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# POVERTY AND WELFARE IN ETHIOPIA: PROFILE AND DETERMINANTS\*

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## *Abstract*

*This paper investigates the state of poverty and its determinants covering the period 1994-1997 on the basis of a panel data that covers 3,000 households both from urban as well as rural areas. The main findings show that poverty on the average declined during this period mainly due to increase in per capita income, particularly in rural areas. The extent of the reduction in poverty would have been much stronger if not for the worsening of income inequality. Profile of poverty shows that poverty in Ethiopia affects urban as well as rural areas at comparable scale and intensity. At the household level, factors such as human and physical capital bear a strong influence on the probability of being in poverty. Factors such as access to markets, resources and urbanisation affect greatly on the chance of being in poverty.*

## INTRODUCTION

This paper deals with poverty, income distribution and welfare issues in Ethiopia in mid-1990s. The choice of the period is dictated by the availability of two important and extensive household surveys on living standards since 1994. One is the National Household Budget Survey carried out by the Welfare Monitoring Unit in collaboration with the Central Statistical Authority in 1995/96. This survey covered 12,000 households which are selected to be representative of the national population. The second data set is generated by the Department of Economics, Addis Ababa University in collaboration with the University of Oxford, Centre for the Study of African Economies and Gothenburg University. This is a panel data covering 3000 households, equally divided between urban and rural areas. The results in this paper cover the period 1994-1997 based on these data sets.

Most of the results have been reported in previous studies by the Welfare Monitoring Unit (1999) and Mekonnen et al. (1999). Based on these results, this study provides profile of poverty in Ethiopia by region, occupation and sector. To do that, Section 1 of the paper provides a lengthy and detailed review of the literature on the measurement of poverty. Section 2 reports the extent of poverty in Ethiopia, its trend over time and profile with a discussion on the determinants of poverty at the household level. Section 3 makes a brief reference to the policy challenges of reducing poverty in

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Ethiopia. Section 4 is summary and conclusions.

## 1. POVERTY MEASUREMENT: A REVIEW

The concern over poverty in the industrialised world declined as faster economic growth and development ensured better life for the majority and it was regarded as a problem of a few marginalised segments of the population that can be addressed through elaborate social security systems. Thus, in the period immediately after the Second World War economics in general addressed poverty as a secondary issue, an addendum to the discussion of income inequality. It was the batch of Indian economists who, for the first time in the developing world, acknowledged the pervading effects of poverty in their planning exercise in the 1950s and attempted to treat poverty explicitly in plan models.

The literature on the measurement of poverty owes Sen (1976) a great deal for breaking the ground in an area that had remained hitherto hidden behind the veil of income inequality despite growing poverty all over the world.

Since then, the measurement of poverty has focused on the development of properties that satisfy certain ethical criterion and on that basis to derive an index that can capture the notion of poverty. This approach made good use of the well-known concept of social welfare functions which are in turn functions of the indirect utility functions of individual households.<sup>1</sup> In the literature, this approach is better known as the welfarist approach to the measurement of poverty.

In later works, Sen (1983, 1985) and others (e.g. Streeten 1994) argued that the Welfarist approach to the measurement of poverty considers material goods and services as an *end* to the attainment of well-being, while in fact they are also a *means* towards achieving well-being by allowing the individual to function well. This view is known as non-welfarist approach or the capabilities approach which has eventually inspired the publication of Human Development Indices by the UNDP. The core of the distinction in the two approaches in poverty analysis is the fact that the Welfarist approach imposes a *priori* utility maximisation by an individual to lead by itself to well-being, while the non-Welfarist approach argues that commodities availed to an individual are vehicles of better life and activities. Thus, a mere increase in income of an individual may not lead to an improvement in his well-being because of a number of factors—environmental as well as personal (see, for details, Lipton and Ravallion 1995).

### 1.1. Definitions: Axioms of Poverty Analysis

The pioneering work by Sen (1976) on the measurement of poverty was the formulation of axioms that are deemed to hold as in the literature on the measurement of income inequality. Sen began his treatise by offering a critique of poverty indices that were commonly used at that time, known better as the Head count ratio and the Poverty gap ratio. More formally, given that the structure of income distribution in a population is



ranked in ascending order such that:

$$y_1 \leq y_2 \leq \dots \leq y_q \leq z \leq y_{q+1} \leq \dots \leq y_n$$

where  $z$  is an exogenously given poverty line, a level of income below which an individual is classified to be poor, then, the Head count ratio,  $H$ , is defined as:

$$H = q / n \quad [1]$$

where  $q$  is the number of people earning an income level below  $z$  and  $n$  is the total number of people in the population.

Similarly, the Poverty Gap or the income gap ratio,  $I$ , is defined as:

$$I = \frac{\sum_{i=1}^q (z - y_i)}{qz} \quad [2]$$

$H$  and  $I$ , measure respectively, the percentage of people falling below the poverty line income level, or prevalence of poverty and the average level of deprivation among the poor.<sup>2</sup> In short,  $I$  measures the aggregate deficit of income experienced by the poor population relative to the poverty line.

Sen (1976) has shown that these two popular measures of poverty violate one or both of the following appealing axioms:

- a) The monotonicity axiom-all other things being equal, a reduction in the income of a person below the poverty line must increase the poverty index;
- b) The transfer axiom-all other things being equal, a pure transfer from a person below the poverty line to someone who is richer, but may still be poor, must increase the poverty index.

It can be seen quite easily that  $H$  violates both monotonicity and transfer axioms while  $I$  violates the transfer axiom. In the words of Sen (1976, 1983), any poverty index worthy of consideration should be able to provide three basic information on poverty: it should be able to identify who the poor are, capture their average deprivation and thirdly their relative deprivation among themselves. As a result,  $H$  captures only who the poor are, or measures the prevalence of poverty,  $I$  measures the average deprivation.

