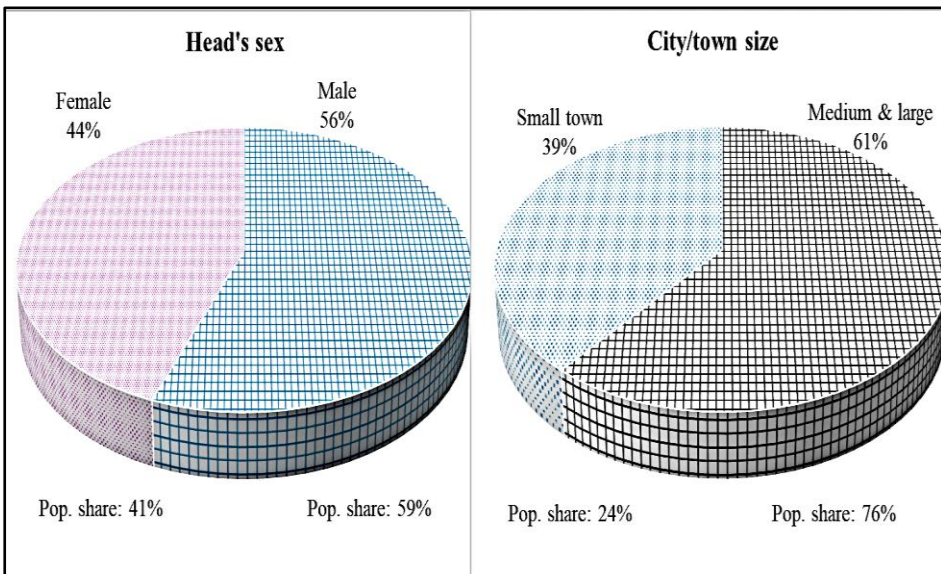
Source: Based on data from ESS 2015/16.

After one considers their population shares, how do various population groups contribute to overall multidimensional poverty? Figure 2 contains results for selected groups using the AF decomposition procedure. It is found that female-headed households are slightly overrepresented in multidimensional poverty as they contribute 44% while their share in the urban population is lower at 41%. The contribution of households in small towns (39%) is also huge compared to their population share (24%).

Figure 3: Contributions of regions to multidimensional poverty in urban Ethiopia 2015/16
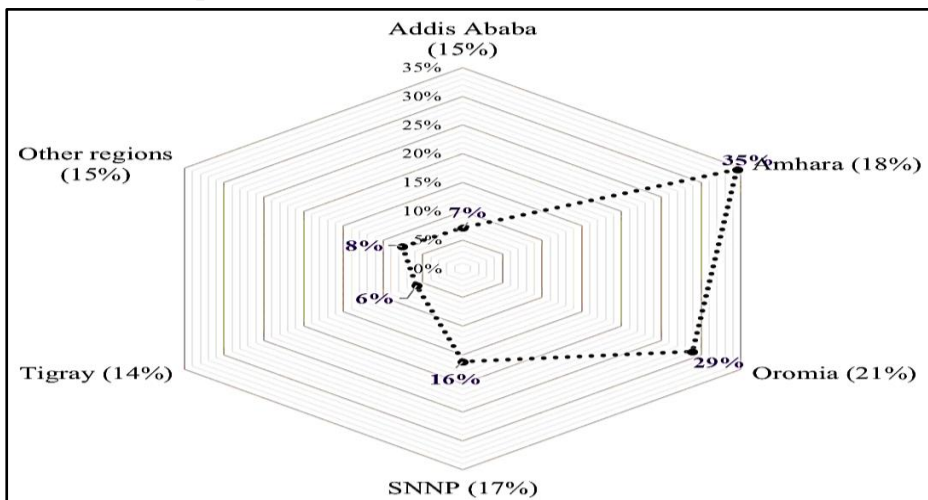
Notes: Figures in parentheses represent percentage contributions of a region in the total urban population. SNNP=Southern Nations, Nationalities and Peoples. "Other regions" represents the regions of Afar, Benishangul-Gumuz, Gambella, Harari and Somali, and Dire Dawa city administration. ESS data are not separately representative in these regions. Source: Based on data from ESS 2015/16.