Instead, Sen (1976) formulated a poverty index by departing from what he called a general expression of a poverty index defined as:<sup>3</sup>

$$Q(x) = A(z, y) \sum_{i \in Q(x)} (z - y_i) v_i(z, y) \quad [3]$$

where  $Q(x)$  is the set of people with income no higher than a designated  $x$ ,  $Q(x)$  is the aggregate income gap,  $v_i(z, y)$  is the non-negative weight to the income gap of the  $i^{\text{th}}$  person; and  $A(z, y)$  is a normalising factor. Note that  $y$  enters as a vector. Sen defines a poverty measure,  $P = \max Q(x)$ , that is  $P$  is the maximum weighted income gap of the poor in a given group or community where the income shortfall of the  $i^{\text{th}}$  person and the  $j^{\text{th}}$  person must receive different weights. In doing so, Sen incorporated the ordered rank weight to capture relative deprivation.

If the income of the poor in a population is equal, Sen argued that complete information on poverty can be obtained from an index  $P=H.I$ , which according to Sen represents both the identity of the poor and their average deprivation. However, if the level of income of the poor is different, as it is the case in reality, then, the axioms of monotonicity, normalisation and ordinal rank order weights are sufficient to generate a poverty index acceptable by a certain social welfare function. Thus, he suggested,

$$S = H[I + (1-I)G_p] \quad [4]$$

where  $G_p$  is the Gini-coefficient among the poor population. It can be shown that if we allow the index given in [4] to embrace the entire income distribution, it evolves into a measure of relative income inequality in a population. We note that the distinction in the type of poverty being measured rests on the way the poverty line is defined. If the poverty line is meant to represent a level of income barely sufficient to meet basic needs and nothing more, then, the underlying poverty measured is known as absolute poverty, whereas if the poverty line is defined as a proportion of mean income of the income distribution, it designates relative poverty.

The literature following Sen focused on the refinement of poverty indices by introducing a number of other desirable properties that can fully represent a range of ethical considerations by offering rooms for flexibility.

Thon (1979, 1981) argued that Sen's index violates certain kinds of transfers and leads to ambiguity. For instance, it can be shown that a transfer of income from a poor person to someone who was poor and becomes non-poor because of the transfer decreases poverty as measured by Sen's index. Thon's extension, and later a number of others, (Kakwani 1980) made an attempt at constructing indices that meet a number of

desirable properties. Another strand of research also pursued the construction of poverty indices on the basis of social welfare functions employing the underlying ethical properties. Notable among these are the works of Blackbory and Donaldson (1980), Clark, et al. (1981) and Chakarvarty (1983) who truncated the underlying income distribution of a population to the relevant segment and defined poverty as a deviation from an "equally distributed income" among the poor.

The list of requirements that has to be satisfied by a poverty index has grown longer with the literature on the measurement of poverty. The most important properties that are expected to be met by any poverty index,  $P(y,z)$  defined over  $z$  and the underlying income distribution of the population are the following:<sup>4</sup>

- i.  $P(y,z)$  is independent of the incomes of the rich, that is the poverty index is based on censored income distribution. Some times this property is known as axiom of focus.
- ii.  $P(y,z)$  is increasing in  $z$ .
- iii. Given other things, a reduction in income of a person below the poverty line must increase the poverty index (monotonicity axiom).
- iv. Given other things, a pure transfer of income from a person below the poverty line to anyone who is richer must increase the poverty index, unless the number of persons below the poverty line is strictly reduced by the transfer (weak transfer axiom).
- v. Given other things, a pure transfer of income from a person below the poverty line to anyone who is richer must increase the poverty index (strong transfer axiom).
- vi.  $P(y,z)$  is left unchanged by a permutation of the incomes (impartiality).
- vii.  $P(y,z)$  is jointly continuous in  $(y,z)$ .
- viii. Additive decomposability: The poverty index for a population can be written as a weighted average of the poverty indices for a set of mutually exclusive and collectively exhaustive sub-populations.

The issue that whether the poverty indices suggested in the literature meet all these requirements has been a subject of inquiry. Kundu (1983) demonstrated that if the fixed population axiom is violated, no single poverty index can meet all the properties listed above. Haggens (1987) showed succinctly that no poverty index can meet all the desirable properties simultaneously and that a choice of a poverty index always implies the preference of some normative judgements over another. It is important for policy makers to make their selection of a poverty index based on properties consistent with their policy objectives since the same scenario is judged differently by different poverty indices.

## 1.2. Popular Aggregate Poverty Measures

In the current literature, poverty indices are summary measures defined over mean income, the relevant poverty line, and the parameters characterising the underlying



income distribution. The general form is given by:

$$P = P(\mu / z, L) \quad [5]$$

where  $\mu$  is mean income of the population,  $z$  is the poverty line determined exogenously and  $L$  is the parameter characterising the income distribution as measured by the Lorenz function.<sup>5</sup>

The specification of  $P$  as in [5] has enormous advantages from practical considerations. It is possible to construct tests of statistical significance (see Kakwani 1990) of a poverty estimate for a given poverty line, it is simpler to decompose changes in poverty into those related with changes in mean income of society and underlying distribution. In addition, one can easily compute elasticity values with respect to mean income and inequality parameters if the poverty index is specified as in above.

Furthermore, it can be shown quite easily that all ethically flexible and sound indices of poverty indices suggested in the literature can be expressed in terms of mean income and the income distribution.

If a poverty index of the form [5] is homogenous of degree zero with respect to the poverty line and the mean income, then the index measures relative poverty, on the other hand, it measures absolute poverty if the poverty index remains unchanged when the same amount of income is added or subtracted from all the incomes and the poverty line itself.

For poverty measures given by  $H$  and  $I$  in [3] and [4] one can readily show that by knowing the parameters of the underlying Lorenz function, which gives the consumption expenditure by the poorest  $p\%$  of the population,  $H = \mu(L'(p))$  which is the inverse function of the distribution function  $p = F(y)$ , and so  $L'(H) = z/\mu$ .  $I$  is then calculated readily using the fact that mean among the poor  $= \mu L(H)/H$ . Given the parameters of the Lorenz function, then,  $H$  and  $I$  can be read-off easily.

Explicit specification of  $P$  has led in the literature to the use of the popular index originally suggested by Foster, Greer and Thorbecke (1984) (hereafter the FGT-index) and later on shown to possess rigorously the desirable properties stated in the preceding section. For continuous income distribution, the FGT-index is given as:

$$P_{\alpha} = \int_0^z \left[ \frac{(z-y)}{z} \right]^{\alpha} f(y) dy \quad [6]$$

where  $\alpha \geq 0$ .

It is observed that for  $\alpha=0$  and 1, the FGT-index reduces to H and I, which are interpreted respectively as poverty indices measuring the prevalence and intensity of poverty (see Ravallion, 1992). For  $\alpha=2$  the FGT-index has been interpreted to measure the severity of poverty. As the value given to  $\alpha$  increases, then the underlying poverty index offers more weight to the distribution of income found at the lower end.

The FGT-index is the most popular index used in the recent literature. Its attraction lies in the fact that while capturing the most desirable properties of a poverty index, it is also decomposable and sub-group consistent. That means, if there are  $n$  mutually exclusive sub-groups of households, classified either along regions of residence, sector of employment or some other means of classification, then, the FGT index allows that the overall poverty can be expressed in terms of poverty within each sub-group. That is, if  $P_s$  represents poverty estimated within each sub-group  $s$ , then overall poverty is given by:

$$P = \sum_{s=1}^n w_s P_s \quad [7]$$

where  $w_s$  represents the population share of the  $s$  sub-group to total population.<sup>6</sup> The task of measuring poverty is complete once the appropriate poverty line is determined and the poverty index is chosen. The latter part of the task is treated at some length in this section. What remains is to review the developments in the literature concerning the estimation of the poverty line.

### 1.3. Setting Poverty Lines

#### Definition

Poverty line is understood as a level of standard of living below which a household is designated as being in poverty. The exact location of a poverty line is difficult to define and varies across a spectrum of factors peculiar to individual households. Inherently, poverty line remains subjective and relative when the host of factors determining the standard of living of a household are taken into consideration. A given household can be considered poor by some measure of a standard of living and as non-poor by another indicator.

#### Welfare Implications

The Welfarist approach anchors the concept of poverty line on the link between income and utility or standard of living which offers an opportunity to interpret the poverty line as the minimum cost of achieving a certain level of utility defining poverty. This money metric utility is derived from neo-classical theory of consumer behaviour.

It is well known that given a utility function  $u$  defined over exhaustive commodities  $x_1, \dots,$



$x_n$  and respective market prices,  $p_1, \dots, p_n$ , and a fixed income of a consumer,  $y$ , the consumer's problem can be stated as:

$$\text{Max } u(x_1, \dots, x_n) \text{ subject to: } y \geq \sum_{i=1}^n x_i P_i \quad [8]$$

A solution to the constrained problem leads to the indirect utility function  $V(P, y)$ , where  $P$  is a vector of prices and  $y$  is the level of income. The inverse of the indirect utility function or the dual of the maximising problem in [8] provides the expenditure function given by:  $y = E(P, u)$ . If we define  $u^*$  to represent a reference utility level designating poverty, then, the poverty line  $z$  is given by:  $z = E(P, u^*)$ , which is defined as the money cost of achieving a certain level of utility defining poverty.

Thus, it is analytically possible to link the determination of the poverty line from underlying demand systems that are derived from neo-classical choice theory.

But, implementing this approach is beset with a number of measurement and identification problems. On the one hand, the reference utility level defining poverty is difficult to establish. Some works (e.g., Lewis and Ulph 1988) suggest that poverty can be thought of a discontinuity in the utility function for lack of certain commodities or services. The demand functions that emerge from such an approach are very difficult to estimate empirically because of identification problems.

The difficulties encountered and the complexities arising from the conceptualisation of the poverty line reduced its estimation to a single indicator in the literature: observed income or expenditure sufficient to meet a certain level of basic needs as defined by local standards. A recurring problem in the use of income or total expenditure to set the poverty line is the issue of family size and scale of economies in the process of consuming a range of goods and services.

### **Equivalence Scales**

Households are composed of family members with different age and sex, leading to differences in needs, consumption habits and preferences. The same level of income cannot serve equally the needs of households that are different in composition. Some households can attain basic needs with lower income than others.

In the theory of demand, this problem is known as the problem of scales of economies in consumption expenditures, and various methods have been suggested to adjust differences in the composition of households using the concept of equivalence scales (see Deaton and Muellbauer 1980 for a comprehensive survey). The equivalence scale concept is based on the assumption that households having different composition reveal their preferences in the market for given income and price structure. It is thus, possible

to establish equivalence in the consumption needs of households having different composition. One of the most popular equivalence scale suggested in the literature is adult equivalence which establishes an equivalence in the consumption of an adult, a child, etc.<sup>7</sup> It is argued however that in a situation where the poor consume both marketable and non-marketable goods, it is difficult to use equivalent scales generated from preferences revealed only from marketable goods (Lipton and Ravallion 1995). On the other hand, some also staunchly argue that equivalence scales should be estimated from the data itself (see Coulter, et al., 1992) since the measurement error arising from the use of ready-made equivalence scales can severely affect the measurement of poverty.

The main issue in the measurement of poverty is not in the precision of our estimate of the poverty line per se but in being able to compare precisely poverty among households. One has to be careful not to classify households earning the same income into poor and non-poor, leading to the absence of robustness of poverty measurements. In this connection, the literature is also apprehensive of the implications in the definition of a poverty line. That is, if a person is moved above the poverty line by one extra dollar, the implication is that he changes his life style from being poor to non-poor. Such instant gradation causes discontinuity in the poverty measurement at the poverty line for which the justification for this is far from satisfactory (see Atkinson 1987; Lipton and Ravallion 1995).

### **Setting Poverty Lines: Practical Methods**

Despite the conceptual complexities in defining poverty lines, the tradition of fixing a certain basic needs as minimum to avoid poverty (say minimum wage legislations) or defining a basket of consumption goods as representing basic goods is not a recent phenomenon. The basic question remains that it is possible to have a poverty line that can offer a poverty profile which is consistent—i.e. the relative position of households remain unchanged whichever sub-group they belong to.

In the current literature the most popular methods of estimating poverty lines are the Food-energy Intake method and the Cost of Basic needs method.