Regional contributions to adjusted multidimensional poverty is plotted in Figure 3. The county's most populous regions, Oromia and Amhara, contribute much of the urban multidimensional poverty. However, Amhara region, with 18% share in the country's urban population, contributes as much twice (35%) to adjusted multidimensional poverty. Oromia region still contributes more than its population (21%) to the MPI (29%). Urban population share and contribution to poverty almost match only for SNNP. Addis Ababa city and Tigray region are least contributors towards multidimensional poverty relative to their share in the country's urban population.

Figure 4: Urban welfare indicators by region and urbanization rate: 2015/16
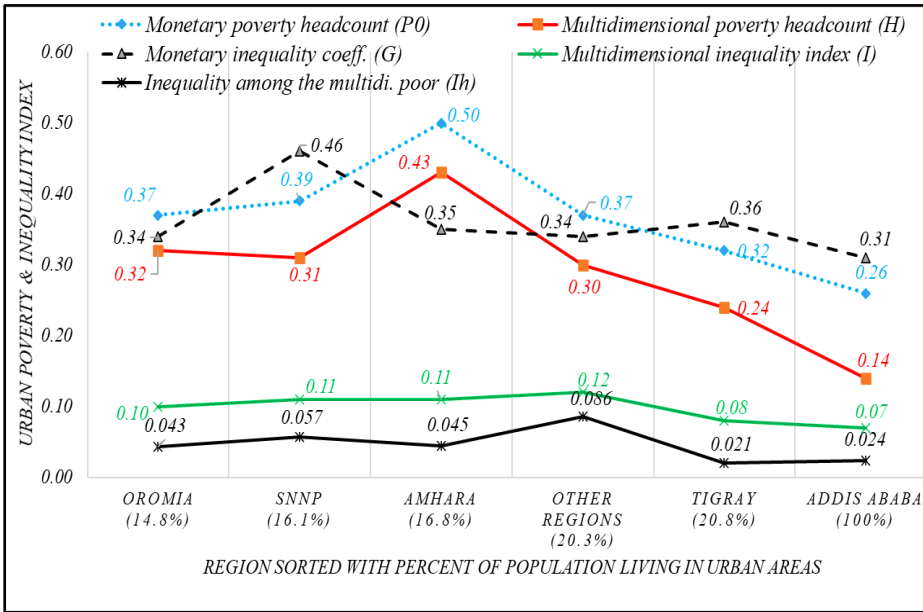
Notes: Regions are sorted in ascending order of their urbanization rate. SNNP=Southern Nations, Nationalities and Peoples. "Other regions" represents the regions of Afar, Benishangul-Gumuz, Gambella, Harari and Somali, and Dire Dawa city administration. ESS data are not separately representative in these regions.
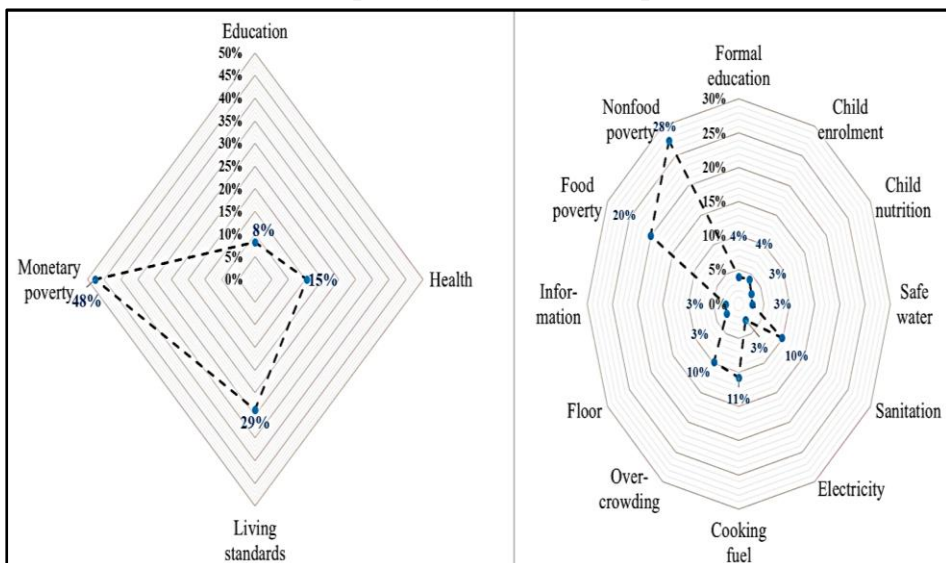
Source: Based on data from ESS 2015/16 and CSA (2013) Population Projections for 2016 (for urbanization).