#### **The Food-Energy Intake (FEI) Method**

This method of setting the poverty line stipulates the cost of attaining a predetermined level of food energy intake. There are a number of ways of estimating the total expenditure needed to arrive at the stipulated food energy intake. The common procedure is to run a regression of cost of a basket of commodities consumed by each household over the calorie equivalent or the food energy implied from the basket of goods. Then, to proceed to calculate how much it would cost to buy a basket of commodities that would be considered as sufficient. The energy intake is a predetermined value expressed in terms of calorie equivalents. Another procedure is to take a sub-sample of households with total expenditure equivalent or close to the



stipulated calorie level and compute a simple average. The FEI method provides automatically the total expenditure implied by the level of food expenditure that provides the stipulated calorie intake, since the latter are dependent variables in the regression equation. Thus, for a specified level of calorie, a corresponding total expenditure is obtained immediately.

This method has been extensively applied in the literature (see for instance and Greer and Thorbecke 1986). Despite its simplicity in estimation there are some caveats to be considered when one uses this method. One is the fact that the FEI method has the difficulty of mapping calorie intakes into expenditure spaces in a manner consistent with preferences and taste of consumers. Ravallion and Bidani (1994) argued that the FEI method is weak in terms of offering a consistent and robust poverty profile. There is no provision in the FEI method for differences in relative prices, tastes and preferences across sub-groups. Instead, they suggested the Cost of Basic Needs approach that anchors on the estimation of relevant Engel functions consistent with the neo-classical theory of demand.

### **The Cost of Basic Needs Approach (CBN)**

The measurement of a poverty line based on basic needs is not new in the literature. It dates back to the work by Rowntree (1901) who attempted to construct a poverty line by defining a basic needs basket to study poverty in New York (see Atkinson 1987 for comments). Since then, the Basic Needs approach to define the poverty line came to be used in practical applications in various research works. But, the fact that the definition of basic needs remained elusive conceptually and has become difficult to reconcile with proper theory of choice, the FEI method swayed for much of the later works in the construction of poverty lines.

The approach developed by Ravallion and Bidani (1994) is to estimate the Engel function for food expenditure by regressing the food share on the logarithm of total expenditure taking care of differences in household size, composition and other exogenous variables. Ravallion and Bidani (1994) have compared and contrasted the two methods of constructing poverty lines using the Indonesian data and concluded that the CBN methods offers a consistent and robust poverty profile.

## **2. POVERTY, INCOME DISTRIBUTION AND WELFARE IN ETHIOPIA: THE MICRO EVIDENCE**

The measurement of poverty reported in this section is based on the Foster-Greer-Thorbecke class of indices reviewed in section I. It is recalled that this measure provides the magnitude, depth and severity of poverty in a given situation. These measures are frequently used because of their immediate policy implications to growth and redistribution.



## 2.1. National Household Income, Consumption and Expenditure Survey<sup>a</sup>

National accounts put the figure for Ethiopia's per capita GDP between US\$ 100-115 for 1990's. As it stands this figure is indeed telling of the appalling gap between Ethiopia and the average for Sub-Saharan Africa, which was US\$ 490 in 1995. An estimate of per capita expenditure based on a national household budget survey put this figure at US\$ 167 (Birr 1085) in 1995, nearly 50% more than the estimate we find in national accounts. The figure for urban areas was about US\$217 (Birr 1411), while it was US\$159 (Birr 1034) for rural areas.

As might be expected, per capita expenditure is distributed unevenly across geographic regions, with Tigray reporting the lowest (US\$139), followed by Amhara region (US\$141), while Addis Ababa reported the highest (US\$241), followed by Harari region (US\$225). Obviously, such disparities in per capita expenditure give rise to parallel disparities in the level of poverty experienced, since per capita expenditure is our measure of welfare.

The level of the absolute poverty line estimated for Ethiopia in 1995 was Birr 1075 (US\$ 165), very close to the mean per capita expenditure. Accordingly, the headcount ratio for Ethiopia in 1995 was estimated to be around 46%, with 47.5% in rural areas and 33.2% in urban areas.

An alternative poverty line that uses 2/3 of the mean per capita expenditure (often referred as relative poverty line) led to a national headcount ratio of 31%, with 30% in rural areas and 22% in urban areas. The determination of the poverty line plays a crucial role in the measurement of poverty. As is observed, a switch from one definition of a poverty line to another leads to a substantial change in the poverty rates estimated. In the context of poor countries like Ethiopia, it appears that the concept of relative poverty is subsumed under the notion of absolute poverty in the sense that some of the absolutely poor are considered non-poor in relative terms. This seemingly contradictory classification is due to the convention of using 2/3 of the mean as a measure of relative poverty. A person who is poor in absolute terms and non-poor in relative terms is difficult to understand, while the converse is reasonable enough. Thus, the relative poverty line can be looked at a measure of extreme or ultra poverty.

Across regions, Table (1) reports that the highest level of absolute poverty as measured by the headcount ratio was reported for Tigray (58%), followed by Amhara (57%) and Southern Region (56.5%). The lowest is recorded for Dire Dawa (24.6%) and Harari (29.1%).

**Table 1: Poverty Profile in Ethiopia by Main Administrative Regions**

Region	PO
Tigray	57.9
Afar	51.8
Amhara	56.7
Oromia	34.7
Somali	34.8
Benshangul-gumuz	47.6
Southern Region	56.5
Gambella	41.8
Harari	29.1
Addis Ababa	30.0
Dire Dawa	24.6
National	46.0

Source: Welfare Monitoring Unit (1999).

## **2. 2. Household Panel Data**

### **2.2.1. The Data**

The data are from two separate but closely related household surveys, one rural and the other urban, undertaken by the Department of Economics of Addis Ababa University. The rural surveys are done in collaboration with the Centre for the Study of African Economies of Oxford University and the International Food Policy Research Institute (IFPRI) and the urban with the Department of Economics of Gothenburg University, Sweden, and Michigan State University. The two surveys covered nearly 3000 households, the sample size in each being about the same. The rural and urban samples were drawn independently of each other but the questionnaires were carefully standardised to enable the collection of comparable data sets allowing for the differences in the two settings.

The rural household survey was undertaken in 15 sites in four rounds—the first two in 1994, the third in 1995 and the last covers 1997. Though small, relative to the size, distribution and diversity of the rural population, the sample tried to capture as many of the major socio-economic groups, agro-ecological zones and farming systems as possible by spreading the sites in the most important regions of the country. While the survey areas were purposively selected to represent the diversity of the rural economy, households in each site were sampled randomly, the sample size being proportional to the population in the region (for details on the sampling procedure, see Bereket 1994).