Urbanization is widely thought to improve the welfare of people while some document that it did little to urban poverty particularly in SSA (Ravallion, Chen and Sangraula, 2007; Todaro and Smith, 2012). Our estimates seem to incline to the first hypothesis. We find that multidimensional poverty headcount in small towns is twice of that in medium/large towns with no significant difference in intensity (Table 5). Besides this evidence, we relate regional welfare estimates with corresponding regional urbanization rates (proportion of total population living in urban areas) obtained from CSA (2013). As depicted in Figure 4, the association urbanization has with multidimensional poverty and inequality as well as with monetary poverty takes the shape of an inverted-U while it generally seems to be inversely related to multidimensional inequality. These pro-urbanization findings contrast with those of Goshu (2019) that multidimensional poverty and inequality increase with urbanization.

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3.3.2   *Decomposition by indicators and dimensions*

Figure 5 depicts the contributions of indicators and dimensions to adjusted multidimensional poverty in urban Ethiopia. As shown on the left panel, about half of the multidimensional poverty comes from monetary poverty dimension (48%), of which (right panel) 28% is contributed by nonfood poverty and the rest 20% by food poverty. This is followed by the dimension of living standards at 29% which is mainly contributed by deprivations in cooking fuels (11%) and floor of dwellings (10%). The health dimension contributes 15%, mainly due to sanitation deprivation (10%). Education is the least contributor at 8% with equal shares from its constituents (deprivations in a member's formal education and child enrolment). Large contributions of monetary and living standards dimensions in Ethiopia are also evidenced by Goshu (2019) estimating 44% and 16% respectively at country level. In the annual Human Development Reports, where multidimensional poverty index is estimated without a monetary dimension, the living standards dimension is always the dominant contributor, as high as 51% in 2016 (UNDP, 2019).

Figure 5: Contributions of dimensions and indicators to overall multidimensional poverty in urban Ethiopia: 2015/16

Source: Based on data from ESS 2015/16.

Table 6: Correlates of multidimensional poverty and inequality in urban Ethiopia: 2015/16

Variable	Multidimensional poverty headcount (Logit)			Multidimensional Inequality (OLS)			Inequality among the multidimensionally poor (OLS)		
	Urban Ethiopia	*Medium/ large*	*Small town*	*Urban Ethiopia*	*Medium/ large*	*Small town*	*Urban Ethiopia*	*Medium/ large*	*Small town*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
Head is female	0.662***	0.717***	0.709*	0.027*	0.031*	0.010	0.018*	0.026*	–0.008
Head's age	0.018**	0.014*	0.045***	0.001*	0.000	0.002*	0.000	0.000	0.000
Household size	0.164***	0.161**	0.210***	0.001	–0.001	0.007	0.002	0.003	0.001
Any child is working	0.616*	0.645*	0.148	0.046	0.053	–0.007	0.010	0.028	–0.015
Females' share in working age	–0.58*	–0.528	–0.932*	0.015	–0.001	0.060	0.017	–0.008	0.065*
Owns the dwelling	–0.231	–0.213	–0.434	–0.004	–0.003	–0.016	0.000	–0.003	0.001
Taken credit of birr 500 or more	–0.639*	–0.555	–0.967*	–0.030*	–0.02	–0.055*	–0.025*	–0.01	–0.033
Has migrant members	–0.197	–0.06	–0.655*	–0.009	–0.006	–0.016	–0.003	–0.016	0.012
Received international remittances	–0.762**	–0.882**	–0.312	–0.016	–0.008	–0.062**	–0.03	–0.035	–0.030**
Shocks faced: food price rise	0.131	0.345	–0.309	0.027*	0.015	0.082*	0.035*	0.016	0.068*
Shocks faced: non-price	–0.105	–0.153	–0.018	–0.012	–0.013	–0.002	–0.018*	–0.018	–0.024*
Community: gov't primary school	–0.454*	–0.599*	0.007	–0.016	–0.031*	0.046	–0.003	–0.014	0.020
Community: microfinance institution	–0.478*	–0.388	–0.343	–0.003	0.001	0.003	–0.003	–0.016	0.013
Community: daily/weekly market	0.052	0.286	–1.349	–0.006	0.005	–0.166	0.014	0.018	–0.048*
Living in small town	1.009***	-	-	0.014	-	-	0.005	-	-
Region: Amhara[1]	1.389***	1.296***	1.398	0.026	0.027*	0.161	0.008	0.006	0.024
Region: Oromia[1]	0.806*	0.748*	0.768	0.009	–0.004	0.147	0.003	–0.016	0.034
Region: SNNP[1]	0.596	0.388	1.054	0.023	0.002	0.190*	0.023	–0.02	0.060
Region: Tigray[1]	0.538	0.626	0.405	–0.013	–0.005	0.116	–0.011	–0.02	0.013
Region: All others[1]	0.623	0.426	-	0.025	0.058	-	0.057	0.113*	-
Constant	–2.384***	–2.421**	–1.283*	0.054	0.080**	–0.073	–0.007	0.019	–0.016
Number of observations	1,625	1,214	411	1,625	1,214	411	504	288	216

Notes: *, ** & *** show statistical significance at 10%, 5% & 1% levels, respectively. [1]Comparison group is Addis Ababa. Multidimensional inequality is proxied by a squared variation of the household deprivation score from the average. SNNP=Southern Nations, Nationalities and Peoples. All observations are weighted to make estimates representative. Standard errors are not reported for brevity; they can be available upon request.

Source: Based on data from ESS 2015/16.

3.4   Factors Associated with Multidimensional Poverty and Inequality

Answering the question of what factors at household, community and macroeconomic levels could be associated with welfare is among the crucial steps to getting closer to policy implications. We run several regressions of monetary and multidimensional poverty, and inequality for the whole urban sample, small towns, and medium/large towns. Relevant diagnostic tests were done and passed before the final regressions were run.

Table 6 summarizes results on the factors that have associations with households' multidimensional poverty status and inequality. Demographic factors such as female headship, increasing head's age and large household size increase the probability of being multidimensionally poor. Using 2011 and 2014 rounds of ESS that sample only rural and small towns of Ethiopia (excluding large and medium towns), Bersisa and Heshmati (2021) similarly find that households with more members and female heads have higher multidimensional poverty incidence. Our estimates show that multidimensional poverty is positively associated with child labor and negatively with higher share of working female adults. Financial factors are also found to be important where those having access to credit, receiving remittances and living closer to microfinance institutions report lower multidimensional poverty. Presence of a primary school in the community is also correlated negatively with multidimensional poverty. The previous finding that multidimensional poverty is higher in small towns and in regions of Amhara and Oromia (relative to Addis Ababa) is also confirmed when other factors are controlled in the regressions. This is also corroborated by Bersisa and Heshmati (2021) in rural and small towns, relative Dire Dawa.

We proxy multidimensional inequality at the household level by a variation of that household's deprivation score from the average weighted deprivation score. Apart from certain demographic and geographic factors, taking credit and receiving international remittances and a nearby primary school are found to reduce overall multidimensional inequality and that among the multidimensionally poor. In contrast, shocks in the form of food price rises worsen inequality.

Correlates of monetary poverty are presented in Table A4 in the Appendix. After controlling for demographic and geographic factors, monetary poverty is found to be lower in households headed by those with at least primary

education. Bersisa and Heshmati (2021) likewise find for rural and small towns of Ethiopia that households with literate heads are less likely to be monetarily poor. Our estimates also reveal that living in places where microfinance institutions are available and access to credit are associated with lower monetary poverty.

Besides those micro- and community-level factors, there are numerous macroeconomic opportunities and constraints associated with urban multidimensional poverty and inequality in Ethiopia. As one opportunity, there seem to be overall government commitment and policy framework. Governments in Ethiopia have a history of preparing development plans aiming at addressing poverty and inequality. Recent ones include SDPRP (2006–2006), PASDEP (2006–2010), GTP I (2010/11–2014/15) and GTP II (2014/15–2019/20). The current government also unveiled the Ten-year Development Plan (2020/21–2029/30). Besides policy frameworks, commitment in terms of spending has also been noticed. For example, recent trends in poverty-targeted expenditures (education, health, agriculture, roads, water) over the period 2011/12–2015/16 averaged over two-thirds of total government expenditure (NPC, 2017). However, there are related constraints, including, among others (i) lack of efficiency by government agencies including implementation of policies at lower tiers of government; (ii) poor expenditure and project management coupled with corruption which not only increase the public debt but also result in inflation when projects take too long to give outputs while billions of funds are pumped into them; and (iii) poor provision and distribution and/or high cost of public infrastructure such as electricity, safe water and improved cooking fuels.