The urban surveys were conducted over a period of four successive weeks during a month considered to represent the average conditions. They covered seven major cities and towns – the capital Addis Ababa, Awassa, Bahr Dar, Dessie, Dire Dawa, Jima and Mekele –selected to represent what were identified as major urban settings and socio-economic characteristics of the urban population in the country. A predetermined sample size of 1500 households was allocated to each urban centre in proportion to the



total population of the selected urban centres and subsequently to each *wereda* (district) in the urban centre. Households were then selected by systematic sampling from half of the *kebeles* (the lowest administration units) in each *wereda* using the registration of residences available at the urban administrative units as sampling frame. Such a frame clearly misses an important social group from the point view of poverty measurement, the homeless, a group whose ranks are swelling at an alarming rate in most, particularly large, urban centres of the country.

The same initial sample size of 1500 households was maintained in all subsequent rounds of both the rural and urban surveys by replacing households that dropped out. The sampled communities have been largely stable during the survey period as a result of which attrition has been extremely low—about 3% from the rural and 7% from the urban samples. With further loss of data of about the same proportions due to mismatching of household identifications, panel data on 1403 households from the rural survey and 1249 households from the urban surveys in the three years were compiled. From these a "national" panel sample was constructed as follows. Since the first and second rounds of the rural survey were undertaken in 1994 (the former covering the first and the latter the second part of the year), they are merged to form the 1994 relevant variables. The 1995 and 1997 rural data were obtained from the third and fourth rounds with appropriate scaling (which depends on ratio of the first and second rounds) to take account of possible seasonal variations. These were merged with proportional sub-samples of the urban panel (about 15%, the urban weight in the country's population) to form the national panel sample of 1654 households used in this study.

Both surveys collected data on the demographic characteristics of households, their educational and health status, ownership of assets, employment and income, credit, and consumption and expenditure.

### 2.3. Results

Table (1) reports per capita expenditure in real terms for national, rural and urban areas for the period 1994-1997. The figures for real per capita expenditure in each survey site were computed in two steps. First, the cost of basic needs is constructed for each survey site. Second, one of the survey sites was taken as a reference so that real per capita expenditure figures for each household are arrived at by using the ratio of site poverty lines by the poverty line of the reference site to deflate nominal expenditure. This allows easy comparison and merging of the expenditure figures.

Table (2): Per Capita Real Consumption Expenditure (Birr)

	1994	1995	1997
Rural	1089	1500	1377
Urban	1248	1320	1457
National	1113	1473	1389

Source: Calculations based on household panel survey.



Table (2) shows that the share of rural households in total consumption expenditure between 1994-1997 was respectively, 46.57%, 53% and 48.6%. This magnitude is similar with the contribution of the agricultural sector to GDP as reported in national accounts. In this period, per capita consumption expenditure recorded a significant jump between 1994 and 1995 (increase of 32% in one year!) and fell in 1997 by 5.7%. Between 1994 and 1997, per capita expenditure increased in rural areas by 8.8%, while in urban areas it increased by 5.3%, leading to an overall growth of 8.3% per annum.

The features of per capita expenditure for rural areas in 1995 are inexplicably high compared even to urban areas. As shown also in Table (2), this period recorded substantial worsening of income inequality where the Gini increased from 39% to 54% in one year! Given the extreme care taken in computing per capita consumption expenditure and the massive data cleaning exercises for the entire set, it is difficult to attribute the features to measurement or computational errors unique to this survey period nor to the administration of the questionnaire. The major reason as reported in Annex (1) is the substantial consumption expenditure reported by the top decile in 1995 which showed an increase of more than 100% in one year. We also refrain from speculating what could have brought such shifts in the whole income distribution and levels of per capita expenditure until through examinations of the changes by household and by survey site are made. In what follows, we concentrate only on the changes in poverty and welfare between 1994 and 1997.

To estimate poverty we used the cost of basic needs approach to set the poverty lines for each site. Then, we used the poverty lines of one of the sites to estimate poverty by deflating per capita expenditure of other sites by a factor of the difference between site level poverty lines and the reference poverty line. That is, we have used the poverty lines as price deflators<sup>9</sup>. Hence, the reference poverty line was computed to be Birr 726 and was held unchanged over time. The resulting figures of poverty estimates and the Gini coefficient are given below:

Table (3): Poverty and Inequality in Ethiopia

Region	1994				1995				1997			
	P0	P1	P2	Gini	P0	P1	P2	Gini	P0	P1	P2	Gini
Rural	41	16	8	39	37	16	9	56	36	13	6	43
Urban	39	15	8	44	38	15	8	45	36	15	9	48
<b>National</b>	<b>41</b>	<b>16</b>	<b>8</b>	<b>39</b>	<b>37</b>	<b>16</b>	<b>9</b>	<b>54</b>	<b>36</b>	<b>13</b>	<b>6</b>	<b>43</b>

Source: Calculations based on Household Panel data

Table (3) makes interesting reading: one poverty overall is more or less a phenomenon of both rural as well as urban areas. Conventional wisdom has it that poverty in poor countries tends to be large in rural areas both in magnitude and concentration. In 1994, poverty in urban areas was less than the rural counterpart by just 2%, and in 1994 they recorded the same level of poverty (36%). The main factor

responsible for this result is the high income inequality in urban areas in both periods as compared to rural areas. In fact, if we base our judgements of welfare using the expenditure distribution pattern reported in Annex Table (1), we see that for a poverty line up to the income of the eighth decile, poverty in rural areas would be less than in urban areas!

Overall, poverty declined between 1994-1997 by about 4.1% per year in the face of 8.3% increase in per capita consumption expenditure. This lower rate of decline is due to the worsening of income inequality at a rate of 3.3% per annum. When we look at the situation for the bottom ten percent of the population, the situation deteriorated in urban areas between 1994 and 1997. In rural areas, after a sharp decline in 1995, the situation of the bottom ten percent improved in 1997. Overall, the per capita expenditure of the poorest ten percent did not improve at best or it deteriorated. Whatever improvements that may have been recorded during this period in economic recovery and growth, it appears that the benefit went mainly to those at higher income brackets. In terms of welfare, it is not easy to make definite conclusions from our data on how it moved over time. Perhaps, one observation we make of the period 1994-1997 is that agriculture showed a dramatic rebound following the drought that hit the country in 1993/94 as there was plenty rainfall in most of the survey sites. Thus, without substantial change in the structure of the whole economy, it is possible to see erratic behaviour of consumption in predominantly poor community.