Figure 6: Universal coverage of publicly provided basic services and multidimensional welfare in urban Ethiopia: simulated
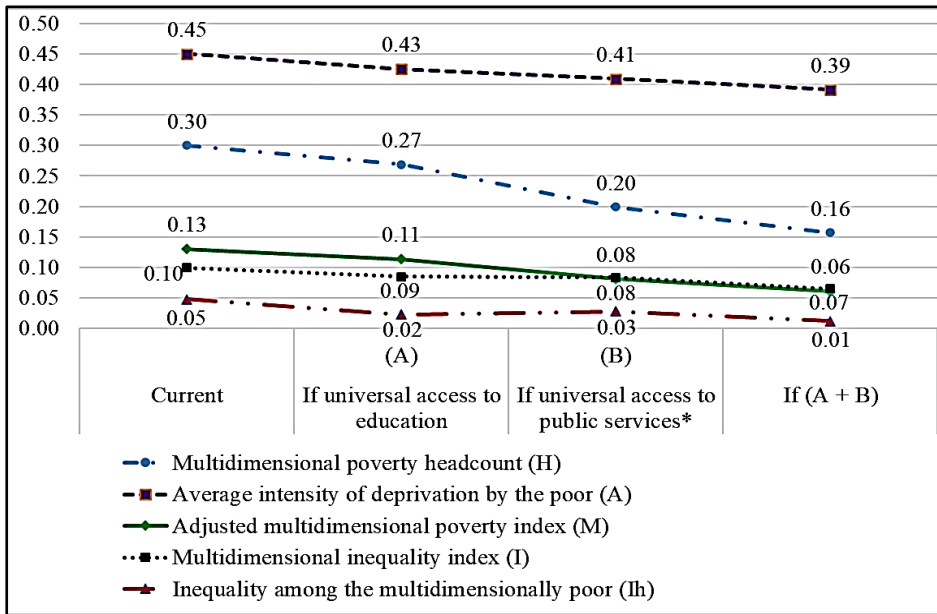

Notes: *Refers to universal access to water, electricity and improved cooking fuel. Standard errors in parentheses. All observations are weighted to make estimates representative.

Source: Based on data from ESS 2015/16.

The second opportunity is that there has been economic growth over the past decades, and this is expected to continue in the years to come. However, the quality of the recent past growth is questionable. Since 2000, four Demographic and Health Surveys and Household Income Consumption and Expenditure (HICE) surveys were conducted that helped estimate both monetary and multidimensional welfare measures in Ethiopia. Collecting these estimates from various sources and corresponding real per-capita GDP growth data from the National Bank of Ethiopia (NBE), we plot trends in Figure 7. A result that stands out is that the association between micro-level welfare and macro-context in terms at least of real per-capital GDP has not been uniform. Over 2000–2016, while monetary poverty headcount was halved, multidimensional poverty headcount fell only by 10 percentage points. In the five years spanning 2011–2016, during when economic growth was the fastest, multidimensional poverty headcount was virtually flat. The entire fifteen years were also characterized by a rise in expenditure inequality as measured by the Gini coefficient.

Figure 7: Recent trends of economic growth and monetary and multidimensional poverty and inequality in Ethiopia: 2000–2016
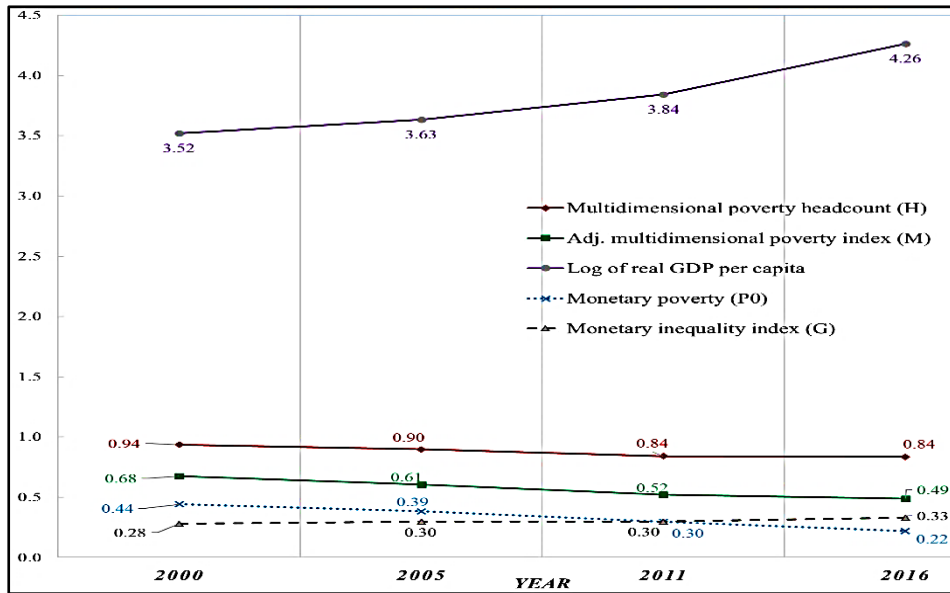
Source: Based on Alkire & Roche (2013), NPC (2017), NBE (2017), UNDP (2010, 2015, 2019).

As a third opportunity, a fairly large number of microfinance institutions exist in Ethiopia. According to the National Bank of Ethiopia, 46 microfinance institutions have been in operation in the country as of July 2020, and some are big and experienced. Moreover, 70% of urban households live in communities having a microfinance institution. However, ESS 2015/16 data show that household credit comes primarily from informal sources with formal or microcredit covering only 27% in urban areas. This is despite our findings that taking credit by households as well as availability of a microfinance institution at community level have desirable correlations with monetary and multidimensional poverty and inequality.

4.   Conclusions and Policy Implications
4.1   Conclusions

This study aims at analyzing Ethiopia's urban multidimensional and monetary poverty and inequality levels, their sources, links to the macro-context, constraints, opportunities and policy issues. Multidimensional poverty and inequality indices use four dimensions, namely, education, health, living standards and monetary poverty, represented by twelve indicators relevant to Ethiopian's contexts and yet related to the literature and SDGs. Data primarily come from the urban sub-sample of ESS 2015/16 which is a LSMS-ISA project of the World Bank. Supplementary data and information also come from various sources.

Findings reveal large prevalence of food and nonfood poverty as well as substantial nonmonetary deprivation particularly in indicators of living standards such as housing and cooking fuels. National deprivation and poverty rates generally mask substantial variations across male-female headship, small town-medium/large town and region. Notably, many of the deprivations are found to be higher in female-headed households, small towns and Amhara region. Estimated monetary poverty incidence, gap and severity are higher than the official figures. Multidimensional poverty in urban Ethiopia is one of the highest with a larger proportion found at a risk of sliding into the same. About half of the overall multidimensional poverty comes from monetary poverty followed by deprivations in living standards, health and education. Overall multidimensional inequality index and the inequality among the multidimensionally poor may be lower but inequalities among regions and within female-headed households are large.

Poverty and inequality seem to fall with urbanization while regional differences are large. The most urbanized, Addis Ababa city and Tigray region, have the lowest deprivation, multidimensional poverty and inequality rates. Households in urban Amhara region have the highest incidence and adjusted multidimensional poverty rates. Given their population shares, small towns and those in Amhara and Oromia regions contribute more to urban multidimensional poverty. Although there seem to be overall government commitment, policy framework and economic growth as opportunities, numerous constraints challenge efforts of reducing poverty and inequality. Despite economic growth over the past decade seemingly halving monetary poverty, multidimensional

poverty declined very steadily, and monetary inequality slightly rose. Besides demographic and geographic factors, receiving remittance, access to credit, availability of microfinance institutions and primary schools at community-level, food price shocks are among the factors that are correlated with various indicators of household welfare in urban Ethiopia. For instance, shocks in the form of food price rises worsen multidimensional inequality.

4.2   Policy Implications

The finding of substantial deprivation particularly in indicators of living standards dimension, which ranks as the second most contributor to overall multidimensional poverty, clearly needs intervention. As these deprivations include publicly provided infrastructural services such as electricity and drinking water, it is crucial that the government pursues a policy of affordable provision. Given that lack of improved cooking fuels is always among the top deprivations in Ethiopia, it requires special intervention. Relating it to universal access to electricity and promoting use of alternative sources of clean household energy may be of paramount help. Addressing the housing problems in urban areas, besides reducing household level overcrowding, is expected to have multiplier welfare effects. Strategies to address housing and related issues need to consider regional contexts and town sizes; one-size-fits-all strategy may not bring required results.

Large incidences of food and nonfood poverty, jointly contributing the largest share of overall multidimensional poverty, also call for interventions. Results imply policies advocating gendered interventions, family planning, and provision of education, credit and employment opportunities. On the other hand, the findings of notable disparities among regions and higher rates of deprivation, poverty and inequality in small towns inevitably call for installing fairer redistribution systems. Given that poverty and inequality are found to fall with urbanization, a policy direction towards planned urbanization is also recommended.