#### Determinants of Poverty in Ethiopia

To examine some correlates of poverty in rural and urban areas, we estimated probit functions for rural and urban sites separately. We have estimated the probits separately, on the one hand, because at least some of the correlates of poverty in rural and urban settings presumably differ and, on the other, if we use our 'national' sample the number of urban households becomes small decreasing our degrees of freedom. In both estimates, the dependent variable is a zero/one dummy for identifying households that are poor in 1994.

The independent variables for the rural sites are: household size, mean age of household members (and its square), age of household head (and its square), number of oxen owned by the household, size of land cultivated, dependency ratio defined as the percentage of household members below 15 and above 65 years of age to total household size and dummy variables (for primary education of household head and wife, for *teff*, coffee and *chat* producing households, sites located in the north and *enset* producing areas and off-farm employment). In addition to these, we included a variable reflecting the proximity of survey sites to big cities/towns; the index is computed by dividing the population of the nearest city/town by the distance from the survey site to it. The probit results for rural areas are given below.



Table (4): Probit Estimates for Rural Areas, 1994

Probit estimates	Number of obs	=	1329
	LR chi2(18)	=	290.61
	Prob > chi2	=	0.0000
Log likelihood = -760.01419	Pseudo R2	=	0.1605

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
hhaize	.0844795	.0175509	4.813	0.000	.0500802 .1188787
meanage	.0074087	.0193318	0.384	0.701	-.030454 .0452713
meanage2	-.0002301	.0002355	-0.977	0.329	-.0006916 .0002315
hhhfem	.2271838	.1012229	2.244	0.025	.0287905 .4255771
agehhh	.0314305	.0141203	2.226	0.026	.0037552 .0591059
agehhh2	-.0002647	.0001344	-1.970	0.049	-.0005281 -.136e-06
hhhprim	-.0006818	.1491974	-0.005	0.996	-.2931033 .2917397
wifeprim	-.6118098	.3439941	-1.784	0.074	-1.288026 .0604062
teff	-.1581494	.0966075	-1.637	0.102	-.3474967 .0311978
coffee	-.2417821	.1288873	-1.876	0.061	-.4943686 .0108043
chat	-1.018185	.1604911	-6.344	0.000	-1.332742 -.7036284
deprndrat	.7954386	.2412301	3.297	0.001	.3226362 1.268241
north	-.255771	.1235679	-2.070	0.038	-.4979596 -.0135824
market	-.0001017	.0000164	-6.217	0.000	-.0001338 -.0000697
endst	-.1306455	.1489535	-0.877	0.380	-.4225889 .161298
oxen	-.1789566	.0309917	-5.774	0.000	-.2396992 -.118214
cultivat	-.0232918	.0600088	-0.388	0.698	-.1410621 .0944786
offfarm	.2818287	.081483	3.455	0.001	.122125 .4415324
_cons	-1.109165	.4288339	-2.586	0.010	-1.949664 -.2686658

Source: Mekonnen, Bereket and Abebe (1999).

To have an idea of the probabilities attached to particular attributes (in addition to examining the coefficients of the dependent variables), we first computed the predicted probabilities for each household and calculated the mean of that for a group of households with similar attributes. These mean predicted probabilities are used, in addition to the estimated coefficients, in our subsequent discussions.

Mean age of household members, primary education of household head and wife, size of cultivated land, the production of *teff* and coffee do not seem to significantly (at 5% level) affect probabilities of falling into poverty.

Bigger households seem to experience higher incidence of poverty; but this is hardly surprising given the fact that we have used per capita expenditure figures for defining poverty levels (i.e., the use of the per capita expenditure ignores the effects from economies of scale). Female-headed households face a slightly higher probability of falling into poverty in rural areas; for instance, the mean predicted probability for female-headed households to fall into poverty is 0.48 but for male-headed ones 0.41. The probability of falling into poverty increases with the age of the household head but decreases at very low and very high levels (indicated by the negative coefficient for the its square). And households in the northern parts of the country have a lesser chance of falling into poverty than in the southern areas; the mean probability for



northern sites is 0.39 but for others 0.44.

As expected, the dependency ratio is strongly related to the probabilities of falling into poverty; the more the percentage of people below 15 and above 65 years of age in the household, the higher the probability of falling into poverty.

The production of marketed crops seems to decrease the chance of falling into poverty. *Teff* is one of the main domestically marketed crops in Ethiopia. Generally, rural households produce *teff* for the market and it is an important source of cash income. Coffee and *chat* are also important cash crops which are exported, coffee being the most important single export item of the country. All the coefficients of the three crops are negative indicating that households producing these have a lesser chance of falling into poverty. While the coefficients on *teff* and coffee become significant at around 6% and 10% levels of significance, the coefficient for *chat* is significant at even 1%. The mean probability for *chat*-producing households to fall into poverty is 0.24 while for those not producing *chat* increases to 0.44. This may highlight the importance of relatively new cash crops (particularly exportable) in the alleviation of poverty.

As expected, oxen owned by households are highly significant in decreasing the chance of falling into poverty. This effect can dramatically be illustrated by looking at the mean predicted probabilities of falling into poverty classified by the number of oxen owned by households; this is given in the table below.

Table (5) : Mean Predicted Probabilities of Falling into Poverty  
by the Number of Oxen Owned by Households

Number of Oxen Owned by Households	Mean Predicted Probabilities
0	0.52
1	0.49
2	0.37
3	0.28
4	0.26
5	0.18
6	0.13
7	0.11
8	0.12
9	0.15
10	0.06

Source: Mekonnen, Bereket and Abebe (1999).

Except in two cases, the mean predicted probability of falling into poverty consistently decreases with the number of oxen owned by households; it plummets from a high of 0.52 to a very low figure of 0.06. This underscores the importance of oxen in the agricultural systems of most rural Ethiopia.

Households involved in off-farm employment are generally associated with a higher chance of falling into poverty. This may indicate that seeking off-farm employment is a consequence of poverty rather than a way enriching oneself.

Finally, as expected the 'market' variable decreases the chance of falling into poverty. Rural areas nearer relatively big cities/towns have a better access to markets and public services.

A similar probit was run for the urban sampled households. While dropping the variables that are not relevant for urban areas, we included dummies identifying regional capitals and occupation of household heads. The occupation of the household heads is classified into private business employer, own account worker, civil servant, public enterprise worker, private sector employee, casual worker and unemployed. The probit results are given in Table 6.

Table (6): Probit Estimates for Urban Areas, 1994

Probit estimates	Number of obs	=	1330
	LR chi2(18)	=	287.81
	Prob > chi2	=	0.0000
Log likelihood = -746.10646	Pseudo R2	=	0.1617

p0	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
hhsize94	.0721009	.0172424	4.182	0.000	.0383064	.1058954
meanage	-.0437891	.0186167	-2.352	0.019	-.0802771	-.007301
meanage2	.0001705	.000234	1.583	0.113	-.0000882	.0008292
femhh	-.0341466	.0979042	-0.349	0.727	-.2260351	.1577421
agehh	.0264806	.0133251	1.987	0.047	.0003638	.0525974
agehh2	-.0002204	.0001365	-1.614	0.106	-.000488	.0000472
hhprime	-.4762578	.0961755	-4.952	0.000	-.6647583	-.2877573
wifprime	-.4463262	.103384	-4.317	0.000	-.6489551	-.2436974
privbus	-.975227	.3078486	-3.168	0.002	-1.578599	-.3718548
ownacct	-.6083281	.1172309	-5.189	0.000	-.8380964	-.3785599
civilser	-.2460617	.1309669	-1.879	0.060	-.502752	.0106286
publicen	-.5559138	.1654954	-3.359	0.001	-.8802788	-.2315489
privempl	-.8441298	.2175551	-3.880	0.000	-1.27053	-.4177297
casualwo	.2550208	.1643059	1.552	0.121	-.0670129	.5770546
unemploy	.1405296	.1791516	0.784	0.433	-.2106011	.4916502
dependat	.8419948	.2173903	3.873	0.000	.4159176	1.268072
north	-.4087424	.0997901	-4.096	0.000	-.6043275	-.2111574
capitalc	.4218555	.0949848	4.441	0.000	.2356887	.6080223
cons	-.635158	.4901665	-1.296	0.195	-1.595867	.3255507

Source: Mekonnen, Bereket and Abebe (1999).

Household size, probably for the same reasons given above, is positively related with the chance of falling into poverty. An increase in the mean age of households

decreases the chance of falling into poverty and quadratic effects on both sides do not seem to be significant. Age of the household head increases the chance of falling into poverty but the probabilities slightly decrease at low and high age brackets.

If household head or the wife has completed primary education, that will significantly decrease the chance of the household falling into poverty; the coefficients on both variables are highly significant and the value of the coefficients are also relatively high.

As expected, the dependency ratios significantly increase the probability of falling into poverty. Households located in northern cities/town have a lesser chance of falling into poverty. Probably contrary to expectation, those households in regional capitals have a higher chance of falling into poverty.

Most of the coefficients on the occupation of household heads are highly significant indicating that in which sector people work has an important impact on their livelihood. Except casual workers and the unemployed, all the other job classifications are associated with a lower chance of falling into poverty. To further illustrate this point, the next table presents the mean predicted probabilities of falling into poverty by occupation of household heads.

Table (7): Mean Predicted Probabilities of Falling into Poverty by Occupation

Occupation	Probability in the Occupation	Probabilities Outside the Occupation
Private Business Employer	0.20	0.39
Own Account Worker	0.32	0.41
Civil Servant	0.30	0.41
Public Enterprise Worker	0.23	0.40
Private Sector Employee	0.22	0.40
Casual Worker	0.63	0.37
Unemployed	0.52	0.38

Source: Mekonen, Berekt and Abebe (1999).

Except in the cases of casual workers and the unemployed, in all other occupations the probabilities of falling into poverty are lower in the occupation than to that outside; the lowest with private business employers and the highest with casual workers. Interestingly, the probability is higher among casual workers than the unemployed. This may indicate that those who can afford to wait longer being unemployed have a better means of supporting themselves; in other words, their reservation wages are higher. This probably indicates that the unemployed depend on social networks that support them from falling into abject poverty while looking for better jobs.

There are some striking similarities and differences in the results for the urban and rural sites. The age of the household head and probabilities of falling into poverty are similarly related in urban and rural sites; first increasing and then decreasing (inverted-U) which may imply increasing returns to age/experience. Even though most



of the coefficients are not statistically significant, the mean ages of household members seem to operate in opposite directions in rural and urban areas. In the rural areas probability of poverty first increases and then falls with mean age (inverted-U) but just the opposite happens in urban areas. This may partially be explained by the fact that in rural areas people work more in the earlier and latter part of their lives than their counterparts in urban areas; a typical rural person starts productive work younger and works even when relatively old. In urban areas, people retire relatively early (particularly those in formal employment).

Probably, the most striking result is related to the effect of having at least a primary education by the household head and wife. Having at least a primary level of education decreases the chance of falling into poverty in both the rural and urban areas. But both coefficients are statistically insignificant (at 5% level) in rural areas but highly significant (at 1% level) in the urban areas. This has an important implication on the returns to education. It seems that education, at least the type of education offered now in Ethiopia, has a more important positive effect on the welfare of households if they are living in urban areas. This may be related to the fact that education is geared towards urban employment.

### **3. POLICY CHALLENGES OF REDUCING POVERTY IN ETHIOPIA**

We have seen in section 2 that poverty in Ethiopia is widespread by any measure of welfare indicator. Some of the salient feature that stand out are that poverty in Ethiopia affects more or less at equal intensity and depth urban and rural areas. This is true also for the measures of income inequality. Secondly, given the low level of per capita expenditure, a significant majority at the national level fall below the absolute poverty line. In addition, rapid changes in income inequality followed the changes in per capita consumption expenditure.