Promoting household access to microcredit and other sources of finance is also another vital strategy. The National Bank of Ethiopia needs to promote innovative forms of microcredit access to the poor by the financial institutions under its supervision. Stabilizing prices, especially of food, has effects on all forms of poverty and inequality. As the link between economic growth and

poverty reduction is not perfect and with undesirable effects on inequality, redistribution policies including social protection programmes for those in severe welfare deprivations may also useful. We also suggest use of a multidimensional approach to welfare measurement, rather than only a monetary one, by the Ministry of Planning and Development for assessment of the country's progress towards reduction of poverty and inequality. As welfare is multidimensional, such a comprehensive approach which also reports monetary welfare measures helps monitor progress from various dimensions, align to the SDGs and improve targeting of the poor. Future research may use panel data and advanced econometric methods which consider endogeneity issues to identify the factors that determine multidimensional welfare in Ethiopia.

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Appendix

Table A1: Distribution of urban households interviewed in ESS 2015/16 by region and town size

Region	Distribution of households interviewed in urban areas			
	Small towns	Medium and large towns	Urban total	% of urban total
Addis Ababa	-	241	241	14.8
Amhara	103	193	296	18.2
Oromia	106	236	342	21.0
SNNP	97	180	277	17.0
Tigray	43	189	232	14.3
All other regions	62	175	237	14.6
Urban total	411	1,214	1,625	100.0
% of urban total	25.3	74.7	100.0	

Notes: SNNP=Southern Nations, Nationalities and Peoples.

Source: Extracted from ESS 2015/16.

Figure A1: Density curves of weighted deprivation scores in urban Ethiopia by town size
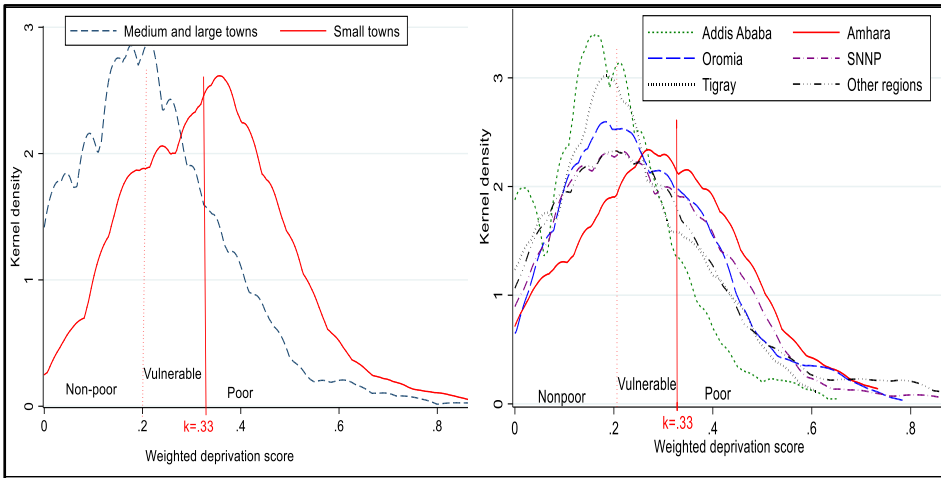
Notes: SNNP=Southern Nations, Nationalities and Peoples. "Other regions" represents the regions of Afar, Benishangul-Gumuz, Gambella, Harari and Somali, and Dire Dawa city administration. ESS data are not separately representative in these regions. According to UNDP (2019), households with weighted deprivation cut-off of 0.33 or higher are identified as multidimensionally poor, those in the range 0.20–0.33 are vulnerable and those with 0.50 or higher are in severe multidimensional poverty.

Source: Based on data from ESS 2015/16.