The overall message of such indicative result is that economic growth is a necessary but not a sufficient condition to effectively reduce poverty in Ethiopia. Growth essentially has to benefit those who are well below the poverty line, if poverty reduction is what drives the policy objectives of the government. As indicated, in a spell of economic recovery between 1994-1997, much of the benefit went to people above the poverty line and in some cases the extremely poor lost in the absolute sense.

Poverty reduction remains a formidable challenge to Ethiopia. Overall, a 1% increase in per capita income is associated with a 1% decline in the level of the headcount ratio. This is in a fortunate situation where income inequality is assumed to remain unchanged over a long time horizon. It is not difficult to compute the number of years an average poor person would have to wait until his income reaches the fixed poverty line to escape poverty. This is calculated from the poverty-gap index which provides the percentage shortfalls of the poor from the poverty line. In a rather optimistic

scenario of a 4% annual increase in the income of the poor would take at least 25 years before he reaches the income level that is sufficient to guarantee basic needs. And, it is hard to imagine how a person could remain an active member of the labour force for such long time given the toll in health condition brought by insufficient calorie levels. Morally, as well as politically, it is impossible to rely on economic growth alone to trickle down to the poor. Thus, poverty reduction is more than securing a sustained growth in per capita GDP.

It has also been reported that poverty is structural and varies significantly with some household attributes. These are, the sex and age of the head of the household, the type of crop planted in rural areas, the occupational categories in urban areas, level of education attained by head of the household, distance from markets, etc.. Like most of Africa, therefore, poverty is a way of life which can only be transformed through changes in the underlying structure of the economy that touches upon the whole range of issues. A work of caution that may have to be made is that some of the determinants of poverty that are outlined in the probit regression model can be equally regarded as effects of poverty itself. The distinction is important in terms of policy implications. For instance, would it be the case that poverty declines significantly in Ethiopia if the country achieves universal primary education soon?

In terms of regional priorities, it is important for policy makers to focus on regions with the highest concentration of poverty, not on those with the highest levels of poverty. This could be illustrated by using the property of additive decomposability of the poverty indices used in the paper. Regions like Oromia, Amhara and Southern regions have the highest share of poverty in Ethiopia because of the size of the population in the regions. Rapid poverty reduction can only be achieved if poverty declined faster in these areas.

## **SUMMARY AND CONCLUSIONS**

In the mid 1990s the percentage of households that could not meet the basic needs for survival fell in the range of 40-45%. This figure underestimates poverty given the low level of per capita expenditure and the implied poverty line. By any account, however, Ethiopia harbours one of the worst poverty conditions in today's world. Poverty is equally widespread in urban and rural areas, complicating the policy options for the government.

Income inequality is reported to be high for such an economy. Rural and urban levels of income inequality are comparable. In a spell of short period of economic recovery, inequality in urban as well as rural areas increased sharply. This scenario suggests the danger that economic growth alone cannot address the problem of poverty in Ethiopia.

The fact that poverty is multifaceted and cuts across the whole spectrum of household



characteristics makes is a condition deeply entrenched in the structure of the entire economy. As such therefore, nothing short of structural transformation can overcome the enormity of the problem in Ethiopia. The current levels as such are suggestive of the implications to social stability and progress in future. There are areas of interventions that can speed up the process of poverty reduction. Investment in human capital, improved economic infrastructures, price incentives, reform in areas of labor market are some of the priorities that may bear directly on the condition of poverty in Ethiopia.

## NOTES

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<sup>1</sup> The construction of social-welfare functions from individual utility functions follows the early traditions as in Dalton (1920) which was translated first into income space by Atkinson (1970) to take later on the interpretation of indirect utility function which is defined over income and prices as a dual to the expenditure function in the process of maximizing utility by individual households.

<sup>2</sup> The Poverty Gap ratio is sometimes expressed in terms of the aggregate gap of the poor as a proportion of GDP or the aggregate income of the poor, when each poor individual receives an income equal to the poverty line.

<sup>3</sup> Sen (1976), pp. 224-226.

<sup>4</sup> See Rodgers and Rodgers (1991) and Chakravarty (1983) for details.

<sup>5</sup> The Lorenz function can be represented by a curve with cumulative share of income or expenditure on the horizontal axis and the cumulative percentage of the population on the vertical axis. Thus, if  $p$  represents the cumulative percentage of population, then,  $L(p)$  offers the corresponding consumption expenditure or income by the poorest  $p\%$ . See Gastwirth (1971) and Kakwani (1980) for mathematical properties of the Lorenz function.

<sup>6</sup> The issue of decomposability and sub-group consistency is an important area in the measurement of poverty. For a detailed discussion, see Hagenaars (1987) and Foster and Shorrocks (1991).

<sup>7</sup> World Health Organisation has constructed an adult equivalence ratio for a range of household size and sex to be used for comparing consumption expenditures.

<sup>8</sup> This section is based on a report by Ministry of Economic Development and External Cooperation (1999).

<sup>9</sup> See Ravallion 1998 for the discussion of this approach.

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Annex Table (1): Decile Distribution of Real Per Capita Expenditure for Ethiopia: Birr Per Month (1994-1997)

	1994			1995			1997		
	National	Rural	Urban	National	Rural	Urban	National	Rural	Urban
10	19	19.10	18.0	16.17	16.15	18.47	22.06	21.89	17.95
10	30.49	30.49	32.67	29.95	30.03	33.60	36.09	36.03	32.59
10	41.44	41.33	44.39	42.97	43.05	45.10	48.47	48.56	45.38
10	52.58	52.82	55.57	56.0	56.22	57.88	60.02	59.91	58.72
10	65.33	65.38	67.54	73.49	73.42	70.17	72.37	72.22	73.41
10	80.15	79.93	80.66	93.83	94.11	84.80	88.50	88.72	89.99
10	97.45	97.54	99.57	120.93	121.21	103.94	114.10	113.77	111.66
10	117.92	117.54	128.29	160.12	160.02	131.72	146.53	146.73	139.88
10	146.60	149.31	169.74	229.68	229.86	178.91	197.9	197.44	195.93
10	254.36	253.94	344.75	613	614.39	371.23	368.26	362.41	448.52
Mean	99.0	90.74	104.11	138.0	143.84	109.58	116.0	114.76	121.4

Source: Household Panel Survey 1994-1997.