Table A2: Multidimensional poverty and inequality at various cut-offs in urban Ethiopia: 2015/16

Multidimensional welfare measure	*Multidimensional poverty cut-off (k)*						
	k=0.05	*k=0.10*	*k=0.20*	*k=0.33*	*k=0.50*	*k=0.67*	*k=0.80*
Multidimensional poverty headcount (H)	0.95	0.87	0.60	***0.30***	0.07	0.01	0.001
	(0.011)	*(0.016)*	*(0.029)*	*(0.024)*	*(0.011)*	*(0.005)*	*(0.001)*
	0.28	0.30	0.36	***0.45***	0.62	0.75	0.85
Average intensity of deprivation (A)	*(0.009)*	*(0.008)*	*(0.007)*	*(0.008)*	*(0.011)*	*(0.016)*	*(0.003)*
Adjusted multidimensional poverty index (M)	0.26	0.25	0.21	**0.13**	0.04	0.01	0.00
	(0.010)	*(0.011)*	*(0.013)*	*(0.012)*	*(0.007)*	*(0.004)*	*(0.001)*
Inequality among the multidimensionally poor (I_h)	0.094	0.083	0.063	***0.048***	0.028	0.012	0.001
	(0.007)	*(0.006)*	*(0.006)*	*(0.007)*	*(0.006)*	*(0.004)*	*(0.000)*

Notes: Standard errors in parentheses. All observations are weighted to make estimates representative.

Source: Based on data from ESS 2015/16.

Table A3: Correlations between indicators and multidimensional poverty and inequality measures in urban Ethiopia: 2015/16

Dimension	Indicator	Correlation with		
		Weighted deprivation score	Multidimensional poverty status	Multidimensional inequality
Education	Formal education	0.3753***	0.6188***	0.3676***
	Child enrolment	0.2836***	0.5901***	0.1900***
Health	Child nutrition	0.2132***	0.3241***	0.0910***
	Safe water	0.2621***	0.3768***	0.3260***
	Sanitation	0.5101***	0.5897***	0.2112***
Living standards	Electricity	0.4033***	0.6087***	0.3816***
	Cooking fuel	0.3955***	0.6167***	–0.0271
	Overcrowding	0.2857***	0.4140***	0.0729***
	Floor	0.5255***	0.6772***	0.1131***
	Information	0.4387***	0.6786***	0.3853***
Monetary poverty	Food poverty	0.5942***	0.8294***	0.2333***
	Nonfood poverty	0.6043***	0.7296***	–0.1087***

Notes: *** denotes correlation is significant at 1% level. The correlation with multidimensional poverty status is tetrachoric (nonlinear) while other correlations are linear pairwise.

Source: Based on data from ESS 2015/16.

Table A4: Correlates of monetary poverty in urban Ethiopia in 2015/16: logit marginal effects

Variable	Urban Ethiopia	Medium/ large town	Small town
	(1)	*(2)*	*(3)*
Head is female	0.081*	0.111**	0.008
Head's age	−0.002	−0.002	0.001
Household size	0.045***	0.041***	0.062***
Has migrant members	−0.021	0.019	−0.135*
Received international remittances	−0.066	−0.105*	0.136
Head's educ: elementary[1]	−0.122**	−0.172**	−0.033
Head's educ: high school[1]	−0.206***	−0.261***	−0.057
Head's educ: >high school[1]	−0.337***	−0.377***	−0.271**
Any child is working	0.091	0.085	0.019
Females' share in working age	−0.171**	−0.187**	−0.112
Owns the dwelling	−0.018	−0.035	0.020
Taken credit of birr 500 or more	−0.096*	−0.064	−0.220**
Shocks faced: food price rise	−0.007	0.021	−0.047
Shocks faced: non-price	0.031	0.007	0.108
Community: gov't primary school	−0.076*	−0.128*	0.100
Community: microfinance institution	−0.100*	−0.094	−0.165
Community: daily/weekly market	0.069	0.052	0.128
Living in small town	0.167**	-	-
Region: Amhara[2]	0.133*	0.108	0.102
Region: Oromia[2]	−0.014	0.010	−0.119
Region: SNNP[2]	−0.014	−0.059	0.044
Region: Tigray[2]	−0.023	−0.056	0.016
Region: All others[2]	−0.051	−0.040	-
Expenditure quintile: poor[3]			
Expenditure quintile: middle[3]			
Expenditure quintile: rich[3]			
Expenditure quintile: richest[3]			
Constant	0.531***	0.638***	0.377
Number of observations	1,625	1,214	411

Notes: *, ** & *** show statistical significance at 10%, 5% & 1% levels, respectively. [1]Comparison: illiterate. [2]Comparison: Addis Ababa. [3] Comparison: poorest. Multidimensional inequality is proxied by a squared variation of the household deprivation score from the average. SNNP=Southern Nations, Nationalities and Peoples. All observations are weighted to make estimates representative. Standard errors are not reported for brevity; they can be available upon request.
Source: Based on data from ESS 2015/16.